<table>
<thead>
<tr>
<th>tcolorbox 4.13</th>
<th></th>
<th>tcolorbox 4.13</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manual for</strong></td>
<td><strong>version</strong></td>
<td><strong>(2018/03/22)</strong></td>
</tr>
<tr>
<td><strong>tcolorbox</strong></td>
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<tr>
<td><strong>Thomas F. Sturm</strong></td>
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<td></td>
</tr>
</tbody>
</table>
Abstract
tcolorbox provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part. The package tcolorbox can be used for the setting of LATEX examples where one part of the box displays the source code and the other part shows the output. Another common use case is the setting of theorems. The package supports saving and reuse of source code and text parts.

1 Introduction

1.1 Installation .................................................. 8
1.2 Loading the Package .......................................... 8
1.3 Libraries ...................................................... 9

2 Quick Reference .................................................. 11

3 Macros for Box Creation ......................................... 12

4 Option Keys ..................................................... 18

4.1 Title ............................................................. 18
4.2 Subtitle ........................................................ 21
4.3 Upper Part .................................................... 22
4.4 Lower Part ..................................................... 24
4.5 Colors and Fonts ............................................... 27
4.6 Text Alignment ................................................ 30
4.7 Geometry ....................................................... 34
  4.7.1 Width ....................................................... 34
  4.7.2 Rules ....................................................... 35
  4.7.3 Arcs ......................................................... 36
  4.7.4 Spacing .................................................... 39
  4.7.5 Size Shortcuts ............................................. 44
  4.7.6 Toggle Left and Right ................................... 46
4.8 Corners ........................................................ 48
4.9 Transparency .................................................. 51
4.10 Height Control ................................................ 53
4.11 Box Content Additions ....................................... 64
4.12 Overlays ...................................................... 71

1 Prof. Dr. Dr. Thomas F. Sturm, Institut für Mathematik und Informatik, Universität der Bundeswehr München, D-85577 Neubiberg, Germany; email: thomas.sturm@unibw.de
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.13 Floating Objects</td>
<td>76</td>
</tr>
<tr>
<td>4.14 Embedding into the Surroundings</td>
<td>78</td>
</tr>
<tr>
<td>4.15 Bounding Box</td>
<td>82</td>
</tr>
<tr>
<td>4.15.1 Shifting Bounding Box Borders</td>
<td>82</td>
</tr>
<tr>
<td>4.15.2 Box Alignment</td>
<td>85</td>
</tr>
<tr>
<td>4.15.3 Toggle Enlargements</td>
<td>86</td>
</tr>
<tr>
<td>4.15.4 Spread Box to Page Borders</td>
<td>87</td>
</tr>
<tr>
<td>4.15.5 Box Extrusion</td>
<td>89</td>
</tr>
<tr>
<td>4.16 Layered Boxes and Every Box Settings</td>
<td>91</td>
</tr>
<tr>
<td>4.17 Capture Mode</td>
<td>94</td>
</tr>
<tr>
<td>4.18 Text Characteristics</td>
<td>95</td>
</tr>
<tr>
<td>4.19 Files</td>
<td>96</td>
</tr>
<tr>
<td>4.20 \tcbox Specials</td>
<td>96</td>
</tr>
<tr>
<td>4.21 Counters, Labels, and References</td>
<td>98</td>
</tr>
<tr>
<td>4.22 Even and Odd Pages</td>
<td>101</td>
</tr>
<tr>
<td>4.23 Externalization</td>
<td>105</td>
</tr>
<tr>
<td>4.24 Miscellaneous</td>
<td>105</td>
</tr>
<tr>
<td>5 Initialization Option Keys</td>
<td>108</td>
</tr>
<tr>
<td>5.1 Numbered Boxes</td>
<td>108</td>
</tr>
<tr>
<td>5.2 Lists of tcolorboxes</td>
<td>115</td>
</tr>
<tr>
<td>6 Side by Side</td>
<td>116</td>
</tr>
<tr>
<td>6.1 Basic Settings</td>
<td>116</td>
</tr>
<tr>
<td>6.2 Advanced Settings from the \xparse Library</td>
<td>122</td>
</tr>
<tr>
<td>7 Saving and Loading of Verbatim Texts</td>
<td>126</td>
</tr>
<tr>
<td>8 Recording</td>
<td>128</td>
</tr>
<tr>
<td>8.1 Macros</td>
<td>128</td>
</tr>
<tr>
<td>8.2 Options</td>
<td>128</td>
</tr>
<tr>
<td>8.3 Example: Exercises</td>
<td>129</td>
</tr>
<tr>
<td>8.4 Example: Solutions</td>
<td>132</td>
</tr>
<tr>
<td>9 Technical Overview and Customization</td>
<td>134</td>
</tr>
<tr>
<td>9.1 Skins and Drawing Engines</td>
<td>134</td>
</tr>
<tr>
<td>9.2 Code Option Keys</td>
<td>138</td>
</tr>
<tr>
<td>9.3 Subskins</td>
<td>141</td>
</tr>
<tr>
<td>9.4 Drawing Scheme</td>
<td>142</td>
</tr>
<tr>
<td>9.5 Useful Properties</td>
<td>146</td>
</tr>
<tr>
<td>10 Library \skins</td>
<td>148</td>
</tr>
<tr>
<td>10.1 Style Option Keys</td>
<td>148</td>
</tr>
<tr>
<td>10.2 Boxed Title Option Keys</td>
<td>155</td>
</tr>
<tr>
<td>10.2.1 Boxed Title Placement</td>
<td>155</td>
</tr>
<tr>
<td>10.2.2 Options for the Boxed Title Placement</td>
<td>157</td>
</tr>
<tr>
<td>10.2.3 Options for the Boxed Title Box</td>
<td>158</td>
</tr>
<tr>
<td>10.3 Watermark Option Keys</td>
<td>165</td>
</tr>
<tr>
<td>10.4 Clip Environments</td>
<td>172</td>
</tr>
<tr>
<td>10.5 Border Line Option Keys</td>
<td>177</td>
</tr>
<tr>
<td>10.6 Shadow Option Keys</td>
<td>182</td>
</tr>
<tr>
<td>10.6.1 Common Shadows and Halos</td>
<td>182</td>
</tr>
</tbody>
</table>

10 Library \skins
10.6.2 Lifted Shadows ................................. 187
10.6.3 Generic Shadows ............................. 188
10.6.4 TikZ Shadows ................................. 191
10.7 TikZ Picture Option Keys ......................... 192
10.8 Underlay Option Keys ............................ 195
10.9 Finish Option Keys ............................... 197
10.10 Hyper Option Keys .............................. 199
10.11 Jigsaw Skin Variants ......................... 201
10.12 Draft Mode .................................. 203
10.13 Skin Family 'standard' ......................... 204
10.14 Skin Family 'enhanced' ......................... 206
10.15 Skin Family 'bicolor' ......................... 219
10.16 Skin Family 'tile' ............................ 224
10.17 Skin Family 'beamer' .......................... 228
10.18 Skin Family 'widget' ......................... 233
10.19 Skin Family 'empty' ............................ 237
10.20 Skin 'spartan' .................................. 247
10.21 Skin 'draft' .................................... 248
10.22 Skin Family 'freelance' ....................... 250

11 Inclusion of Boxed Image Files .......................... 251
11.1 Macros ........................................... 251
11.2 Option Keys ....................................... 254

12 TikZ Image and Picture Fill Extensions; Auxiliary Macros ........................................... 256
12.1 Fill Plain ......................................... 256
12.2 Fill Stretch ....................................... 257
12.3 Fill Overzoom ..................................... 258
12.4 Fill Zoom ......................................... 259
12.5 Fill Shrink ........................................ 260
12.6 Fill Tile ............................................. 261
12.7 Filling Options .................................... 262
12.8 Straightening of the Arcs ....................... 263
12.9 Extracting Node Dimensions ................... 264
12.10 Hyper Nodes ..................................... 264

13 Library vignette ...................................... 265
13.1 Vignette Drawing .................................... 265
13.2 Generic Geometry Settings ....................... 266
13.3 Generic Color and Style Settings ................ 268
13.4 Generic Fading Settings .......................... 270
13.5 Vignette as Underlay ............................. 272
13.6 Vignette as Finish ............................... 274

14 Library raster ........................................... 277
14.1 Concept of Rasters ................................ 277
14.2 Macros of the Library ............................. 279
14.3 Option Keys of the Library ....................... 283
14.4 Adding Styles for Specific Boxes ............... 288
14.5 Combining Columns or Rows ..................... 290
14.6 Rasters inside Rasters ......................... 293
14.6.1 Raster Setup ................................... 293
## 20 Library fitting

20.1 Macros of the Library ............................................ 410
20.2 Option Keys of the Library ..................................... 412

## 21 Library hooks

21.1 Concept of Hooks .................................................. 421
21.2 Box Content Additions ............................................ 423
21.3 Embedding into the Surroundings ................................ 424
21.4 Overlays ............................................................. 425
21.5 Watermarks .......................................................... 427
21.6 Underlays ............................................................ 429
21.7 Finishes ............................................................... 430
21.8 Skin Code ............................................................ 430
21.9 Extras ................................................................. 432

## 22 Library xparse

22.1 Option Keys .......................................................... 433
22.2 Producing \texttt{tcolorbox} Environments and Commands ........ 435
22.3 Producing \texttt{tcbox} Commands .................................. 438
22.4 Producing \texttt{tcblisting} Environments ......................... 441
22.5 Producing \texttt{tcbinputlisting} Commands ....................... 443
22.6 Producing \texttt{tboxfit} Commands ................................ 444

## 23 Library external

23.1 Preparation of a Document for Externalization ............... 446
23.2 Marking Externalization Snippets ................................ 448
23.3 Customization ....................................................... 453
23.4 Troubleshooting and FAQ ......................................... 457

## 24 Library documentation

24.1 Macros of the Library ............................................. 458
24.2 Option Keys of the Library ....................................... 468
24.3 Predefined Colors of the Library ................................ 475

### A Picture Credits

References 477
Index 479
1 Introduction

The package originates from the first edition of my book «\LaTeX – Einführung in das Textsatzsystem» [21] in about 2006. For the \LaTeX examples and tutorials given there, I wanted to have accentuated and colored boxes to display source code and compiled text in combination. Since, in my opinion, this type of boxes is also quite useful to highlight definitions and theorems, I applied them for my lecture notes in mathematics [18–20] as well. With this package, you are invited to apply these boxes for similar projects.

Starting with version 2.00, for all internal calculations \texttt{\LaTeX} [2] expressions are used in replacement of the package \texttt{calc}. The breaking news for version 2.00 is the support for breakable boxes. This new feature allows new applications of the package without affecting the core package too much if you do not need boxes to break automatically. With version 2.20, the often requested 'side by side’ mode for listings has been added. With version 3.00, boxed titles are introduced together with improved customization options for overlays, underlays, finishes, and own code extensions.

Since the first public release in 2011, I received a lot of feedback from all over the world. I want to thank all who wrote me for supporting this package by sending bug reports and ideas for new or better features.

1.1 Installation

Typically, \texttt{tcolorbox} will be installed as part of a major \LaTeX distribution and there is nothing special to do for a user.

If you intend to make a local installation \textit{by hand}, see the \texttt{README} file of the \texttt{tcolorbox} package for some hints. The short story is: you have to install not only \texttt{tcolorbox.sty}, but also all \texttt{*.code.tex} files in the local \texttt{texmf} tree.

1.2 Loading the Package

The base package \texttt{tcolorbox} loads the packages \texttt{pgf} [22], \texttt{verbatim} [17], \texttt{etoolbox} [7], and \texttt{environ} [16]. \texttt{tcolorbox} itself is loaded in the usual manner in the preamble:

\begin{quote}
\texttt{\usepackage{tcolorbox}}
\end{quote}

The package takes option keys in the key-value syntax. Alternatively, you may use these keys later in the preamble with \texttt{\tcbuselibrary{P.9}} (see there). For example, the key to typeset listings is:

\begin{quote}
\texttt{\usepackage[listings]{tcolorbox}}
\end{quote}
1.3 Libraries

The base package \texttt{tcolorbox} is extendable by program libraries. This is done by using option keys while loading the package or inside the preamble by applying the following macro with the same set of keys.

\begin{verbatim}
\tcbuselibrary\{\langle key list\rangle\}
\end{verbatim}

 Loads the libraries given by the \langle key list\rangle.

```
\tcbuselibrary\{listings, theorems\}
```

The following keys are used inside \texttt{\tcbuselibrary} respectively \texttt{\usepackage} without the key tree path /tcb/library/.

\begin{itemize}
  \item \texttt{/tcb/library/skins} \hspace{1cm} \texttt{[skins]}
    Loads the package \texttt{tikz} \cite{22} and provides additional styles (skins) for the appearance of the colored boxes; see Section 10 from page 148.
  \item \texttt{/tcb/library/vignette} \hspace{1cm} \texttt{[vignette]}
    Provides code for more ornamental; see Section 13 from page 265.
  \item \texttt{/tcb/library/raster} \hspace{1cm} \texttt{[raster]}
    Provides additional macros and options for typesetting multiple boxes arranged in a kind of raster; see Section 14 from page 277.
  \item \texttt{/tcb/library/listings} \hspace{1cm} \texttt{[listings]}
    Loads the package \texttt{listings} \cite{6} and provides additional macros for typesetting listings which are described in Section 15 from page 298.
  \item \texttt{/tcb/library/listingsutf8} \hspace{1cm} \texttt{[listingsutf8]}
    Loads the packages \texttt{listings} \cite{6} and \texttt{listingsutf8} \cite{10} for UTF-8 support. This is a variant of the library [listings] and is described in Section 15 from page 298.
  \item \texttt{/tcb/library/minted} \hspace{1cm} \texttt{[minted]}
    Loads the package \texttt{minted} \cite{12} to typeset listings with the \texttt{Pygments} \cite{14} tool, also see Section 15 on page 298.
  \item \texttt{/tcb/library/theorems} \hspace{1cm} \texttt{[theorems]}
    Provides additional macros for typesetting theorems which are described in Section 16 from page 339.
  \item \texttt{/tcb/library/breakable} \hspace{1cm} \texttt{[breakable]}
    Provides support for automatic box breaking from one page to another; see Section 17 on page 363.
  \item \texttt{/tcb/library/magazine} \hspace{1cm} \texttt{[magazine]}
    Provides support for storing broken box parts to be used later or in interchanged order, Section 18 on page 387.
  \item \texttt{/tcb/library/poster} \hspace{1cm} \texttt{[poster]}
    Provides support for creating posters, Section 19 on page 397.
  \item \texttt{/tcb/library/fitting} \hspace{1cm} \texttt{[fitting]}
    Provides support for font size adaption of the box content to the box dimensions; see Section 20 from page 410.
  \item \texttt{/tcb/library/hooks} \hspace{1cm} \texttt{[hooks]}
    Extends several option keys to ’hookable’ keys; see Section 21 from page 421.
\end{itemize}
/tcb/library/xparse
Provides document command production with \texttt{xpars} for \texttt{tcolorbox}; see Section 22 from page 433.

/tcb/library/external
Provides externalization support for stand-alone document snippets, see Section 23 on page 446.

/tcb/library/documentation
Provides additional macros for typesetting \LaTeX{} documentations which are described in Section 24 from page 458.

/tcb/library/many (style, no value)
Loads the libraries \texttt{skins}, \texttt{breakable}, \texttt{raster}, \texttt{hooks}, \texttt{theorems}, \texttt{fitting}, and \texttt{xpars}. Use this shortcut, if you want to use all features of \texttt{tcolorbox} with exception of typesetting listings and using the specialized \texttt{documentation} library.

/tcb/library/most (style, no value)
Loads all libraries except \texttt{minted} and \texttt{documentation}. Use this shortcut, if you want to use all features of \texttt{tcolorbox} with exception of using the \texttt{minted} package and using the specialized \texttt{documentation} library.

/tcb/library/all (style, no value)
Loads all libraries. Use this shortcut only, if you intend to use the \texttt{documentation} library.

Package \texttt{tcolorbox}

Basic Features
Base package

Advanced Features
breakable
eexternal
rfitting
hooks
magazine
poster
raster
skins
theorems
vignette
xpars

Advanced Listings
\texttt{listings}
\texttt{listingsutf8}

Documentation
\texttt{documentation}
3 Macros for Box Creation

\begin{tcolorbox}[(options)]
(environment content)
\end{tcolorbox}

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts. The appearance of this box is controlled by numerous options. In the most simple case the source code

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

creates the following compiled text box:

This is a \textbf{tcolorbox}.

The text content of the box can be divided in an upper and a lower part by the command \texttt{\textbf{tcbower}}. Visually, both parts are separated by a line. For example:

\begin{tcolorbox}
This is another \textbf{tcolorbox}.
\tcbower
Here, you see the lower part of the box.
\end{tcolorbox}

This code gives the following box:

This is another \textbf{tcolorbox}.

Here, you see the lower part of the box.

The \texttt{(options)} control the appearance and several functions of the boxes, see Section 4 on page 18 for the complete list. A quick example is given here:

\begin{tcolorbox}[	extnormal{colback=red!5!white, colframe=red!75!black, title=My nice heading}]
This is another \textbf{tcolorbox}.
\tcbower
Here, you see the lower part of the box.
\end{tcolorbox}

My nice heading

This is another \textbf{tcolorbox}.

Here, you see the lower part of the box.

\texttt{tcbower}

Used inside \textbf{tcolorbox} to separate the upper box part from the optional lower box part. The upper and the lower part are treated as separate functional units. If you only want to draw a line, see \texttt{tcbline} \texttt{P.209}. 

12
\tcbset\{\textit{options}\}\}
Sets options for every following \texttt{tcolorbox} inside the current \LaTeX\ group. By default, this does not apply to nested boxes, see Section 4.16 on page 91. For example, the colors of the boxes may be defined for the whole document by this:

\begin{verbatim}
\tcbset\{colback=red!5!white, colframe=red!75!black\}
\end{verbatim}

\tcbsetforverylayer\{\textit{options}\}\}
Sets options for every following \texttt{tcolorbox} inside the current \LaTeX\ group. In contrast to \texttt{tcbset}, this does also apply to nested boxes, see Section 4.16 on page 91. Technically, the \textit{options} are appended to the default values for every \texttt{tcolorbox} which are applied by \texttt{/tcb/reset}.

You should not use this macro, if you are not completely sure that you want to have the \textit{options} also for boxes in boxes (in boxes in boxes ...).

\begin{verbatim}
\tcbset\{colback=green!10!white\}
\tcbsetforverylayer\{colframe=red!75!black\}
\begin{tcolorbox}[title=All options for this box]
This is a tcolorbox.\par\medskip
\begin{tcolorbox}[title=Nested box]
Note that this nested box has a red frame but no green background.
\end{tcolorbox}
\end{tcolorbox}
\end{verbatim}

All options for this box
This is a tcolorbox.

\begin{tcolorbox}
\begin{tcolorbox}[title=Nested box]
Note that this nested box has a red frame but no green background.
\end{tcolorbox}
\end{tcolorbox}

Options given with \texttt{tcbsetforverylayer} survive a \texttt{reset}.
\texttt{tcolorbox}\{(options)\}\{(box content)\}

Creates a colored box which is fitted to the width of the given \texttt{(box content)}. In principle, most \texttt{(options)} for a \texttt{tcolorbox} can be used for \texttt{tcolorbox} with some restrictions. A \texttt{tcolorbox} cannot have a lower part and cannot be broken.

\begin{center}
\begin{tcolorbox}[colframe=blue!50!black,colback=white,colupper=red!50!black,fonttitle=\textbf{series},nobodyafter,center title]
Text \texttt{tcolorbox[tcbx raise base]Hello World}\hfill
\end{tcolorbox}
\end{center}

\begin{center}
\begin{tcolorbox}[left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=0mm,toptitle=0.5mm,bottomtitle=0.5mm,title=My table]{
\arrayrulecolor{blue!50!black}\renewcommand{\arraystretch}{1.2}\begin{tabular}{r|c|l}
One & Two & Three \\
\hline
Men & Mice & Lions \\
\hline
Upper & Middle & Lower
\end{tabular}}\hfill
\end{tcolorbox}
\end{center}

\begin{center}
\begin{tcolorbox}[colback=blue!85!black,left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=1mm,arc=0mm,boxrule=0.5pt,title=My picture]{\includegraphics[width=5cm]{Basilica_5.png}}
\end{tcolorbox}
\end{center}

% \usepackage{tikz}
\begin{tcolorbox}[colframe=blue!50!black,colback=white,colupper=red!50!black,fonttitle=\textbf{series},center title]
% Fixed width box
\begin{tcolorbox}Hello\World!\end{tcolorbox}
% Fitted width box (like hbox or makebox)
\texttt{tcolorbox}\{Hello\World!\}
% Fitted width box (using a \texttt{tikzname} node)
\texttt{tcolorbox[tikznode]}\{Hello\World!\}
See Section 22.2 on page 435 and Section 22.3 on page 438 for more elaborate methods to create new environments and commands.

\newtcolorbox{(init options)}{(name)}{(number)}{(default)}{(options)}

Creates a new environment \texttt{(name)} based on \texttt{tcolorbox} \cite[p.12]{P.12}. Basically, \texttt{\newtcolorbox} operates like \texttt{\newenvironment}. This means, the new environment \texttt{(name)} optionally takes \texttt{(number)} arguments, where \texttt{(default)} is the default value for the optional first argument. The \texttt{(options)} are given to the underlying \texttt{tcolorbox}. Note that /tcb/savedelimiter \cite[p.26]{P.26} is set to the given \texttt{(name)} automatically. The \texttt{(init options)} allow setting up automatic numbering, see Section 5 from page 108.

\begin{Verbatim}
\newtcolorbox{mybox}{colback=red!5!white,
    colframe=red!75!black}
\begin{mybox}
This is my own box.
\end{mybox}
\end{Verbatim}

\begin{Verbatim}
\newtcolorbox{mybox}{[1]}{colback=red!5!white,
    colframe=red!75!black,fonttitle=\bfseries
    title=#1}
\begin{mybox}{Hello there}
This is my own box with a mandatory title.
\end{mybox}
\end{Verbatim}

\begin{Verbatim}
\newtcolorbox{mybox}{[2]}{colback=red!5!white,
    colframe=red!75!black,fonttitle=\bfseries,
    colbacktitle=red!85!black,enhanced,
    attach boxed title to top center={yshift=-2mm},
    title=#2,#1}
\begin{mybox}{colback=yellow}{Hello there}
This is my own box with a mandatory title
and options.
\end{mybox}
\end{Verbatim}

\textbf{Definition in the preamble:}

\begin{Verbatim}
\newtcolorbox[auto counter,number within=section]{pabox}{[2]}{\%
    colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
    title=Examp.-\thetcbcounter: #2,#1}
\begin{pabox}{colback=yellow}{Hello there}
This is my own box with a mandatory numbered title
and options.
\end{pabox}
\end{Verbatim}

\begin{Verbatim}
\renewtcolorbox{(init options)}{(name)}{(number)}{(default)}{(options)}

Operates like \texttt{\newtcolorbox}, but based on \texttt{\renewenvironment} instead of \texttt{\newenvironment}. An existing environment is redefined.
\newtcbox[{\it init options}]{\langle name \rangle}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}

Creates a new macro \langle name \rangle based on \tcbox \^\cite{P.14}. Basically, \newtcbox operates like \newcommand. The new macro \langle name \rangle optionally takes \langle number \rangle+1 arguments, where \langle default \rangle is the default value for the optional first argument. The \langle options \rangle are given to the underlying \tcbox. The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 108.

\begin{verbatim}
\newtcbox\{mybox\}{colback=red!5!white,  
colframe=red!75!black}
\mybox\{This is my own box.\}

\newtcbox\{mybox\}[1]{colback=red!5!white,  
colframe=red!75!black,title=\bfseries,#1}
\mybox\{Hello there\}\{This is my own box.\}

\newtcbox\{mybox\}[2]{colback=red!5!white,  
colframe=red!75!black,title=\bfseries,#2,#1}
\mybox\{colback=yellow\}\{Hello there\}\%  
\{This is my own box.\}

\newtcbox\{\mybox\}[1][red]{on line,  
arccol=0pt,arccd=0pt,colback=#1!10!white,colframe=#1!50!black,  
boxsep=0pt,left=1pt,right=1pt,top=2pt,bottom=2pt,  
boxrule=0pt,bottomrule=1pt,toprule=1pt}
\newtcbox\{\xmybox\}[1][red]{on line,  
arccol=7pt,colback=#1!10!white,colframe=#1!50!black,  
before upper=\{\textbf{rule}[3pt]{#1}{10pt}\},boxrule=1pt,  
boxsep=0pt,left=6pt,right=6pt,top=2pt,bottom=2pt}
\end{verbatim}

\begin{verbatim}
\begin{verbatim}
The \mybox\{green\}\{quick\} brown \mybox\{fox\} \mybox\{blue\}\{jumps\} over the  
\mybox\{green\}\{lazy\} \mybox\{dog\}. \textbf{par}
\end{verbatim}
\end{verbatim}

The quick brown \textbf{fox} jumps over the lazy dog.

\renewtcbox[\it init options]{{\langle name \rangle}}{{\langle number \rangle}}{\langle default \rangle}{\langle options \rangle}

Operates like \newtcbox, but based on \renewcommand instead of \newcommand. An existing macro is redefined.

16
An existing environment \langle name \rangle is redefined to be boxed inside a \texttt{tcolorbox} with the given \langle options \rangle.

\begin{tcolorboxenvironment}{myitemize}{blanker, before skip=6pt, after skip=6pt, borderline west={3mm}{0pt}{red}}

Some text.
\begin{myitemize}
\item Alpha
\item Beta
\item Gamma
\end{myitemize}
More text.

Some text.
\begin{myitemize}
\item Alpha
\item Beta
\item Gamma
\end{myitemize}
More text.

See further examples in Section 16.4 on page 362.
4 Option Keys

For the \textit{options} in \texttt{tcolorbox} \cite{p.12} respectively \texttt{tcbset} \cite{p.13} the following \texttt{pgf} keys can be applied. The key tree path /tcb/ is not to be used inside these macros. It is easy to add your own style keys using the syntax for \texttt{pgf} keys, see \cite{21, 22} or the examples starting from page 326.

4.1 Title

\texttt{/tcb/title=⟨text⟩} \hspace{1cm} \textit{(no default, initially empty)}

Creates a heading line with \textit{⟨text⟩} as content.

\begin{tcolorbox}[title=My heading line]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\medskip

\texttt{/tcb/notitle} \hspace{1cm} \textit{(no value, initially set)}

Removes the title line if set before.

\texttt{/tcb/adjusted title=⟨text⟩} \hspace{1cm} \textit{(style, no default, initially unset)}

Creates a heading line with \textit{⟨text⟩} as content. The minimal height of this line is adjusted to fit the text given by \texttt{/tcb/adjust text}. This option makes sense for single line headings if boxes are set side by side with equal height. Note that it is very easy to trick this adjustment.

\begin{tcolorbox}[colback=White,arc=0mm,width=(\textwidth-4pt)/4,equal height group=AT,before=,after=\hfill,fonttitle=\bfseries]
\texttt{the\ following\ titles\ are\ not\ adjusted:\}\begin{tcolorbox}[title=\texttt{xxx},colframe=red!75!black]
Some content.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}[colback=White,arc=0mm,width=(\textwidth-4pt)/4,equal height group=AT,before=,after=\hfill,fonttitle=\bfseries]
\texttt{The\ following\ titles\ are\ not\ adjusted:\}\begin{tcolorbox}[adjusted title=\texttt{xxx},colframe=blue!75!black]
Some content.
\end{tcolorbox}
\end{tcolorbox}

\medskip

\texttt{/tcb/adjust text=⟨text⟩} \hspace{1cm} \textit{(no default, initially Äpgjy)}

This sets the reference text for \texttt{/tcb/adjusted title}. If your texts never exceed ‘Äpgjy’ in depth and height you don’t need to care about this option.
/tcb/squeezed title=⟨text⟩  (style, no default, initially unset)

Creates a single heading line with ⟨text⟩ as content. If the ⟨text⟩ is longer than the available space, the text is squeezed to fit into the available space.

```
% \tcbuselibrary{raster}
\begin{tcbitemize}[raster columns=3,raster equal height,  
colframe=red!75!black,colback=red!5!white,fonttitle=bfseries]
 \tcbitem{squeezed title={Short title}}
 First box
 \tcbitem{squeezed title={This is a very very long title}}
 Second box
 \tcbitem{squeezed title={This title is clearly to long for this application}}
 Third box
\end{tcbitemize}
```

<table>
<thead>
<tr>
<th>Short title</th>
<th>This is a very very long title</th>
<th>This title is clearly to long for this application</th>
</tr>
</thead>
<tbody>
<tr>
<td>First box</td>
<td>Second box</td>
<td>Third box</td>
</tr>
</tbody>
</table>

/tcb/squeezed title*=⟨text⟩  (style, no default, initially unset)

This is a combination of /tcb/adjusted title^P.18 and /tcb/squeezed title.

```
% \tcbuselibrary{raster}
\begin{tcbitemize}[raster columns=3,raster equal height,  
colframe=red!75!black,colback=red!5!white,fonttitle=bfseries]
 \tcbitem{squeezed title*={Short title}}
 First box
 \tcbitem{squeezed title*={This is a very very long title}}
 Second box
 \tcbitem{squeezed title*= {This title is clearly to long for this application}}
 Third box
\end{tcbitemize}
```

<table>
<thead>
<tr>
<th>Short title</th>
<th>This is a very very long title</th>
<th>This title is clearly to long for this application</th>
</tr>
</thead>
<tbody>
<tr>
<td>First box</td>
<td>Second box</td>
<td>Third box</td>
</tr>
</tbody>
</table>
/tcb/detach title (no value)
Detaches the title from its normal position. The text of the title is stored into \tcbtitletext and the formatted title is available by \tcbttitle. The main application is to move the title from its usual place to another one.

\begin{mybox}{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[detach title, before upper={\tcbtitle \quad}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[detach title, after upper={\par\hfill \tcbtitle}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

My title
This is a \textbf{tcolorbox}.

My title
This is a \textbf{tcolorbox}.

My title
This is a \textbf{tcolorbox}.

More title options are documented in Section 4.11 on page 64 and Section 10.2 on page 155.

/tcb/attach title (no value)
Attaches the title to its normal position. This option is used to reverse /tcb/detach title.

/u 2015-07-08
/tcb/attach title to upper=(text) (style, default empty, initially unset)
Attaches the title to the begin of the upper part of the box content. The optional \textit{text} is set between the formatted title and the box content.

\begin{mybox}[attach title to upper={---}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[attach title to upper, after title={:}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

My title — This is a \textbf{tcolorbox}.

My title: This is a \textbf{tcolorbox}.
4.2 Subtitle

Inside the box content, one or more subtitles can be added. In general, a subtitle is a further \tcolorbox \(^*\text{P.12}\) which inherits some color and geometry options from the enclosing box. It may be customized just like any other \tcolorbox \(^*\text{P.12}\).

\textbf{N} 2014-10-10
\texttt{\textbackslash tcbsubtitle\{}\langle options\rangle\}\{\langle text\rangle\}

Used inside a \tcolorbox \(^*\text{P.12}\) to add a subtitle box with the given \textit{text}. This is an independent \tcolorbox \(^*\text{P.12}\) which is formatted by several inherited properties of the enclosing box, by further settings from /tcb.subtitle style, and by the given \textit{options}.

\begin{tcolorbox}
[title=My title, 
colback=red!5!white, 
colframe=red!75!black, 
fonttitle=\bfseries] 
This is a \textbf{tcolorbox}.
\tcbsubtitle[before skip=\baselineskip]\% 
{My subtitle} 
Further text.
\end{tcolorbox}

\begin{tcolorbox}
[title=My title, 
colback=red!5!white, 
colframe=red!75!black, 
colbacktitle=yellow!50!red, 
coltitle=red!25!black, 
fonttitle=\bfseries] 
This is a \textbf{tcolorbox}.
\tcbsubtitle[before skip=\baselineskip]\% 
{My subtitle} 
Further text.
\end{tcolorbox}

\textbf{N} 2014-10-10
/tcb/subtitle style=\langle options\rangle

(no default, initially empty)

Adds \tcolorbox \langle options\rangle to the settings for \texttt{\textbackslash tcbsubtitle}.
4.3 Upper Part

The text content of a \texttt{tcolorbox} may be parted into a mandatory upper part and an optional lower part. These parts are separated by \texttt{tcblower}. If there is no \texttt{tcblower} present, there is no lower part and the upper part forms the complete text content.

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\bigskip

\begin{tcolorbox}[upperbox=invisible,colback=white]
\tcblower
This is the lower part.
\end{tcolorbox}

\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\section*{N 2015-01-06 /tcb/upperbox=(mode) (no default, initially visible)}

Controls the treatment of the upper part of the box. If there is no lower part, this is the complete text content. Feasible values for \textit{mode} are:

- \texttt{visible}: usual type setting of the upper part,
- \texttt{invisible}: empty space instead of the upper part contents.

\begin{verbatim}
\begin{tcolorbox}[upperbox=visible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}
\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\tcblower
This is the lower part.
\end{tcolorbox}
\end{verbatim}

\section*{N 2015-01-06 /tcb/visible (style, no value)}

Shortcut for setting /tcb/upperbox and /tcb/lowerbox to be \texttt{visible}.

\section*{N 2015-01-06 /tcb/invisible (style, no value)}

Shortcut for setting /tcb/upperbox and /tcb/lowerbox to be \texttt{invisible}.

\begin{verbatim}
\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}
\end{verbatim}
/tcb/saveto={file name} \hspace{1cm} (no default, initially empty)

Saves the content of the box into a file for an optional later usage. This is the counterpart of \(\texttt{/tcb/savelowerto}^{\text{P.24}}\), but is saves not only the upper part but the whole content. If a lower part is present, it is also saved including \(\texttt{\texttt{tcblower}}^{\text{P.12}}\).

! This option cannot be combined with \(\texttt{/tcb/savelowerto}^{\text{P.24}}\).

\begin{tcolorbox}[invisible,saveto={\jobname_mysave1.tex},colback=white]
This is a \textbf{tcolorbox} which seems to be empty. The content is saved for later usage.
\end{tcolorbox}

Now, we load the saved text:\
\input{\jobname_mysave1.tex}

This is a \textbf{tcolorbox} which seems to be empty. The content is saved for later usage.

\begin{tcolorbox}[saveto={\jobname_mysave2.tex}]
This is a \texttt{tcolorbox}.
\texttt{tcblower}
This is the lower part.
\end{tcolorbox}

Now, we load the saved text:
\begin{tcolorbox}[colframe=red,colback=red!10,\
coltitle=black,colbacktitle=red!20,sidebyside,\
title=Here we see the saved content including the lower part]\
\input{\jobname_mysave2.tex}\
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is the lower part.

Now, we load the saved text:
Here we see the saved content including the lower part
This is a \textbf{tcolorbox}.
This is the lower part.
4.4 Lower Part

/tcb/lowerbox=\langle mode \rangle \quad \text{(no default, initially visible)}

Controls the treatment of the lower part of the box. Feasible values for \langle mode \rangle are:

- \textbf{visible}: usual type setting of the lower part,
- \textbf{invisible}: empty space instead of the lower part contents,
- \textbf{ignored}: the lower part is not used (here).

The last two values are usually applied in connection with \verb+savelowerto+.

\begin{tcolorbox}[lowerbox=invisible,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part \textbf{(but invisible)}.
\end{tcolorbox}

\begin{tcolorbox}[lowerbox=ignored,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part \textbf{(but ignored)}.
\end{tcolorbox}

/U 2014-11-28

/tcb/savelowerto=\langle file name \rangle \quad \text{(no default, initially empty)}

Saves the content of the lower part into a file for an optional later usage.

\begin{tcolorbox}[lowerbox=invisible,savelowerto=\jobname_bspsave.tex,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part which may be quite complex: 
$f(x)=\frac{1+x^2}{1-x^2}$.
\end{tcolorbox}

Now, we load the saved text:\\ 
\input{\jobname_bspsave.tex}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Now, we load the saved text:

This is the lower part which may be quite complex: $f(x) = \frac{1+x^2}{1-x^2}$. 

24
If set to `true`, the lower part is visually separated from the upper part. It depends on the chosen skin how the visualization of the separation is done.

```
\begin{tcbraster}
% \tcbuselibrary{skins,raster}
\begin{tcolorbox}[title=Lower separated]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}
%
\begin{tcolorbox}[title=Lower not separated,lower separated=false]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}
%
\begin{tcolorbox}[sidebyside,title=Lower separated]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}
%
\begin{tcolorbox}[sidebyside,title=Lower not separated,lower separated=false]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}
%
\begin{tcolorbox}[beamer,title=Lower separated]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}
%
\begin{tcolorbox}[beamer,title=Lower not separated,lower separated=false]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}
%
\end{tcbraster}
```
/tcb/savedelimiter=(name)              (no default, initially tcolorbox)
Used in connection with new environment definitions which extend tcolorbox and use
or allow the option savelowerto. To catch the end of the new box environment
⟨name⟩ has to be the name of this environment. Additionally, the environment defini-
tion has to use \tcolorbox instead of \begin{tcolorbox} and \end{tcolorbox} instead of
\end{tcolorbox}.

\newenvironment{mybox}[1]{%  
  \tcolorbox[  
    savedelimiter=mybox,  
    savelowerto=\jobname_bspsave2.tex,lowerbox=ignored,  
    colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,  
    title=#1]%  
}{\endtcolorbox}

\begin{mybox}{My Example}  
Upper part.  
\tcblower  
Saved lower part!  
\end{mybox}

Now, the saved part is used:  
\begin{tcolorbox}[colback=green!5]  
\input{\jobname_bspsave2.tex}  
\end{tcolorbox}  
My Example  
Upper part.  
Now, the saved part is used:  
Saved lower part!

The savedelimiter is used implicitly with \texttt{\newtcolorbox}^\textit{P.15} which allows a more
convenient usage:

\newtcolorbox{mybox}[1]{%  
  savelowerto=\jobname_bspsave2.tex,lowerbox=ignored,  
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,  
  title=#1}%  
\begin{mybox}{My Example}  
Upper part.  
\tcblower  
Saved lower part!  
\end{mybox}

Now, the saved part is used:  
\begin{tcolorbox}[colback=green!5]  
\input{\jobname_bspsave2.tex}  
\end{tcolorbox}  
My Example  
Upper part.  
Now, the saved part is used:  
Saved lower part!
4.5 Colors and Fonts

/tcb/colframe=⟨color⟩  
(no default, initially black!75!white)
Sets the frame ⟨color⟩ of the box.

\begin{tcolorbox}[colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/colback=⟨color⟩  
(no default, initially black!5!white)
Sets the background ⟨color⟩ of the box.

\begin{tcolorbox}[colback=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/title filled=true|false  
(default true, initially false)
Switches the drawing of the title background according to the given value. This option is set to true automatically by /tcb/colbacktitle, /tcb/opacitybacktitle P.51, and /tcb/title style P.151, and /tcb/title code P.140.

\begin{tcolorbox}[title=My title, title filled]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[title=My title, title filled=false]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/colbacktitle=⟨color⟩  
(no default, initially black!50!white)
Sets the background ⟨color⟩ of the title area of the box.

\begin{tcolorbox}[colbacktitle=red!50!white, title=My title, coltitle=black, fonttitle=\bfseries]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[colupper=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[collower=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[coltext=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[coltitle=red!75!black, colbacktitle=black!10!white, title=Test]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Test

This is a \textbf{tcolorbox}. 
/tcb/fontupper=⟨text⟩  (no default, initially empty)
Sets ⟨text⟩ before the content of the upper part (e.g. font settings).

\begin{tcolorbox}[fontupper=Hello! \sffamily]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Hello! This is a \textbf{tcolorbox}.

/tcb/fontlower=⟨text⟩  (no default, initially empty)
Sets ⟨text⟩ before the content of the lower part (e.g. font settings).

\begin{tcolorbox}[fontlower=\sffamily\bfseries]
\tcblower
This is the lower part.
\end{tcolorbox}

This is a tcolorbox.

This is the lower part.

/tcb/fonttitle=⟨text⟩  (no default, initially empty)
Sets ⟨text⟩ before the content of the title text (e.g. font settings).

\begin{tcolorbox}[fonttitle=\sffamily\bfseries\large,title=Hello]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Hello

This is a tcolorbox.

More color options are provided by using skins documented in Section 10 from page 148.
### 4.6 Text Alignment

**/tcb/halign=(alignment)**

(no default, initially **justify**)

If there is no lower part, **halign** determines the horizontal ⟨**alignment**⟩ of the text content. Otherwise, **halign** determines the horizontal ⟨**alignment**⟩ of the upper part of the box only. The feasible values for ⟨**alignment**⟩ are more or less identical to the corresponding \texttt{/tikz/align} settings, even if the implementation differs.

- **justify**: usual left and right justified type setting.
- **left**: left border justification in analogy to plain \TeX.
- **flush left**: left border justification with \texttt{\raggedright} of \LaTeX.
- **right**: right border justification in analogy to plain \TeX.
- **flush right**: right border justification with \texttt{\raggedleft} of \LaTeX.
- **center**: centering in analogy to plain \TeX.
- **flush center**: centering with \texttt{\centering} of \LaTeX.

The differences between the flush and non-flush version are explained in detail in the \texttt{TikZ} manual [22]. The short story is that the non-flush versions will often look more balanced but with more hyphenations.

```latex
\tcset{colback=red!5!white,colframe=red!75!black,size=small,fonttitle=\bfseries,width=3.5cm,box align=top,nobeforeafter}
\begin{tcolorbox} [adjusted title=flush center,halign=flush center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox} [adjusted title=flush left,halign=flush left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox} [adjusted title=flush right,halign=flush right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox} [adjusted title=center,halign=center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox} [adjusted title=left,halign=left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox} [adjusted title=right,halign upper=right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
```

flush center

This is a demonstration text for showing how line breaking works.

flush left

This is a demonstration text for showing how line breaking works.

flush right

This is a demonstration text for showing how line breaking works.

center

This is a demonstration text for showing how line breaking works.

left

This is a demonstration text for showing how line breaking works.

right

This is a demonstration text for showing how line breaking works.

Alias for **/tcb/halign**.
/tcb/halign lower=⟨alignment⟩  

(halign lower) determines the horizontal ⟨alignment⟩ of the lower part of the box. The feasible values for ⟨alignment⟩ are the same as for /tcb/halign - P.30.

\begin{tcbraster}
\begin{tcolorbox}[adjusted title=flush center,halign lower=flush center]
  Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign lower=flush left]
  Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign lower=flush right]
  Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign lower=center]
  Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign lower=left]
  Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign lower=right]
  Upper part. \tcblower Lower part.
\end{tcolorbox}
\end{tcbraster}
\begin{tcbraster}[raster columns=3,fonttitle=\bfseries,\colorback=red!5!white,\colorframe=red!75!black]
\begin{tcolorbox}[adjusted title=flush center,halign title=flush center]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign title=flush left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign title=flush right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign title=center]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign title=left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign title=right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcbraster}
The vertical alignment settings are only relevant for boxes which are larger than their natural height, see Section 4.10 on page 53.

/\textcbvalign\{alignment\} (no default, initially top)

If the height of a tcolorbox is not the natural height, valign determines the vertical (alignment) of the upper part. Feasible values are

- top: Anchor text at top.
- center: Anchor text at center.
- bottom: Anchor text at bottom.
- scale: Scale text vertically to fit into the available space. This is brutal and may not look very good. Consider Section 20 on page 410 alternatively.
- scale*: Like scale, but scaling is bounded by /\textcbvalign scale limit.

For a box with natural height, these settings are meaningless.

\textcbset{width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm}
\foreach \myalign in {top,center,bottom,scale}{\begin{tcolorbox}\[valign=\myalign\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}}

/\textcbvalign upper\{alignment\} (no default, initially top)

Alias for /\textcbvalign.

/\textcbvalign lower\{alignment\} (no default, initially top)

This key has the same meaning for the lower part as valign for the upper part, i.e., it determines the vertical (alignment) of the lower part with feasible values top, center, bottom, scale, and scale*.

\textcbvalign scale limit\{real number\} (no default, initially 1.1)

Sets an upper scale limit for the scale* setting in /\textcbvalign and /\textcbvalign lower. Note that this value is not reset by /\textcb/reset. So, changes also apply to embedded boxes.

Also see /\textcb/sidebyside align\sup{P.117} for alignment settings when upper part and lower part are set side-by-side.
4.7 Geometry

4.7.1 Width

/\texttt{tcb/width}=(\texttt{length}) \hspace*{1em} \text{(no default, initially \texttt{\textbackslash linewidth})}

Sets the total width of the colored box to \texttt{\langle length\rangle}. See also /\texttt{tcb/height} \texttt{\texttt{\textendash}P.53}.

\begin{tcolorbox}
\texttt{\textbackslash tcbset\{colback=red!5!white,\textsl{colframe=red}!75!black\}}
\begin{tcolorbox}
\texttt{\textbackslash \textbf{\textbackslash begin\{tcolorbox\}\texttt{[width=\textbackslash linewidth/2]}\texttt{\textbackslash \textsl{This is a \texttt{\textbackslash textbf{tcolorbox}}.}}\texttt{\textbackslash \textsl{\textbackslash end\{tcolorbox\}}}}
\end{tcolorbox}
\end{tcolorbox}

This is a \texttt{tcolorbox}.

/\texttt{tcb/text width}=(\texttt{length}) \hspace*{1em} \text{(style, no default)}

Sets the text width of the upper part to \texttt{\langle length\rangle}. See also /\texttt{tcb/text height} \texttt{\texttt{\textendash}P.54}.

\begin{tcolorbox}
\texttt{\textbackslash tcbset\{colback=red!5!white,\textsl{colframe=red}!75!black\}}
\begin{tcolorbox}
\texttt{\textbackslash \textbf{\textbackslash begin\{tcolorbox\}\texttt{[text width=4cm]}\texttt{\textbackslash \textsl{This is a \texttt{\textbackslash textbf{tcolorbox}} where the text has a width of 4cm.}}\texttt{\textbackslash \textsl{\textbackslash end\{tcolorbox\}}}}
\end{tcolorbox}
\end{tcolorbox}

This is a \texttt{tcolorbox} where the text has a width of 4cm.

/\texttt{tcb/add to width}=(\texttt{length}) \hspace*{1em} \text{(style, no default)}

Adds \texttt{\langle length\rangle} to the current total width of the colored box.

\begin{tcolorbox}
\texttt{\textbackslash tcbset\{width=4cm,\textsl{colback=red}!5!white,\textsl{colframe=red}!75!black\}}
\begin{tcolorbox}
\texttt{\textbackslash \textbf{\textbackslash begin\{tcolorbox\}\texttt{}}\texttt{\texttt{\textbackslash \textbf{This is a \texttt{\textbackslash textbf{tcolorbox}}.}}\texttt{\texttt{\textbackslash \texttt{\textbackslash end\{tcolorbox\}}}}}
\end{tcolorbox}
\begin{tcolorbox}
\texttt{\textbackslash \textbf{\textbackslash begin\{tcolorbox\}\texttt{[add to width=1cm]}\texttt{\textbackslash \textsl{This is a \texttt{\textbackslash textbf{tcolorbox}}.}}\texttt{\textbackslash \textsl{\textbackslash end\{tcolorbox\}}}}
\end{tcolorbox}
\end{tcolorbox}

This is a \texttt{tcolorbox}.

This is a \texttt{tcolorbox}.

See Section 4.10 on page 53 for setting fixed height values.
4.7.2 Rules

/tcb/toprule=$\langle$\text{length}$\rangle$ (no default, initially 0.5mm)
Sets the line width of the top rule to $\langle$\text{length}$\rangle$.

\begin{tcolorbox}
\{colback=red!5!white, colframe=red!75!black\}
\begin{tcolorbox}[toprule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

This is a tcolorbox.

/tcb/bottomrule=$\langle$\text{length}$\rangle$ (no default, initially 0.5mm)
Sets the line width of the bottom rule to $\langle$\text{length}$\rangle$.

\begin{tcolorbox}
\{colback=red!5!white, colframe=red!75!black\}
\begin{tcolorbox}[bottomrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

This is a tcolorbox.

/tcb/leftrule=$\langle$\text{length}$\rangle$ (no default, initially 0.5mm)
Sets the line width of the left rule to $\langle$\text{length}$\rangle$.

\begin{tcolorbox}
\{colback=red!5!white, colframe=red!75!black\}
\begin{tcolorbox}[leftrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

This is a tcolorbox.

/tcb/rightrule=$\langle$\text{length}$\rangle$ (no default, initially 0.5mm)
Sets the line width of the right rule to $\langle$\text{length}$\rangle$.

\begin{tcolorbox}
\{colback=red!5!white, colframe=red!75!black\}
\begin{tcolorbox}[rightrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

This is a tcolorbox.
\texttt{/tcb/titlerule=(length)} \hspace{1cm} (no default, initially 0.5mm)
Sets the line width of the rule below the title to \texttt{(length)}.

\begin{tcolorbox}[titlerule=3mm,title=This is the title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/boxrule=(length)} \hspace{1cm} (style, no default, initially 0.5mm)
Sets all rules of the frame to \texttt{(length)}, i.e. /tcb/toprule \texttt{P.35}, /tcb/bottomrule \texttt{P.35}, /tcb/leftrule \texttt{P.35}, /tcb/rightrule \texttt{P.35}, and /tcb/titlerule.

\begin{tcolorbox}[boxrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

More options for drawing a \texttt{/tcb/borderline} \texttt{P.177} are provided by using skins documented in Section 10 from page 148.

4.7.3 Arcs
\texttt{/tcb/arc=(length)} \hspace{1cm} (no default, initially 1mm)
Sets the inner radius of the four frame arcs to \texttt{(length)}.

\begin{tcolorbox}[arc=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[arc=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
/tcb/circular arc

Sets /tcb/arc *P.36* to match the half of the inner width of the colored box. If width and height of the box are identical, this gives a circle.

If the height of the box is smaller than the width, the result will look quite ugly.

\begin{tcolorbox}
[width=3cm, 
colback=red!5!white, 
colframe=red!75!black, 
valign=\centering, 
square, circular arc]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/bean arc

Sets /tcb/arc *P.36* to match the smaller value of the half of the inner width and of the inner height of the colored box.

This only works for a fixed /tcb/height *P.53*. Also, /tcb/bean arc must be used after width and height are set by option keys.

\begin{tcolorbox}
[size=fbox, boxrule=0.5mm, 
colback=red!5!white, 
colframe=red!75!black, 
valign=\centering]
\begin{tcolorbox}[width=3cm, height=2cm, 
bean arc]
Box A
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
[size=fbox, boxrule=0.5mm, 
colback=red!5!white, 
colframe=red!75!black, 
valign=\centering]
\begin{tcolorbox}[width=2cm, height=3cm, 
bean arc]
Box B
\end{tcolorbox}
\end{tcolorbox}

/tcb/octogon arc

Sets /tcb/arc *P.36* to match $\frac{1}{2+\sqrt{2}}$ of the inner width of the colored box. If width and height of the box are identical, the interior is a regular octogon.

\begin{tcolorbox}
[enhanced, 
size=minimal, auto outer arc, 
width=2.1cm, octogon arc, 
colback=red, colframe=white, colupper=white, 
fontupper=\footnotesize \bfseries \sffamily, 
halign=\centering, valign=\centering, 
square, arc is angular, 
borderline={0.2mm}{-1mm}{red}]
STOP
\end{tcolorbox}
Using this option applies a patch which straightens the corners arcs of the boxes. The little arcs are replaced by little straight lines.

This patch is considered as an experimental feature. It changes some of the original Ti\textup{K}Z code. This change may break with future updates of Ti\textup{K}Z.

\begin{tcolorbox}
\[\texttt{arc is angular}\]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
\[\texttt{arc is curved}\]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

This option resets the patch from \texttt{/tcb/arc is angular}. The original Ti\textup{K}Z code is activated.

\texttt{/tcb/outer arc\(=\langle length\rangle\)} (no default, initially unset)
Sets the outer radius of the four frame arcs to \langle length\rangle.

\begin{tcolorbox}
\[\texttt{arc=4mm, outer arc=1mm}\]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/auto outer arc} (no value, initially set)
Sets the outer radius of the four frame arcs automatically in dependency of the inner radius given by \texttt{/tcb/arc}.\textsuperscript{P.36}.
4.7.4 Spacing

/tcb/boxsep=/langle length \rangle

Sets a common padding of \langle length \rangle between the text content and the frame of the box. This value is added to the key values of left, right, top, bottom, and middle at the appropriate places.

\begin{tcolorbox}[boxsep=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[boxsep=5mm,draft]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}
\tcbset{colback=red!5!white,colframe=red!75!black,width=(\linewidth-4mm)/2, before=,after=\hfill}
\begin{tcolorbox}[boxsep=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[boxsep=5mm,draft]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}[left=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is some text.

\begin{tcolorbox}[grow to left by=5mm,left*=0mm, enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is some text.

\begin{tcolorbox}
\tcbset{colback=red!5!white,colframe=red!75!black}
This is some text.
\begin{tcolorbox}[left=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}[left*=0mm]
This is some text.
\end{tcolorbox}

This is some text.
/tcb/lefttitle=(length) (no default, initially 4mm)
Sets the left space between title text and frame (additional to boxsep).

\tcbset{colback=red!5!white, colframe=red!75!black}
\begin{tcolorbox}[lefttitle=3cm, title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My Title
This is a tcolorbox.

/tcb/leftupper=(length) (no default, initially 4mm)
Sets the left space between upper text and frame (additional to boxsep).

\tcbset{colback=red!5!white, colframe=red!75!black}
\begin{tcolorbox}[leftupper=3cm, title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My Title
This is a tcolorbox.

/tcb/leftlower=(length) (no default, initially 4mm)
Sets the left space between lower text and frame (additional to boxsep).

\tcbset{colback=red!5!white, colframe=red!75!black}
\begin{tcolorbox}[leftlower=3cm]
\tcblower
This is the lower part.
\end{tcolorbox}

This is a tcolorbox.
This is the lower part.

/tcb/right=(length) (style, no default, initially 4mm)
Sets the right space between all text parts and frame (additional to boxsep). This is an abbreviation for setting righttitle, rightupper, and rightlower to the same value.

\tcbset{colback=red!5!white, colframe=red!75!black}
\begin{tcolorbox}[width=5cm, right=2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.
/tcb/right*=\langle length \rangle 
(style, no default)
Sets /tcb/right such that \langle length \rangle is the distance between the right bounding box and the text parts.

```
\tcbset{colback=red!5!white,colframe=red!75!black}
\flushright This is some text.
\begin{tcolorbox}[grow to right by=5mm,right*=0mm,
ahalign=right,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

/tcb/righttitle=\langle length \rangle 
(no default, initially 4mm)
Sets the right space between title text and frame (additional to boxsep).

```
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=5cm,righttitle=2cm,title=My very long title text]
This is a \textbf{tcolorbox} with standard upper box dimensions.
\end{tcolorbox}
```

/tcb/rightupper=\langle length \rangle 
(no default, initially 4mm)
Sets the right space between upper text and frame (additional to boxsep).

```
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=5cm,rightupper=2cm,title=My very long title text]
This is a \textbf{tcolorbox} with compressed upper box dimensions.
\end{tcolorbox}
```
/tcb/rightlower\=(length)  \hspace{1cm} \text{(no default, initially 4mm)}
Sets the right space between lower text and frame (additional to boxsep).

\begin{tcolorbox}[width=5cm,rightlower=2cm]
This is a \textbf{tcolorbox} with standard upper box dimensions.
\tcblower
This is the lower part with large space at right.
\end{tcolorbox}

This is a \textbf{tcolorbox} with standard upper box dimensions.
This is the lower part with large space at right.

/tcb/top\=(length)  \hspace{1cm} \text{(no default, initially 2mm)}
Sets the top space between text and frame (additional to boxsep).

\begin{tcolorbox}[top=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/toptitle\=(length)  \hspace{1cm} \text{(no default, initially 0mm)}
Sets the top space between title and frame (additional to boxsep).

\begin{tcolorbox}[toptitle=3mm,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}. 
/tcb/bottom = \langle length \rangle  
(no default, initially 2mm)
Sets the bottom space between text and frame (additional to boxsep).

\begin{tcolorbox}[bottom=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

\tcset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[bottomtitle=3mm,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

/tcb/bottomtitle = \langle length \rangle  
(no default, initially 0mm)
Sets the bottom space between title and frame (additional to boxsep).

\begin{tcolorbox}[middle=0mm,boxsep=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/middle = \langle length \rangle  
(no default, initially 2mm)
Sets the space between upper and lower text to the separation line (additional to boxsep).

\begin{tcolorbox}[middle=0mm,boxsep=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.
4.7.5 Size Shortcuts

\texttt{/tcb/size=\textit{name}} \hspace{1em} \textit{(no default, initially normal)}

Sets all geometry keys with exception of \texttt{/tcb/width} \[^{P.34}\] to predefined length values. For \textit{name}, the following values are feasible:

- \textbf{normal}: normal sized boxes e.g. of width \texttt{\textbackslash linewidth}.
- \textbf{title}: title line sized boxes.
- \textbf{small}: small boxes e.g. for keyword highlighting.
- \textbf{fbox}: identical to the standard \texttt{\textbackslash fbox}.
- \textbf{tight}: no padding space at all.
- \textbf{minimal}: no padding space, no box rules.

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black}
\foreach \s in {normal,title,small,fbox,tight,minimal} {
  \tcbox[size=\s,on line]{\s}
}
\foreach \s in {normal,title,small,fbox,tight,minimal} {
  \tcbox[size=\s,on line,title=Test]{\s}
}
\foreach \s in {normal,title,small,fbox,tight,minimal} {
  \begin{tcolorbox}[size=\s,on line,title=Test,width=2.2cm]
    \s \tcblower lower\end{tcolorbox}
}
\end{verbatim}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|}
\hline
 & \textbf{normal} & \textbf{title} & \textbf{small} & \textbf{fbox} & \textbf{tight} & \textbf{minimal} \\
\hline\hline
\textbf{boxrule} & 0.5mm & 0.4mm & 0.3mm & 0.4pt & 0.4pt & 0.0pt \\
\textbf{boxsep} & 1.0mm & 1.0mm & 1.0mm & 3.0pt & 0.0pt & 0.0pt \\
\textbf{left} & 4.0mm & 2.0mm & 1.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{right} & 4.0mm & 2.0mm & 1.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{top} & 2.0mm & 0.25mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{bottom} & 2.0mm & 0.25mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{toptitle} & 0.0mm & 0.0mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{bottomtitle} & 0.0mm & 0.0mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{middle} & 2.0mm & 0.75mm & 0.5mm & 1.0pt & 0.2pt & 0.0pt \\
\textbf{arc} & 1.0mm & 0.75mm & 0.5mm & 1.0pt & 0.0pt & 0.0pt \\
\textbf{outer arc} & auto & auto & auto & auto & 0.0pt & 0.0pt \\
\hline
\end{tabular}
\caption{Predefined values}
\end{table}
\textit{Normal text for comparison:}


\begin{tcolorbox}[oversize,title=Oversized box]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=Normal box]
\lipsum[2]
\end{tcolorbox}

\textit{Normal text for comparison:}


\begin{tcolorbox}
\lipsum[2]
\end{tcolorbox}
4.7.6 Toggle Left and Right

\input{tcb/toggle_left_and_right}

According to the \emph{(toggle preset)}, the left and the right settings of the \texttt{tcolorbox} are switched or not. Feasible values are:

- \texttt{none}: no switching.
- \texttt{forced}: the values of the left and right rules, spaces, and corners are switched.
- \texttt{evenpage}: if the page is an even page, the values of the left and right rules, spaces, and corners are switched. This value also sets \texttt{/tcb/check odd page} \texttt{\textasciitilde P.101} to \texttt{true}.

Horizontal bounding box enlargements are not toggled by this option. They can be toggled independently by \texttt{/tcb/toggle enlargement} \texttt{\textasciitilde P.86}. For example, \texttt{/tcb/oversize} \texttt{\textasciitilde P.45} changes the bounding box.

This example switches a 1cm thick rule from the left to the right side depending on the page number. Thereby, the rule is always on the outer side of the double-sided paper. Additionally, a ball is drawn on the outer side with help of an overlay.

\begin{verbatim}
\begin{tcolorbox}[enhanced, breakable, toggle left and right, sharp corners, boxrule=0mm, top=0mm, bottom=0mm, left=1mm, right=1mm, rightrule=1cm, colupper=blue!25!black, interior style={fill overzoom image=lichtspiel.jpg, fill image opacity=0.25}, frame style={pattern=crosshatch dots light steel blue}, overlay={\begin{tcbclipframe}
\coordinate (X) at ([xshift=-5mm]frame.east);\coordinate (X) at ([xshift=5mm]frame.west);\fill[shading=ball, ball color=blue!50!white, opacity=0.5] (X) circle (4mm);\end{tcbclipframe}}]
\lipsum[1-6]
\end{tcolorbox}
\end{verbatim}


Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellen-

4.8 Corners

The four corners of any \texttt{tcolorbox} can be set individually as /tcb/sharp corners or as /tcb/rounded corners \cite{p:49}. These settings are also reflected in the behavior of /tcb/borderline \cite{p:177} and /tcb/shadow \cite{p:188} as one would expect.

By default, all four corners are \textit{rounded}. So, only the /tcb/sharp corners option will be necessary for most use cases. The /tcb/rounded corners \cite{p:49} option can be used to revert a /tcb/sharp corners setting.

\texttt{/tcb/sharp corners\texttt{=\texttt{\{position\}}} \texttt{(default all, initially unset)}}

The \texttt{\{position\}} denotes one or more of the four box corners to be set as \textit{sharp} corners. The not assigned corners will retain their mode. Feasible values for \texttt{\{position\}} are:

- \texttt{northwest}
- \texttt{northeast}
- \texttt{southwest}
- \texttt{southeast}
- \texttt{north}
- \texttt{south}
- \texttt{east}
- \texttt{west}
- \texttt{downhill}
- \texttt{uphill}
- \texttt{all}

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners=northwest ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

48
/tcb/rounded corners=(position)  
(default all, initially all)
The /tcb/rounded corners can be used to revert a /tcb/sharp corners \(^{P.48}\) setting.
The (position) denotes one or more of the four box corners to be set as rounded corners.
The not assigned corners will retain their mode. Feasible values for (position) are\(^2\):
- northwest
- northeast
- southwest
- southeast
- north
- south
- east
- west
- downhill
- uphill
- all

\begin{tcolorbox}[colback=red!5!white,  
colframe=red!75!black,sharp corners,  
rounded corners=northwest ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/sharpish corners  
(style, no value)
Shortcut for setting /tcb/arc \(^{P.36}\) and /tcb/outer arc \(^{P.38}\) to 0pt. With this setting, 
rounded corners will appear as quasi-sharp, but e.g. the shadow will be somewhat rounder 
than the shadow of really sharp corners.

! Corners are still of type rounded with this option, but appear sharp. To switch back 
to rounded corners, one has to adapt /tcb/arc \(^{P.36}\) and /tcb/outer arc \(^{P.38}\).

\begin{tcolorbox}[colback=red!5!white,  
colframe=red!75!black,sharpish corners ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\(^2\)The graphical examples assume that the boxes where set to have sharp corners before.
The following examples will show the differences between \texttt{tcb/rounded corners} \textsuperscript{P. 49}, \texttt{tcb/sharpish corners} \textsuperscript{P. 49}, and \texttt{tcb/sharp corners} \textsuperscript{P. 48}. The later two give the same core box, but \texttt{tcb/borderline} \textsuperscript{P. 177} and \texttt{tcb/shadow} \textsuperscript{P. 188} settings are slightly different. The following examples use \texttt{tcb/drop fuzzy shadow} \textsuperscript{P. 182}. 

\begin{itemize}
\item \textbf{My title}
\item This is a \texttt{tcolorbox}.
\item \textbf{rounded corners}
\item
\item \textbf{My title}
\item This is a \texttt{tcolorbox}.
\item \textbf{sharpish corners}
\item
\item \textbf{My title}
\item This is a \texttt{tcolorbox}.
\item \textbf{sharp corners}
\item
\end{itemize}
4.9 Transparency

Transparency effects are likely to be used in conjunction with *jigsaw* skin variants, see Section 10.11 on page 201.

\begin{tcolorbox}[opacityframe=0.25, colframe=red]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityframe=0.5, opacityback=0.5]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityframe=0.5, opacitybacktitle=0.5, title filled, title=This is a title]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a title

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityfill=0.7, title=This is a title]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a title
/tcb/opacityupper\(=\langle fraction\rangle\) (no default, initially 1.0)
Sets the text opacity of the upper box part to the given \langle fraction\rangle.

\begin{tcolorbox}[enhanced,opacityupper=0.5,
interior style={pattern=checkerboard light
\&gray}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/opacitylower\(=\langle fraction\rangle\) (no default, initially 1.0)
Sets the text opacity of the lower box part to the given \langle fraction\rangle.

\begin{tcolorbox}[enhanced,opacitylower=0.5,
interior style={pattern=checkerboard light
\&gray}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/opacitytext\(=\langle fraction\rangle\) (no default, initially 1.0)
Sets the text opacity of the upper and the lower box part to the given \langle fraction\rangle.

\begin{tcolorbox}[enhanced,opacitytext=0.5,
interior style={pattern=checkerboard light
\&gray}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/opacitytitle\(=\langle fraction\rangle\) (no default, initially 1.0)
Sets the text opacity of the box title to the given \langle fraction\rangle.

\begin{tcolorbox}[enhanced,opacitytitle=0.7,
coltitle=black,
fonttitle=\textbf{series},title=This is a title,
title style={pattern=checkerboard light
\&gray}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
4.10 Height Control

In a typical usage scenario, the height of a \texttt{tcolorbox} is computed automatically to fit the content. Nevertheless, the height can be set to a fixed value or to fit commonly for several boxes, e.g. if boxes are set side by side.

\begin{quote}
\textbf{The height control keys are only applicable to unbreakable boxes. If a box is set to be /tcb/breakable, the height is always computed according to the natural height.}
\end{quote}

\texttt{/tcb/natural height} \hspace{1cm} (no value, initially set)

Sets the total height of the colored box to its natural height depending on the box content.

\texttt{/tcb/height=\langle length\rangle} \hspace{1cm} (no default)

Sets the total height of the colored box to \langle length\rangle independent of the box content. \langle length\rangle is the minimum height of the box, if /tcb/height plus is larger than zero.

\begin{example}
\tcbset{width=(\linewidth-2mm)/3,before=,after=,hfill, colframe=blue!75!black, colback=white}
\begin{tcolorbox}[height=1cm,valign=center]
This box has a height of 1cm.
\end{tcolorbox}
\begin{tcolorbox}[height=2cm,valign=center]
This box has a height of 2cm.
\end{tcolorbox}
\begin{tcolorbox}[height=3cm,split=0.5,valign=center,valign lower=center]
This box has a height of 3cm.
tcblower
Lower part.
\end{tcolorbox}
\end{example}

\texttt{/tcb/height plus=\langle length\rangle} \hspace{1cm} (no default, initially 0pt)

The box may extend a given fixed /tcb/height up to the given \langle length\rangle.

\begin{example}
\tcbset{colback=red!5!white, colframe=red!75!black, left=1mm, top=1mm, bottom=1mm, right=1mm, boxsep=0mm, width=3cm, nobeforeafter}
\begin{tcolorbox}[height=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[height=1cm,height plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[height=1cm,height plus=1cm]
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{tcolorbox}
\end{example}
\textbf{/tcb/height from}=(min) to (max) \hspace{1cm} (style, no default)

Sets the box height to a dimension between (min) and (max).

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,
bottom=1mm,right=1mm,boxsep=0mm,width=4.5cm,nobeforeafter,
height from=2cm to 8cm]
\textbf{This is a tcolorbox.}
\end{tcolorbox}

\begin{tcolorbox}
\textbf{This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.}
\end{tcolorbox}

\begin{tcolorbox}
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}
\textbf{This is a tcolorbox.}
\end{tcolorbox}

\begin{tcolorbox}
\textbf{This is a tcolorbox. This is a tcolorbox.}
\end{tcolorbox}


\textbf{/tcb/text height}=(length) \hspace{1cm} (style, no default)

Sets the text height to (length). This is the length from the top of the upper part to the bottom of the optional lower part. See also /tcb/text width.\textsuperscript{P.34}

\begin{tcolorbox}
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[text height=2cm]
\textbf{This is a \textbf{tcolorbox} where the text area has a height of 2cm.}
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\textbf{This is a tcolorbox where the text area has a height of 2cm.}
\end{tcolorbox}
/tcb/add to height=(length) (style, no default)

Adds \(\langle length\rangle\) to the current height of the colored box. /tcb/height \(\uparrow P.53\) has to be set before this key is used! If this option is used several times, then the /tcb/height \(\uparrow P.53\) is also increased several times.

\begin{tcolorbox}
\tcbset{height=2cm, 
valign=center, width=(\linewidth-2mm)/2, 
before=,after=\hfill,colframe=blue!75!black,colback=white}
\begin{tcolorbox}
This box has a height of 2cm.
\end{tcolorbox}
\begin{tcolorbox}[add to height=1cm]
This box has a height of 3cm.
\end{tcolorbox}
\end{tcolorbox}

/tcb/add to natural height=(length) (style, no default)

The application of this option generates a box with natural height plus the given \(\langle length\rangle\). If this option is used several times, then the last setting of \(\langle length\rangle\) wins. The resulting box is not considered a fixed height box and the implementation is quite different to /tcb/add to height.

\begin{tcolorbox}
\tcbset{valign=center, width=(\linewidth-2mm)/2, 
before=,after=\hfill,colframe=blue!75!black,colback=white}
\begin{tcolorbox}
This box has natural height.
\end{tcolorbox}
\begin{tcolorbox}[add to natural height=1cm]
This box has natural height plus 1 cm.
\end{tcolorbox}
\end{tcolorbox}
If set to `true`, the height of the `tcolorbox` is set to the rest of the available vertical space of the current page. If set to `maximum`, the page is compressed as much as possible. Note that the `tcolorbox` is always set as its own paragraph using this option. Also see `/tcb/text fill` on page 67.

Note that the library `breakable` has to be loaded to use this key!

This height control key is only applicable to unbreakable boxes, but it uses code from the library `breakable`. The counterpart for breakable boxes is `/tcb/height fixed` on page 370.

This option can and should not be used for boxes in boxes, but it can be used for boxes inside a `tcbraster` on page 279.

```latex
\begin{tcolorbox}[height fill, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries, title=Box which fills the rest of the page]
\lipsum[1]
\end{tcolorbox}
```

Box which fills the rest of the page

If this option is used for a `tcolorbox` which is embedded inside another (outer) `tcolorbox` and if this outer `tcolorbox` has a fixed height, then the given (fraction) of the available text height of the outer `tcolorbox` is used as `/tcb/height` for the current `tcolorbox`. Otherwise, `/tcb/natural height` is applied for the current `tcolorbox`. 

```latex
\begin{tcolorbox}[title=Outer box with fixed height 4cm,height=4cm]
\begin{tcolorbox}[title=Inner box,nobeforeafter,inherit height]
This inner box matches the available space.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}[title=Outer box with natural height]
\begin{tcolorbox}[title=Inner box,nobeforeafter,inherit height]
This inner box has its natural height.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}[title=Outer box with fixed height 5cm,height=5cm]
\begin{tcolorbox}[title=Inner box,nobeforeafter,inherit height]
\begin{tcolorbox}[colframe=red,beforeafter skip=0pt,inherit height=0.6]
Deeply nested box using 60 percent of the available space.
\end{tcolorbox}
\begin{tcolorbox}[colframe=red,beforeafter skip=0pt,inherit height=0.4]
Deeply nested box using 40 percent of the available space.
\end{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}
```

Outer box with fixed height 4cm

<table>
<thead>
<tr>
<th>Inner box</th>
</tr>
</thead>
<tbody>
<tr>
<td>This inner box matches the available space.</td>
</tr>
</tbody>
</table>

Outer box with natural height

<table>
<thead>
<tr>
<th>Inner box</th>
</tr>
</thead>
<tbody>
<tr>
<td>This inner box has its natural height.</td>
</tr>
</tbody>
</table>

Outer box with fixed height 5cm

<table>
<thead>
<tr>
<th>Inner box</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deeply nested box using 60 percent of the available space.</td>
</tr>
<tr>
<td>Deeply nested box using 40 percent of the available space.</td>
</tr>
</tbody>
</table>
Sets `/tcb/height` \(^{P.53}\) to match the width of the colored box.

\begin{tcolorbox}[width=3cm, colback=red!5!white, colframe=red!75!black, halign=center, valign=center, square]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[width=3cm, colback=white, colframe=blue!75!black, height=3cm]  
\begin{tcolorbox}[space=0.2]  
This is the upper part.  
\end{tcolorbox}  
This is the lower part.  
\begin{tcolorbox}[space=0.4]  
This is the upper part.  
\end{tcolorbox}  
This is the lower part.  
\begin{tcolorbox}[space=0.7]  
This is the upper part.  
\end{tcolorbox}  
This is the lower part.

\begin{tcolorbox}[width=(\linewidth-2mm)/3, before=, after=\hfill, colframe=blue!75!black, colback=white, height=3cm]  
\foreach \f in {0.2,0.4,0.7}  
{\begin{tcolorbox}[space=\f]  
This is the upper part.  
\tcblower  
This is the lower part.  
\end{tcolorbox}}

\begin{tcolorbox}[width=(\linewidth-2mm)/3, before=, after=\hfill, colframe=blue!75!black, colback=white, height=3cm]  
This is an abbreviation for \texttt{space=1}, i.e. all extra space is added to the upper part.

\begin{tcolorbox}[width=(\linewidth-2mm)/3, before=, after=\hfill, colframe=blue!75!black, colback=white, height=3cm]  
This is an abbreviation for \texttt{space=0}, i.e. all extra space is added to the lower part (if there is any).
/tcb/space to both
This is an abbreviation for \texttt{space=0.5}, i.e. the extra space equally distributed between the upper and the lower part.

\begin{tcolorbox}
\texttt{\tcbset{width=(\linewidth-2\textwidth)/3,before=,after=\texttt{hfill},
colframe=blue!75!black,colback=white,height=3\textwidth}}
\begin{tcolorbox}
\foreach \myspace in {space to upper,space to both,space to lower}
{\texttt{\begin{tcolorbox}[\myspace]}
This is the upper part.
\texttt{\tcblower}
This is the lower part.
\end{tcolorbox}}
\end{tcolorbox}
\end{tcolorbox}

N 2015-02-15
/tcb/space to\texttt{=}\texttt{(macro)}
(no default, initially unset)

If the height of a \texttt{tcolorbox} is not the natural height, the space difference between the forced and the natural size is saved into the given local \texttt{(macro)}. This \texttt{(macro)} can and should be used inside the box content to add content which is vertically sized to match \texttt{(macro)}.

- The actual length saved into \texttt{(macro)} is adapted dynamically during several compilations – at least two, but maybe more.
- Due to the adaption algorithm, objects can be sized with \texttt{(macro)} plus any offset length.
- Never ever use \texttt{(macro)} multiplied with a factor. The only exception to this rule is that the space can be split into parts which sum to \texttt{(macro)}.
- Never use this in combination with \texttt{/tcb/fit} \texttt{P.412}.

\begin{tcolorbox}[colframe=blue!75!black,colback=white,height=3\textwidth,
space to=\myspace]
This is my box of height 3\textwidth. The space is filled with a picture:\\[2\text{mm}\]
\includegraphics[width=\linewidth,height=\myspace]{goldshade.png}\\[1\text{mm}]
This is some other text.
\end{tcolorbox}

This is my box of height 3\textwidth. The space is filled with a picture:

This is some other text.
\begin{tcolorbox}[colframe=blue!75!black,colback=white,height=3cm,space to=\myspace]\includegraphics[width=\linewidth,height=0.33\dimexpr\myspace\]{blueshade.png}\end{tcolorbox}

This is my box of height 3cm.

\begin{tcolorbox}[colframe=blue!75!black,colback=white,height=3cm,space to=\myspace]\includegraphics[width=\linewidth,height=0.67\dimexpr\myspace\]{goldshade.png}\end{tcolorbox}

This is my box of height 3cm.

\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill,height=3cm,\colback=white,\colframe=blue!75!black,\valign=\center,\valign lower=\center}

\foreach \f in {0.1,0.5,0.8}{\begin{tcolorbox}[split=\f]This is the upper part.\tcblowerThis is the lower part with a lot of text in several lines.\end{tcolorbox}}
Boxes which are members of an equal height group will all get the same height, i.e. the maximum of all their natural heights. The \( id \) serves to distinguish between different height groups. Note that you have to compile twice to see changes and that height groups are global definitions.

\[
\int_0^1 x^2 = \frac{1}{3}.
\]

See Section 14 on page 277 for more equal height options.
/tcb/minimum for equal height group=(id):⟨length⟩

Plants a ⟨length⟩ into the equal height group with the given ⟨id⟩. This ensures that the height will not drop below ⟨length⟩. Note that you cannot reduce a computed height value by using this key with a small value. The difference to applying /tcb/height,P.55 directly is that the boxes are never too small for their content.

\begin{tcolorbox}
My first box. All boxes will get 3.5cm times 3.5cm if the content height is not too large.
\end{tcolorbox}

\begin{tcolorbox}
My second box.
\tcblower
This is the lower part.
\end{tcolorbox}

\begin{tcblisting}
\textbf{Mixed}
\end{tcblisting}

\begin{tcolorbox}[title={Fourth box}]
My final box.
\end{tcolorbox}

\begin{tcbitemize}
\raster every box/.style={minimum for current equal height group=2cm}
\item A
\item B
\end{tcbitemize}
Sets the current box to a fixed \texttt{/tcb/height} which is copied from an equal height group with the given \langle id \rangle. If this height is not available during the current compilation, no fixed height setting is used. If \langle id \rangle is omitted, the current equal height group is used which has to be set before by \texttt{/tcb/equal height group}. Note that the natural height of the current box is not considered for computation of the group height. The main application for \texttt{/tcb/use height from group} is that the height can be adapted further by \texttt{/tcb/add to height}.

\begin{tcolorbox} [use height from group=C, add to height=-2cm, colframe=blue!75!black, colback=white]
Height from group 'C' of the previous example, but reduced by 2cm. \end{tcolorbox}

% \tcbuselibrary{raster}
Every line is inside an equal height group:
\begin{tcbraster} [raster equal height=rows, title=Box \thetcbrasternum, enhanced, size=small, colframe=red!50!black, colback=red!10!white]
\begin{tcolorbox}First line\second line\The height of this box rules.\end{tcolorbox}
\begin{tcolorbox}First line\second line\end{tcolorbox}
\begin{tcolorbox}First line\second line\end{tcolorbox}
\begin{tcolorbox}First line\second line\end{tcolorbox}
\end{tcbraster}

% \tcbheightfromgroup\langle macro \rangle\{\langle id \rangle \}
Saves the height from an equal height group with the given \langle id \rangle to a \langle macro \rangle. If this height is not available during the current compilation, \langle macro \rangle is set to 0pt.
4.11 Box Content Additions

The following options introduce some arbitrary \textit{(code)} to the content of a \texttt{tcolorbox}. These additions can be given at the beginning or at the ending of the title, the upper part, or the lower part.

\texttt{/tcb/before title=\textit{(code)}} \hspace{1cm} (no default, initially unset)

The given \textit{(code)} is placed after the color and font settings and before the content of the title.

\begin{verbatim}
\tcbset{before title={\textcolor{yellow}{\large Important:}~},
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\texttt{Important: My title}

This is a \texttt{tcolorbox}.

\texttt{/tcb/after title=\textit{(code)}} \hspace{1cm} (no default, initially unset)

The given \textit{(code)} is placed after the content of the title.

\begin{verbatim}
\tcbset{after title={\hspace{1cm}\colorbox{Navy}{approved}},
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\texttt{My title \hspace{1cm} approved}

This is a \texttt{tcolorbox}. 
The given ⟨code⟩ is placed after the color and font settings and before the content of the upper part.

\tcbset{before upper={\textit{The story:}\par},
\textcolor{red}{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}}

\begin{tcolorbox}[title=My title]
This is a tcolorbox.
\end{tcolorbox}

My title

The story:
This is a tcolorbox.

An \unskip is placed in front of the given ⟨code⟩. From version 3.80 to 3.94, this \unskip was omitted to avoid certain problems which (hopefully) should not occur with the new improved code.

\begin{tcolorbox}[before upper=\textit{Read more next week},
\textcolor{red}{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}]
\begin{tcolorbox}[title=My title]
This is a tcolorbox.
\end{tcolorbox}

This is a tcolorbox.

Read more next week

\begin{tcolorbox}[before upper=\textit{Read more next week},
\textcolor{red}{colback=red!5!white,colframe=red!75!black}]
This is a tcolorbox.
\end{tcolorbox}

«This is a tcolorbox.»

Alias for /tcb/after upper. From version 3.80 to 3.94, it prepended an \unskip to the given ⟨code⟩. Now, this key is considered to be deprecated.
The given \textit{code} is placed after the color and font settings and before the content of the lower part.

\begin{tcolorbox}
\tcblower
This is the lower part.
\end{tcolorbox}

This is a tcolorbox.

\begin{tcolorbox}[before lower=$,after lower=$,
colback=red!5!white,colframe=red!75!black]
\tcblower
\sin^2(x)+\cos^2(x)=1.
\end{tcolorbox}

This is a tcolorbox.

\begin{tcolorbox}[after lower=\ \textit{This is the end.},
colback=red!5!white,colframe=red!75!black]
\tcblower
This is the lower part.
\end{tcolorbox}

This is a tcolorbox.

! An \texttt{unskip} is placed in front of the given \textit{code}. From version 3.80 to 3.94, this \texttt{unskip} was omitted to avoid certain problems which (hopefully) should not occur with the new improved code.

Alias for /tcb/after lower. From version 3.80 to 3.94, it prepended an \texttt{unskip} to the given \textit{code}. Now, this key is considered to be deprecated.
If /tcb/text fill is used, one cannot have a lower part and the box is unbreakable.

/tcb/text fill

This style sets /tcb/before upper \(^\text{P.65}\) and /tcb/after upper \(^\text{P.65}\) to embed the upper part with a minipage. If a fixed height was applied e.g. by /tcb/height \(^\text{P.53}\) or /tcb/height fill \(^\text{P.56}\), this minipage gets a matching height. This allows to use vertical glue macros like \vfill to act like expected. If the box has no fixed height, setting /tcb/text fill has no other effect as making the box unbreakable.

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, height=8cm,text fill, title=My filled box]
\begin{center}
My middle text.
\end{center}
\end{tcolorbox}

My filled box

This is a \textbf{tcolorbox}.

My middle text.

This is the end of my box.
If \texttt{tcb/tabularx} or \texttt{tcb/tabularx*} are used, one cannot have a lower part.

\texttt{tcb/tabularx}=⟨\texttt{preamble}⟩ \hspace{1cm} \text{(style)}

This style sets \texttt{tcb/before upper} \texttt{P.65} and \texttt{tcb/after upper} \texttt{P.65} and several geometry keys to support a \texttt{tabularx} with the given \texttt{⟨preamble⟩}. The packages \texttt{tabularx} \texttt{[4]}, \texttt{array}, and \texttt{colortbl} have to be loaded separately.

\begin{verbatim}
% \usepackage{array,tabularx}
% \usepackage{colortbl} - or - \usepackage[\texttt{table}]\{xcolor\}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X} \hspace{1cm} \text{see \texttt{tabularx}}
\tcbset{\texttt{enhanced},\texttt{fonttitle=\bfseries\large,fontupper=\normalsize\textsf{family}},
\hspace{1cm} \text{colback=\texttt{yellow!10!white},colframe=\texttt{red!50!black},colbacktitle=\texttt{Salmon!30!white},
\hspace{1cm} \text{coltitle=\texttt{black},center title}}
\begin{tcolorbox}\{\texttt{tabularx=\{X||Y|Y|Y|Y||Y\},title=My table}\}
\begin{tabular}{cccccc}
\hline
\text{Group} & \text{One} & \text{Two} & \text{Three} & \text{Four} & \text{Sum} \\
\hline
\text{Red} & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\text{Green} & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\text{Blue} & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\text{Sum} & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabular}
\end{tcolorbox}
\end{verbatim}

\texttt{tcb/tabularx*}=⟨\texttt{code}⟩\{⟨\texttt{preamble}⟩\} \hspace{1cm} \text{(style)}

This is a variant of \texttt{tcb/tabularx} which adds some \texttt{⟨code⟩} before the table starts.

\begin{verbatim}
% \usepackage{array,tabularx}
% \usepackage{colortbl} - or - \usepackage[\texttt{table}]\{xcolor\}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X} \hspace{1cm} \text{see \texttt{tabularx}}
\begin{tcolorbox}\{\texttt{tabularx*=\{\texttt{arrayrulewidth}0.5mm\}\{X|X|X\},title=My table}\}
\begin{tabular}{ccc}
\hline
\text{One} & \text{Two} & \text{Three} \\
\hline
1000.00 & 2000.00 & 3000.00 \\
2000.00 & 3000.00 & 4000.00 \\
\hline
\end{tabular}
\end{tcolorbox}
\end{verbatim}
/tcb/tikz_upper=(options)  (style)
This style adds a centered \texttt{tikzpicture} environment to the start and end of the upper part. The \texttt{(options)} may be given as TikZ picture options.

\begin{tcolorbox}
\[tikz upper,\text{fonttitle=\texttt{bfseries},colback=white,}\]
\[\text{colframe=black,}\]
\[\text{title=\texttt{tikzname}\ drawing}\]
\begin{tikzpicture}
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}
\end{tcolorbox}

/TikZ drawing

\begin{tcblisting}{title=\texttt{tikzname}\ drawing}
\path[fill=yellow,draw=yellow!75!red]
\[\ (0,0) \ \text{circle (1cm)};\]
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red]
\[\ (215:5mm) \ \text{arc (215:325:5mm)};\]
\end{tcblisting}

/tcb/tikz_lower=(options)  (style)
This style adds a centered \texttt{tikzpicture} environment to the start and end of the lower part. The \texttt{(options)} may be given as TikZ picture options.

\begin{tcblisting}{title=\texttt{tikzname}\ drawing}
\path[fill=yellow,draw=yellow!75!red]
\[\ (0,0) \ \text{circle (1cm)};\]
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red]
\[\ (215:5mm) \ \text{arc (215:325:5mm)};\]
\end{tcblisting}

/TikZ drawing
/tcb/tikznodesterminal{(options)}

This style places the upper part content into a centered TikZ node. The (options) may be given as TikZ node options. This style is especially useful for boxes with multiline texts which are fitted to the text width.

% \usepackage{tikz}
\newtcbbox{headline}[1][]{enhanced,center,
  ignore nobreak,fontupper=\Large\bfseries,
  colframe=red!50!black,colback=red!10!white,
  drop fuzzy shadow=yellow,tikznodesterminal,#1}
\headline{Important\Headline

\begin{tcolorbox}
Upper part.
\tcblower
Lower part.
\end{tcolorbox}

/tcb/tikznoderecess{(options)}

This style places the lower part content into a centered TikZ node. The (options) may be given as TikZ node options.

% \usepackage{tikz}
\begin{tcolorbox}
Upper part.
\tcblower
Lower part.
\end{tcolorbox}

/tcb/tikznodestart{(options)}

Shortcut for setting /tcb/tikznodesterminal and /tcb/tikznoderecess the same time.

/tcb/varwidth terminal{(length)}

This style places the upper part content into a varwidth environment. This style needs the varwidth package [1] to be loaded manually. The resulting box has a maximal width of (length). This option is only senseful for a \tcbox\textsuperscript*P.14.

% \usepackage{varwidth}
\newtcbbox{varbox}{colframe=red!50!black,
  colback=red!10!white,varwidth terminal}
\varbox{Short text.}
\varbox{This box contains is a longer text which is broken.}
4.12 Overlays

With an overlay, arbitrary ⟨graphical code⟩ can be added to a tcolorbox. This code is executed after the frame and interior are drawn and before the text content is drawn. Therefore, you can decorate the tcolorbox with your own extensions. Common special cases are watermarks which are implemented using overlays. See Subsection 10.3 from page 165 if you want to add watermarks.

If you use the core package only, the ⟨graphical code⟩ has to be pgf code and there is not much assistance for positioning. Therefore, the usage of the /tcb/enhanced mode from the library skins is recommended which allows tikz code and gives access to /tcb/geometry nodes for positioning.

\tcb/overlay=⟨graphical code⟩

(no default, initially unset)

Add ⟨graphical code⟩ to the box drawing process. This ⟨graphical code⟩ is drawn after the frame and interior and before the text content.
This example demonstrates the application of break sequence specific overlay options. Here, we define an environment `myexample` based on `tcolorbox` where the visible drawing is done totally by overlay keys.

Here, the first application of `myexample` produces an unbroken `tcolorbox`. The frame is drawn by the code given with `/tcb/overlay unbroken`.

The second application of `myexample` is broken into several parts which are drawn by the codes given with `/tcb/overlay first`, `/tcb/overlay middle`, and `/tcb/overlay last`.
Example 1

Example 2


Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in,


4.13 Floating Objects

\texttt{/tcb/floatplacement=}⟨\texttt{values}⟩ (no default, initially htb)
Sets ⟨\texttt{values}⟩ as default values for the usage of \texttt{/tcb/float} and \texttt{/tcb/float*}. Feasible are the usual parameters for floating objects.

\begin{tcolorbox}
\texttt{\tcbset\{enhanced, colback=red!5!white, colframe=red!75!black, watermark color=red!15!white\}}
\begin{tcolorbox}[floatplacement=t, float, title=\texttt{Floating box from |floatplacement|}, watermark text={\texttt{I am floating}}]
This floating box is placed at the top of a page.
\end{tcolorbox}
\end{tcolorbox}

\texttt{/tcb/float=}⟨\texttt{values}⟩ (default from floatplacement)
Turns the box to a floating object where ⟨\texttt{values}⟩ are the usual parameters for such floating objects. If they are not used, the placement uses the default values given by floatplacement.

\begin{tcolorbox}
\begin{tcolorbox}[float, title=\texttt{Floating box from |float|}, enhanced, watermark text={\texttt{I'm also floating}}]
This box floats to a feasible place automatically. You do not have to use a numbering for this floating object.
\end{tcolorbox}
\end{tcolorbox}

\texttt{/tcb/float*=\{values\}} (default from floatplacement)
Identical to \texttt{/tcb/float}, but for wide boxes spanning the whole page width of two column documents or in conjunction with the packages multicol or paracol. Note that you have to set \texttt{width=\textwidth} additionally, if the box should span the whole page width in these cases!

\begin{tcolorbox}
\begin{tcolorbox}[float=b, title=\texttt{Floating box from |float*|}, width=\textwidth, enhanced, watermark text={\texttt{I'm also floating}}]
In this single column document, you will see no difference to \texttt{|float|}.
\end{tcolorbox}
\end{tcolorbox}

\texttt{/tcb/nofloat} (style, initially set)
Turns the floating behavior off.

\begin{tcolorbox}
\begin{tcolorbox}[float*, title=\texttt{Floating box from |float*|}]
In this single column document, you will see no difference to \texttt{float}.
\end{tcolorbox}
\end{tcolorbox}
/tcb/every float=(code) (no default, initially empty)

For floating objects, the /tcb/before \(^{\text{P.78}}\) and /tcb/after \(^{\text{P.78}}\) settings are ignored. Instead, the given \((\text{code})\) is inserted before a floating box. If the box is /tcb/breakable \(^{\text{P.365}}\), the given \((\text{code})\) is inserted before every part of the break sequence. The most common use case is every float=\centering.

\tcbox[float=htb,title={Floating box},every float=\centering, colback=blue!50!black,colframe=blue!50!white,colbacktitle=blue!10!white, coltitle=black,center title] \{
\includegraphics[height=6cm]{lichtspiel.jpg}
\}
4.14 Embedding into the Surroundings

Typically, but not necessarily, a `tcolorbox` is put inside a separate paragraph and has some vertical space before and after it. This behavior is controlled by the keys `before` and `after`.

/\texttt{tcb/before}=(\texttt{code}) (no default, initially see /\texttt{tcb/autoparskip})

Sets the \texttt{(code)} which is executed before the colored box. It is not used for floating boxes. Also, it is not used, if the box follows a heading immediately and /\texttt{tcb/ignore nobreak} \texttt{^P.81} is set to \texttt{false}.

/\texttt{tcb/after}=(\texttt{code}) (no default, initially see /\texttt{tcb/autoparskip})

Sets the \texttt{(code)} which is executed after the colored box. It is not used for floating boxes.

/\texttt{tcb/parskip} (style, no value)

Sets the keys `before` and `after` to values which are recommended, if the package `parskip` is used and there is no better idea for `before` and `after`. This is similar to:

\begin{verbatim}
\tcbset{parskip/.style={before={\par\pagebreak[0]\parindent=0pt},
after={\par}}}
\end{verbatim}

/\texttt{tcb/noparskip} (style, no value)

Sets the keys `before` and `after` to values which are recommended, if the package `parskip` is not used and there is no better idea for `before` and `after`. This is similar to:

\begin{verbatim}
\tcbset{noparskip/.style={before={\par\pagebreak[0]\smallskip\parindent=0pt},
after={\par\smallskip}}}
\end{verbatim}

/\texttt{tcb/autoparskip} (style, no value, initially set)

Tries to detect the usage of the package `parskip` and sets the keys `before` and `after` accordingly. Actually, the following is done:

- If the length of `\parskip` is greater than `0pt` at the beginning of the document, /\texttt{tcb/parskip} is executed. Here, the usage of package `parskip` is assumed.
- Otherwise, if the length of `\parskip` is not greater than `0pt` at the beginning of the document, /\texttt{tcb/noparskip} is executed. Here, the absence of package `parskip` is assumed.

\texttt{autoparskip} is the default for the package `tcolorbox`, if `before` or `after` are not changed otherwise.

/\texttt{tcb/nobeforeafter} (style, no value)

Abbreviation for clearing the keys `before` and `after`. The colored box is not put into a paragraph and there is no space before or after the box.

\begin{verbatim}
\tcbset{myone/.style={colback=LightGreen,colframe=DarkGreen,  
equal height group=nobefaf,width=\linewidth/4,nobeforeafter}}
\begin{tcolorbox}[myone,title=Box 1]Box 1\end{tcolorbox}
\begin{tcolorbox}[myone,title=Box 2]Box 2\end{tcolorbox}
\begin{tcolorbox}[myone,title=Box 3]Box 3\end{tcolorbox}
\begin{tcolorbox}[myone,title=Box 4]Box 4\end{tcolorbox}
\end{verbatim}

/\texttt{tcb/forces nobeforeafter} (style, no value)

Forces the setting of /\texttt{tcb/nobeforeafter} even if /\texttt{tcb/before} and /\texttt{tcb/after} are set to other values later. Do not use this option globally unless you really know what you do. Note that embedded boxes do not inherit this forced clearance.
/tcb/baseline=⟨length⟩ (no default, initially 0pt)
Used to set the \pgfsetbaseline value of the resulting tcolorbox.

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text \dotfill
\begin{tcolorbox}[baseline=3mm]
One line.
\end{tcolorbox}
\begin{tcolorbox}[baseline=3mm]
First line.\Second line.
\end{tcolorbox}

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text \dotfill
\begin{tcolorbox}[box align=bottom]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=bottom]
First line.\Second line.
\end{tcolorbox}

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text \dotfill
\begin{tcolorbox}[box align=top]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=top]
First line.\Second line.
\end{tcolorbox}

/tcb/box align=⟨alignment⟩ (style, no default, initially bottom)
Used to set the /tcb/baseline value of the resulting tcolorbox. Feasible values for ⟨alignment⟩ are:
- bottom: alignment with the box bottom,
- top: alignment with the box top,
- center: alignment with the box center,
- base: alignment with the box content base. This option is not applicable for a \tcolorbox but for a \tcbox only. It is an alias for /tcb/tcbox raise base.
Some text \begin{tcolorbox}[box align=center]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=center]
First line. \Second line.
\end{tcolorbox}
Some text . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
\begin{tcolorbox}[before skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[after skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
Some text.
\begin{tcolorbox}[beforeafter skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}
Second box.
\end{tcolorbox}

\texttt{/tcb/before \_skip=⟨glue⟩} (style, no default)
Inserts some vertical space of the given \langle glue\rangle before the colored box. This style sets /tcb/before \_P.78.

\begin{tcolorbox}[before=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/after \_skip=⟨glue⟩} (style, no default)
Inserts some vertical space of the given \langle glue\rangle after the colored box. This style sets /tcb/after \_P.78.

\begin{tcolorbox}[after=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/beforeafter \_skip=⟨glue⟩} (style, no default)
Inserts some vertical space of the given \langle glue\rangle before and after the colored box. This style sets /tcb/before \_P.78 and /tcb/after \_P.78.

\begin{tcolorbox}[beforeafter=0pt, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

80
/tcb/left skip=(length) 
(style, no default, initially 0mm)

Inserts some horizontal space of the given ⟨length⟩ before the colored box. This style sets \tcb/grow to left by \textsuperscript{P.84} with the negated ⟨length⟩, i.e. the bounding box and box width are changed.

\noindent\rule{\linewidth}{2pt}
\begin{tcolorbox}[left skip=1cm, colframe=red!50!white]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\/tcb/right skip=(length) 
(style, no default, initially 0mm)

Inserts some horizontal space of the given ⟨length⟩ after the colored box. This style sets \tcb/grow to right by \textsuperscript{P.84} with the negated ⟨length⟩, i.e. the bounding box and box width are changed.

\noindent\rule{\linewidth}{2pt}
\begin{tcolorbox}[right skip=1cm, colframe=red!50!white]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\/tcb/leftright skip=(length) 
(style, no default)

Inserts some horizontal space of the given ⟨length⟩ before and after the colored box. This style changes the bounding box and the box width.

\noindent\rule{\linewidth}{2pt}
\begin{tcolorbox}[leftright skip=1cm, colframe=red!50!white]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\/tcb/ignore nobreak=true|false 
(default true, initially false)

After a heading, \LaTeX\ tries to avoid a break by setting a nobreak boolean value. Starting from version 3.33, the /tcb/before \textsuperscript{P.78} respectively /tcb/before skip \textsuperscript{P.80} settings are not used after a heading if /tcb/ignore nobreak is set to false. For an unbreakable box, /tcb/before nobreak is used instead. Further, a /tcb/breakable \textsuperscript{P.365} box will also try to avoid a break between a heading and a directly following first part of a break sequence. Set /tcb/ignore nobreak to true, if nobreak should be ignored as prior to version 3.33. Also, such a setting may be used locally to enforce the /tcb/before \textsuperscript{P.78} setting.

\/tcb/before nobreak=(code) 
(no default, initially \noindent)

Sets the ⟨code⟩ which is executed before the colored box if it is unbreakable, if /tcb/ignore nobreak is not set, and if the box follows a heading.

\/tcb/parfillskip restore=true|false 
(default true, initially true)

If this option is set to be true, the minimum value of \parfillskip is tested at specific spots, if it is greater than 0pt. If so, \parfillskip is restored to 0flushglue which happens to be the default value. These tests are executed for /tcb/parskip \textsuperscript{P.78}, /tcb/noparskip \textsuperscript{P.78}, /tcb/after skip \textsuperscript{P.80}, /tcb/breakable \textsuperscript{P.365}, and tcbraster \textsuperscript{P.279}.
This option was created to automatically avoid overfull box warnings with \parfillskip changing packages.
4.15 Bounding Box

Normally, every \texttt{tcolorbox} has a bounding box which fits exactly to the dimensions of the outer frame. Therefore, \LaTeX{} reserves exactly the space needed for the box. This behavior can be changed by enlarging (or shrinking) the bounding box. If the bounding box is enlarged, the \texttt{tcolorbox} will get some clearance around it. If the bounding box is shrunk, i.e. enlarged with negative values, the \texttt{tcolorbox} will overlap to other parts of the page. For example, the \texttt{tcolorbox} could be stretched into the page margin.

The following examples use \texttt{/tcb/show bounding box} \textsuperscript{\textsuperscript{P. 159}} to display the actual bounding box. For this, the library \texttt{skins} has to be included and \texttt{/tcb/enhanced} \textsuperscript{\textsuperscript{P. 206}} has to be set.

4.15.1 Shifting Bounding Box Borders

\texttt{/tcb/enlarge top initially by=\langle length \rangle} \; \text{(no default, initially 0mm)}

Enlarges the bounding box distance to the top of the box by \texttt{\langle length \rangle}. If the box is \textit{breakable}, only the first box of the break sequence gets enlarged. \texttt{/tcb/enlarge top by} \textsuperscript{\textsuperscript{P. 83}} overwrites this key.

```
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge top initially by=-5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge top initially by=5mm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

\texttt{/tcb/enlarge bottom finally by=\langle length \rangle} \; \text{(no default, initially 0mm)}

Enlarges the bounding box distance to the bottom of the box by \texttt{\langle length \rangle}. If the box is \textit{breakable}, only the last box of the break sequence gets enlarged. \texttt{/tcb/enlarge bottom by} \textsuperscript{\textsuperscript{P. 83}} overwrites this key.

```
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge bottom finally by=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge bottom finally by=-5mm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```
/tcb/enlarge top at break by=(length)  
(no default, initially 0mm)
Enlarges the bounding box distance to the top of the box by \( \langle \text{length} \rangle \), if the box is \( \text{/tcb/breakable} \). In this case, it is applied to \( \text{middle} \) and \( \text{last} \) parts in a break sequence. \( \text{/tcb/enlarge top by} \) overwrites this key.

/tcb/enlarge bottom at break by=(length)  
(no default, initially 0mm)
Enlarges the bounding box distance to the bottom of the box by \( \langle \text{length} \rangle \), if the box is \( \text{/tcb/breakable} \). In this case, it is applied to \( \text{first} \) and \( \text{middle} \) parts in a break sequence. \( \text{/tcb/enlarge bottom by} \) overwrites this key.

/tcb/enlarge top by=(length)  
(no default, initially 0mm)
Enlarges the bounding box distance to the top of the box by \( \langle \text{length} \rangle \). \( \text{/tcb/enlarge top initially by} \) and \( \text{/tcb/enlarge top at break by} \) are set to \( \langle \text{length} \rangle \).

/tcb/enlarge bottom by=(length)  
(no default, initially 0mm)
Enlarges the bounding box distance to the bottom of the box by \( \langle \text{length} \rangle \). \( \text{/tcb/enlarge bottom finally by} \) and \( \text{/tcb/enlarge bottom at break by} \) are set to \( \langle \text{length} \rangle \).

/tcb/enlarge left by=(length)  
(no default, initially 0mm)
Enlarges the bounding box distance to the left side of the box by \( \langle \text{length} \rangle \).

/tcb/enlarge right by=(length)  
(no default, initially 0mm)
Enlarges the bounding box distance to the right side of the box by \( \langle \text{length} \rangle \).
/tcb/enlarge by=(length)  (no default, initially 0mm)
Enlarges the bounding box distance to all sides of the box by (length).

\tcbset{colframe=blue!75!black,colback=white,width=5cm,nobeforeafter}
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge by=5mm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.

/tcb/grow to left by=(length)  (no default, initially 0mm)
Enlarges the current box width by (length) and enlarges (shrinks) the bounding box distance
to the left side of the box by −(length). Also see /tcb/left skip \[^{P.81}\].

\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[width=5cm,grow to left by=2cm,enhanced,show bounding box]
This is a \textbf{tcolorbox} with a width of 7cm.
\end{tcolorbox}
This is a \textbf{tcolorbox} with a width of 7cm.

/tcb/grow to right by=(length)  (no default, initially 0mm)
Enlarges the current box width by (length) and enlarges (shrinks) the bounding box distance
to the right side of the box by −(length). Also see /tcb/right skip \[^{P.81}\].

\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[grow to right by=2cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\bigskip
\begin{tcolorbox}[grow to right by=2cm,grow to left by=1cm,
enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.

This is a \textbf{tcolorbox}.
This is a \textbf{tcolorbox}.

84
/tcb/grow sidewards by=(length)  
(no default, initially 0mm)
Shortcut for setting /tcb/grow to left by \texttt{P.84} and /tcb/grow to right by \texttt{P.84} to (length). Also see /tcb/oversize \texttt{P.45} and /tcb/spread sidewards \texttt{P.88}.

\begin{tcolorbox}[grow sidewards by=2cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

4.15.2 Box Alignment

/tcb/flush left  
(\texttt{style}, no value)
Enlarges the bounding box to the right side to fill the line completely.

\begin{tcolorbox}[flush left,width=5cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

/tcb/flush right  
(\texttt{style}, no value)
Enlarges the bounding box to the left side to fill the line completely.

\begin{tcolorbox}[flush right,width=5cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

/tcb/center  
(\texttt{style}, no value)
Enlarges the bounding box equally to both sides to fill the line completely.

\begin{tcolorbox}[center,width=5cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
4.15.3 Toggle Enlargements

\texttt{/tcb/toggle enlargement=\{toggle preset\}} \hspace{1em} (default \texttt{evenpage}, initially \texttt{none})

According to the \texttt{\{toggle preset\}}, the left and the right enlargements of the bounding box are switched or not. Feasible values are:

- \texttt{none}: no switching.
- \texttt{forced}: the values of the left and right enlargement are switched.
- \texttt{evenpage}: if the page is an even page, the values of the left and right enlargement are switched. This value also sets \texttt{/tcb/check odd page} to \texttt{true}.

See \texttt{/tcb/toggle left and right} to toggle geometry settings.

\begin{tcolorbox}[colframe=blue!75!black, colback=white, grow to left by=20mm, grow to right by=-5mm, \color{OrangeRed}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[colframe=red!60!black, colback=red!15!white, fonttitle=\bfseries, title=\texttt{Floating box from \texttt{toggle enlargement}}, width=\textwidth, grow to right by=2cm, \color{OrangeRed}]
This page is an \texttt{tcbifoddpage\{odd\}\{even\}} page. Therefore, the left and right enlargements are not toggled. This box stretches to the right margin on odd pages and to the left margin on even pages. The current document is one-sided -- this feature makes sense for two-sided documents only.
\end{tcolorbox}
4.15.4 Spread Box to Page Borders

The following border options are *not* applicable to nested boxes, boxes inside tables, etc. For boxes inside lists, the options *may* work, but not necessarily. Also, boxes should be set with `\noindent` and full width.

\begin{tcolorbox}[enhanced,spread inwards,\
  colframe=blue!75!black,colback=white,show bounding box]\
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{This is a tcolorbox.}

\begin{tcolorbox}[enhanced,spread outwards,\
  colframe=blue!75!black,colback=white,show bounding box]\
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{This is a tcolorbox.}

\begin{tcolorbox}[enhanced,move upwards,\
  colframe=blue!75!black,colback=white,show bounding box]\
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{This is a tcolorbox.}

\begin{tcolorbox}[enhanced,fill downwards,\
  colframe=blue!75!black,colback=white,show bounding box]\
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{This is a tcolorbox.}
This is an example for 'spread upwards'.

\begin{tcolorbox}[enhanced,spread upwards,sharp corners=north,height=3cm,  
colframe=blue!75!black,interior style={top color=blue!50,bottom color=white}]
This is an example for 'spread upwards'.
\end{tcolorbox}

Identical to /tcb/move upwards \textsuperscript{P.87}, but without starting a new page.

/tcb/spread sidewards=(length) \textsuperscript{(default 0pt, initially unset)}
Combination of /tcb/spread inwards \textsuperscript{P.87} and /tcb/spread outwards \textsuperscript{P.87}. The optional \textit{⟨length⟩} is used for all these keys. Also see /tcb/oversize \textsuperscript{P.45} and /tcb/grow sidewards by \textsuperscript{P.85}.

\begin{tcolorbox}[enhanced,spread sidewards,  
colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

Combination of /tcb/move upwards \textsuperscript{P.87}, /tcb/fill downwards \textsuperscript{P.87}, /tcb/spread inwards \textsuperscript{P.87}, and /tcb/spread outwards \textsuperscript{P.87}. Such, the box fills the whole page. The optional \textit{⟨length⟩} is used for all these keys.

\begin{tcolorbox}[enhanced,spread downwards,sharp corners=south,  
colframe=red!75!black,interior style={top color=white,bottom color=red!50}]
This is an example for 'spread downwards'.
\end{tcolorbox}

This is an example for 'spread downwards'.
4.15.5 Box Extrusion

The following keys should not be used with breakable boxes or boxes with a lower part.

/tcb/shrink tight (style, no value, initially unset)

The total colored box is shrunk to the dimensions of the upper part. There should be no lower part and no title. This style sets the /tcb/boxsep to 0pt and other geometry keys to fitting values. This option is likely to be used with the following extrusion keys.

```
\tcbset{colframe=blue!75!black,colback=white,arc=0mm,boxrule=0.4pt,
  nobeforeafter,tcbox raise base,shrink tight}
\begin{tcolorbox}
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

Lorem \tcbox{ipsum} dolor sit amet, consectetuer adipiscing elit.
```

/tcb/extrude left by = (length) (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given (length) to the left side. The inner width and the bounding box is kept unchanged and the operation is additive!

```
\tcbset{enhanced,colframe=red,colback=yellow!25!white,
  frame style={opacity=0.25},interior style={opacity=0.5},
  nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox[extrude left by=1cm]{Curabitur} dictum gravida mauris.
Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.
```

/tcb/extrude right by = (length) (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given (length) to the right side. The inner width and the bounding box is kept unchanged and the operation is additive!

```
\tcbset{enhanced,colframe=red,colback=yellow!25!white,
  frame style={opacity=0.25},interior style={opacity=0.5},
  nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox[extrude right by=1cm]{Curabitur} dictum gravida mauris.
Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.
```
/tcb/extrude top by\(=\langle length \rangle\) \hspace{1em} (style, no default, initially unset)
The (upper part of the) colored box is extruded by the given \(\langle length \rangle\) to the top side. The inner width and the bounding box is kept unchanged and the operation is additive!

\[
\text{\tcbsmallset[enhanced, colframe=red, colback=yellow!25!white,}
\text{ frame style={opacity=0.25}, interior style={opacity=0.5},}
\text{ nobeforeafter, tcbbox raise base, shrink tight, extrude by=2mm}]
\]

\[
\text{Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit,}
\text{ vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox[extrude top by=1cm]{Curabitur} dictum gravida mauris.}
\text{Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.}
\]

/tcb/extrude bottom by\(=\langle length \rangle\) \hspace{1em} (style, no default, initially unset)
The (upper part of the) colored box is extruded by the given \(\langle length \rangle\) to the bottom side. The inner width and the bounding box is kept unchanged and the operation is additive!

\[
\text{\tcbsmallset[enhanced, colframe=red, colback=yellow!25!white,}
\text{ frame style={opacity=0.25}, interior style={opacity=0.5},}
\text{ nobeforeafter, tcbbox raise base, shrink tight, extrude by=2mm}]
\]

\[
\text{Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit,}
\text{ vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox[extrude bottom by=1cm]{Curabitur} dictum gravida mauris.}
\text{Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.}
\]

/tcb/extrude by\(=\langle length \rangle\) \hspace{1em} (style, no default, initially unset)
The (upper part of the) colored box is extruded by the given \(\langle length \rangle\) to all sides. The inner width and the bounding box is kept unchanged and the operation is additive!

\[
\text{\tcbsmallset[enhanced, colframe=red, colback=yellow!25!white,}
\text{ frame style={opacity=0.25}, interior style={opacity=0.5},}
\text{ nobeforeafter, tcbbox raise base, shrink tight, extrude by=2mm}]
\]

\[
\text{Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit,}
\text{ vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox{Curabitur} dictum gravida mauris.} \text{\tcbox[colframe=Green, interior style={opacity=0.0}]{Nam}}
\text{arcu libero, nonummy eget, consectetur id, \tcbox{vulputate} a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.} \text{\tcbox{Mauris ut leo.}}
\]

\[
\text{Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit,}
\text{ vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox{Curabitur} dictum gravida mauris.} \text{\tcbox{Nam}}\text{arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.} \text{Mauris ut leo.}
\]
4.16 Layered Boxes and Every Box Settings

A \texttt{tcolorbox} may contain another \texttt{tcolorbox} and so on. The package takes track of the nesting level using a counter \texttt{tcblayer}. Counter values may be used for doing some fancy things, but you should never change the counter value yourself.

The package takes special care for the first four layers or nesting levels, called managed layers. Here, footnote texts are administrated to find their intended place and specific layer dependent options may be set by changing /\texttt{tcb/every box on layer n}. If needed, the number of managed layers can be increased by setting \texttt{\tcbsetmanagedlayers} to a higher value than 4.

The following styles have a considerable influence on how layered boxes are processed. Note especially that nested boxes are getting a /\texttt{tcb/reset} by default. You can change this, but be prepared for suprises if you do.

If the defaults are not changed, a \texttt{tcolorbox} gets its options in the following order. Following options overwrite preceding options.

1. On package load, all options are set to default values.
2. Every \texttt{\tcbset} command adds or changes options for the following boxes inside the current \texttt{TEX} group.
3. While entering a \texttt{tcolorbox}, a /\texttt{tcb/every box on layer n} or /\texttt{tcb/every box on higher layers} option list is applied. With default settings this means:
   - For layer 1 (lowest layer), the /\texttt{tcb/every box} option list is applied. Not overwritten options given by a preceding \texttt{\tcbset} survive.
   - For layer 2 and above (nested boxes), a /\texttt{tcb/reset} followed by /\texttt{tcb/every box} option list is applied. Every resettable options given by a preceding \texttt{\tcbset} and by the surrounding box(es) are reset.
4. The ⟨options⟩ given to the \texttt{tcolorbox} are applied. Or, if the box was generated by \texttt{\newtcolorbox} or friends, the ⟨options⟩ given there are applied.
5. If the box was generated by \texttt{\newtcolorbox} or friends, some automated options are applied.

/\texttt{tcb/every box} (style)

By default, this style is empty.

```
\% default setting:
\tcbset\{every box/.style={}}
```

It may be changed by redefining this style.

```
\% setting all boxes to be enhanced:
\tcbset\{every box/.style={enhanced}}
```

The alternative for setting something for every box (on every layer) is \texttt{\tcbsetforeverylayer}:

```
\% setting all boxes to be enhanced:
\tcbsetforeverylayer\{enhanced}\}
```
/tcb/every box on layer n

Here, n has to be replaced by a number ranging from 1 to the highest managed layer number (4 by default).

\% default settings:
\tcbset{
  every box on layer 1/.style={every box},
  every box on layer 2/.style={reset,every box},
  every box on layer 3/.style={reset,every box},
  every box on layer 4/.style={reset,every box},
}

/tcb/every box on higher layers

Higher layers are layers above the highest managed layer number (4 by default).

\tcbset{every box on higher layers/.style={reset,every box}}

\tcbsetmanagedlayers{⟨number⟩}

Replaces the highest managed layer number by ⟨number⟩ where 4 is the default. This macro can only be used inside the preamble. Using a ⟨number⟩ lower than 4 typically makes no sense, but is not forbidden.

\% \usepackage{lipsum}
\% \tcbuselibrary{skins,breakable}
\tcbset{colframe=red!75!black,fonttitle=\textbf, 
  colback=red!5!white, 
  every box/.style=\{enhanced,watermark text=\texttcblayer, 
  before=\par\smallskip,after=\par\smallskip, 
  every box on layer 2/.style={reset,every box,colback=yellow!10!white, 
  drop fuzzy shadow}}
\begin{tcolorbox}[enhanced jigsaw,breakable,title=Layer 1 Box]
  Here comes a footnote\footnote{Footnote from layer 1 box}.
  \lipsum[2]
  \begin{tcolorbox}[title=Layer 2 Box]
    abc\footnote{The footnote of abc}
  \end{tcolorbox}
  \begin{tcolorbox}[title=Another Box,ams equation]
    \tcbhighmath{\sum_{n=1}^{\infty} \frac{1}{n}} = \infty.
  \end{tcolorbox}
  Some text\footnote{Footnote from some text}.
  \begin{tcolorbox}[title=Yet Another Box]
    My text.
    \begin{tcolorbox}
      Another lipsum text\footnote{A lipsum text}. \lipsum[3]
      \begin{tcolorbox}[title=Layer 4,colframe=blue,colback=white]
        Layer 4\footnote{Layer 4 footnote}
      \end{tcolorbox}
    \end{tcolorbox}
    The End\footnote{Last footnote}.
  \end{tcolorbox}
  \begin{tcolorbox}
  \end{tcolorbox}
}\end{tcolorbox}

Layer 1 Box


Layer 2 Box

abc

\(^a\)The footnote of abc

Another Box

\[ \sum_{n=1}^{\infty} \frac{1}{n} = \infty. \]

Some text.

Yet Another Box


My text.


Layer 4

\(^a\)Layer 4 footnote

The End\(^b\).

\(^a\)A lipsom text

\(^b\)Last footnote

\(^a\)Footnote from layer 1 box

\(^b\)Footnote from some text
4.17 Capture Mode

\texttt{/tcb/capture\{mode\}} \quad \text{(no default, initially minipage)}

The capture \texttt{\{mode\}} defines how the box content is processed.
Feasible values for \texttt{\{mode\}} are:

- \texttt{minipage}:
  This is the default \texttt{\{mode\}} for \texttt{tcolorbox}\textsuperscript{P.12}. The content may have an upper and a lower part. Optionally, the box can be \texttt{/tcb/breakable}\textsuperscript{P.365}. The box content is put into a minipage or into something similar to a minipage.

- \texttt{hbox}:
  This is the default \texttt{\{mode\}} for \texttt{\tcbox}\textsuperscript{P.14}. The content cannot have a lower part and cannot be broken. The colored box is sized according to the dimensions of the content. A shortcut to set this mode is \texttt{/tcb/hbox}.

- \texttt{fitbox} (needs the \texttt{fitting} library)
  This is the default \texttt{\{mode\}} for \texttt{\tcboxfit}\textsuperscript{P.410}. The content cannot have a lower part and cannot be broken. The content is sized according to the dimensions of the colored box. A shortcut to set this mode is \texttt{/tcb/fit}\textsuperscript{P.412}.

\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[capture=minipage]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[capture=hbox]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[capture=fitbox,height=9mm]\% needs the 'fitting' library
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/hbox} \quad \text{(style, no default)}

Shortcut for \texttt{capture=hbox}.

\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[hbox]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/minipage} \quad \text{(style, no default)}

Shortcut for \texttt{capture=minipage}.
4.18 Text Characteristics

The text inside a tcolorbox is formatted using a \LaTeX\ minipage if the box is unbreakable. If breakable, the box tries a mimicry of a minipage. In a minipage or parbox, paragraphs are formatted slightly different as the main text. If the key value is set to false, the normal main text behavior is restored. In some situations, this has some unwanted side effects. It is recommended that you use this experimental setting only where you really want to have this feature.

\begin{tcolorbox}[parbox,adjusted title={parbox=true (normal)}]
\lipsum[1-2]
\end{tcolorbox}
\hfill
\begin{tcolorbox}[parbox=false,adjusted title={parbox=false}]
\lipsum[1-2]
\end{tcolorbox}

parbox=true (normal)


parbox=false


/tcb/hyphenationfix=true|false  (default true, initially false)
Long words at the beginning of paragraphs in very narrow boxes will not be hyphenated using \pdflatex. This problem is circumvented by applying the hyphenationfix option.

\tcbset{colframe=blue!75!black,
  fontupper=\normalsize,
  colback=blue!5!white,width=4cm}
\begin{tcolorbox}
Rechnungsadjunktentochter. \Statthaltereikonzipist.
\end{tcolorbox}
\begin{tcolorbox}[hyphenationfix]
Rechnungsadjunktentochter. \Statthaltereikonzipist.
\end{tcolorbox}

parbox=false and hyphenationfix should not be used together. They are targeting different box types and they do not blend very well.

4.19 Files
/tcb/tempfile=(file name)  (no default, initially \jobname.tcbtemp)
Sets (file name) as name for the temporary file which is used inside \tcbwritetemp \textsuperscript{P.126} and \tcbusetemp \textsuperscript{P.126} implicitly.

4.20 \texttt{tcbox} Specials

The following options are applicable for \texttt{tcbox} \textsuperscript{P.14} and \texttt{tcboxmath} \textsuperscript{P.341} only.
/tcb/tcbox raise=(length)  (no default, initially 0pt)
Raises the \texttt{tcbox} \textsuperscript{P.14} by the given \texttt{length}.

\tcbset{colframe=blue!50!black,colback=white,colupper=red!50!black,
  fonttitle=\bfseries,nobeforeafter,center title}
Test \dotfill \texttt{tcbox}[tcbox raise base]{Hello World 1} \dotfill \texttt{tcbox}{Hello World 2} \dotfill \texttt{tcbox}[tcbox raise=5mm]{Hello World 3}

/tcb/tcbox raise base  (style, no value, initially unset)
Raises the \texttt{tcbox} \textsuperscript{P.14} such that the base of its content matches the base of the environmental line; see example above.
/tcb/on line  (style, no value, initially unset)
Combines /tcb/tcbox raise base with /tcb/nobeforeafter \textsuperscript{P.78}. The resulting box behaves analogue to \texttt{fbox}. 96
Controls how \tcbox\textsuperscript{P.14} respects a /tcb/width\textsuperscript{P.34} setting. Feasible values for (mode) are:

- **auto** (initial setting): ignore /tcb/width\textsuperscript{P.34} and set box width according to its content.
- **auto limited**: Set box width according to its content, if it is smaller than /tcb/width\textsuperscript{P.34}. Otherwise, the content is set like in a \tcbox\textsuperscript{P.12} with line breaks.
- **forced center**: Set box width according to /tcb/width\textsuperscript{P.34}. The content is centered and may overlap the box borders.
- **forced left**: Set box width according to /tcb/width\textsuperscript{P.34}. The content is left aligned and may overlap the box borders.
- **forced right**: Set box width according to /tcb/width\textsuperscript{P.34}. The content is right aligned and may overlap the box borders.
- **minimum center**: Set box width according to /tcb/width\textsuperscript{P.34}, if the content fits into. The content is centered and the box width may grow beyond /tcb/width\textsuperscript{P.34}.
- **minimum left**: Set box width according to /tcb/width\textsuperscript{P.34}, if the content fits into. The content is left aligned and the box width may grow beyond /tcb/width\textsuperscript{P.34}.
- **minimum right**: Set box width according to /tcb/width\textsuperscript{P.34}, if the content fits into. The content is right aligned and the box width may grow beyond /tcb/width\textsuperscript{P.34}.

\begin{verbatim}
\tcset{size=small,on line,before upper=\strut, colframe=blue!75!black,colback=blue!5!white, fontupper=\normalsize,width=4cm}
\tcbox[tcbox width=auto]{auto}
\tcbox[tcbox width=auto limited]{auto limited}
\tcbox[tcbox width=auto limited]{auto limited with long text}
\tcbox[tcbox width=forced center]{forced center}
\tcbox[tcbox width=forced center]{forced center with long text}
\tcbox[tcbox width=forced left]{forced left}
\tcbox[tcbox width=forced left]{forced left with long text}
\tcbox[tcbox width=forced right]{forced right}
\tcbox[tcbox width=forced right]{forced right with long text}
\tcbox[tcbox width=minimum center]{minimum center}
\tcbox[tcbox width=minimum center]{minimum center with long text}
\tcbox[tcbox width=minimum left]{minimum left}
\tcbox[tcbox width=minimum left]{minimum left with long text}
\tcbox[tcbox width=minimum right]{minimum right}
\tcbox[tcbox width=minimum right]{minimum right with long text}
\end{verbatim}
4.21 Counters, Labels, and References

/tcb/phantom\(\langle code\rangle\) (no default, initially unset)

The \(\langle code\rangle\) is put in a box at the upper left corner of the tcolorbox. If the tcolorbox is breakable, the \(\langle code\rangle\) is executed for the first box of the break sequence only. If there already was some phantom code given, the new \(\langle code\rangle\) is appended.

The \(\langle code\rangle\) is intended to be used for counter stepping, labelling, and related operations which do not produce visible text.

- The \(\langle code\rangle\) is executed before the title and box content, i.e. counter values are ensured to be increased before usage.
- Labels are ensured to reference the correct page number.
- The \(\langle code\rangle\) is executed only once even during fitting operations for title and box content.
- In combination with the hyperref package, the hyper anchor is set to the upper left corner of the tcolorbox, i.e. links inside the pdf document will jump to the box pleasantly.
- Since the \(\langle code\rangle\) is executed inside a \TeX{} group, only global operations can survive this group.

Examples for the phantom usage are given in Section 15.9 from page 333, e.g. Example 15.1 on page 334.

/tcb/nophantom (no value, initially set)

Removes the phantom code if set before.

/tcb/label\(\langle marker\rangle\) (no default, initially unset)

The \(\langle marker\rangle\) is set as label text for a reference with the \texttt{\ref} macro. Typically, this option is used for numbered boxes, see Subsection 5.1 from page 108, e.g. /tcb/new/auto counter\(\texttt{^P.108}\).

/tcb/phantomlabel\(\langle marker\rangle\) (no default, initially unset)

Equivalent to /tcb/label for an unnumbered box. A \texttt{\phantomsection} from the package hyperref [15] is used to set a correct hyperlink target. This is not needed for a numbered box.

/tcb/label type\(\langle type\rangle\) (no default, initially unset)

This option key can be used only in conjunction with the cleveref package [5] which has to be loaded separately. \(\langle type\rangle\) has to be a cross-reference type known to cleveref like theorem, algorithm, result, etc. References made with cleveref will use this type. Note that using label type will result in compilation errors, if cleveref is not loaded. For an example, see Theorem 16.3.5 on page 359.

/tcb/no label type (no value, initially set)

Removes a /tcb/label type, if set before.

/tcb/step\(\langle counter\rangle\) (no default, initially unset)

Shortcut for \texttt{phantom\{\refstepcounter{#1}\}}. The given \(\langle counter\rangle\) is increased and ready for labelling. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 5.1 from page 108.

/tcb/step and label\(\langle counter\rangle\}\{\langle marker\rangle\} (no default, initially unset)

Shortcut for using /tcb/step and /tcb/label. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 5.1 from page 108.
If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 115 is used, this key describes the \textit{entry} for an entry into the generated list, e.g.

\begin{tcblist}[numberline,thetcbcounter]{My beautiful Example}

See Section 15.9 from page 333 for a complete example.

\begin{tcblist}[]{My beautiful Example},
\begin{tcblist}[numberline,thetcbcounter]{My beautiful Example}

See Section 15.9 from page 333 for a complete example.

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 115 is used, list entries are generated automatically. With this key, you can enforce an entry to the given \textit{list} with the given \textit{type}. This issues:

\begin{tcblist}[]{\textit{entry text}}

If the \texttt{nameref} package is loaded, the given \textit{text} is used for corresponding \texttt{nameref} macros. Typically, the \textit{text} will be chosen to be identical or nearly identical to the one for \texttt{tcb/title}.

\begin{verbatim}
\newtcolorbox[auto counter,number within=section]{pabox}[2]{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Examp.-\textsc{#2},#1}
\begin{pabox}[label={mynamelabel},nameref={Title or anything else}]{Title text}
This is a tcolorbox.
\end{pabox}
This box is automatically numbered with \texttt{\ref{mynamelabel}} on page \texttt{\pageref{mynamelabel}}.
The box is titled '\texttt{\nameref{mynamelabel}}'.

\begin{Examp} 4.1: Title text
This is a tcolorbox.
\end{Examp}
This box is automatically numbered with \texttt{4.1} on page \texttt{99}.
The box is titled 'Title or anything else'.

/\texttt{tcb/nameref} is used automatically inside \texttt{\newtcbtheorem} \textsuperscript{P.339}.

N 2014-09-19
/tcb/list entry=(text)
(no default, initially unset)

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 115 is used, this key describes the \textit{entry} for an entry into the generated list, e.g.

list entry={\protect\numberline{\thetcbcounter}My beautiful Example}

See Section 15.9 from page 333 for a complete example.

N 2014-09-19
/tcb/list text=(text)
(style, no default)

This is a shortcut for setting \texttt{tcb/list entry} to \texttt{\protect\numberline{\thetcbcounter}(text)}. So, the following settings are identical:

list text={My beautiful Example}, \texttt{tcb/list entry}={\protect\numberline{\thetcbcounter}My beautiful Example}

See Section 15.9 from page 333 for a complete example.

N 2014-09-19
/tcb/add to list={\langle\text{list}\rangle}{\langle\text{type}\rangle}
(no default, initially unset)

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 115 is used, list entries are generated automatically. With this key, you can enforce an entry to the given \textit{list} with the given \textit{type}. This issues:

\addcontentsline{\langle\text{list}\rangle}{\langle\text{type}\rangle}{\langle\text{entry text}\rangle}

N 2014-09-19
/tcb/nameref=(text)
(no default, initially unset)

If the \texttt{nameref} package is loaded, the given \textit{text} is used for corresponding \texttt{nameref} macros. Typically, the \textit{text} will be chosen to be identical or nearly identical to the one for \texttt{tcb/title}.

\begin{verbatim}
\begin{verbatim}
\newtcolorbox[auto counter,number within=section]{pabox}[2]{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Examp.-\textsc{#2},#1}
\begin{pabox}[label={mynamelabel},nameref={Title or anything else}]{Title text}
This is a tcolorbox.
\end{pabox}
This box is automatically numbered with \texttt{\ref{mynamelabel}} on page \texttt{\pageref{mynamelabel}}.
The box is titled '\texttt{\nameref{mynamelabel}}'.

\begin{Examp} 4.1: Title text
This is a tcolorbox.
\end{Examp}
This box is automatically numbered with \texttt{4.1} on page \texttt{99}.
The box is titled 'Title or anything else'.

/\texttt{tcb/nameref} is used automatically inside \texttt{\newtcbtheorem} \textsuperscript{P.339}.
\end{verbatim}
\end{verbatim}

N 2014-09-19
/tcb/list entry=(text)
(no default, initially unset)

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 115 is used, this key describes the \textit{entry} for an entry into the generated list, e.g.

list entry={\protect\numberline{\thetcbcounter}My beautiful Example}

See Section 15.9 from page 333 for a complete example.

N 2014-09-19
/tcb/list text=(text)
(style, no default)

This is a shortcut for setting \texttt{tcb/list entry} to \texttt{\protect\numberline{\thetcbcounter}(text)}. So, the following settings are identical:

list text={My beautiful Example}, \texttt{tcb/list entry}={\protect\numberline{\thetcbcounter}My beautiful Example}

See Section 15.9 from page 333 for a complete example.

N 2014-09-19
/tcb/add to list={\langle\text{list}\rangle}{\langle\text{type}\rangle}
(no default, initially unset)

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 115 is used, list entries are generated automatically. With this key, you can enforce an entry to the given \textit{list} with the given \textit{type}. This issues:

\addcontentsline{\langle\text{list}\rangle}{\langle\text{type}\rangle}{\langle\text{entry text}\rangle}

N 2014-09-19
/tcb/nameref=(text)
(no default, initially unset)

If the \texttt{nameref} package is loaded, the given \textit{text} is used for corresponding \texttt{nameref} macros. Typically, the \textit{text} will be chosen to be identical or nearly identical to the one for \texttt{tcb/title}.

\begin{verbatim}
\begin{verbatim}
\newtcolorbox[auto counter,number within=section]{pabox}[2]{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Examp.-\textsc{#2},#1}
\begin{pabox}[label={mynamelabel},nameref={Title or anything else}]{Title text}
This is a tcolorbox.
\end{pabox}
This box is automatically numbered with \texttt{\ref{mynamelabel}} on page \texttt{\pageref{mynamelabel}}.
The box is titled '\texttt{\nameref{mynamelabel}}'.

\begin{Examp} 4.1: Title text
This is a tcolorbox.
\end{Examp}
This box is automatically numbered with \texttt{4.1} on page \texttt{99}.
The box is titled 'Title or anything else'.

/\texttt{tcb/nameref} is used automatically inside \texttt{\newtcbtheorem} \textsuperscript{P.339}.
\end{verbatim}
\end{verbatim}

N 2014-09-19
/tcb/list entry=(text)
(no default, initially unset)

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 115 is used, this key describes the \textit{entry} for an entry into the generated list, e.g.

list entry={\protect\numberline{\thetcbcounter}My beautiful Example}

See Section 15.9 from page 333 for a complete example.

N 2014-09-19
/tcb/list text=(text)
(style, no default)

This is a shortcut for setting \texttt{tcb/list entry} to \texttt{\protect\numberline{\thetcbcounter}(text)}. So, the following settings are identical:

list text={My beautiful Example}, \texttt{tcb/list entry}={\protect\numberline{\thetcbcounter}My beautiful Example}

See Section 15.9 from page 333 for a complete example.

N 2014-09-19
/tcb/add to list={\langle\text{list}\rangle}{\langle\text{type}\rangle}
(no default, initially unset)

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 115 is used, list entries are generated automatically. With this key, you can enforce an entry to the given \textit{list} with the given \textit{type}. This issues:

\addcontentsline{\langle\text{list}\rangle}{\langle\text{type}\rangle}{\langle\text{entry text}\rangle}

N 2014-09-19
/tcb/nameref=(text)
(no default, initially unset)

If the \texttt{nameref} package is loaded, the given \textit{text} is used for corresponding \texttt{nameref} macros. Typically, the \textit{text} will be chosen to be identical or nearly identical to the one for \texttt{tcb/title}.

\begin{verbatim}
\begin{verbatim}
\newtcolorbox[auto counter,number within=section]{pabox}[2]{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Examp.-\textsc{#2},#1}
\begin{pabox}[label={mynamelabel},nameref={Title or anything else}]{Title text}
This is a tcolorbox.
\end{pabox}
This box is automatically numbered with \texttt{\ref{mynamelabel}} on page \texttt{\pageref{mynamelabel}}.
The box is titled '\texttt{\nameref{mynamelabel}}'.

\begin{Examp} 4.1: Title text
This is a tcolorbox.
\end{Examp}
This box is automatically numbered with \texttt{4.1} on page \texttt{99}.
The box is titled 'Title or anything else'.

/\texttt{tcb/nameref} is used automatically inside \texttt{\newtcbtheorem} \textsuperscript{P.339}.
\end{verbatim}
\end{verbatim}
A `\hypertarget` from the package `hyperref` \cite{hyperref} is used to create an internal link of an anchor \langle marker \rangle. This \langle marker \rangle can be referenced by `\hyperlink` or `/tcb/hyperlink` \footnote{P.199}.

```
% \usepackage{hyperref}
\begin{tcolorbox}[enhanced,
  colback=red!10,colframe=red!50!black,
  hypertarget=hypertwinA,
  hyperlink=hypertwinB,
  title=Box A]
Click me to jump to Box B.
\end{tcolorbox}
```

Box A

Click me to jump to Box B.

Sets a PDF bookmark with the given \langle text \rangle, if the package `bookmark` \cite{bookmark} is loaded. This bookmark is set with an automated destination (the current box) and is set one level below the current bookmark level.

```
% \usepackage{bookmark}
\begin{tcolorbox}[colback=blue!10,colframe=blue!50!black,
  bookmark=Example for using a bookmark,
  title=Example for using a bookmark]
Open the bookmark view of the previewer to see the bookmark.
\end{tcolorbox}
```

Example for using a bookmark

Open the bookmark view of the previewer to see the bookmark.

Identical to `/tcb/bookmark`, but additional \langle options \rangle from the package `bookmark` \cite{bookmark} can be given.

```
% \usepackage{bookmark}
\begin{tcolorbox}[colback=red!10,colframe=red!50!black,
  bookmark*={color=red,italic,bold}
  {Another bookmark example},
  title=Red and bold bookmark]
Open the bookmark view of the previewer to see the bookmark.
\end{tcolorbox}
```

Red and bold bookmark

Open the bookmark view of the previewer to see the bookmark.
4.22 Even and Odd Pages

Also see \texttt{/tcb/toggle left and right}^{P.46} and \texttt{/tcb/toggle enlargement}^{P.86} for further even/odd options.

\begin{itemize}
  \item \texttt{/tcb/check odd page=\texttt{true}|false} \hspace{1cm} (default \texttt{true}, initially \texttt{false})

  If set to \texttt{true}, a precise even/odd page testing for the current box is applied. This is done by using labels. If a box moves to another page, the document has to be compiled twice for the correct settings. If set to \texttt{false}, even/odd page tests may give wrong results for the first box of a page.\texttt{/tcb/toggle left and right}^{P.46}, \texttt{/tcb/toggle enlargement}^{P.86}, and \texttt{/tcb/if odd page} automatically set \texttt{check odd page}, but for \texttt{\tbifoddpage}^{P.103} this option has to be set explicitly.

  \begin{tcolorbox}
  \texttt{if odd page}=\{\texttt{odd options}\}\{\texttt{even options}\} \hspace{1cm} (style, no default)

  If the current box is on an odd page, the \texttt{\{odd options\}} are applied. On an even page, the \texttt{\{even options\}} are applied. \texttt{/tcb/check odd page} is automatically set for precise even/odd page testing.
  \end{tcolorbox}

\begin{itemize}
  \item \texttt{/tcb/if odd page or oneside=\{\texttt{odd options}\}\{\texttt{even options}\}} \hspace{1cm} (style, no default)

    For onesided documents, the \texttt{\{odd options\}} are applied always. For twosided documents, this style is identical to \texttt{/tcb/if odd page}.
\end{itemize}
This option needs the \texttt{breakable} library, see Section 17 on page 363.

For breakable boxes, if the current partial box is on an odd page, the \textit{odd options} are applied. On an even page, the \textit{even options} are applied. \texttt{/tcb/check odd page} is automatically set for precise even/odd page testing.

In contrast to \texttt{/tcb/if odd page}, \texttt{/tcb/if odd page*} is used on every partial box of a break sequences and not only on the first box. Another difference is that \texttt{/tcb/if odd page*} is applied quite \textit{late} during option processing, while \texttt{/tcb/if odd page} is applied immediately.

\texttt{/tcb/if odd page*} is implemented as \texttt{/tcb/if odd page} packed into \texttt{/tcb/extras}.

\begin{tcolorbox}[breakable,if odd page*={colback=yellow!50}{colback=red!50}]
This breakable box is colored in yellow on an odd page and is colored in red on an even page. For every partial box, the test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots sequence for a long content.
\end{tcolorbox}

For onesided documents, the \textit{odd options} are applied always. For twosided documents, this style is identical to \texttt{/tcb/if odd page*}. 

\begin{tcolorbox}
This breakable box is colored in yellow on an odd page and is colored in red on an even page. For every partial box, the test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots sequence for a long content.
\end{tcolorbox}
If the current box is on an odd page, the \{odd code\} is executed. On an even page, the \{even code\} is executed. For precise even/odd page testing, the /tcb/check odd page\textsuperscript{P.101} has to be set manually inside the box options.

The macro \texttt{tcbifoddpage} can be used inside underlay, overlay, or watermark code to test if the box is on an odd page. This will work also for boxes in a break sequence. The macro can also be used inside the box \texttt{content text}. For unbreakable boxes, the correct page test is applied. But for /tcb/breakable\textsuperscript{P.365} boxes, \texttt{tcbifoddpage} will always give the result for the page of the \textit{first} box inside the box \texttt{content text}. If needed, the methods from the packages \texttt{changepage} or \texttt{ifoddpage} could be used here.

```
\tcbset{colframe=blue!75!black,colback=white,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,check odd page, title={Example for a box on an \tcbifoddpage\{odd\}\{even\} page}, watermark text={\tcbifoddpage\{Odd\}\{Even\} page!}]
\lipsum[1]
\end{tcolorbox}
```

\begin{example}
\end{example}

For onesided documents, the \{odd code\} is executed always. For twosided documents, this macro is identical to \texttt{tcbifoddpage}.
This is a unique identifier (arabic number) for a tcolorbox. It is locally defined inside boxes and has no meaning outside. It is used for precise even/odd page testing, but may also be valuable for elaborate user code.

\begin{tcolorbox}[colback=yellow!5,title=Box \thetcolorboxnumber]
This box is \thetcolorboxnumber.
\tcbox[on line,size=fbox]{This box is \thetcolorboxnumber} and
\tcbox[on line,size=fbox]{this box is \thetcolorboxnumber}.
This box is \thetcolorboxnumber.
\end{tcolorbox}

\newpage

Box 1119

This box is 1119. This box is 1120 and this box is 1121. This box is 1119.

\begin{tcolorbox}[colback=yellow!5,check odd page, title=Box on page \thetcolorboxpage]
This box is located on page \thetcolorboxpage.
\end{tcolorbox}

Box on page 104

This box is located on page 104.
4.23 Externalization

See Section 23 on page 446 for the \texttt{external} library of \texttt{tcolorbox}.

If the \texttt{externalization} library of the \texttt{tikz} package is used and \texttt{/tcb/graphical environment}\textsuperscript{*}\textsuperscript{P.135} is set to \texttt{tikzpicture}, a \texttt{tcolorbox} could trigger the externalization process which will arise a compilation error.

To avoid this, there are two possible strategies:

- Ensure, that \texttt{\tikzexternaldisable} is set before a \texttt{tcolorbox} is used. If you typically use the pattern \texttt{\tikzexternalenable some picture \tikzexternaldisable}, there is nothing to care about.

- If \texttt{externalization} is enabled globally, use \texttt{/tcb/shield externalize} to shield any \texttt{tcolorbox}. The preamble code could look like this:

\begin{verbatim}
\use tikzlibrary{external}  
\tikzexternalize  
\tcbsset{shield externalize}
\end{verbatim}

\texttt{/tcb/shield externalize=\texttt{true}|\texttt{false}} (default \texttt{true}, initially \texttt{false})

If set to \texttt{true}, the drawing part of the \texttt{tcolorbox} is not being externalized which is a good thing at the current state of art. Nevertheless, if the \texttt{tcolorbox} contains a \texttt{tikzpicture}, this picture is still externalized. Pictures drawn with help of \texttt{/tcb/tikz upper}\textsuperscript{*}\textsuperscript{P.69} or alike are not externalized.

If a \texttt{tcolorbox} is used inside a node of an encircling \texttt{tikzpicture} which is externalized, do \textbf{not} use \texttt{\tikzexternaldisable} in front of the \texttt{tcolorbox}. \texttt{/tcb/shield externalize} is deactivated automatically inside a \texttt{tikzpicture}.

\texttt{/tcb/external=\langle file name \rangle} (no default, initially unset)

Convenience option which calls \texttt{\tikzsetnextfilename{\langle file name \rangle}}. Typically, it may be used inside the option list of a \texttt{tcolorbox} to set the externalization \langle file name \rangle for the first \texttt{tikzpicture} which is discovered \textit{inside} the box content. The package \texttt{tikz} [22] or the library \texttt{skins} has to be loaded to use this option. Additionally, \texttt{\usetikzlibrary{external}} has to be used.

\texttt{/tcb/remake=\texttt{true}|\texttt{false}} (default \texttt{true}, initially \texttt{false})

Convenience option which calls \texttt{/tikz/external/remake next}. Typically, it may be used inside the option list of a \texttt{tcolorbox} to force the remake of the first \texttt{tikzpicture} which is discovered \textit{inside} the box content. The package \texttt{tikz} [22] or the library \texttt{skins} has to be loaded to use this option. Additionally, \texttt{\usetikzlibrary{external}} has to be used.

4.24 Miscellaneous

\texttt{/tcb/reset} (no value, initially set)

Sets (nearly) all \texttt{tcolorbox} settings (including loaded libraries) back to their default values plus any settings given by \texttt{\tcbssetforeverylayer}\textsuperscript{*}\textsuperscript{P.13} /\texttt{tcb/savedelimiter}\textsuperscript{*}\textsuperscript{P.26} and \texttt{/tcb/capture}\textsuperscript{*}\textsuperscript{P.94} keep their values. Also, all raster values (see Section 14 on page 277) are not resetted.

This option is useful for boxes in boxes where the inner box should not inherit the settings of the outer box. Note that for boxes inside boxes the \texttt{reset} is done automatically, if the standard settings of the package are used (v2.40 and above), see Section 4.16 from page 91.
\documentclass{beamer}
\usepackage[many]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcolorbox}[title=My title,fonttitle=\bfseries,
enhanced,colframe=red!50!black,colback=red!10,colbacktitle=red,
sidebyside,righthand width=3cm,
lowerbox=invisible,lower separated=false,
drop lifted shadow,
only=<1>{colbacktitle=yellow,coltitle=red!50!black,colframe=red},
only=<3>{colback=yellow!50,watermark text={Attention!}},
only=<3->{lowerbox=visible}]
This is a test.
\begin{itemize}[<+->]
\item One
\item Two
\item \alert<3>{Three}
\item Four
\end{itemize}
\tcblower
\begin{equation*}
\int\limits_{1}^{x} \frac{1}{t}~dt = \ln(x).
\end{equation*}
\tcblower
\end{tcolorbox}
\end{frame}
\end{document}
Annihilates the current \texttt{tcolorbox} as far as possible. Basically, this comments out the whole \texttt{tcolorbox} by using a key. If the option list of the current \texttt{tcolorbox} contains arbitrary code with global impact (like counter settings), these actions are not undone automatically. Nevertheless, the effects of \texttt{/tcb/phantom} \footnote{p. 98}, \texttt{/tcb/step} \footnote{p. 98}, \texttt{/tcb/new/auto\counter} \footnote{p. 108}, etc., are removed by \texttt{/tcb/void}.

\begin{tcolorbox}[title=This box is completely removed by the following key, void]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This option key cannot be applied for every situation. For example, if several box environments with the same environment name are nested, for the outer environment \texttt{/tcb/void} cannot be used, since the end of the inner environment will be misinterpreted as end of the outer environment.
The initialization options are only applicable for the generation of new environments and commands based on \texttt{tcolorbox} and friends. Particularly, they can be used for

- \texttt{\newtcolorbox} \texttt{P.15},
- \texttt{\newtcbox} \texttt{P.16},
- \texttt{\newtcbrule} \texttt{P.302},
- \texttt{\newtcblisting} \texttt{P.304},
- \texttt{\newtcbinputlisting} \texttt{P.304},
- \texttt{\newtcbtheorem} \texttt{P.339}, and
- \texttt{\newtcbbox} \texttt{P.411}.

Typically, these options may generate counters and alike. It is strongly recommended that you use initialization options inside the preamble only. Otherwise, you may get trouble when using \LaTeX{}'s \texttt{\include} features.

### 5.1 Numbered Boxes

Counters assigned using the initialization options are administrated automatically. Especially, they are increased for each new box. Independent from the real counter name, the counter value can be referenced by \texttt{\thetcbcounter}, e.g. inside the title of the box. The real counter name is stored inside \texttt{\tcbcounter}.

\texttt{\tcb/new/auto counter} (no value, initially unset)

Creates a new counter automatically. With \texttt{\tcb/new/number format} \texttt{P.110} and \texttt{\tcb/new/number within} \texttt{P.110}, the appearance and behavior of the counter can be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\begin{minipage}{1\textwidth}
\begin{verbatim}
\newtcolorbox{auto counter,number within=section}{pabox}{2}{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Examp.~\thetcbcounter: #2,#1}
\end{verbatim}
\end{minipage}

\begin{minipage}{1\textwidth}
\texttt{\begin{pabox}[label={myautocounter}]{Title with number}
This box is automatically numbered with \texttt{\ref{myautocounter}} on page \texttt{\pageref{myautocounter}}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{|\thetcbcounter|}. The real counter name is \texttt{tcb@cnt@pabox}.
\end{pabox}}
\end{minipage}

\textbf{Examp. 5.1: Title with number}

This box is automatically numbered with 5.1 on page 108. Inside the box, the 5.1 can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@pabox}. 

108
Here, a counter from another \texttt{tcolorbox} is reused. Note that the settings for \texttt{/tcb/new/number format} \texttt{^P.110} and \texttt{/tcb/new/number within} \texttt{^P.110} are inherited and cannot be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\begin{mybox}[label=\texttt{myusecounterfrom}]{Title with continued number}
This box is automatically numbered with \texttt{\ref{myusecounterfrom}} on page \texttt{\pageref{myusecounterfrom}}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@pabox}.
\end{mybox}

\begin{mybox}[label=\texttt{myusecounter}]{Title with \LaTeX\ number}
This box is automatically numbered with \texttt{A} on page \texttt{109}. Inside the box, the \texttt{A} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{myexample}.
\end{mybox}

An existing \LaTeX\ \texttt{counter} is used for numbering. In contrast to \texttt{/tcb/new/use counter}, the options \texttt{/tcb/new/number format} \texttt{^P.110} and \texttt{/tcb/new/number within} \texttt{^P.110} are ignored. Use this for counters which are already configured outside the \texttt{tcolorbox} package, e.g. the standard \texttt{figure} counter.

The created boxes are not numbered. This is the default. The option may be used to overrule a previous option.
/tcb/new/number within=(counter)  (no default, initially unset)
The automatic counter is set to zero, if \(\langle\text{counter}\rangle\) is increased. Additionally, during output, the value of \(\langle\text{counter}\rangle\) is prepended to the value of the automatic counter.
To preprend the automatic counter with the chapter number and to reset it with every new chapter, use:

```
number within=chapter
```

See /tcb/new/use counter \textsuperscript{P.109} for a complete example.

/tcb/new/number format=(format macro)  (no default, initially \texttt{\arabic})
Declares the format of the automatic counter. The \(\langle\text{format macro}\rangle\) can be any valid \LaTeX\ number formatting macro like \texttt{\arabic}, \texttt{\roman}, etc.
To display the counter value in large roman numbers, use:

```
number format=\Roman
```

See /tcb/new/auto counter \textsuperscript{P.108} for a complete example.

/tcb/new/number freestyle=(code)  (no default, initially unset)
Allows advanced control over the complete number format. This option overrules the format given by /tcb/new/number within and /tcb/new/number format. Nevertheless, you can combine it with /tcb/new/number within to get the desired reset property.
The \(\langle\text{code}\rangle\) is some formatting code which should contain \texttt{\tcbcounter} to reference the automated counter. Since this \(\langle\text{code}\rangle\) is expanded, you have to secure each macro with \texttt{\noexpand} with exception of \texttt{\tcbcounter}.

```
\newtcolorbox[auto counter, number within=section, number freestyle={(Q/\noexpand\thesection/\noexpand\Alph{\tcbcounter})}],
}{phbox}[2]
{%
colback=yellow!15!white,colframe=blue!75!black,fonttitle=\bfseries,
title=Question~\texttt{\tcbcounter}: #2,#1}
```

```
\begin{phbox}[label={myfreestyle}]{Title with freestyle number}
This box is automatically numbered with \texttt{\ref{myfreestyle}} on page \texttt{\pageref{myfreestyle}}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@phbox}.
\end{phbox}
```

```
\textbf{Question (Q/5/A): Title with freestyle number}
This box is automatically numbered with (Q/5/A) on page 110. Inside the box, the (Q/5/A) can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@phbox}.
```

110
The following options `/tcb/new/crefname` and `/tcb/new/Crefname` need to be set inside the preamble.

The option key can be used only in conjunction with the `cleveref` package which has to be loaded separately. It creates a cross-reference type for the new `tcolorbox`es, where the lowercase `<singular>` and `<plural>` forms of the cross-reference are given. This type is the environment or macro name and `/tcb/label type P.98` is set automatically. See `/tcb/label type P.98` and [5] for more information.

Definition in the preamble:

```latex
% \usepackage{cleveref}
\newtcolorbox[auto counter,number within=section,
  crefname={bluebox}{blueboxes}]{mybluebox}[
  colback=blue!5!white,colframe=blue!75!black,fonttitle=\bfseries,
  title=Bluebox \thetcbcounter: #2,#1]
% \usepackage{varioref}
% \usepackage{cleveref}
\begin{mybluebox}[label={myreference}]{My title}
This is an example.
\end{mybluebox}
\Cref{myreference}, \cref{myreference}.
\Cpageref{myreference}, \cpageref{myreference}.
\nameCref{myreference}, \namecref{myreference}.
With \texttt{varioref}:
\Vref{myreference}, \vref{myreference}.
\Vref*{myreference}, \vref*{myreference}.
```

Bluebox 5.1: My title

This is an example.

Bluebox 5.1, bluebox 5.1.
Page 111, page 111.
Bluebox, bluebox.
5.1, 111.
With varioref:
Bluebox 5.1, bluebox 5.1.
Used to comfortably blend into an existing schema of naming and numbering for some selected cases. For example, a \tcolorbox can be used to display and entitle an image pretending to be a standard figure environment. Here, /tcb/title^{P.18} is used instead of the standard \caption and /tcb/list text^{P.99} can be used instead of the optional parameter of the standard \caption.

Feasible values for \langle name \rangle are:

- **figures**: blend into the standard figure environment.
- **tables**: blend into the standard table environment.
- **listings**: blend into the standard \lstlisting environment of the package listings \cite{6}.

Note that blend into=listings can only be used in the document content or, preferably, inside a \AtBeginDocument clause! Using it without \AtBeginDocument inside the preamble does not work since the listings packages initializes its counter also inside \AtBeginDocument.

```latex
\begin{figure}[htb]
\centering\includegraphics[height=4cm]{lichtspiel.jpg}
\caption{A standard figure}
\end{figure}

\newtcolorbox[blend into=figures]{myfigure}[2]{float=htb,capture=hbox, title={#2},every float=\centering,#1}

\begin{myfigure}{A tcolorbox figure}
\includegraphics[height=4cm]{lichtspiel.jpg}
\end{myfigure}
```

Figure 1: A standard figure

Figure 2: A tcolorbox figure
/tcb/blend before title=(value) (no default, initially colon)

This option formats the title output of /tcb/new/blend into P.112. Note that this is a common tcolorbox option which should be set globally or in the normal option part of \newtcolorbox P.15.

Feasible values for \textlangle value\textrangle are:

- **colon**: use name/number plus colon.
- **dash**: use name/number plus dash.
- **colon hang**: use name/number plus colon with hanging indent.
- **dash hang**: use name/number plus dash with hanging indent.

```latex
\newtcolorbox[blend into=figures]{myfigure}[2][\{float=htb,capture= hbox, blend before title=dash hang,title={#2},every float=\centering,#1}\]
\begin{myfigure}{A tcolorbox figure with quite a long title}
  \includegraphics[height=5cm]{lichtspiel.jpg}
\end{myfigure}
```

Figure 3 – A tcolorbox figure with quite a long title
This option formats the title output of \texttt{/tcb/new/blend} into \texttt{P.112}. The \texttt{(code)} takes one parameter, the name/number. Use this, if \texttt{/tcb/blend before title} \texttt{P.113} is not flexible enough.

\begin{myfigure}{A tcolorbox figure}
\includegraphics[height=6cm]{lichtspiel.jpg}
\end{myfigure}

Figure 4
A tcolorbox figure
5.2 Lists of \texttt{tcolorbox}

For figures and tables, \LaTeX provides the \texttt{listoffigures} and \texttt{listoftables} commands to create lists of these numbered entities. Also, a \texttt{tcolorbox} can be part of such a kind of list.

1. Assign a list \langle name \rangle by the \textit{initialization} option /tcb/new/list inside.
2. Optionally, a new \langle type \rangle for list entries may be assigned by the \textit{initialization} option /tcb/new/list type.
3. List entries a generated automatically within each new \texttt{tcolorbox} using the above initialization.
   - If /tcb/list entry—P.99 is set, the entry is generated with it.
   - Otherwise, if /tcb/title—P.18 is set, the entry is generated with it.
   - Otherwise, the entry is generated with the current number and the environment name.
4. The generated list is displayed by \texttt{tcblistof}.

\texttt{/tcb/new/list inside=⟨name⟩} (no default, initially unset)
Assigns a list or contents file to the generated \texttt{tcolorbox}es. Entries to this list are saved to a file which gets the \langle name \rangle as file name extension. The list is referenced by this name in \texttt{tcblistof}. For example:

\begin{verbatim}
list inside=exam
\end{verbatim}

See Section 15.9 from page 333 for a complete example.

\texttt{/tcb/new/list type=⟨type⟩} (no default, initially \texttt{tcolorbox})
Optionally, some \langle type \rangle can be assigned to the list entries. For a new \langle type \rangle, a macro \texttt{\l@⟨type⟩} has to exist which controls the format of the list entry. The default type is defined by

\begin{verbatim}
\newcommand*{\l@tcolorbox}{\@dottedtocline{1}{1.5em}{2.3em}}
\end{verbatim}

This is identical to the \texttt{\l@section} setting of \LaTeX. \texttt{\l@tcolorbox} can be redefined or a new \langle type \rangle can be assigned.

\texttt{\tcblistof}\[\langle macro \rangle\{⟨name⟩\}\{⟨title text⟩\}]
Displays the generated list of \texttt{tcolorbox}es with the given \langle name \rangle. The heading is generated by \langle macro\rangle\{⟨title text⟩\} where \texttt{section} is the default setting for \langle macro\rangle.
To display the list inside a subsection, use for example:

\begin{verbatim}
\tcblistof\[subsection\{exam\}\{List of Exercises\}
\end{verbatim}

The result of the example is found as Subsection 15.10 on page 336.

! The core of the list is generated by \texttt{@starttoc\{⟨name⟩\}} which can be wrapped into an own macro.
A side by side box is a special \texttt{tcolorbox} where the upper and lower part of the box are set side by side. All boxes of this kind are unbreakable.

Further side by side options for code examples are \texttt{/tcb/listing side text}, \texttt{/tcb/text side listing}, \texttt{/tcb/listing outside text}, and \texttt{/tcb/text outside listing}.

### 6.1 Basic Settings

\texttt{\texttt{tcb/sidebyside}=true|false} (default true, initially false)

Normally, the upper part and the lower part of the box have their positions as their names suggest. If \texttt{sidebyside} is set to true, the upper part is drawn left-handed and the lower part is drawn right-handed. Both parts are drawn together with the geometry settings of the upper part but the space is divided horizontally according to the following options. Colors, fonts, and box content additions are used individually. The resulting box is unbreakable.

\begin{verbatim}
\tcset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,sidebyside]
This is the upper (\textit{left-handed}) part.
tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
\end{verbatim}
Sets the vertical \textit{alignment} for the left-handed and right-handed part. Feasible values for \textit{alignment} are:

- \textbf{center}: identical to \texttt{minipage} option \texttt{c}.
- \textbf{top}: identical to \texttt{minipage} option \texttt{t} (aligns the top lines of the left-handed and right-handed side according to their baselines).
- \textbf{bottom}: identical to \texttt{minipage} option \texttt{b} (aligns the bottom lines of the left-handed and right-handed side according to their baselines).
- \textbf{center seam}: aligns the center of the left-handed and right-handed side.
- \textbf{top seam}: aligns the very top seam of the left-handed and right-handed side.
- \textbf{bottom seam}: aligns the very bottom seam of the left-handed and right-handed side.

\begin{tcolorbox}[adjusted title=center, sidebyside align=center]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}
\hfill
\begin{tcolorbox}[adjusted title=top, sidebyside align=top]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}
\hfill
\begin{tcolorbox}[adjusted title=bottom, sidebyside align=bottom]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}

\textbf{center}, \textbf{top}, and \textbf{bottom} are identical to the known corresponding \texttt{minipage} options. While this is the preferred approach for text content, the result for boxed content like tables or images may not be as expected.

For such content, one may use \textbf{center seam}, \textbf{top seam}, and \textbf{bottom seam}. For example, \textbf{top seam} aligns the very top seam of the left-handed and right-handed side.
This is my description text for the pictures displayed on the right-handed side.

center seam

This is my description text for the pictures displayed on the right-handed side.

top seam

This is my description text for the pictures displayed on the right-handed side.

bottom seam

This is my description text for the pictures displayed on the right-handed side.
Sets the horizontal distance between the left-handed and right-handed part to \(\text{\texttt{\textbackslash length}}\).

\begin{tcolorbox}[adjusted title=Wide gap,sidebyside gap=30mm]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=Narrow gap,sidebyside gap=1mm]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}

Sets the width of the left-handed part to the given \(\text{\texttt{\textbackslash length}}\).

\begin{tcolorbox}[title=My title,sidebyside,righthand width=3cm]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}

Sets the width of the right-handed part to the given \(\text{\texttt{\textbackslash length}}\).

\begin{tcolorbox}[title=My title,sidebyside,lefthand width=3cm]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
/tcb/lefthand ratio={fraction} (no default, initially 0.5)
Sets the width of the left-handed part to the given {fraction} of the available space. {fraction} is a value between 0 and 1.

\begin{tcolorbox}[title=My title,sidebyside,lefthand ratio=0.25]
This is the upper \textit{(left-handed)} part.
\tcblower
This is the lower \textit{(right-handed)} part.
\end{tcolorbox}

My title

This is the upper (left-handed) part. This is the lower (right-handed) part.

/tcb/righthand ratio={fraction} (no default, initially 0.5)
Sets the width of the right-handed part to the given {fraction} of the available space. {fraction} is a value between 0 and 1.

\begin{tcolorbox}[title=My title,sidebyside,righthand ratio=0.25]
This is the upper \textit{(left-handed)} part.
\tcblower
This is the lower \textit{(right-handed)} part.
\end{tcolorbox}

My title

This is the upper (left-handed) part. This is the lower (right-handed) part.
If one side of a side-by-side box should be adapted to the width of its content, this width has to be computed beforehand. The following example uses a savebox \mysavebox to store the picture to determine its width. A more convenient way to handle this task is to use the methods from Section 6.2 on page 122.

\begin{tikzpicture}
\path[fill=red!20,draw=red!50!black]
(0,0) node[below]{A} -- (3,1) node[right]{B}
-- (1,4) node[above]{C} -- cycle;
\end{tikzpicture}

The Triangle

6.2 Advanced Settings from the \texttt{xparse} Library

All following macros and options need the \texttt{xparse} library to be loaded, see Section 22 on page 433.

\begin{tcbsidebyside}[(options)]\{\texttt{left-handed content}\}\{\texttt{right-handed content}\}

Creates a colored box using more or less arbitrary \texttt{(options)} for a \texttt{tcolorbox}\textsuperscript{12}. The \texttt{/tcb/sidebyside}\textsuperscript{116} option is set to \texttt{true} and the \texttt{(left-handed content)} and \texttt{(right-handed content)} is filled into the box appropriately. The resulting box is unbreakable. \texttt{tcb/sidebyside} is not only a shortcut for using a normal \texttt{tcolorbox}\textsuperscript{12} with \texttt{/tcb/sidebyside}\textsuperscript{116}, but allows setting further options like \texttt{/tcb/sidebyside adapt}\textsuperscript{123} and \texttt{/tcb/sidebyside switch}\textsuperscript{125}.

\begin{verbatim}
\% \tcbuselibrary{skins,xparse}
% \usepackage{lipsum}
\tcbsidebyside[title=The Triangle,
sidebyside adapt=left,
bicolor,colback=white,colbacklower=yellow!10,
fonttitle={\bfseries},center title,drop lifted shadow,]
\begin{tikzpicture}
\path[fill=red!20,draw=red!50!black]
(0,0) node[below]{A} -- (3,1) node[right]{B}
-- (1,4) node[above]{C} -- cycle;
\end{tikzpicture}
\end{tcbsidebyside}
\% \lipsum[1]
\end{verbatim}

The Triangle

The option allows the left-handed and/or right-handed side to determine the dimensions of the box. This option is only valid inside `\tcb\texttt{sidebyside}`\textsuperscript{P.122}.

Feasible values for \texttt{\langle side(s)\rangle} are:

- \texttt{none}: no measurement of left-handed and right-handed side.
- \texttt{left}: the actual width of the left-handed content is used to set \texttt{/tcb/lefthand width}\textsuperscript{P.119}.
- \texttt{right}: the actual width of the right-handed content is used to set \texttt{/tcb/righthand width}\textsuperscript{P.119}.
- \texttt{both}: the actual width of the left-handed and right-handed content is used to set \texttt{/tcb/lefthand width}\textsuperscript{P.119}, \texttt{/tcb/righthand width}\textsuperscript{P.119}, and the overall \texttt{/tcb/width}\textsuperscript{P.34}.

\begin{verbatim}
% \tcb\texttt{uselibrary{skins,xparse}}
\tcb\texttt{sidebyside[sidebyside adapt=left,}
\texttt{title=Very important table,}
\texttt{beamer,colframe=blue!50!black,colback=blue!10,}
\texttt{lower separated=false,sidebyside gap=5mm}
\texttt{]}
\begin{tabular}{|l|c|r|}
\hline
\texttt{left} & \texttt{center} & \texttt{right} \\
\hline
A & B & C \\
D & E & F \\
\hline
\end{tabular}
\end{verbatim}

Very important table

\begin{verbatim}
\texttt{\lipsum[2]}
\end{verbatim}


Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.
<table>
<thead>
<tr>
<th>left</th>
<th>center</th>
<th>right</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
</tbody>
</table>
If set to \texttt{true}, the \emph{(left-handed content)} and \emph{(right-handed content)} of \texttt{\textbackslash tcb\textbackslash sidebyside} are switched. Obviously, this option is only valid inside \texttt{\textbackslash tcb\textbackslash sidebyside}. The side switching can be made even/odd page sensitive, if used inside \texttt{\textbackslash tcb\textbackslash if odd page}.

\begin{verbatim}
\% \tcbuselibrary{skins,xparse}
\tcb\textbackslash sidebyside\{Left\}{Right}

\tcb\textbackslash sidebyside\{title=Very important table, if odd page={sidebyside switch,sidebyside adapt=right,flushright title}\%
\% \{sidebyside adapt=left\}, beamer,colframe=blue!50!black,colback=blue!10,
\% lower separated=false,sidebyside gap=5mm
\%
\begin\{tabular\}{|l|c|r|}
\hline
left & center & right \\
\hline
A & B & C \\
\hline
D & E & F \\
\hline
\end\{tabular\}
\%
This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.
\}
\end{verbatim}
7 Saving and Loading of Verbatim Texts

The following macros are slightly modified versions of the original macros from the known packages \texttt{moreverb} and \texttt{verbatim}. They are used implicitly inside of a \texttt{tcolorbox} environment, but they can be used outside also.

\begin{tcbverbatimwrite}{⟨file name⟩}
⟨environment content⟩
\end{tcbverbatimwrite}

Saves the ⟨environment content⟩ to a file named by ⟨file name⟩. \TeX{} macros inside the environment are not expanded.

\begin{tcbverbatimwrite}{\jobname\_verbexp.tex}
This text is saved \textit{as is}.
\end{tcbverbatimwrite}

Now, we are using the file:
\input{\jobname\_verbexp.tex}

This environment may be used inside an own environment. Note, that inside the environment definition \texttt{tcbverbatimwrite} has to be used instead of \texttt{\begin{tcbverbatimwrite}} and \texttt{\end{tcbverbatimwrite}} instead of \texttt{\end{tcbverbatimwrite}}.

\newenvironment{myverbatim}{\begingroup \tcbverbatimwrite{\jobname\_myverb.tex}}{\endtcbverbatimwrite\endgroup}

\begin{myverbatim}
This is the text which is saved by my own environment.
\end{myverbatim}

Now, we are using the file:
\input{\jobname\_myverb.tex}

\begin{tcbwritetemp}
⟨environment content⟩
\end{tcbwritetemp}

Has the same function as \texttt{tcbverbatimwrite}, but uses the key value of \texttt{tempfile} for the file name.

\begin{tcbwritetemp}
This text is saved \textit{as is}.
\end{tcbwritetemp}

Now, we are using the file:
\tcbusetemp

\texttt{tcbusetemp}

Loads the current temporary file which was saved by \texttt{tcbwritetemp}.
If this option is set to be \texttt{true}, the percent sign \% is silently ignored for \texttt{tcbverbatimwrite} \textsuperscript{\textit{P.126}} and all macros and environments which are built using \texttt{tcbverbatimwrite} \textsuperscript{\textit{P.126}}, e.g. \texttt{tcbwritetemp} \textsuperscript{\textit{P.126}}, \texttt{tcblisting} \textsuperscript{\textit{P.299}}, or \texttt{dispExample} \textsuperscript{\textit{P.463}}.

This option may be useful for creating some special effects, but mainly it is intended to be applied for documentation with DocStrip. The creation of this option was motivated by Yudai Nakata. Note that this option is not getting reset by \texttt{/tcb/reset} \textsuperscript{\textit{P.105}}.

\begin{tcblisting}{title=Normal}\egin{center}\fseries This is my \texttt{5\%\text} text and this is my \texttt{10\% text}.
\end{center}
\end{tcblisting}

\begin{tcblisting}{title=Option applied, verbatim ignore percent}\egin{center}\fseries This is my \texttt{5\%\text} text and this is my \texttt{10\% text}.
\end{center}
\end{tcblisting}

Note that every percent sign is removed, also escaped ones.
8 Recording

The package provides some macros and options to take records during compilation. This is done by \LaTeX file operations to save some data to a file for later usage. The main application scenario is depicted in Section 8.3 on the next page where information about example solutions is recorded and read again in Section 8.4 on page 132.

8.1 Macros

\begin{itemize}
\item \texttt{\textbackslash tcbstartrecording}
\begin{itemize}
\item \texttt{\langle file name\rangle}
\end{itemize}
\end{itemize}

Opens a file denoted by \texttt{\langle file name\rangle} for writing the records. The default file name is \texttt{\jobname.records}. See Section 8.3 on the next page for an example application.

\begin{itemize}
\item \texttt{\textbackslash tcbrecord\{\langle content\rangle\}}
\end{itemize}

Records any \texttt{\langle content\rangle} to the record file. \texttt{\textbackslash tcbrecord} is implemented as \texttt{\immediate\textbackslash write}. \texttt{\textbackslash tcbstartrecording} has to be called before; otherwise, \texttt{\textbackslash tcbrecord} is silently ignored.

\begin{itemize}
\item \texttt{\textbackslash tcbstoprecording}
\end{itemize}

Closes the current record file which was opened by \texttt{\textbackslash tcbstartrecording} before.

\begin{itemize}
\item \texttt{\textbackslash tcbinputrecords\{\langle file name\rangle\}}
\end{itemize}

Opens a file denoted by \texttt{\langle file name\rangle} for reading the records via \texttt{\input}. The default file name is the name of the last used record file for saving. \texttt{\textbackslash tcbstoprecording} has to be called before.

8.2 Options

\begin{itemize}
\item \texttt{/tcb/record=\langle content\rangle} \hspace{1cm} (style, no default)
\end{itemize}

Records any \texttt{\langle content\rangle} to the record file, see \texttt{\textbackslash tcbrecord}. This key can be used several times to write several lines.

\begin{itemize}
\item \texttt{\textbackslash tcbinputrecords\{\langle file name\rangle\}}
\end{itemize}

Disables \texttt{\textbackslash tcbrecord} and \texttt{/tcb/record} inside the current group.
8.3 Example: Exercises

The following application example creates exercises and their corresponding solutions. Each pair is generated inside a single `tcolorbox` where the solution is given below `\tcblower`\textsuperscript{P.12}. For every example, the solution part is saved by `/tcb/savelowerto`\textsuperscript{P.24} to a file. The saving is recorded using `/tcb/record`\textsuperscript{P.128}. To enlighten the possibilities, the second exercise has no solution. Finally, the solutions are input in Section 8.4 on page 132.

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
\begin{align*}
  f(x) &= \sin((\sin x)^2) \\
  &= \cos((\sin x)^2) 2\sin x \cos x.
\end{align*}
\end{equation*}
\end{exercise}
\begin{exercise}[no solution]
It holds:
\begin{equation*}
\frac{d}{dx}\left(\ln|x|\right) = \frac{1}{x}.
\end{equation*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)=\left(\sin^2(x)\right)^2
\end{equation*}
\begin{align*}
f'(x) &= \left( \sin^2(x) \right)^2 \\
&= 2\sin(x)\cos(x)\cos x.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)=\sqrt{x^3-6x^2+2x}
\end{equation*}
\begin{align*}
f'(x) &= \frac{3x^2-12x+2}{2\sqrt{x^3-6x^2+2x}}.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)=\left(\frac{2+3x}{1-2x}\right)^3
\end{equation*}
\begin{align*}
f'(x) &= 3 \left(\frac{2+3x}{1-2x}\right)^2 \left(\frac{(1-2x)3-(2+3x)(-2)}{(1-2x)^2}\right)
= \frac{21(2+3x)^2}{(1-2x)^3}.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)=\frac{\cos x}{\tan^2(2x)}
\end{equation*}
\begin{align*}
f'(x) &= -\frac{\cos(2x) \left[\sin x \sin 2x \cos 2x + 4\cos x -\sin 2x\right] + 4 \cos x \left[\cos 2x -2\cos 2x + 4\cos x \left(\sin 2x -2\right)\right]}{(\sin 2x)^3}.
\end{align*}
\end{exercise}
Exercise 8.1: Compute the derivative of the following function:

\[ f(x) = \sin((\sin x)^2) \]

Solution on page 132

Exercise 8.2: It holds:

\[ \frac{d}{dx} (\ln x) = \frac{1}{x} \]

Exercise 8.3: Compute the derivative of the following function:

\[ f(x) = (\sin(\sin x))^2 \]

Solution on page 132

Exercise 8.4: Compute the derivative of the following function:

\[ f(x) = \sqrt{x^3 - 6x^2 + 2x} \]

Solution on page 132
Exercise 8.5: Compute the derivative of the following function:

\[ f(x) = \left( \frac{2 + 3x}{1 - 2x} \right)^3 \]

Solution on page 133

Exercise 8.6: Compute the derivative of the following function:

\[ f(x) = \frac{\cos x}{(\tan 2x)^2} \]

Solution on page 133

Exercise 8.7: Compute the derivative of the following function:

\[ f(x) = \cos((2x^2 + 3)^3) \]

Solution on page 133

Exercise 8.8: Compute the derivative of the following function:

\[ f(x) = (x^2 + 1)\sqrt{x^4 + 1} \]

Solution on page 133

8.4 Example: Solutions

This concludes the example given in Section 8.3 on page 129. Now, the saved and recorded solutions are included.

Solution of Exercise 8.1 on page 131:
The derivative is:

\[ f'(x) = \left( \sin((\sin x)^2) \right)' = \cos((\sin x)^2)2\sin x\cos x. \]

Solution of Exercise 8.3 on page 131:
The derivative is:

\[ f'(x) = \left( (\sin(x))^2 \right)' = 2\sin(x)\cos(x)\cos x. \]

Solution of Exercise 8.4 on page 131:
The derivative is:

\[ f'(x) = \left( \sqrt{x^3 - 6x^2 + 2x} \right)' = \frac{3x^2 - 12x + 2}{2\sqrt{x^3 - 6x^2 + 2x}}. \]
Solution of Exercise 8.5 on page 132:
The derivative is:
\[ f'(x) = \left( \frac{2 + 3x}{1 - 2x} \right)^3 = 3 \left( \frac{2 + 3x}{1 - 2x} \right)^2 \frac{(1 - 2x)3 - (2 + 3x)(+2)}{(1 - 2x)^2} = \frac{21(2 + 3x)^3}{(1 - 2x)^4}. \]

Solution of Exercise 8.6 on page 132:
The derivative is:
\[
\begin{align*}
  f''(x) &= \left( \frac{\cos x}{(\tan 2x)^2} \right)' = \left( \frac{\cos x (\cos 2x)^2}{(\sin 2x)^2} \right)' \\
  &= \frac{(\sin 2x)^2 \left[ -\sin x (\cos 2x)^2 + (\cos x)4 \cos 2x(-\sin 2x) \right] - \cos x (\cos 2x)^2 4 \sin 2x \cos 2x}{(\sin 2x)^4} \\
  &= \frac{\cos(2x) \sin x \sin 2x \cos 2x + 4 \cos x (\sin 2x)^2 + 4 \cos x (\cos 2x)^2}{(\sin 2x)^3} \\
  &= \frac{\cos(2x) \sin x \sin 2x \cos 2x + 4 \cos x}{(\sin 2x)^3}.
\end{align*}
\]

Solution of Exercise 8.7 on page 132:
The derivative is:
\[
\begin{align*}
  f'(x) &= \left( \cos(2x^3 + 3)^3 \right)' = -\sin(2x^3 + 3)3(2x^2 + 3)^2 2 \cdot 2x \\
  &= -12x (2x^2 + 3)^2 \sin((2x^3 + 3)^3).
\end{align*}
\]

Solution of Exercise 8.8 on page 132:
The derivative is:
\[
\begin{align*}
  f'(x) &= \left( (x^2 + 1) \sqrt{x^4 + 1} \right)' = 2x \sqrt{x^4 + 1} + \frac{2x^3(x^2 + 1)}{\sqrt{x^4 + 1}}.
\end{align*}
\]
9 Technical Overview and Customization

This section provides a technical overview of the skin concept of \texttt{tcolorbox}. For most applications of \texttt{tcolorbox}, one will not need to know the bells and whistles described herein. You may proceed to Section 10 on page 148 where the customization options for most users are documented.

The following explanations also cover options and settings from the \texttt{skins} library, see Section 10 on page 148.

9.1 Skins and Drawing Engines

From a technical point of view, a skin is a style definition for the appearance of a \texttt{tcolorbox}. The core package provides some additional option keys for skins but only two skins called \texttt{standard} \footnote{P.204} and \texttt{standard jigsaw} \footnote{P.205}. The \texttt{skins} library adds several more skins. To change to a skin, only one option from the core package has to be set.

\begin{verbatim}
\tcb/skin=⟨name⟩ (style, no default, initially standard)
\end{verbatim}

Sets the current skin to ⟨name⟩. This is a style definition which sets all the following keys, i.e. for many use cases there is nothing more to do.

\begin{verbatim}
\tcbset{colback=Salmon!50!white,colframe=FireBrick!75!black,  
width=(\linewidth-8mm)/2,before=,after=\hfill,equal height group=ske}
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[skin=beamer,adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
\tcb/skin first=⟨name⟩ (style, no default, initially standard)
\end{verbatim}

If the box is set to be \texttt{/tcb/breakable}{P.365} and is broken actually, then the skin for the first part of the break sequence is set to ⟨name⟩, see Subsection 17.8 on page 377. Typically, this key is set by a \texttt{/tcb/skin}.

\begin{verbatim}
\tcb/skin middle=⟨name⟩ (style, no default, initially standard)
\end{verbatim}

If the box is set to be \texttt{/tcb/breakable}{P.365} and is broken actually, then the skin for the middle parts (if any) of the break sequence is set to ⟨name⟩, see Subsection 17.8 on page 377. Typically, this key is set by a \texttt{/tcb/skin}.

\begin{verbatim}
\tcb/skin last=⟨name⟩ (style, no default, initially standard)
\end{verbatim}

If the box is set to be \texttt{/tcb/breakable}{P.365} and is broken actually, then the skin for the last part of the break sequence is set to ⟨name⟩, see Subsection 17.8 on page 377. Typically, this key is set by a \texttt{/tcb/skin}.
/tcb/graphical environment=⟨name⟩ (no default, initially pgfpicture)
Sets the graphical environment for the tcolorbox to ⟨name⟩. Feasible values are pgfpicture and tikzpicture or environments which inherit from one of these two. This key is set by a /tcb/skin and may seldom be used directly.

The skin of a tcolorbox is drawn by up to four engines. Afterwards, the text content is drawn which is not part of a skin. The four steps are:

1. The frame of the box, drawn by /tcb/frame engine.
2. The interior of the box. The interior of a box with title is drawn differently from a box without title. /tcb/interior titled engine or /tcb/interior engine is used to draw the interior.
3. The segmentation (line) of the box, if there is a lower part; drawn by /tcb/segmentation engine.
4. The title area of the box, if there is a title and /tcb/title filled is set to true; drawn by /tcb/title engine.

/tcb/frame engine=⟨name⟩ (no default, initially standard)
Sets the frame drawing engine for a box to ⟨name⟩. Typically, this key is set by a /tcb/skin. Feasible values for ⟨name⟩ are:
- standard: the original code from the core package,
- path: a tikz path which is controlled by /tcb/frame style,
- pathjigsaw: a tikz path which is controlled by /tcb/frame style,
- pathfirst: a tikz path which is controlled by /tcb/frame style,
- pathfirstjigsaw: a tikz path which is controlled by /tcb/frame style,
- pathmiddle: a tikz path which is controlled by /tcb/frame style,
- pathmiddlejigsaw: a tikz path which is controlled by /tcb/frame style,
- pathlast: a tikz path which is controlled by /tcb/frame style,
- pathlastjigsaw: a tikz path which is controlled by /tcb/frame style,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.

/tcb/interior titled engine=⟨name⟩ (no default, initially standard)
Sets the interior drawing engine for a titled box to ⟨name⟩. Typically, this key is set by a /tcb/skin. Feasible values for ⟨name⟩ are:
- standard: the original code from the core package,
- path: a tikz path which is controlled by /tcb/interior style,
- pathfirst: a tikz path which is controlled by /tcb/interior style,
- pathmiddle: a tikz path which is controlled by /tcb/interior style,
- pathlast: a tikz path which is controlled by /tcb/interior style,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.
/tcb/interior engine=(name) (no default, initially standard)
Sets the interior drawing engine for an untitled box to ⟨name⟩. Typically, this key is set by a \tcb/skin. Feasible values for ⟨name⟩ are:
- standard: the original code from the core package,
- path: a \tikz path which is controlled by \tcb/interior style,
- pathfirst: a \tikz path which is controlled by \tcb/interior style,
- pathmiddle: a \tikz path which is controlled by \tcb/interior style,
- pathlast: a \tikz path which is controlled by \tcb/interior style,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.

/tcb/segmentation engine=(name) (no default, initially standard)
Sets the segmentation (line) drawing engine for a box to ⟨name⟩. Typically, this key is set by a \tcb/skin. Feasible values for ⟨name⟩ are:
- standard: the original code from the core package,
- path: a \tikz path which is controlled by \tcb/segmentation style,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.

/tcb/title engine=(name) (no default, initially standard)
Sets the title area drawing engine for a titled box to ⟨name⟩. Typically, this key is set by a \tcb/skin. Feasible values for ⟨name⟩ are:
- standard: the original code from the core package,
- path: a \tikz path which is controlled by \tcb/title style,
- pathfirst: a \tikz path which is controlled by \tcb/title style,
- pathmiddle: a \tikz path which is controlled by \tcb/title style,
- pathlast: a \tikz path which is controlled by \tcb/title style,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.

After an engine is set to an initializing value, the resulting graphical code can be changed using code option keys, see Section 9.2 on page 138.
/tcb/geometry nodes=true|false (default true, initially false)

If set to true, up to four tikz nodes are defined for a tcolorbox which are named frame, interior, segmentation, and title. These nodes describe the boundaries of the equally named parts of a tcolorbox. They are used by most engines based on Ti\kZ. Typically, this key is set automatically by a /tcb/skin •P.134.

\begin{tcolorbox}[adjusted title=The title]
The upper part. \tcblower The lower part.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,adjusted title=The title,
  frame code={\path[draw=red,fill=red!25]
    (frame.south west) rectangle (frame.north east);},
  interior titled code={\path[draw=blue,fill=blue!25]
    (interior.south west) rectangle (interior.north east);},
  segmentation code={\path[draw=green,fill=green!25]
    (segmentation.south west) rectangle (segmentation.north east);},
  title code={\path[draw=black,fill=brown!75!black]
    (title.south west) rectangle (title.north east);}]
The upper part. \tcblower The lower part.
\end{tcolorbox}
9.2 Code Option Keys

The following code options are applicable for all skins. The used \textit{(graphical code)} can be any \texttt{pgf} code. For all skins with exception of \texttt{standard}\textsuperscript{\texttt{P.204}} and \texttt{standard jigsaw}\textsuperscript{\texttt{P.205}}, the \textit{(graphical code)} can also be any \texttt{TikZ} code.

\texttt{/tcb/frame code=⟨graphical code⟩} \texttt{(code, default from standard)}

The given \textit{(graphical code)} is used for drawing the \textit{frame} of the box.

\begin{tcolorbox}[enhanced,frame code={
\foreach \n in {north east,north west,south east,south west}{
\path [fill=red!75!black] (interior.\n) circle (3mm); }
}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\texttt{/tcb/frame empty} \texttt{(style, no value)}

This is a shortcut for setting \texttt{/tcb/frame code} to empty. This option removes the drawing of the frame. Alternatively, use \texttt{/tcb/frame hidden}\textsuperscript{\texttt{P.149}}.

\texttt{/tcb/interior titled code=⟨graphical code⟩} \texttt{(code, default from standard)}

The given \textit{(graphical code)} is used for drawing the \textit{interior} of the box, if the box comes with a title.

\begin{tcolorbox}[enhanced,title=My title,interior titled code={
\path [draw=red!5!white,line width=5mm,line cap=round]
({xshift=3mm,yshift=-3mm}interior.north west) --({xshift=-3mm,yshift=3mm}interior.south east) 
({xshift=3mm,yshift=3mm}interior.south west) --({xshift=-3mm,yshift=-3mm}interior.north east);}
]}
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\texttt{/tcb/interior titled empty} \texttt{(style, no value)}

This is a shortcut for setting \texttt{/tcb/interior titled code} to empty. This option removes the drawing of the untitled interior. Alternatively, use \texttt{/tcb/interior hidden}\textsuperscript{\texttt{P.150}}.
/tcb/interior code=(graphical code) (code, default from standard)
The given (graphical code) is used for drawing the interior of the box, if the box is without a title.

\begin{tcolorbox}[enhanced,interior code={
\path[draw=red!5!white,line width=5mm,line cap=round]
([xshift=3mm,yshift=-3mm]interior.north west)
--([xshift=-3mm,yshift=3mm]interior.south east)
([xshift=3mm,yshift=3mm]interior.south west)
--([xshift=-3mm,yshift=-3mm]interior.north east);}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a tcolorbox.
This is the lower part.

/tcb/interior empty (style, no value)
This is a shortcut for setting /tcb/interior code to empty. This option removes the drawing of the interior. Alternatively, use /tcb/interior hidden \cite{P.150}.

/tcb/segmentation code=(graphical code) (code, default from standard)
The given (graphical code) is used for drawing the segmentation area of the box.

\begin{tcolorbox}[enhanced,title=My title,segmentation code={
\path[top color=red!5!white,bottom color=red!5!white,middle color=blue]
(segmentation.south west) rectangle (segmentation.north east);}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.

/tcb/segmentation empty (style, no value)
This is a shortcut for setting /tcb/segmentation code to empty. This option removes the drawing of the segmentation line. Alternatively, use /tcb/segmentation hidden \cite{P.151}.
The given \texttt{graphical code} is used for drawing the \textit{title} area of the box.

\begin{tcolorbox}[enhanced,title=My title,title code={\path\[draw=yellow,solid,decorate,line width=2mm,\-decoration={coil,aspect=0,segment length=10.1mm}\](\[xshift=1mm\]title.west) -- (\[xshift=-1mm\]title.east);}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a shortcut for setting \texttt{/tcb/title code} to empty. This option removes the drawing of the title area. Alternatively, use \texttt{/tcb/title hidden}.\textsuperscript{P.152}
9.3 Subskins

A subskin is a new /tcb/skin \(^{P.134}\) based on an existing skin which is extended or changed.

Never use geometry settings or bounding box options inside a subskin definition! If one skin is replaced by another skin, the overall bounding box should stay constant. Especially, if a skin is used for a breakable box, unpredictable and unpleasant results could arise otherwise. If you want to change the geometry also, use an additional style. See the skin beamer \(^{P.228}\) and the style /tcb/beamer \(^{P.228}\) as pattern.

\[
\text{\texttt{tcbsubskin}}\{\langle\text{name}\rangle\}\{\langle\text{base skin}\rangle\}\{\langle\text{options}\rangle\}
\]

Creates a new skin \(\langle\text{name}\rangle\) which inherits all properties of an existing \(\langle\text{base skin}\rangle\) plus the given \(\langle\text{options}\rangle\). The new skin \(\langle\text{name}\rangle\) can be used as value for the keys /tcb/skin \(^{P.134}\), /tcb/skin first \(^{P.134}\), /tcb/skin middle \(^{P.134}\), and /tcb/skin last \(^{P.134}\). As \(\langle\text{base skin}\rangle\), one can take standard \(^{P.204}\), empty \(^{P.237}\), enhanced \(^{P.206}\), or any skin from the \texttt{skins} library, see Section 10 on page 148.

% \texttt{tcbuselibrary(skins)}
\texttt{tcbsubskin(mycross)(empty)(frame code=\{
\texttt{\textbackslash{}draw[red,line width=5pt] (frame.south west)--(frame.north east);}
\texttt{\textbackslash{}draw[red,line width=5pt] (frame.north west)--(frame.south east);},
\texttt{skin first=mycross,skin middle=mycross,skin last=mycross })
\begin{tcolorbox}[skin=mycross]
This is my content.
\end{tcolorbox}

/tcb/skin first is subskin of \(\{\langle\text{base skin}\rangle\}\{\langle\text{options}\rangle\}\) (no default, initially unset)

Creates a new unnamed skin which inherits all properties of an existing \(\langle\text{base skin}\rangle\) plus the given \(\langle\text{options}\rangle\). This skin is set as /tcb/skin first \(^{P.134}\). See a detailed example on page 243.

/tcb/skin middle is subskin of \(\{\langle\text{base skin}\rangle\}\{\langle\text{options}\rangle\}\) (no default, initially unset)

Creates a new unnamed skin which inherits all properties of an existing \(\langle\text{base skin}\rangle\) plus the given \(\langle\text{options}\rangle\). This skin is set as /tcb/skin middle \(^{P.134}\). See a detailed example on page 243.

/tcb/skin last is subskin of \(\{\langle\text{base skin}\rangle\}\{\langle\text{options}\rangle\}\) (no default, initially unset)

Creates a new unnamed skin which inherits all properties of an existing \(\langle\text{base skin}\rangle\) plus the given \(\langle\text{options}\rangle\). This skin is set as /tcb/skin last \(^{P.134}\). See a detailed example on page 243.
9.4 Drawing Scheme

Depending on the complexity of a \texttt{tcolorbox} definition, the resulting box is drawn in a more or less complex series of steps.

To document and demonstrate these drawing steps, we consider the following box definition:

\begin{tcolorbox}[1]
\newtcolorbox{testbox}[]
{enhanced,title=Test Box,}
boxrule=1mm,titlerule=0.5mm,colframe=blue!50!black, 
interior style={top color=blue!20!green!50!white,bottom color=blue!20!yellow!50!white},
colbacktitle=blue!50!green!90!white,segmentation style={solid},
fonttitle=\bfseries,drop fuzzy shadow,borderline={0.3mm}{0.35mm}{yellow!50!white},
derender={
\path[fill image opacity=0.15,fill image scale=0.9, 
fill stretch picture={\draw[blue,line width=2mm] circle (1);}
(interior.south west) rectangle (interior.north east);},
watermark text={Watermark},watermark color={green!20!white},
finish={
\begin{tcbclipframe}
\path[bottom color=black,top color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
\path[top color=white,bottom color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.north east) -- (frame.north west) -- cycle;
\end{tcbclipframe},#1}
\end{tcolorbox}

For this definition, we get the maximal number of drawing steps:

\begin{itemize}
\item Section 10.6 on page 182.
\item 1. shadow
\item 2. frame
\item /tcb/colframe \textsuperscript{P.27}, /tcb/opacityframe \textsuperscript{P.51}
\item /tcb/frame code \textsuperscript{P.138}
\item /tcb/frame style \textsuperscript{P.148}
\end{itemize}

All together, the box is drawn:

```latex
% \usepackage{lipsum}
\begin{testbox}
\lipsum[2]
\tcblower
Lower part
\end{testbox}
```


9.5 Useful Properties

The following macros describe certain properties which may be used for the drawing scheme, see Section 9.4 on page 142. Sometimes, they are even available inside the box content. All of them are considered to be read-only and should never be redefined by the user.

\tcbheightspace

If the height of a \tcolorbox is not the natural height, the space difference between the forced and the natural size is hold by \tcbheightspace. This macro is not usable inside the box content, but for skins or inside /tcb/underlay^{P.195}, /tcb/overlay^{P.71}, etc. If such a space information is needed inside the box content, see /tcb/space to^{P.59} instead.

\begin{tcolorbox}
\text{Inside a box: } \tcbheightspace (\text{=}370.74823pt).
\end{tcolorbox}

\tcbtextwidth

This property describes the box content width.
- If there also is a lower part, it describes the width of the upper part.
- For /tcb/sidebyside^{P.116} boxes, it describes the combined text width plus segmentation.
- This property can be used inside the box content text with exception of /tcb/fit^{P.412} boxes.
- \tcbtextwidth can be used for all box types for skins or inside /tcb/underlay^{P.195}, /tcb/overlay^{P.71}, etc.

\begin{tcolorbox}[colframe=blue!75!black]
Inside a box: \tcbtextwidth \text{=} \text{the} \text{linewidth}.
\end{tcolorbox}
This property describes the designated box content height. If the box is larger than the natural height, the actual content will be smaller than \texttt{\textbackslash tcbtextheight}.

- For boxes with a fixed \texttt{\textbackslash tcb/height}\textsuperscript{\footnote{P.53}}, this property can be used inside the box content text. For other boxes, it denotes \texttt{0pt} inside the box content.
- \texttt{\textbackslash tcbtextheight} can be used for all box types for skins or inside \texttt{\textbackslash tcb/underlay}\textsuperscript{\footnote{P.195}}, \texttt{\textbackslash tcb/overlay}\textsuperscript{\footnote{P.71}}, etc.

\begin{tcolorbox}
[enhanced,colframe=blue!75!black,
  underlay={\node[left,red] at (frame.east) {Here: \texttt{\textbackslash tcbtextheight}};}]
Inside a box with natural height: \texttt{\textbackslash tcbtextheight}.
\end{tcolorbox}

\begin{tcolorbox}
[enhanced,colframe=blue!75!black,height=1cm,
  underlay={\node[left,red] at (frame.east) {Here: \texttt{\textbackslash tcbtextheight}};}]
Inside a box with fixed height: \texttt{\textbackslash tcbtextheight}.
\end{tcolorbox}

Here: 7.95pt  
Inside a box with natural height: \texttt{0pt}.
Here: 8.5359pt  
Inside a box with fixed height: 8.5359pt.

This macro contains 0, 1, or 2. It is set for every unbroken box and every broken partial box with the following meaning:

- \texttt{0}: The current (partial) box contains only an upper part.
- \texttt{1}: The current (partial) box contains an upper and a lower part. The segmentation node can be used for positioning.
- \texttt{2}: The current (partial) box contains only a lower part. This can only be true for parts of breakable boxes.

Skins like \texttt{bicolor}\textsuperscript{\footnote{P.219}} use this property to paint the (partial) boxes.

\begin{tcolorbox}
Upper part 0
\end{tcolorbox}

\begin{tcolorbox}
Upper part \texttt{1}
\end{tcolorbox}

\begin{tcolorbox}
Upper part \texttt{\textbackslash tcblower} Lower part \texttt{\textbackslash end(tcolorbox)}
\end{tcolorbox}

\begin{tcolorbox}
\texttt{\textbackslash tcbsegmentstate}
\end{tcolorbox}
The library is loaded by a package option or inside the preamble by:

```
\uselibrary{skins}
```

This also loads the package `tikz` [22]. Typically but not necessarily, the following skins use `tikz` instead of `pgf`.

### 10.1 Style Option Keys

The following style options are applicable for all skins which use engines of type `path`, `pathfirst`, `pathmiddle`, or `patlast`. Especially, the skin `enhanced` \(^{\text{P.206}}\) supports all of them and `standard` \(^{\text{P.204}}\) none.

\begin{itemize}
\item \texttt{/tcb/frame style=⟨tikz keys⟩} (style, no default)
\end{itemize}

The ⟨tikz keys⟩ are used inside the `tikz` path command for drawing the frame of the box. This option is available if the \texttt{/tcb/frame engine} \(^{\text{P.135}}\) is set to `path`, `pathfirst`, `pathmiddle`, or `patlast`. It is not available for `standard`.

\begin{itemize}
\item \texttt{/tcb/frame style image=⟨file name⟩} (no default, initially unset)
\end{itemize}

Fills the frame with an external image referenced by ⟨file name⟩. For advanced features like blending of a picture with the background, use \texttt{/tcb/frame style} together with \texttt{/tikz/fill stretch image} \(^{\text{P.257}}\).
/tcb/frame style tile={⟨graphics options⟩}{⟨file name⟩} (no default, initially unset)
Fills the frame with a tile pattern based on an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use /tcb/frame style together with /tikz/fill tile image P.148.

\begin{tcolorbox}[enhanced,title=My title, frame style tile={width=1cm}{pink_marble.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.

/tcb/frame hidden (style, no value)
This is a shortcut for frame style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the frame. Alternatively, use /tcb/frame empty P.138.

\begin{tcolorbox}[enhanced,title=My title, frame hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.

/tcb/interior style=⟨tikz keys⟩ (style, no default)
The ⟨tikz keys⟩ are used inside the \tikz path command for drawing the interior of the box. They are used for the titled and for the untitled version as well. This option is available if the /tcb/interior titled engine P.135 or /tcb/interior engine P.136 is set to path, pathfirst, pathmiddle, or pathlast. It is not available for standard.

\begin{tcolorbox}[enhanced,title=My title, interior style={left color=red!20!white, right color=yellow!50!white}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.
/tcb/interior style image=⟨file name⟩  (no default, initially unset)
Fills the interior with an external image referenced by ⟨file name⟩. For advanced features like blending of a picture with the background, use /tcb/interior style=P.149 together with /tikz/fill stretch image=P.257.

```
\tcbset{colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, interior style image=goldshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/interior style tile={⟨graphics options⟩}{⟨file name⟩}  (no default, initially unset)
Fills the interior with a tile pattern based on an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use /tcb/interior style=P.149 together with /tikz/fill tile image=P.261.

```
\tcbset{colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, interior style tile={width=2cm}{crinklepaper.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/interior hidden  (style, no value)
This is a shortcut for interior style=⟨draw=none, fill=none⟩. Depending on the skin, this option switches off the drawing of the interior. Alternatively, use /tcb/interior empty=P.139 and/or /tcb/interior titled empty=P.138.

```
\tcbset{frame style={top color=red!20!white, bottom color=red!20!white!75!black}, fonttitle=\bfseries, coltitle=black}
\begin{tcolorbox}[enhanced,title=My title, interior hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title
This is a \textbf{tcolorbox}.
This is the lower part.

150
/tcb/segmentation style = (tikz keys) (style, no default)

The (tikz keys) are used inside the tikz path command for drawing the segmentation line of the box.

This option is available if the /tcb/segmentation engine^P.136 is set to path. It is not available for standard.

\begin{tcolorbox}
\setkeys{colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[enhanced, title=My title, segmentation style={double=white,draw=blue, double distance=1pt, solid}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{tcolorbox}

/tcb/segmentation hidden (style, no value)

This is a shortcut for segmentation style={draw=none, fill=none}. Depending on the skin, this option switches off the drawing of the segmentation line. See also \tcb/lower separated^P.25 which has the same effect for most skins. Alternatively, use /tcb/segmentation empty^P.139.

\begin{tcolorbox}
\setkeys{colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[enhanced, title=My title, segmentation hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{tcolorbox}

/tcb/title style = (tikz keys) (style, no default)

The (tikz keys) are used inside the tikz path command for drawing the title area of the box.

This option is available if the /tcb/title engine^P.136 is set to path, pathfirst, pathmiddle, or pathlast. It is not available for standard.

\begin{tcolorbox}
\setkeys{colback=red!5!white, colframe=red!75!black, coltitle=blue!50!black, fonttitle=\bfseries}
\begin{tcolorbox}[enhanced, title=My title, title style={left color=blue!15!yellow, right color=red!85!black}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{tcolorbox}
/tcb/title style image={file name}  (no default, initially unset)
Fills the title area with an external image referenced by \textit{file name}. For advanced features like blending of a picture with the background, use /tcb/title style \(^{\text{P.151}}\) together with /tcb/title stretched image \(^{\text{P.257}}\).

\begin{tcolorbox}
\tcblset{colback=blue!5!white,colframe=blue!75!black,fonttitle=\bfseries}
\begin{tcbox}[enhanced,title=My title, title style image=blueshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcbox}
\end{tcolorbox}

\begin{tcolorbox}
\tcblset{colback=red!5!white,colframe=red!75!black,coltitle=blue!50!black,fonttitle=\bfseries}
\begin{tcbox}[enhanced,title=My title, title style tile={width=1cm}{pink_marble.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcbox}
\end{tcolorbox}

/tcb/title hidden  (style, no value)
This is a shortcut for title style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the title background. See also /tcb/title filled \(^{\text{P.27}}\) for a similar effect. Alternatively, use /tcb/title empty \(^{\text{P.140}}\).

\begin{tcolorbox}
\tcblset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcbox}[title=My title, enhanced,title hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcbox}
\end{tcolorbox}
The ⟨tikz keys⟩ are used to draw a title rule, i.e. a rule below the optional title. The width of the rule is controlled by /tcb/titlerule. It may be set directly to a smaller width to create mixed effects with the standard rule. This option is implemented as an /tcb/underlay. Thus, it is not available for standard and standard jigsaw, but for all other skins, e.g. enhanced. As an underlay, this option can be used multiple times and is removed by /tcb/no underlay.

\begin{tcolorbox}[enhanced, colback=red!5!white,colframe=red!75!black, colbacktitle=red!50!yellow,fonttitle=\bfseries, title=My title, titlerule=1mm, titlerule style=yellow ] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[enhanced, colback=red!5!white,colframe=red!75!black, colbacktitle=red!50!yellow,fonttitle=\bfseries, title=My title, titlerule=1mm, titlerule style={yellow,line width=0.5mm} ] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[enhanced, colback=red!10!white,colframe=red!75!black, colbacktitle=red!50!yellow,fonttitle=\bfseries, frame hidden, title=My title, boxrule=0pt,titlerule=1mm, titlerule style=red!50!black ] This is a \textbf{tcolorbox}. \end{tcolorbox}

%\usetikzlibrary{arrows.meta}
\begin{tcolorbox}[empty, coltitle=red!75!black,fonttitle=\bfseries, borderline horizontal={0.5mm}{0pt}{red!50!white}, title=My title, titlerule style={red, arrows = {Hooks[arc=270]-Hooks[arc=270]}} ] This is a \textbf{tcolorbox}. \end{tcolorbox}
The combined Ti\textit{k}Z style applied to frame, interior, and title background can be used by authors in customizing code.

\texttt{/tikz/tcb \textit{fill frame}} \texttt{(style, no value)}

This is a Ti\textit{k}Z style which is finally applied to the \textit{frame} of the box.

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\texttt{/tikz/tcb \textit{fill interior}} \texttt{(style, no value)}

This is a Ti\textit{k}Z style which is finally applied to the \textit{interior} of the box.

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\texttt{/tikz/tcb \textit{fill title}} \texttt{(style, no value)}

This is a Ti\textit{k}Z style which is finally applied to the \textit{title area} of the box.

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
10.2 Boxed Title Option Keys

10.2.1 Boxed Title Placement

The following options place the title text into an own \textit{tcbox}. This boxed title can be customized independently from the main box using \textit{tcb/boxed title style}. The placement can be influenced by \textit{boxtitle options}.

\input{boxed_title_placement}

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top left] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top right] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom left] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom center] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom right] This is a \textbf{tcolorbox}. \end{tcolorbox}
This is a convenient style to mimic a standard title. It uses \begin{tcolorbox} [enhanced,title=My title, attach boxed title to top, boxed title style={colframe=red}] This is a \textbf{tcolorbox}. \end{tcolorbox}

In contrast to /tcb/attach boxed title to top, this style uses smaller left and right rules to avoid previewer glitches. Typically, one would not use different colors for the frame as in the example below.

This is a convenient style to produce a standard-like title at the bottom of the box. It uses \begin{tcolorbox} [enhanced,title=My title, attach boxed title to bottom, boxed title style={colframe=red}] This is a \textbf{tcolorbox}. \end{tcolorbox}

In contrast to /tcb/attach boxed title to top, this style uses smaller left and right rules to avoid previewer glitches.

This style combines /tcb/attach boxed title to bottom* with /tcb/boxed title style*. The \langle\text{options}\rangle are given to /tcb/boxed title style*. 

\begin{tcolorbox} [title,flip title={sharp corners}, title=My title, colback=red!10, colbacktitle=red!75!black] This is a \textbf{tcolorbox}. \end{tcolorbox}
10.2.2 Options for the Boxed Title Placement

The \textit{boxtitle options} of the keys described above are shift values. The dimensions of the boxed title are stored into two macros \texttt{tcboxedtitleheight} and \texttt{tcboxedtitlewidth}. These macros can be used inside the following \textit{boxtitle options}:

\begin{verbatim}
/tcb/boxtitle/xshift=(length)
\end{verbatim}

(no default, initially 0pt)

The boxed title is shifted by \textit{(length)} in the horizontal direction.

\begin{tcolorbox}[enhanced,title=My title,attach boxed title to top left={xshift=-2mm},boxed title style={size=small,colback=blue}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{verbatim}
/tcb/boxtitle/yshift=(length)
\end{verbatim}

(no default, initially 0pt)

The boxed title is shifted by \textit{(length)} in the vertical direction.

\begin{tcolorbox}[enhanced,title=My title,attach boxed title to top center={yshift=-\tcboxedtitleheight/2},boxed title style={size=small,colback=blue}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{verbatim}
/tcb/boxtitle/yshifttext=(length)
\end{verbatim}

(no default, initially 0pt)

The text inside the main box by \textit{(length)} to give room for e.g. a sunken title.

\begin{tcolorbox}[enhanced,title=My title,attach boxed title to top center={yshift=-3mm,yshifttext=-1mm},boxed title style={size=small,colback=blue}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{verbatim}
/tcb/boxtitle/yshift*= (length)
\end{verbatim}

(no default, initially 0pt)

Sets /tcb/boxtitle/yshift and /tcb/boxtitle/yshifttext the same time.
/tcb/boxtitle/yshifttext is only set if necessary.

\begin{tcolorbox}[enhanced,title=My title,attach boxed title to top center={yshift*=-3mm},boxed title style={size=small,colback=blue}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{verbatim}
/tcb/boxtitle/yshift*
\end{verbatim}

The bounding box of the resulting total \texttt{tcolorbox} is adapted automatically to the \textit{vertical} dimensions of the boxed title. Possible horizontal enlargements are \textit{not} automatically computed.

\begin{tcolorbox}[enhanced,title=My title,attach boxed title to top left={xshift=-2mm,yshift=-2mm},boxed title style={size=small,colback=blue},show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
10.2.3 Options for the Boxed Title Box

The boxed title options are implemented as an underlay, see Section 10.8 on page 195. Therefore, a boxed title is not drawn, if a skin does not support underlays like standard. Still, the room for the boxed titles gets reserved in these cases.

A TiZ node title is produced by a boxed title which can be used inside /tcb/frame code, /tcb/interior code, underlays, overlays, and finishes.

A boxed title is almost always the first underlay. The only exceptions are underlays defined by /tcb/underlay boxed title which are drawn before. Additionally, underlays defined by /tcb/underlay boxed title are only drawn, if a boxed title is actually set. They are ignored, if there is no boxed title.

\begin{tcbraster}
\begin{tcolorbox}[boxed title size=title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[boxed title size=standard]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[boxed title size=copy]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcbraster}

This setting defines the basic size for the title box. Further settings can be applied using /tcb/boxed title style. Feasible values for (size) are:

- title: Sets the size according to /tcb/size = title.
- standard: No size setting. Typically, this is identical to /tcb/size = normal.
- copy: The size values for a title of the base box are copied for the title box.
By default, a boxed title is dimensioned with \textcode{/tcb/size=\textit{title}} and inherits the \textcode{/tcb/skin} and \textcode{/tcb/colframe} of the main box. Also, the \textcode{/tcb/colback} is inherited from the main \textcode{/tcb/colbacktitle}. Font and color of the title text are set as usual. All other \textcode{(options)} are set by the \textcode{/tcb/boxed title style} key. Since a boxed title is set by \textcode{\tcbbox}, all \textcode{tcolorbox} options are applicable here. If \textcode{/tcb/boxed title style} is used several times, the \textcode{(options)} are appended.

\begin{tcolorbox}[enhanced,title=My title,fonttitle=\bfseries,coltitle=green!25!black,attach boxed title to top center={yshift=-2mm,yshifttext=-1mm},boxed title style={colframe=green!75!black,colback=yellow!50!green}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title,colframe=red!50!black,colback=red!10!white,arc=1mm,colbacktitle=red!10!white,fonttitle=\bfseries,coltitle=red!50!black,attach boxed title to top left={xshift=3.2mm,yshift=-0.50mm},boxed title style={skin=enhancedfirst jigsaw,size=small,arc=1mm,bottom=-1mm,interior style={fill=none,top color=red!30!white,bottom color=red!20!white}}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title,colframe=blue!50!black,colback=blue!10!white,colbacktitle=blue!5!yellow!10!white,fonttitle=\bfseries,coltitle=black,attach boxed title to top center={yshift=-0.25mm-\tcboxedtitleheight/2,yshifttext=2mm-\tcboxedtitleheight/2},boxed title style={boxrule=0.5mm,frame code={ \path[\tcb fill frame] ([xshift=-4mm]frame.west) -- (frame.north west) -- (frame.north east) -- ([xshift=4mm]frame.east) -- (frame.south east) -- (frame.south west) -- cycle; },interior code={ \path[\tcb fill interior] ([xshift=-2mm]interior.west) -- (interior.north west) -- (interior.north east) -- ([xshift=2mm]interior.east) -- (interior.south east) -- (interior.south west) -- cycle; })]
\lipsum[2]
\end{tcolorbox}

My title


The title text content is captured with a horizontal box. Especially, there are no linebreak possible.

\newtcolorbox{mybox}[1]{hbox boxed title, enhanced, attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

The title text content is captured with a minipage with a width of \langle length \rangle. By default, the resulting boxed title is somewhat smaller than the main box.

\newtcolorbox{mybox}[1]{minipage boxed title, enhanced, attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title,title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

The title text content is captured with a minipage with a width of main box width plus \langle length \rangle. By default, the resulting boxed title is somewhat smaller than the main box.

\newtcolorbox{mybox}[1]{minipage boxed title*=\langle length \rangle, enhanced, attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title,title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
The title text content is captured with a TikZ node with given TikZ (options). The text is centered by default

\begin{mybox}{Short title}
This is a tcolorbox.
\end{mybox}

\begin{mybox}{This title is not really very short}
This is a tcolorbox.
\end{mybox}

The title text content is captured with a varwidth environment with a width of \langle length \rangle. This style needs the varwidth package [1] to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

% \usepackage{varwidth}
\begin{mybox}{Short title}
This is a tcolorbox.
\end{mybox}

\begin{mybox}{This title is not really very short}
This is a tcolorbox.
\end{mybox}

The title text content is captured with a varwidth environment with a width of main box width plus \langle length \rangle. This style needs the varwidth package [1] to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

% \usepackage{varwidth}
\begin{mybox}{Short title}
This is a tcolorbox.
\end{mybox}

\begin{mybox}{This title is not really very short}
This is a tcolorbox.
\end{mybox}
10.3 Watermark Option Keys

The following watermark options are applicable for all skins which use \tikzpicture as \tcb/graphical environment. Therefore, the skin standard does not support these watermarks, but all other skins, e.g. enhanced. The watermark options rely on the more general overlay options described in Section 4.12 from page 71. Therefore, watermarks and overlays cannot be used mixed. But a mixture is possible with the \texttt{hooks} library, see Section 21.

\begin{tcolorbox}
\begin{tcblower}
\lipsum[1]
\end{tcblower}
\end{tcolorbox}

\texttt{/tcb/watermark text} = \langle\text{text}\rangle \quad \text{(no default, initially unset)}

\begin{itemize}
  \item \langle\text{text}\rangle in the center of the interior region of a \texttt{tcolorbox}. This \langle\text{text}\rangle is written after the frame and interior are drawn and before the text content is drawn. It is zoomed or stretched according the values of \texttt{/tcb/watermark zoom} or \texttt{/tcb/watermark stretch}.
\end{itemize}

\begin{tcbset}
\colback=red!5!white,\colframe=red!75!black,fonttitle=\bfseries
\end{tcbset}

\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark]
\lipsum[1]
\tcblower
\lipsum[2]
\end{tcolorbox}

\texttt{/tcb/watermark text on} = \langle part \rangle is \langle\text{text}\rangle \quad \text{(no default, initially unset)}

This option writes some \langle\text{text}\rangle in the center of the interior region of a \texttt{tcolorbox} as described for \texttt{/tcb/watermark text}. But this is done only for boxes named \langle part \rangle of a break sequence, see \texttt{/tcb/breakable}.

Feasible values for \langle part \rangle are:
\begin{itemize}
  \item \texttt{broken}: all broken box parts,
  \item \texttt{unbroken}: unbroken boxes only,
  \item \texttt{first}: first parts of a break sequence,
  \item \texttt{middle}: middle parts of a break sequence,
  \item \texttt{last}: last parts of a break sequence,
  \item \texttt{unbroken and first}: unbroken boxes and first parts of a break sequence,
  \item \texttt{middle and last}: middle and last parts of a break sequence,
  \item \texttt{first and middle}: first and middle parts of a break sequence.
\end{itemize}
Draws an external picture referenced by \textit{(file name)} in the center of the interior region of a \texttt{tcolorbox}. The picture is drawn \textit{after} the frame and interior are drawn and \textit{before} the text content is drawn. It is zoomed or stretched according the values of /tcb/watermark zoom \textsuperscript{P.168} or /tcb/watermark stretch \textsuperscript{P.170}.

\begin{tcolorbox}[enhanced,title=My title,watermark graphics=Basilica_5.png, watermark opacity=0.15]
\lipsum[1-2]
\end{tcolorbox}

My title


This example uses a public domain picture from \url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}

\end{tcolorbox}

/tcb/watermark graphics on=\texttt{(part)}\ is \textit{(file name)} \noreset\ (no default, initially unset)\n
This option draws a picture referenced by \textit{(file name)} in the center of the interior region of a \texttt{tcolorbox} as described for \texttt{/tcb/watermark graphics}. But this is done only for boxes named \texttt{(part)} of a break sequence, see \texttt{/tcb/breakable} \textsuperscript{P.365}.

Feasible values for \texttt{(part)} are:

- \texttt{broken}: all broken box parts,
- \texttt{unbroken}: unbroken boxes only,
- \texttt{first}: first parts of a break sequence,
- \texttt{middle}: middle parts of a break sequence,
- \texttt{last}: last parts of a break sequence,
- \texttt{unbroken and first}: unbroken boxes and first parts of a break sequence,
- \texttt{middle and last}: middle and last parts of a break sequence.
/tcb/watermark tikz = ⟨graphical code⟩  
(no default, initially unset)

Draws the given tikz ⟨graphical code⟩ in the center of the interior region of a tcolorbox. The code is executed after the frame and interior are drawn and before the text content is drawn. The result is zoomed or stretched according the values of /tcb/watermark zoom "P.168" or /tcb/watermark stretch "P.170".

\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, watermark tikz={\draw[line width=2mm] circle (1cm) node{\fontfamily{ptm}\fontseries{b}\fontsize{20mm}{20mm}\selectfont ?};}]
\lipsum[1]
\tcbfooter
\lipsum[2]
\end{tcolorbox}

My title


/\tcb/watermark tikz on = ⟨part⟩ is ⟨graphical code⟩  
(no default, initially unset)

This option draws the given tikz ⟨graphical code⟩ in the center of the interior region of a tcolorbox as described for /tcb/watermark tikz. But this is done only for boxes named ⟨part⟩ of a break sequence, see /tcb/breakable "P.365".

Feasible values for ⟨part⟩ are:
- broken: all broken box parts,
- unbroken: unbroken boxes only,
- first: first parts of a break sequence,
- middle: middle parts of a break sequence,
- last: last parts of a break sequence,
- unbroken and first: unbroken boxes and first parts of a break sequence,
- middle and last: middle and last parts of a break sequence.

/\tcb/no watermark  
(style, no default, initially set)

Removes the watermark if set before. This is an alias for /tcb/no overlay "P.72".
Sets the opacity value $\in [0,1]$ for a watermark.

\begin{tcolorbox}[title=Opacity 1.00,watermark opacity=1.00]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=Opacity 0.50,watermark opacity=0.50]
\lipsum[2]
\end{tcolorbox}

Sets the zoom value for a watermark. The zoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches the frame.

\begin{tcolorbox}[title=Zoom 1.0,watermark zoom=1.0]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=Zoom 0.5,watermark zoom=0.5]
\lipsum[2]
\end{tcolorbox}
/tcb/watermark shrink=(fraction)  
(no default, initially unset)

Identically to /tcb/watermark zoom\textsuperscript{P.168}, but the watermark never gets enlarged. Thus, the watermark keeps its original size or is shrunk.

/tcb/watermark overzoom=(fraction)  
(no default, initially unset)

Sets the overzoom value for a watermark. The overzoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches all four sides of the frame.

\begin{tcolorbox}
\begin{tabular}{|l|l|}
\hline
\textbf{Zoom 1.0} & \textbf{Overzoom 1.0} \\
\hline

\end{tabular}
\end{tcolorbox}

\begin{tcolorbox}
\begin{tabular}{|l|l|}
\hline
\textbf{Zoom 1.0} & \textbf{Overzoom 1.0} \\
\hline

\end{tabular}
\end{tcolorbox}

If a /tcb/watermark overzoom value of 1.0 is used in connection with invisible top and bottom rules which still have a thickness greater than 0pt, the space of these invisible rules may not be covered by the watermark. For example, this situation may occur during the breaking of /tcb/enhanced\textsuperscript{P.206} boxes. To avoid this optical glitch, just set /tcb/pad at break\textsuperscript{P.369} to any desired value.
/tcb/watermark stretch=(fraction) (no default, initially unset)
Sets the stretch value for a watermark. The stretch value is applied to width and height in relation to the box dimensions. It does not respect the aspect ratio. The value 1.0 means to fill the whole box.

\begin{tcolorbox}[title=Stretch 1.00,watermark stretch=1.00]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[title=Stretch 0.50,watermark stretch=0.50]
\lipsum[2]
\end{tcolorbox}

/tcb/watermark color=(color) (no default, initially mixed background and frame color)
Sets the color for the watermark.

\begin{tcolorbox}[colback=white,colframe=blue!50!black,fonttitle=\bfseries,
watermark graphics=lichtspiel.jpg,watermark opacity=0.5,
nobeforeafter,width=(\linewidth-2mm)/2]
\begin{tcolorbox}[title=My title,watermark text=My Watermark,
watermark color=yellow!50!red]
\lipsum[1]
\end{tcolorbox}
\end{tcolorbox}
/tcb/clip watermark=true|false

Sets the watermark to be clipped to the interior area.

\begin{tcolorbox}
\textbf{Clip (default)}
\lipsum[1]
\end{tcolorbox}

\begin{tcolorbox}
\textbf{No clip}
\lipsum[1]
\end{tcolorbox}

10.4 Clip Environments

The following clip environments are applicable for all skins which use engines of type `path`, `pathfirst`, `pathmiddle`, or `pathlast`. Especially, the skin `enhanced` supports all of them and `standard` none. The typical area of application is inside overlay code, see Section 4.12 from page 71.

\begin{tcbclipframe}
\begin{environment content}
\end{environment content}
\end{tcbclipframe}

Defines a Tikz scope which clips to the frame area path.

\begin{tcblackbox}[title=My Picture Box]{lichtspiel.jpg}
\lipsum[1]
\end{tcblackbox}

 Defines a Tikz scope which clips to the outside of the frame area path.

\begin{tikzpicture}
% draw two balls
\path [use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}

\begin{tcolorbox}
[title=A translucent box, 
overlay={\begin{tcbinvclipframe}
\draw [red,line width=1cm] ([xshift=-2mm,yshift=2mm]frame.north west) -- ([xshift=2mm,yshift=-2mm]frame.south east);
\draw [red,line width=1cm] ([xshift=-2mm,yshift=-2mm]frame.south west) -- ([xshift=2mm,yshift=2mm]frame.north east);
\end{tcbinvclipframe}}]
\lipsum[2]
\end{tcolorbox}

A translucent box

\begin{tcbclipinterior}
\begin{tcolorbox}[enhanced,title=My Title, overlay={\begin{tcbclipinterior}
\draw[red, line width=1cm] (interior.north west)--(interior.south east);
\draw[red, line width=1cm] (interior.south west)--(interior.north east);
\end{tcbclipinterior}]}
\lipsum[1]
\end{tcolorbox}
\lipsum[1]
\end{tcbclipinterior}

Defines a Tikz scope which clips to the interior area path.

\begin{tcbcliptitle}
\begin{tcolorbox}[enhanced,title=My Title, colframe=blue, colback=yellow!10!white, overlay={\begin{tcbcliptitle}\node at (title) {\includegraphics[width=\linewidth]{lichtspiel.jpg}};\end{tcbcliptitle}}]
\lipsum[1]
\end{tcolorbox}
\end{tcbcliptitle}

Defines a Tikz scope which clips to the title area path.
\texttt{/tcb/clip title=true|false} \hspace{1em} \textit{(default true, initially false)}

Sets the title to be clipped to the title area.

\begin{tcolorbox}
\[title=\mbox{This is a title which is unbreakable and far too long}\]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}
\[title=\mbox{This is a title which is unbreakable and far too long}, clip title\]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/clip upper=true|false} \hspace{1em} \textit{(default true, initially false)}

Sets the upper part to be clipped to the interior area.

\begin{verbatim}
\newcommand{\mygraphics}[2][]{%
  \tcbx[enhanced,boxsep=0pt,top=0pt,bottom=0pt,left=0pt,right=0pt,boxrule=0.4pt,drop fuzzy shadow,clip upper,
  colback=black!75!white,toptitle=2pt,bottomtitle=2pt,nobeforeafter,
  center title,fonttitle=\small\sffamily,title=\detokenize{#2}]{\includegraphics[width=\the\dimexpr(\linewidth-4mm)/2\relax]{#2}}%
\}
\mygraphics{lichtspiel.jpg} \hspace{1em} \mygraphics{Basilica_5.png}
\end{verbatim}

lichtspiel.jpg

Basilica_5.png
The example for `/tcb/clip upper` sizes the box according to the dimensions of the picture. To do it the other way around, the watermark options provide an easy solution.

\newcommand{\mygraphics}[2][]{% 
\tcbox[enhanced,capture=minipage,boxsep=0pt,top=0pt,bottom=0pt,left=0pt, 
right=0pt,boxrule=0.4pt,drop fuzzy shadow,nobeforeafter, 
colback=black!75!white,toptitle=2pt,bottomtitle=2pt, 
center title,fonttitle=\small\textfamily,title=\detokenize{#2}, 
width=(\linewidth-4mm)/2,height=6cm,colbacktitle={black}, 
watermark zoom=1.0,watermark graphics={#2}]{}}

\mygraphics{lichtspiel.jpg}\hfill \mygraphics{Basilica_5.png}

/tcb/clip lower=true|false (default true, initially false) 
Sets the lower part to be clipped to the interior area.
10.5 Border Line Option Keys

The following borderline options are applicable for most skins which use `tikzpicture` as `/tcb/graphical environment`.

Therefore, the skin standard does not support these border lines, but most other skins, e.g. enhanced.

The borderlines are independent from the normal `tcolorbox` rules. They may be used with or without the `/tcb/segmentation engine`.

The borderlines are stackable, i.e. several different border lines can be used on the same `tcolorbox`. They are drawn after the box frame and box interior and before overlays or watermarks.

Technically, the normal `tcolorbox` rules result from a TiKZ filling process. The border lines are created by a TiKZ drawing process. This can be used to apply different effects.

```
\begin{tcolorbox}
\[enhanced,title=Rounded corners,fonttitle=\bfseries,boxsep=5pt, \]
\[arc=8pt, \]
\[borderline={0.5pt}{0pt}{red}, \]
\[borderline={0.5pt}{5pt}{blue,dotted}, \]
\[borderline={0.5pt}{-5pt}{green} \]
\end{tcolorbox}
```

This is a tcolorbox.

```
\begin{tcolorbox}
\[enhanced,title=Sharp corners,fonttitle=\bfseries,boxsep=5pt, \]
\[arc=8pt,sharp corners=downhill, \]
\[borderline={0.5pt}{0pt}{red}, \]
\[borderline={0.5pt}{5pt}{blue,dotted}, \]
\[borderline={0.5pt}{-5pt}{green} \]
\end{tcolorbox}
```

This is a tcolorbox.

```
/\texttt{tcb/borderline}={(\texttt{width})\{\texttt{offset}\}\{\texttt{options}\})
```

(no default, initially unset)

Adds a new borderline to the stack of border lines. This border line is drawn with the given \{\texttt{width}\} and gets an \{\texttt{offset}\} computed from the frame outline. A positive \{\texttt{offset}\} value moves the borderline inside the tcolorbox and a negative \{\texttt{offset}\} value moves it outside without changing the bounding box.

The border line is drawn along a TiKZ path with the given TiKZ \{\texttt{options}\}. Note that the TiKZ \texttt{line width} option should not be used here.

The border lines adapt to the rounded corners of the tcolorbox. An inside borderline will switch to sharp corners if necessary, an outside borderline will always be rounded except for `/tcb/sharp corners`.

### Rounded corners

This is a tcolorbox.

### Sharp corners

This is a tcolorbox.


The following *partial* borderlines act slightly different from the complete borderlines described before. They ignore rounded corner settings, their length is not modified by their *(offset)*, they ignore skin settings but adapt to breakable boxes.

\begin{tcolorbox}[enhanced, borderline north={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced, borderline south={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced, borderline east={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced, borderline west={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
Adding a new borderline with the given \langle width\rangle to the north and south of the \texttt{tcolorbox}. A positive \langle offset\rangle value moves the borderlines inside the \texttt{tcolorbox} and a negative \langle offset\rangle value moves them outside without changing the bounding box.

\begin{tcolorbox}[blanker,top=3mm,bottom=3mm,\texttt{borderline horizontal}={2pt}{0pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Adding a new borderline with the given \langle width\rangle to the east and west of the \texttt{tcolorbox}. A positive \langle offset\rangle value moves the borderlines inside the \texttt{tcolorbox} and a negative \langle offset\rangle value moves them outside without changing the bounding box.

\begin{tcolorbox}[blanker,left=3mm,right=3mm,\texttt{borderline vertical}={2pt}{0pt}{red}]
This is a \textbf{tcolorbox}.\\
My second line.
\end{tcolorbox}

10.6 Shadow Option Keys

The following shadow options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment}. Therefore, the skin \texttt{standard} does not support these shadows, but most other skins, e.g. \texttt{enhanced}.

The shadows are stackable, i.e. several different shadows can be used on the same \texttt{tcolorbox}. They are drawn before the box frame is drawn.

\texttt{/tcb/no shadow} (no default)

Removes all shadows if set before.

10.6.1 Common Shadows and Halos

\texttt{/tcb/drop shadow=(color)} (style, default \texttt{black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{(color)} for the shadow can be changed.

\texttt{
\verb|\tcbset|{\texttt{enhanced},colback=red!5!white, colframe=red!75!black,fonttitle=\texttt{\bfseries}}
\begin{tcolorbox}[drop shadow]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Another shadow, drop shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop fuzzy shadow=(color)} (style, default \texttt{black!50!white})

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{(color)} for the shadow can be changed.

\texttt{
\verb|\tcbset|{\texttt{enhanced},colback=red!5!white, colframe=red!75!black,fonttitle=\texttt{\bfseries}}
\begin{tcolorbox}[drop fuzzy shadow]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Another shadow, drop fuzzy shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop midday shadow=(color)} (style, default \texttt{black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{(color)} for the shadow can be changed.

\texttt{
\verb|\tcbset|{\texttt{enhanced},colback=red!5!white, colframe=red!75!black,fonttitle=\texttt{\bfseries}}
\begin{tcolorbox}[drop midday shadow]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Another shadow, drop midday shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}
This is a tcolorbox.
\end{tcolorbox}
/tcb/drop fuzzy midday shadow=(color) (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

\begin{tcolorbox}[drop fuzzy midday shadow]
This is a tcolorbox.
\end{tcolorbox}

Another shadow
This is a tcolorbox.

/tcb/halo=(size) with (color) (style, default 0.9mm with yellow)
Adds a new halo shadow with the given (color) which overlaps the colorbox on all sides by (size).

\begin{tcolorbox}[title=My own halo,halo]
This is a tcolorbox.
\end{tcolorbox}

My own halo
This is a tcolorbox.

\begin{tcolorbox}[title=Another halo,halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

Another halo
This is a tcolorbox.

/tcb/fuzzy halo=(size) with (color) (style, default 0.9mm with yellow)
Adds a new fuzzy halo shadow with the given (color) which overlaps the colorbox on all sides by (size) plus 0.48mm.

\begin{tcolorbox}[title=My own halo,fuzzy halo]
This is a tcolorbox.
\end{tcolorbox}

My own halo
This is a tcolorbox.

\begin{tcolorbox}[title=Another halo,fuzzy halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

Another halo
This is a tcolorbox.

\begin{tcolorbox}[blank,enhanced jigsaw,boxsep=2pt,arc=2pt,
  fuzzy halo=2mm with red!50!white,
  fuzzy halo=1mm with white]
\lipsum[1]
\end{tcolorbox}


183
For all following shadows, the optionally given \textit{\langle color\rangle} for the shadow can be changed equivalent to the preceding examples.

\texttt{/tcb/drop shadow southeast=(color) \quad (style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \texttt{/tcb/drop shadow}\textsuperscript{P.182}.

This is a tcolorbox.

\begin{tcolorbox}[drop shadow southeast, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop shadow south=(color) \quad (style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \texttt{/tcb/drop midday shadow}\textsuperscript{P.182}.

This is a tcolorbox.

\begin{tcolorbox}[drop shadow south, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop shadow southwest=(color) \quad (style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

This is a tcolorbox.

\begin{tcolorbox}[drop shadow southwest, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop shadow west=(color) \quad (style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

This is a tcolorbox.

\begin{tcolorbox}[drop shadow west, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop shadow northwest=(color) \quad (style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

This is a tcolorbox.

\begin{tcolorbox}[drop shadow northwest, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop shadow north=(color) \quad (style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

This is a tcolorbox.

\begin{tcolorbox}[drop shadow north, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
/tcb/drop shadow northeast=(color) (style, default black!50!white) Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop shadow northeast, enhanced, colback=red!5!white, colframe=red!75!black] This is a tcolorbox. \end{tcolorbox}

/tcb/drop shadow east=(color) (style, default black!50!white) Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop shadow east, enhanced, colback=red!5!white, colframe=red!75!black] This is a tcolorbox. \end{tcolorbox}

/tcb/drop fuzzy shadow southeast=(color) (style, default black!50!white) Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tcb/drop fuzzy shadow \textsuperscript{P.182}.

\begin{tcolorbox}[drop fuzzy shadow southeast, enhanced, colback=red!5!white, colframe=red!75!black] This is a tcolorbox. \end{tcolorbox}

/tcb/drop fuzzy shadow south=(color) (style, default black!50!white) Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tcb/drop fuzzy midday shadow \textsuperscript{P.183}.

\begin{tcolorbox}[drop fuzzy shadow south, enhanced, colback=red!5!white, colframe=red!75!black] This is a tcolorbox. \end{tcolorbox}

/tcb/drop fuzzy shadow southwest=(color) (style, default black!50!white) Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow southwest, enhanced, colback=red!5!white, colframe=red!75!black] This is a tcolorbox. \end{tcolorbox}

/tcb/drop fuzzy shadow west=(color) (style, default black!50!white) Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow west, enhanced, colback=red!5!white, colframe=red!75!black] This is a tcolorbox. \end{tcolorbox}
/tcb/drop fuzzy shadow northwest=(color) \hspace{2cm} (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.
\begin{tcolorbox}[drop fuzzy shadow northwest, enhanced,colback=red!5!white,colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow north=(color) \hspace{2cm} (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.
\begin{tcolorbox}[drop fuzzy shadow north, enhanced,colback=red!5!white,colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow northeast=(color) \hspace{2cm} (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.
\begin{tcolorbox}[drop fuzzy shadow northeast, enhanced,colback=red!5!white,colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow east=(color) \hspace{2cm} (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.
\begin{tcolorbox}[drop fuzzy shadow east, enhanced,colback=red!5!white,colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
10.6.2 Lifted Shadows

/tcb/drop lifted shadow=(color) (style, default black!50!white)
Adds a new lifted shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

```
\tcbset{enhanced,colback=red!5!white,
  boxrule=0.4pt,sharp corners,
  colframe=red!75!black,fonttitle={bfseries}}
\begin{tcolorbox}[drop lifted shadow]
  This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Another shadow,
  drop lifted shadow=blue]
  This is a tcolorbox.
\end{tcolorbox}
```

/tcb/drop small lifted shadow=(color) (style, default black!50!white)
Adds a new small lifted shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

```
\tcbset{enhanced,colback=red!5!white,
  boxrule=0.4pt,sharp corners,
  colframe=red!75!black,fonttitle={bfseries}}
\tcbox[drop small lifted shadow=size=fbox]
  {This is a tcolorbox.}
\par
\begin{tcolorbox}[title=Another shadow,
  drop small lifted shadow=black]
  This is a tcolorbox.
\end{tcolorbox}
```

/tcb/drop large lifted shadow=(color) (style, default black!50!white)
Adds a new large lifted shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

```
\tcbset{enhanced,colback=red!5!white,
  boxrule=0.4pt,sharp corners,
  colframe=red!75!black,fonttitle={bfseries}}
\begin{tcolorbox}[drop large lifted shadow]
  This is a tcolorbox.
\end{tcolorbox}
```
10.6.3 Generic Shadows

\( /tcb/shadow\)\{\langle xshift\rangle\}\{\langle yshift\rangle\}\{\langle offset\rangle\}\{\langle options\rangle\}\) (no default)

Adds a new shadow to the stack of shadows. This shadow follows the outline of the \texttt{tcolorbox} but is shifted by \langle xshift\rangle and \langle yshift\rangle. The \langle offset\rangle value is a distance value from the frame outline. A positive \langle offset\rangle value shrinks the shadow and a negative \langle offset\rangle value enlarges the shadow. The shadow is filled along a TiKZ path with the given TiKZ \langle options\rangle.

The shadows adapt to the rounded corners of the \texttt{tcolorbox}. An shrinked shadow will switch to sharp corners if necessary, an enlarged shadow may become more rounded depending on several factors. But \texttt{/tcb/sharp corners} \(^{P.48}\) have sharp shadows.

Shadows are not considered for the bounding box computation by default. Large shadows may be overlaped by the following content. But, the bounding box can be adapted if necessary.

```latex
\tcbset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[title=My own shadow, shadow={2mm}{-1mm}{0mm}{black!50!white}]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Another shadow, shadow={-1mm}{-2mm}{0mm}{fill=blue, opacity=0.5}]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Double shadow, shadow={-1.5mm}{-1.5mm}{0mm}{fill=blue, opacity=0.25}, shadow={1.5mm}{-1.5mm}{0mm}{fill=red, opacity=0.25}]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Far shadow, shadow={5.5mm}{-3.5mm}{2mm}{fill=black, opacity=0.25}]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Halo shadow, shadow={0mm}{0mm}{-1.5mm}]
This is a tcolorbox.
\end{tcolorbox}
```

My own shadow

This is a tcolorbox.

Another shadow

This is a tcolorbox.

Double shadow

This is a tcolorbox.

Far shadow

This is a tcolorbox.

Halo shadow

This is a tcolorbox.
/tcb/fuzzy shadow=(xshift){(yshift)}{(offset)}{(step)}{(options)} (no default)

Adds a new fuzzy shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This fuzzy shadow follows the outline of the \texttt{tcolorbox} but is shifted by \langle xshift \rangle and \langle yshift \rangle. The \langle offset \rangle value is a distance value from the frame outline. A positive \langle offset \rangle value shrinks the shadow and a negative \langle offset \rangle value enlarges the shadow. The \{\langle step \rangle\} value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a Ti\kZ\langle options \rangle but any \texttt{opacity} value will be ignored.

\begin{tcolorbox}[title=My own shadow, fuzzy shadow={2mm}{-1mm}{0mm}{0.1mm}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, fuzzy shadow={-1mm}{-2mm}{0mm}{0.2mm}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Double shadow, fuzzy shadow={-1.5mm}{-1.5mm}{0mm}{0.1mm}, fuzzy shadow={1.5mm}{-1.5mm}{0mm}{0.1mm}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Far shadow, fuzzy shadow={5.5mm}{-3.5mm}{0mm}{0.3mm}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Glow shadow, fuzzy shadow={0mm}{0mm}{-1.5mm}{0.15mm}]
This is a tcolorbox.
\end{tcolorbox}

\newtcolorbox{mybox}[1][]{enhanced, fuzzy shadow={1.0mm}{-1.0mm}{0.12mm}{0mm}{blue!50!white}, fuzzy shadow={-1.0mm}{-1.0mm}{0.12mm}{0mm}{red!50!white}, fuzzy shadow={-1.0mm}{1.0mm}{0.12mm}{0mm}{green!50!white}, fuzzy shadow={1.0mm}{1.0mm}{0.12mm}{0mm}{yellow!50!white},#1}

\begin{mybox}[title=A multi shadow box]
This is a tcolorbox.
\end{mybox}
If set to `true`, the shadow drawing algorithm tries to do a somewhat smart calculation of the arc for the shadow. The result is pleasing for typical boxes with rounded corners, but gives strange results for circular boxes.

```latex
\begin{tcolorbox}[drop shadow]
Smart shadow arc (arguably better than normal)
\end{tcolorbox}
\hfill
\begin{tcolorbox}[smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}
\hfill
\begin{tcolorbox}[circular arc, drop shadow]
Smart shadow arc (worse than normal)
\end{tcolorbox}
\hfill
\begin{tcolorbox}[circular arc, smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}
```

Adds a new lifted shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This lifted shadow follows the outline of the `tcolorbox` but is shifted by \( \langle xshift \rangle \) and \( \langle yshift \rangle \) on the lower left corner and by \(-\langle xshift \rangle\) and \( \langle yshift \rangle \) on the lower right corner. Additionally, there is a \( \langle bend \rangle \) in the middle. The \( \langle step \rangle \) value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a Ti\( \text{KZ} \) path with the given Ti\( \text{KZ} \) \( \langle \text{options} \rangle \) but any opacity value will be ignored.

```latex
\begin{tcolorbox}[title=My own shadow, lifted shadow={1mm}{-2mm}{3mm}{0.1mm}
\%\{black!50!white\}]
This is a tcolorbox.
\end{tcolorbox}
```
10.6.4 TikZ Shadows

Alternativ to the package shadow options described before, shadows from the «Shadows Library» of TikZ can be used. Such shadows can be added directly to the frame path using \texttt{/tcb/frame style -P.148}.

\begin{tcolorbox}[enhanced, colback=red!5!white, colframe=red!75!black, frame style={drop shadow}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,height=3cm, colback=red!5!white, colframe=red!75!black, halign=center, valign=center, frame style={circular drop shadow}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,width=2.5cm, square, circular arc, halign=center, valign=center, colback=red!5!white, colframe=red!75!black, frame style={circular glow={fill=red}}]
tcolorbox
\end{tcolorbox}
10.7 TikZ Picture Option Keys

The following general options are applicable for skins which use \texttt{tikzpicture} as \\
\texttt{/tcb/graphical environment}. Therefore, the skin \texttt{standard} does not support these options, but most other skins, e.g. \texttt{enhanced}.

\texttt{/tcb/tikz=⟨tikz option list⟩} (no default, initially empty)

Adds the given \texttt{⟨tikz option list⟩} to the main \texttt{tikzpicture} environment used to draw the color box, see \cite{22}. If this option is applied a second time, the new \texttt{⟨tikz option list⟩} is appended to the current option list.

\begin{tcolorbox}
\begin{tcubehmenu}
\begin{itemize}
\item 
\end{itemize}
\end{tcubehmenu}
\end{tcolorbox}

\texttt{/tcb/tikz reset} (initially set)

Removes all options given by \texttt{/tcb/tikz}.

\texttt{/tcb/at begin tikz=⟨tikz code⟩} (no default, initially empty)

The given \texttt{⟨tikz code⟩} is executed at the beginning of the \texttt{tikzpicture} environment after \texttt{the TikZ option execute at begin picture} was applied. If this option is applied a second time, the new \texttt{⟨tikz code⟩} is appended to the current code.

\texttt{/tcb/at begin tikz reset} (initially set)

Removes all code given by \texttt{/tcb/at begin tikz}.

\texttt{/tcb/at end tikz=⟨tikz code⟩} (no default, initially empty)

The given \texttt{⟨tikz code⟩} is executed at the ending of the \texttt{tikzpicture} environment before the TikZ option \texttt{execute at end picture} was applied. If this option is applied a second time, the new \texttt{⟨tikz code⟩} is appended to the current code.

\texttt{/tcb/at end tikz reset} (initially set)

Removes all code given by \texttt{/tcb/at end tikz}.

192
/tcb/rotate=⟨angle⟩  (no default, initially unset)
Rotates the \texttt{tcolorbox} by the given \texttt{⟨angle⟩}. Note that this is a \texttt{TiKZ} coordinate transformation i.e. not all graphical elements like shadings will really be rotated.

\begin{tcolorbox}[title=Rotated box,rotate=30]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Scaled box,scale=0.5]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Scaled box,scale=1.25]
This is a tcolorbox.
\end{tcolorbox}

/tcb/scale=⟨fraction⟩  (no default, initially unset)
Scales the \texttt{tcolorbox} by the given \texttt{⟨fraction⟩}. Note that this is a \texttt{TiKZ} coordinate transformation i.e. not all graphical elements like line widths will really be scaled.

\begin{tcolorbox}[enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries]
\begin{tcolorbox}[title=Scaled box,scale=0.5]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Scaled box,scale=1.25]
This is a tcolorbox.
\end{tcolorbox}
\end{tcolorbox}

/tcb/remember  (style, initially unset)
Shortcut for \texttt{tikz}={\texttt{remember} \texttt{picture}}. This allows one to reference nodes in other \texttt{TiKZ} pictures.

\begin{tcolorbox}[enhanced,remember,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,title=The four corners of a paper,overlay={\draw[red!50!white,line width=1mm,opacity=0.5,shorten >=3mm](frame.north west) edge[->] (current page.north west)(frame.north east) edge[->] (current page.north east)(frame.south west) edge[->] (current page.south west)(frame.south east) edge[->] (current page.south east);}]
This is a tcolorbox.
\end{tcolorbox}

The four corners of a paper

This is a tcolorbox.
The \texttt{frame} node will be remembered by the given \langle \textit{name} \rangle to be referenced in other \LaTeX\ pictures.

\begin{tcbbox}[title=First Box,nobeforeafter,width=\linewidth/4,remember as=one]
This is a test.
\end{tcbbox}
\hfill
\begin{tcbbox}[title=Second Box,nobeforeafter,width=\linewidth/4,remember as=two]
This is a test.
\end{tcbbox}
\hfill
\begin{tcbbox}[title=Third Box,nobeforeafter,width=\linewidth/4,remember as=three]
This is a test.
\end{tcbbox}
\hfill
\begin{tcbbox}[title=Fourth Box,remember as=four]
This is a test.
\end{tcbbox}

\begin{tikzpicture}[overlay,remember picture,line width=1mm,draw=red!75!black]
\draw[->] (one.east) to[bend right] node[above] {A} (two.west);
\draw[->] (two.east) to[bend left] node[above] {B} (three.west);
\draw[->] (three.east) to[bend left=90] node[right] {C} (four.east);
\draw[->] (four.west) to[bend left=90] node[left] {D} (one.west);
\end{tikzpicture}

10.8 Underlay Option Keys

Underlays are quite similar to overlays described in Section 4.12 on page 71. Underlays are drawn after the frame and interior are drawn and before overlays and the text content is drawn; see Section 9.4 on page 142 for the general drawing scheme.

The differences between underlays and overlays are:

- Underlays are not applicable for the skins standard\(^\text{P.204}\) and standard jigsaw\(^\text{P.205}\), whereas overlays are applicable also for these skins. The skin spartan\(^\text{P.247}\) supports underlays but no overlays.
  
  If an underlay is used with the standard\(^\text{P.204}\) skin, it is silently ignored.

- Underlays are stackable, i.e. several different underlays can be used on the same tcolorbox. Overlays are not stackable by default (but with some help of the library \texttt{hooks}).

- Boxed titles are implemented with underlays (Section 10.2 on page 155), watermarks are implemented with overlays (Section 10.3 on page 165).

\texttt{/tcb/underlay}=(\textit{graphical code}) \hspace{1cm} \text{(no default, initially unset)}

Adds \textit{\textit{graphical code}} to the box drawing process. This \textit{\textit{graphical code}} is drawn after the frame and interior and before the text content.

\texttt{\newtcolorbox{mybox}[\text{enhanced, colback=red!5!white, colbacktitle=red!85!black!50!white, colframe=red!75!black, fonttitle=\texttt{bfseries}, watermark color=yellow!50!white, underlay={\begin{tcbclipinterior}\draw[red!40!white, line width=1cm] (interior.south west)--(interior.north east); \end{tcbclipinterior}}], attach boxed title to top center={yshift=-2mm},#1}}

\begin{mybox}[\text{title=My box, watermark text=My Watermark}] \lipsum[2] \end{mybox}

My box

\begin{tcbitemize}
\end{tcbitemize}

\texttt{/tcb/no underlay} \hspace{1cm} \text{(style, no default, initially set)}

Removes the underlay if set before.
If the box is set to be /tcb/breakable P.365 and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process. /tcb/underlay P.195 overwrites this key.

If the box is set to be /tcb/unbreakable P.366, then the ⟨graphical code⟩ is added to the box drawing process. /tcb/underlay P.195 overwrites this key.

/tcb/no underlay unbroken (style, no default, initially set)
Removes the unbroken underlay if set before.

/tcb/underlay unbroken=⟨graphical code⟩ (no default, initially unset)
If the box is set to be /tcb/breakable P.365 but is not broken actually or if the box is set to be /tcb/unbreakable P.366, then the ⟨graphical code⟩ is added to the box drawing process for the first part of the break sequence. /tcb/underlay P.195 overwrites this key.

/tcb/no underlay first (style, no default, initially set)
Removes the first underlay if set before.

/tcb/underlay first=⟨graphical code⟩ (no default, initially unset)
If the box is set to be /tcb/breakable P.365 and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the first part of the break sequence. /tcb/underlay P.195 overwrites this key.

/tcb/no underlay middle (style, no default, initially set)
Removes the middle underlay if set before.

/tcb/underlay middle=⟨graphical code⟩ (no default, initially unset)
If the box is set to be /tcb/breakable P.365 and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/underlay P.195 overwrites this key.

/tcb/no underlay last (style, no default, initially set)
Removes the last underlay if set before.

/tcb/underlay last=⟨graphical code⟩ (no default, initially unset)
If the box is set to be /tcb/breakable P.365 and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the last part of the break sequence. /tcb/underlay P.195 overwrites this key.

/tcb/no underlay boxed title (style, no default, initially set)
Removes the boxed title underlay if set before.

/tcb/underlay boxed title=⟨graphical code⟩ (no default, initially unset)
If the box has a boxed title, see Section 10.2 on page 155, then the ⟨graphical code⟩ is added to the box drawing process before the boxed title is drawn.

/tcb/no underlay boxed title (style, no default, initially set)
Removes the boxed title underlay if set before.

/tcb/underlay unbroken and first=⟨graphical code⟩ (no default, initially unset)
This is an abbreviation for setting /tcb/underlay unbroken and /tcb/underlay first together. /tcb/underlay P.195 overwrites this key.

/tcb/underlay middle and last=⟨graphical code⟩ (no default, initially unset)
This is an abbreviation for setting /tcb/underlay middle and /tcb/underlay last together. /tcb/underlay P.195 overwrites this key.

/tcb/underlay unbroken and last=⟨graphical code⟩ (no default, initially unset)
This is an abbreviation for setting /tcb/underlay unbroken and /tcb/underlay last together. /tcb/underlay P.195 overwrites this key.

/tcb/underlay first and middle=⟨graphical code⟩ (no default, initially unset)
This is an abbreviation for setting /tcb/underlay first and /tcb/underlay middle together. /tcb/underlay P.195 overwrites this key.
10.9 Finish Option Keys

Finishes are quite similar to underlays described in Section 10.8 on page 195 and overlays described in Section 4.12 on page 71. Finishes are drawn after the text content is drawn; see Section 9.4 on page 142 for the general drawing scheme. Therefore, a finish will reduce the readability of the text content.

Finishes are intended for special effects like highlights or glosses or text over text.

- Finishes are only applicable for the skins enhanced\textsuperscript{P. 206}, empty\textsuperscript{P. 237}, freelance\textsuperscript{P. 250}, bicolor\textsuperscript{P. 219}, beamer\textsuperscript{P. 228}, and widget\textsuperscript{P. 233}.

\begin{itemize}
  \item If a finish is used with the standard\textsuperscript{P. 204} skin, it is silently ignored.
  \item Finishes are stackable, i.e. several different finishes can be used on the same \texttt{tcolorbox}.
\end{itemize}

/tcb/finish=⟨graphical code⟩

(no default, initially unset)

Adds ⟨graphical code⟩ to the box drawing process. This ⟨graphical code⟩ is drawn after the text content.

\begin{verbatim}
\newtcolorbox{mybox}{[1][1]}{enhanced,colback=red!5!white, colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\bfseries, finish=\begin{tcbclipframe}
\path[bottom color=black,top color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
\path[top color=white,bottom color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.north east) -- (frame.north west) -- cycle;
\end{tcbclipframe}},#1}
\begin{mybox}[title=My box]
\lipsum[2]
\end{mybox}
\end{verbatim}

My box


\begin{verbatim}
\newtcolorbox{mybox}{[1][1]}{enhanced,colback=red!5!white, colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\bfseries, finish={\node[draw,fill=white,fill opacity=0.85,inner sep=5mm, rounded corners] at (frame.center) {\Huge\bfseries Finish!};},#1}
\begin{mybox}[title=My box]
\lipsum[2]
\end{mybox}
\end{verbatim}

My box

/tcb/no finish (style, no default, initially set)
Removes the finish if set before.

/tcb/finish broken=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \( \text{P.365} \) and is broken actually, then the \( \langle \text{graphical code} \rangle \) is added to the box drawing process. /tcb/finish \( \text{P.197} \) overwrites this key.

/tcb/finish unbroken=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \( \text{P.365} \) but is not broken actually or if the box is set to be /tcb/unbreakable \( \text{P.366} \), then the \( \langle \text{graphical code} \rangle \) is added to the box drawing process. /tcb/finish \( \text{P.197} \) overwrites this key.

/tcb/no finish unbroken (style, no default, initially set)
Removes the unbroken finish if set before.

/tcb/finish first=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \( \text{P.365} \) and is broken actually, then the \( \langle \text{graphical code} \rangle \) is added to the box drawing process for the first part of the break sequence. /tcb/finish \( \text{P.197} \) overwrites this key.

/tcb/no finish first (style, no default, initially set)
Removes the first finish if set before.

/tcb/finish middle=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \( \text{P.365} \) and is broken actually, then the \( \langle \text{graphical code} \rangle \) is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/finish \( \text{P.197} \) overwrites this key.

/tcb/no finish middle (style, no default, initially set)
Removes the middle finish if set before.

/tcb/finish last=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \( \text{P.365} \) and is broken actually, then the \( \langle \text{graphical code} \rangle \) is added to the box drawing process for the last part of the break sequence. /tcb/finish \( \text{P.197} \) overwrites this key.

/tcb/no finish last (style, no default, initially set)
Removes the last finish if set before.

/tcb/finish unbroken and first=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish first together. /tcb/finish \( \text{P.197} \) overwrites this key.

/tcb/finish middle and last=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish middle and /tcb/finish last together. /tcb/finish \( \text{P.197} \) overwrites this key.

/tcb/finish unbroken and last=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish last together. /tcb/finish \( \text{P.197} \) overwrites this key.

/tcb/finish first and middle=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish first and /tcb/finish middle together. /tcb/finish \( \text{P.197} \) overwrites this key.
10.10 Hyper Option Keys

All options of this section need the package \texttt{hyperref} \cite{15} to be loaded separately. All these options are implemented as /tcb/finish \cite{197} and can be disabled by /tcb/no finish \cite{198}.

If the package \texttt{hyperref} \cite{15} is not loaded or if the standard \cite{204} skin is used, all hyper option are silently ignored.

\begin{verbatim}
\tcb/hyperref=(marker) \hspace{1em} (no default, initially unset)

The whole frame of a tcolorbox is make an active hyperlink for a \texttt{(marker)} which was given by \texttt{\label} or /tcb/label \cite{98} or /tcb/phantomlabel \cite{98}. Such, the tcolorbox is made a clickable button (depending on the previewer).
\end{verbatim}

\begin{verbatim}
\tcb/hyperref interior=(marker) \hspace{1em} (no default, initially unset)

Identical to /tcb/hyperref, but only the interior of a tcolorbox is made a hyperlink (without frame and title).
\end{verbatim}

\begin{verbatim}
\tcb/hyperref title=(marker) \hspace{1em} (no default, initially unset)

Identical to /tcb/hyperref, but only the title of a tcolorbox is made a hyperlink.
\end{verbatim}

\begin{verbatim}
\tcb/hyperref node=(marker)\{\langle node\rangle\} \hspace{1em} (no default, initially unset)

Identical to /tcb/hyperref, but only the given Ti\textit{k}Z \texttt{\langle node\rangle} is made a hyperlink. This \texttt{\langle node\rangle} may be frame, interior, title, or any other named node used for drawing the tcolorbox. The \texttt{\langle node\rangle} may be defined inside /tcb/underlay \cite{195}, /tcb/overlay \cite{71} or /tcb/finish \cite{197}. If the later is used, define the node before /tcb/hyperref node is applied.
\end{verbatim}

\begin{verbatim}
\tcb/hyperlink=(marker) \hspace{1em} (no default, initially unset)

The whole frame of a tcolorbox is make an active hyperlink for a \texttt{(marker)} which was given by \texttt{\hypertarget} or /tcb/hypertarget \cite{100}. Such, the tcolorbox is made a clickable button (depending on the previewer).
\end{verbatim}
Identical to `/tcb/hyperlink` \cite{P.199}, but only the interior of a \texttt{tcolorbox} is made a hyperlink (without frame and title).

Identical to `/tcb/hyperlink` \cite{P.199}, but only the title of a \texttt{tcolorbox} is made a hyperlink.

Identical to `/tcb/hyperlink` \cite{P.199}, but only the given Ti\texttt{k}Z \texttt{(node)} is made a hyperlink. This \texttt{(node)} may be \texttt{frame}, \texttt{interior}, \texttt{title}, or any other named node used for drawing the \texttt{tcolorbox}. The \texttt{(node)} may be defined inside \texttt{/tcb/underlay} \cite{P.195}, \texttt{/tcb/overlay} \cite{P.71} or \texttt{/tcb/finish} \cite{P.197}. If the later is used, define the node before \texttt{/tcb/hyperlink node} is applied.

The whole frame of a \texttt{tcolorbox} is make an active hyperlink for an \texttt{(url)} in the same manner as using \texttt{\href} or \texttt{\url}. Such, the \texttt{tcolorbox} is made a clickable button (depending on the previewer).

Identical to \texttt{/tcb/hyperurl}, but only the interior of a \texttt{tcolorbox} is made a hyperlink (without frame and title).

Identical to \texttt{/tcb/hyperurl}, but only the title of a \texttt{tcolorbox} is made a hyperlink.

Identical to \texttt{/tcb/hyperurl}, but only the given Ti\texttt{k}Z \texttt{(node)} is made a hyperlink. This \texttt{(node)} may be \texttt{frame}, \texttt{interior}, \texttt{title}, or any other named node used for drawing the \texttt{tcolorbox}. The \texttt{(node)} may be defined inside \texttt{/tcb/underlay} \cite{P.195}, \texttt{/tcb/overlay} \cite{P.71} or \texttt{/tcb/finish} \cite{P.197}. If the later is used, define the node before \texttt{/tcb/hyperurl node} is applied.

\begin{tcolorbox} \[enhanced, colback=green!50, \hyperurl*=\{page=3, pdfnewwindow=true\} \% \{tcolorbox-example.pdf\} \] Open example file on Page 3. \end{tcolorbox}
10.11 Jigsaw Skin Variants

As described in Section 9.1 on page 134, a \texttt{tcolorbox} is drawn by up to four \textit{engines}. Typically, the \textit{frame} engine fills the complete box area with color and the other engines fill certain areas with other colors. Finally, only the area which you see as \textit{frame} of the box will display the frame color. For most applications, this is a good approach.

For certain boxes, a more delicate procedure is needed. E.g., if the box should be translucent, an already painted area cannot be made unpainted. Therefore, more elaborate frame engines saw holes into the frame where the interior area and optionally the title area will be painted. The resulting skins are called \textit{jigsaw} skins. For \texttt{standard}\textsuperscript{P.204} and \texttt{enhanced}\textsuperscript{P.206}, there are variants called \texttt{standard jigsaw}\textsuperscript{P.205} and \texttt{enhanced jigsaw}\textsuperscript{P.213}.

\begin{Verbatim}
\newcommand{\ballexample}{\begin{tikzpicture}
\path[\use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}}
\tcbset{enhanced,colback=blue!5!white,\frame style={left color=red!75!black,right color=red!10!yellow},\fonttitle=bfseries}
\ballexample
\begin{tcolorbox}[\title=A normal box]\lipsum[2]\end{tcolorbox}
\ballexample
\begin{tcolorbox}[\title=A translucent jigsaw box,\enhanced jigsaw,opacityback=0.35]\lipsum[2]\end{tcolorbox}
\end{Verbatim}

A normal box


A translucent jigsaw box

To reduce the compilation time while drafting a document, the draft mode can be applied. Basically, it changes all skins to spartan and sets the /tcb/fit algorithm to squeeze. Especially, when fuzzy shadows are used, the speedup will be considerable high.

It is strongly recommended that the draft mode is *not* used for the final document. Use spartan directly, if you want to stay with it. The draft mode implementation may change in future.

Normally, switching to the draft mode should not alter the geometry of your document. Since overlays are deactivated, any code placed there (e.g. counter changes) is not executed anymore! Also, /tcb/remember as will not have any effect. You may exclude critical code with \tcbswitchdrafmode from converting to draft mode.

Any following \tcolorbox code is put into *draft mode*. All skin settings are overruled with spartan. Overlays, watermarks, shadows, borderlines, and rounded corners are deactivated for all \tcolorbox layers.

The draft mode is deactivated for the following code.

If the compilation is in *draft mode*, the draft mode is deactivated until a following \tcbswitchdrafmode is detected.

If the compilation is not in *draft mode*, nothing happens and a following \tcbswitchdrafmode will not start the draft mode.

The pair \tcbswitchdrafmode and \tcbswitchdrafmode cannot be used nested.

Continues the *draft mode* which was suspended by a preceding \tcbswitchdrafmode. Nothing happens, if there was no draft mode before \tcbswitchdrafmode.

Code, which is placed between \tcbswitchdrafmode and \tcbswitchdrafmode is shielded from *draft mode*.

If set to true, the *draft mode* is started. If set to false, the *draft mode* is stopped.

\begin{mybeamer}{Beamer box}
This box looks like a box provided by the \texttt{beamer} class.
\end{mybeamer}

\begin{mybeamer}[draftmode]{Beamer box}
This box looks like a box provided by the \texttt{beamer} class.
\end{mybeamer}

\begin{mybeamer}[draftmode]{Beamer box}
This box looks like a box provided by the \texttt{beamer} class.
\end{mybeamer}
10.13 Skin Family 'standard'

Note that the option keys /tcb/frame style P.148, /tcb/interior style P.149, /tcb/segmentation style P.151, and /tcb/title style P.151 are not be applicable to the standard skin. Also, watermarks (see Subsection 10.3) are not usable with the standard skin.

/tcb/skin=standard  

This is the standard skin from the core package. All drawing engines are set to type standard. The drawing is based on pgf commands and does not need the tikz package.

Environment and engines for the skin 'standard'

/tcb/graphical environment P.135: pgfpicture  
/tcb/frame engine P.135: standard  
/tcb/interior titled engine P.135: standard  
/tcb/interior engine P.136: standard  
/tcb/segmentation engine P.136: standard  
/tcb/title engine P.136: standard

/tcb/standard  

This is an abbreviation for setting skin=standard.

\begin{tcbraster}
\[standard,raster equal height,raster columns=4, \]
\[colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, \]
\[left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm\]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is the standard jigsaw skin from the core package. It differs from the skin `standard` by its frame engine, see Section 10.11 on page 201.

Environment and engines for the skin `standard jigsaw`

- `/tcb/graphical environment` \( \rightarrow \) \( P.135 \): \`pgfpicture\`
- `/tcb/frame engine` \( \rightarrow \) \( P.135 \): \`standardjigsaw\`
- `/tcb/interior titled engine` \( \rightarrow \) \( P.135 \):
  - `/tcb/interior engine` \( \rightarrow \) \( P.136 \):
    - `/tcb/segmentation engine` \( \rightarrow \) \( P.136 \):
      - `/tcb/title engine` \( \rightarrow \) \( P.136 \):

This is an abbreviation for setting `skin=standard jigsaw`.

\begin{tcbraster}[standard jigsaw,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,
opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}

This is my content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

More content.
10.14 Skin Family 'enhanced'

If you like the standard appearance of a \texttt{tcolorbox} but you want to have some 'enhanced' features, the \texttt{enhanced} skin is what you are looking for.

\texttt{/tcb/skin=enhanced} (skin)

This skin translates the drawing commands of the core package into \texttt{tikz} path commands. Therefore, it allows all \texttt{tikz} high level options for these paths and has more flexibility compared to the \texttt{standard} \textsuperscript{P.204} skin. You pay for this with some prolonged compilation time. The \texttt{tikz} path options can be given with the option keys \texttt{/tcb/frame style} \textsuperscript{P.148}, \texttt{/tcb/interior style} \textsuperscript{P.149}, \texttt{/tcb/segmentation style} \textsuperscript{P.151}, and \texttt{/tcb/title style} \textsuperscript{P.151}.

Environment and engines for the skin 'enhanced'

\begin{itemize}
  \item \texttt{/tcb/graphical environment} \textsuperscript{P.135}: \texttt{tikzpicture}
  \item \texttt{/tcb/frame engine} \textsuperscript{P.135}: \texttt{path}
  \item \texttt{/tcb/interior titled engine} \textsuperscript{P.135}: \texttt{path}
  \item \texttt{/tcb/interior engine} \textsuperscript{P.136}: \texttt{path}
  \item \texttt{/tcb/segmentation engine} \textsuperscript{P.136}: \texttt{path}
  \item \texttt{/tcb/title engine} \textsuperscript{P.136}: \texttt{path}
\end{itemize}

\texttt{/tcb/enhanced} (style, no value)

This is an abbreviation for setting \texttt{skin=enhanced}.

\begin{verbatim}
\begin{tcbbraster}
  \begin{tcolorbox}[enhanced,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
    \begin{tcolorbox}
      This is my content.
    \end{tcolorbox}
    \begin{tcolorbox}
      This is my content.
    \end{tcolorbox}
    \tcblower
    More content.
    \end{tcolorbox}
  \end{tcolorbox}
\end{tcbbraster}
\end{verbatim}

206
With the 'enhanced' skin, it is quite easy to produce fancy looking effects.

Note that this is still a \texttt{tcolorbox}.

Of course, skins can be used for listings also.

\begin{equation}
\int \limits_1^2 \frac{1}{x} \, dx = \ln(2).
\end{equation}
For unbreakable boxes, this is identical to using \texttt{/tcb/enhanced}. But, for breakable boxes, the `break sequence` is identical to the \texttt{standard} skin, see Section 17.8 from page 377.

This style relies on the \texttt{enhanced}. All drawing operations are hidden and all margins are set to 0pt. See \texttt{/tcb/blanker} for switching off the drawing engines.

\begin{tcolorbox}[blank,watermark text=\texttt{A blank box}]
\lipsum[1]
\end{tcolorbox}

Sometimes, a line is only a line. With \texttt{\textbackslash tcb\textcolor{red}{\textbackslash lower}}^{\textsuperscript{P.12}} you separate the box content into two functional units. \texttt{\textbackslash tc\textbackslash line} draws only a line which looks like the segmentation line between upper and lower part. Furthermore, you can use \texttt{\textbackslash tc\textbackslash line} more than just once. \texttt{\textbackslash tc\textbackslash line} always uses the \texttt{path} drawing engine. Therefore, the \texttt{\textbackslash t\textbackslash cb/segmentation style}^{\textsuperscript{P.151}} can be applied.

\texttt{\textbackslash t\textbackslash cb\textbackslash set\{enhanced, colframe=blue!50!black, colback=white\}}

\begin{tcolorbox}[colupper=red!50!black, collower=green!50!black]
\texttt{\textbackslash lipsum}\{1\}
\texttt{\textbackslash tc\textbackslash line}
\texttt{\textbackslash lipsum}\{2\}
\texttt{\textbackslash tc\textbackslash lower}
\texttt{\textbackslash lipsum}\{3\}
\texttt{\textbackslash tc\textbackslash line}
\texttt{\textbackslash lipsum}\{4\}
\end{tcolorbox}


\texttt{\textbackslash tc\textbackslash line\textcolor{red}{\textbackslash asterisk}}

Equivalent to \texttt{\textbackslash tc\textbackslash line}, but in a breakable box, \texttt{\textbackslash tc\textbackslash line\textcolor{red}{\textbackslash asterisk}} is removed if at a page/box break. Also, it is removed at the end of a box.
This is a flavor of \texttt{enhanced} which is used as a \textit{first} part in a break sequence for \texttt{enhanced}. Nevertheless, this skin can be applied independently.

\begin{tcbraster}[skin=enhancedfirst,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of enhanced \textsuperscript{P.206} which is used as a middle part in a break sequence for enhanced \textsuperscript{P.206}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin 'enhancedmiddle'

- `/tcb/graphical environment` \textsuperscript{P.135}: \texttt{tikzpicture}
- `/tcb/frame engine` \textsuperscript{P.135}: \texttt{pathmiddle}
- `/tcb/interior titled engine` \textsuperscript{P.135}: \texttt{pathmiddle}
- `/tcb/interior engine` \textsuperscript{P.136}: \texttt{pathmiddle}
- `/tcb/segmentation engine` \textsuperscript{P.136}: \texttt{path}
- `/tcb/title engine` \textsuperscript{P.136}: \texttt{pathmiddle}

\begin{tcbraster}[skin=enhancedmiddle,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of \texttt{enhanced} \textsuperscript{P.206} which is used as a \textit{last} part in a break sequence for \texttt{enhanced} \textsuperscript{P.206}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin ‘\texttt{enhancedlast}’

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{/tcb/graphical environment} \textsuperscript{P.135}</td>
<td>\texttt{tikzpicture}</td>
</tr>
<tr>
<td>\texttt{/tcb/frame engine} \textsuperscript{P.135}</td>
<td>\texttt{pathlast}</td>
</tr>
<tr>
<td>\texttt{/tcb/interior titled engine} \textsuperscript{P.135}</td>
<td>\texttt{pathlast}</td>
</tr>
<tr>
<td>\texttt{/tcb/interior engine} \textsuperscript{P.136}</td>
<td>\texttt{pathlast}</td>
</tr>
<tr>
<td>\texttt{/tcb/segmentation engine} \textsuperscript{P.136}</td>
<td>\texttt{path}</td>
</tr>
<tr>
<td>\texttt{/tcb/title engine} \textsuperscript{P.136}</td>
<td>\texttt{pathlast}</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[skin=enhancedlast,raster equal height,raster columns=4,\hline \begin{tcolorbox} This is my content. \end{tcolorbox} \begin{tcolorbox} This is my content. \tcblower More content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title] This is my content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title] This is my content. \tcblower More content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title] This is my content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title] This is my content. \tcblower More content. \end{tcolorbox} \end{tcbraster}
This is the jigsaw variant of skin enhanced\textsuperscript{P.206}. It differs by its frame engine, see Section 10.11 on page 201.

### Environment and engines for the skin 'enhanced jigsaw'

- `/tcb/graphical environment`\textsuperscript{P.135}: \texttt{tikzpicture}
- `/tcb/frame engine`\textsuperscript{P.135}: \texttt{pathjigsaw}
- `/tcb/interior titled engine`\textsuperscript{P.135}: \texttt{path}
- `/tcb/interior engine`\textsuperscript{P.136}: \texttt{path}
- `/tcb/segmentation engine`\textsuperscript{P.136}: \texttt{path}
- `/tcb/title engine`\textsuperscript{P.136}: \texttt{path}

This is an abbreviation for setting `skin=enhanced jigsaw`.

\begin{tcbraster}
[enhanced jigsaw,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,
opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}

For unbreakable boxes, this is identical to using `/tcb/enhanced jigsaw`. But, for breakable boxes, the break sequence is identical to the standard jigsaw\textsuperscript{P.205} skin, see Section 17.8 from page 377.
This is the jigsaw variant of skin `enhancedfirst` \(^\text{\textsuperscript{(skin)}}\). It differs by its frame engine, see Section 10.11 on page 201.

**Environment and engines for the skin 'enhancedfirst jigsaw'**

- `/tcb/graphical environment` \(^\text{\textsuperscript{P.135}}\): `tikzpicture`
- `/tcb/frame engine` \(^\text{\textsuperscript{P.135}}\): `pathfirstjigsaw`
- `/tcb/interior titled engine` \(^\text{\textsuperscript{P.135}}\): `pathfirst`
- `/tcb/interior engine` \(^\text{\textsuperscript{P.136}}\): `pathfirst`
- `/tcb/segmentation engine` \(^\text{\textsuperscript{P.136}}\): `path`
- `/tcb/title engine` \(^\text{\textsuperscript{P.136}}\): `pathfirst`

\begin{tcbraster}[skin=enhancedfirst jigsaw,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{tcbraster}
This is the jigsaw variant of skin `enhancedmiddle` \(^\text{P.211}\). It differs by its frame engine, see Section 10.11 on page 201.

### Environment and engines for the skin 'enhancedmiddle jigsaw'

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment (^\text{P.135})</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine (^\text{P.135})</td>
<td>pathmiddlejigsaw</td>
</tr>
<tr>
<td>/tcb/interior titled engine (^\text{P.135})</td>
<td>pathmiddlejigsaw</td>
</tr>
<tr>
<td>/tcb/interior engine (^\text{P.136})</td>
<td>pathmiddlejigsaw</td>
</tr>
<tr>
<td>/tcb/segmentation engine (^\text{P.136})</td>
<td>path</td>
</tr>
<tr>
<td>/tcb/title engine (^\text{P.136})</td>
<td>pathmiddlejigsaw</td>
</tr>
</tbody>
</table>

This styles relies on the skin `enhancedmiddle jigsaw`. It is intended to be used as an optical marker like a highlighter pen.

```
\begin{tcbraster}
\begin{tcolorbox}[raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
```

```
\begin{tcolorbox}[marker]
\lipsum[2]
\end{tcolorbox}
```


215
This examples demonstrates the creation of several text marker environments based on `enhancedmiddle`\textsuperscript{p.211}.

\begin{tcolorbox}[textmarker/.style={%
  skin=enhancedmiddle jigsaw,breakable,parbox=false, 
  boxrule=0mm,letrule=5mm,rigtrule=5mm,boxsep=0mm,arc=0mm,outer arc=0mm, 
  left=3mm,right=3mm,top=1mm,bottom=1mm,toptitle=1mm,bottomtitle=1mm,oversize}]
\begin{tcolorbox}[yellow]{textmarker, colback=yellow!5!white, colframe=yellow}
\lipsum[1-3]
\end{tcolorbox}
\begin{tcolorbox}[orange]{textmarker, colback=DarkOrange!5!white, colframe=DarkOrange!75!yellow}
\lipsum[4]
\end{tcolorbox}
\begin{tcolorbox}[red]{textmarker, colback=red!5!white, colframe=red}
\lipsum[5]
\end{tcolorbox}
\begin{tcolorbox}[green]{textmarker, colback=Chartreuse!5!white, colframe=Chartreuse}
\lipsum[6]
\end{tcolorbox}
\begin{tcolorbox}[blue]{textmarker, colback=DeepSkyBlue!5!white, colframe=DeepSkyBlue}
\lipsum[7]
\end{tcolorbox}
\begin{tcolorbox}[rainbow]{textmarker, interior hidden, 
  frame style={top color=blue, bottom color=red, middle color=green}}
\lipsum[8]
\end{tcolorbox}
\end{tcolorbox}


Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique,


This is the jigsaw variant of skin \textit{enhancedlast}. It differs by its frame engine, see Section 10.11 on page 201.

### Environment and engines for the skin 'enhancedlast'

\begin{tcblist}{[skin=enhancedlast jigsaw,raster equal height,raster columns=4,
  colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,
  opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,
  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{tcblist}
10.15 Skin Family ’bicolor’

This skin is quite similar to the standard and enhanced skin. But instead of a segmentation line, the optional lower part of the box is filled with a different color or drawn with a different style.

Environment and engines for the skin ’bicolor’

- The most basic usage of this skin is to set the background color of the lower part by \( /tcb/colbacklower \) and all other options like for the standard skin.

- The more advanced usage of this skin is to apply the \( /tcb/frame style \) and the \( /tcb/interior style \) like for the enhanced skin. Also, the \( /tcb/segmentation style \) can be used, but it is applied to the whole lower part.

\[
\begin{tcolorbox}[skin=bicolor,title=The title, colframe=FireBrick!75!black,colback=Salmon!50!white,colbacklower=Salmon]
The upper part.
\t\tcblower
The lower part.
\end{tcolorbox}
\]

\[
\begin{tcolorbox}[skin=bicolor,title=The title, frame style={top color=FireBrick,bottom color=FireBrick!15!white,draw=black}, interior style={left color=Salmon,right color=Salmon!50!white}, segmentation style={right color=Salmon,left color=Salmon!50!white}]
The upper part.
\t\tcblower
The lower part.
\end{tcolorbox}
\]

\( /tcb/bicolor \) (style, no value)

This is an abbreviation for setting \( /tcb/skin=bicolor \).
This is my content.

This is my content.

More content.

This is my content.

My title

This is my content.

My title

This is my content.

More content.

\begin{tcblisting}{title={Snapshot of the staging area},
gitexample={The option `-a` automatically stages all tracked and modified files before the commit.\par
This can be combined with the message option `-m` as seen in the third line.}}

\begin{verbatim}
git commit
\end{verbatim}

\end{tcblisting}

The option `-a` automatically stages all tracked and modified files before the commit. This can be combined with the message option `-m` as seen in the third line.
This is a flavor of \textit{bicolor}\footnote{P.219} which is used as a \textit{first} part in a break sequence for \textit{bicolor}\footnote{P.219}. Nevertheless, this skin can be applied independently.

---

### Environment and engines for the skin `bicolorfirst`

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphical environment</td>
<td>\textit{tikzpicture}</td>
</tr>
<tr>
<td>Frame engine</td>
<td>\textit{pathfirst}</td>
</tr>
<tr>
<td>Interior titled engine</td>
<td>\textit{special}</td>
</tr>
<tr>
<td>Interior engine</td>
<td>\textit{special}</td>
</tr>
<tr>
<td>Segmentation engine</td>
<td>\textit{special}</td>
</tr>
<tr>
<td>Title engine</td>
<td>\textit{pathfirst}</td>
</tr>
</tbody>
</table>

---

```latex
\begin{tcbraster}[skin=bicolorfirst,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
colbacktitle=LimeGreen!75!DarkGreen,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
```
This is a flavor of *bicolor* which is used as a *middle* part in a break sequence for *bicolor*. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin 'bicolormiddle'

- **/tcb/graphical environment** → *P.135*: `tikzpicture`
- **/tcb/frame engine** → *P.135*: `pathmiddle`
- **/tcb/interior titled engine** → *P.135*: `special`
- **/tcb/interior engine** → *P.136*: `special`
- **/tcb/segmentation engine** → *P.136*: `special`
- **/tcb/title engine** → *P.136*: `pathmiddle`

```latex
\begin{tcbraster}
\begin{tcolorbox}[skin=bicolormiddle,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
```
This is a flavor of bicolor\textsuperscript{P.219} which is used as a last part in a break sequence for bicolor\textsuperscript{P.219}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'bicolorlast'

\begin{tcbraster}[skin=bicolorlast,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{tcbraster}
10.16 Skin Family ‘tile’

This skin is a variant of skin bicolor. Especially, the optional lower part of the box is colored by /tcb/colbacklower. The main difference to bicolor is that tile has no frame.

Environment and engines for the skin ‘tile’

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>empty</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>path</td>
</tr>
</tbody>
</table>

This is an abbreviation for setting skin=tile.

It also changes the geometry and some style options.

\begin{tcbraster}[tile,raster equal height,raster columns=4,  
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,  
colbacktitle=LimeGreen!75!DarkGreen,  
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of *tile*\(^{P.224}\) which is used as a *first* part in a break sequence for *tile*\(^{P.224}\). Nevertheless, this skin can be applied independently.

### Environment and engines for the skin 'tilefirst'

<table>
<thead>
<tr>
<th>Engine</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>\texttt{tikzpicture}</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>\texttt{pathfirst}</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[skin=tilefirst,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm,boxrule=0pt]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of tile \textsuperscript{P.224} which is used as a middle part in a break sequence for tile \textsuperscript{P.224}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin 'tilemiddle'

- \texttt{/tcb/graphical environment} \textsuperscript{P.135}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine} \textsuperscript{P.135}: \texttt{empty}
- \texttt{/tcb/interior titled engine} \textsuperscript{P.135}: \texttt{special}
- \texttt{/tcb/interior engine} \textsuperscript{P.136}: \texttt{special}
- \texttt{/tcb/segmentation engine} \textsuperscript{P.136}: \texttt{special}
- \texttt{/tcb/title engine} \textsuperscript{P.136}: \texttt{pathmiddle}
This is a flavor of \texttt{tile} \cite{P.224} which is used as a \textit{last} part in a break sequence for \texttt{tile} \cite{P.224}. Nevertheless, this skin can be applied independently.

\begin{tcbraster}[skin=tilelast,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
colbacktitle=LimeGreen!75!DarkGreen,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm,boxrule=0pt]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
tcblower
More content.
\end{tcolorbox}
\end{tcbraster}

Environment and engines for the skin `tilelast’

- \texttt{/tcb/graphical environment} \cite{P.135}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine} \cite{P.135}: \texttt{empty}
- \texttt{/tcb/interior titled engine} \cite{P.135}: \texttt{special}
- \texttt{/tcb/interior engine} \cite{P.136}: \texttt{special}
- \texttt{/tcb/segmentation engine} \cite{P.136}: \texttt{special}
- \texttt{/tcb/title engine} \cite{P.136}: \texttt{pathlast}
10.17 Skin Family 'beamer'

This skin resembles boxes known from the beamer class and therefore is called 'beamer'. It uses the normal colors from the core package but shades them a little bit. To use this skin, the tikz library shadings has to be included in the preamble by:

\usetikzlibrary{shadings}

Environment and engines for the skin 'beamer'

/tcb/graphical environment → P.135: tikzpicture
/tcb/frame engine → P.135: path
/tcb/interior titled engine → P.135: special
/tcb/interior engine → P.136: special
/tcb/segmentation engine → P.136: special
/tcb/title engine → P.136: path

This is an abbreviation for setting skin=beamer.

It also changes the geometry and some style options.

\begin{tcbraster}
\begin{tcolorbox}[beamer,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
A colored box with the 'beamer' skin

This box looks like a box provided by the \texttt{beamer} class.

Beamer Box with background picture


Beamerish block: myblock

This is a flavor of `beamer` which is used as a first part in a break sequence for `beamer`. Nevertheless, this skin can be applied independently.

Environment and engines for the skin `beamerfirst`

<table>
<thead>
<tr>
<th>/tcb/graphical environment</th>
<th>tikzpicture</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/frame engine</td>
<td>pathfirst</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>pathfirst</td>
</tr>
</tbody>
</table>

```latex
\begin{tcbraster}[beamer, skin=beamerfirst, raster equal height, raster columns=4, colback=LightGreen, colframe=DarkGreen, left=1mm, right=1mm, top=1mm, bottom=1mm, middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{tcbraster}
```

This is my content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

More content.
This is a flavor of `beamer` which is used as a `middle` part in a break sequence for `beamer`. Nevertheless, this skin can be applied independently.

Environment and engines for the skin `beamermiddle`:

```
\begin{tcbraster}
\begin{tcolorbox}[beamer,skin=beamermiddle,raster equal height,raster columns=4,
    colback=LightGreen,colframe=DarkGreen,
    left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
```
This is a flavor of \texttt{beamer} which is used as a \textit{last} part in a break sequence for \texttt{beamer}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'beamerlast'

- \texttt{/tcb/graphical environment}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine}: \texttt{pathlast}
- \texttt{/tcb/interior titled engine}: \texttt{special}
- \texttt{/tcb/interior engine}: \texttt{special}
- \texttt{/tcb/segmentation engine}: \texttt{special}
- \texttt{/tcb/title engine}: \texttt{pathlast}
10.18 Skin Family ‘widget’

`/tcb/skin=widget` 

This skin uses the normal colors from the core package but shades them a little bit. To use this skin, the `tikz` library `shadings` has to be included in the preamble by:

```
\usetikzlibrary{shadings}
```

The appearance of the skin can be controlled by `/tcb/frame style` P.148, `/tcb/interior style` P.149, and `/tcb/segmentation style` P.151, if needed.

### Environment and engines for the skin ‘widget’

```
\begin{tcbraster}[widget,raster equal height,raster columns=4,    
    colback=LightGreen,colframe=DarkGreen, 
    left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
```

This is an abbreviation for setting `skin=widget`.

It also changes the geometry and some style options.
A colored box with the 'widget' skin

This is my content.

\begin{tcolorbox}[widget,colback=Salmon!50!white,colframe=FireBrick!75!black,adjusted title=A colored box with the 'widget' skin]
This is my content.
\end{tcolorbox}

\textcolor{red}{/tcb/skin=widgetfirst (skin)}

This is a flavor of widget \textsuperscript{P.233} which is used as a \textit{first} part in a break sequence for widget \textsuperscript{P.233}. Nevertheless, this skin can be applied independently.

\begin{tabular}{|l|l|}
\hline
\textbf{Environment and engines for the skin 'widgetfirst'} & \textbf{Environment and engines for the skin 'widgetfirst'} \\
\hline
\textcolor{red}{/tcb/graphical environment} \textsuperscript{P.135}: & \textcolor{red}{tikzpicture} \\
\textcolor{red}{/tcb/frame engine} \textsuperscript{P.135}: & \textcolor{red}{pathfirst} \\
\textcolor{red}{/tcb/interior titled engine} \textsuperscript{P.135}: & \textcolor{red}{pathfirst} \\
\textcolor{red}{/tcb/interior engine} \textsuperscript{P.136}: & \textcolor{red}{pathfirst} \\
\textcolor{red}{/tcb/segmentation engine} \textsuperscript{P.136}: & \textcolor{red}{special} \\
\textcolor{red}{/tcb/title engine} \textsuperscript{P.136}: & \textcolor{red}{special} \\
\hline
\end{tabular}

\begin{tcbaster}[widget,skin=widgetfirst,raster equal height,raster columns=4,colback=LightGreen,colframe=DarkGreen,left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
tcblover
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
tcblover
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{tcbaster}

234
This is a flavor of widget\textsuperscript{\textcopyright P.233} which is used as a middle part in a break sequence for widget\textsuperscript{\textcopyright P.233}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'widgetmiddle'

\begin{tcbraster}\[widget,skin=widgetmiddle,raster equal height,raster columns=4,\]
colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm\]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of \texttt{widget} \textsuperscript{P.233} which is used as a last part in a break sequence for \texttt{widget} \textsuperscript{P.233}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin ‘\texttt{widgetlast}’

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphical Environment</td>
<td>\texttt{tikzpicture}</td>
</tr>
<tr>
<td>Frame Engine</td>
<td>\texttt{pathlast}</td>
</tr>
<tr>
<td>Interior Titled Engine</td>
<td>\texttt{pathlast}</td>
</tr>
<tr>
<td>Interior Engine</td>
<td>\texttt{pathlast}</td>
</tr>
<tr>
<td>Segmentation Engine</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>Title Engine</td>
<td>\texttt{special}</td>
</tr>
</tbody>
</table>

\begin{tcbraster}
\[\texttt{widget,skin=widgetlast,raster equal height,raster columns=4,}
\texttt{colback=LightGreen,colframe=DarkGreen,}
\texttt{left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\texttt{tcblower}
More content.
\end{tcolorbox}
\begin{tcolorbox}[\texttt{adjusted title=My title}]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[\texttt{adjusted title=My title}]
This is my content.
\texttt{tcblower}
More content.
\end{tcolorbox}
\end{tcbraster}
10.19 Skin Family 'empty'

/\texttt{tcb/skin=empty} \quad (\text{skin})

This skin sets all engines to \texttt{empty}, i.e. nothing is drawn at all. Therefore, this skin is a good starting point to create a complete new style by yourself.

**Environment and engines for the skin 'empty'**

\begin{itemize}
  \item \texttt{/tcb/graphical environment} $^{\text{P.135}}$: \texttt{tikzpicture}
  \item \texttt{/tcb/frame engine} $^{\text{P.135}}$: \texttt{empty}
  \item \texttt{/tcb/interior titled engine} $^{\text{P.135}}$: \texttt{empty}
  \item \texttt{/tcb/interior engine} $^{\text{P.136}}$: \texttt{empty}
  \item \texttt{/tcb/segmentation engine} $^{\text{P.136}}$: \texttt{empty}
  \item \texttt{/tcb/title engine} $^{\text{P.136}}$: \texttt{empty}
\end{itemize}

/\texttt{tcb/empty} \quad (\text{style, no value})

This is an abbreviation for setting \texttt{skin=empty}.

\begin{verbatim}
\begin{tcbraster}
[empty,raster equal height,raster columns=4, coltitle=Navy,borderline={2pt}{0pt}{black!10!white}, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{tcbraster}
\end{verbatim}

This is my content. \hspace{1cm} This is my content. \hspace{1cm} My title \hspace{1cm} My title

This is my content. \hspace{1cm} This is my content. \hspace{1cm} More content. \hspace{1cm} More content.
This style relies on the skin `empty` \(^\text{P.237}\). All engines are set to empty and all margins are set to `0pt`. In contrast to `/tcb/blank` \(^\text{P.208}\), the graphical paths are not constructed with exception of the geometry nodes.

\begin{tcolorbox}[blanker,watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}

\begin{tabular}{|c|c|c|}
\hline
A & B & C \\
\hline
\mybox{A}{\lipsum[1]} & \mybox{B}{\lipsum[2]} & \mybox{C}{\lipsum[3]} \\
\hline
\end{tabular}
This style extends /tcb/blanker~P.238. All engines are set to empty and all margins are set to 0pt. In contrast to /tcb/blanker~P.238, also title, shadow, underlay, overlay, finish and borderline are removed.

\begin{tcbaster}\[raster columns=3,raster equal height,  
title=Box \tcbasternum,  
enhanced, size=small, colframe=red!50!black, colback=red!10!white,  
coltitle=yellow!85!black,  
drop fuzzy shadow, watermark text={Box \tcbasternum},  
bordeline={.25mm}{-0.5mm}{green!40!black},  
finish={\begin{tcbclipframe}\draw[blue, opacity=0.1, line width=1cm]  
(frame.south west) -- (frame.north east);\end{tcbclipframe}},  
]\end{tcbaster}

\begin{tcolorbox}\lipsum[4]\end{tcolorbox}
\begin{tcolorbox}[blanker]\lipsum[4]\end{tcolorbox}
\begin{tcolorbox}[blankest]\lipsum[4]\end{tcolorbox}

\begin{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\end{tcolorbox}
This is a flavor of empty\textsuperscript{P.237} which is used as a first part in a break sequence for empty\textsuperscript{P.237}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin ‘emptyfirst’

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>\texttt{tikzpicture}</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>\texttt{empty}</td>
</tr>
</tbody>
</table>

\begin{tcbraster}
\[\text{empty,skin=emptyfirst,raster equal height,raster columns=4,}
\text{coltitle=Navy,borderline={2pt}{Opt}{black!10!white},}
\text{left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of empty \textsuperscript{P.237} which is used as a middle part in a break sequence for empty \textsuperscript{P.237}. Nevertheless, this skin can be applied independently.

<table>
<thead>
<tr>
<th>Environment and engines for the skin ‘\texttt{emptymiddle}’</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment \textsuperscript{P.135}: tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine \textsuperscript{P.135}: empty</td>
</tr>
<tr>
<td>/tcb/interior titled engine \textsuperscript{P.135}: empty</td>
</tr>
<tr>
<td>/tcb/interior engine \textsuperscript{P.136}: empty</td>
</tr>
<tr>
<td>/tcb/segmentation engine \textsuperscript{P.136}: empty</td>
</tr>
<tr>
<td>/tcb/title engine \textsuperscript{P.136}: empty</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[empty,skin=emptymiddle,raster equal height,raster columns=4, coltitle=Navy,borderline={2pt}{0pt}{black!10!white}, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
More content.
\end{tcolorbox}
\begin{tcolorbox}
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of empty\textsuperscript{P.237} which is used as a last part in a break sequence for empty\textsuperscript{P.237}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin ‘emptylast’

- **/tcb/graphical environment**: tikzpicture
- **/tcb/frame engine**: empty
- **/tcb/interior titled engine**: empty
- **/tcb/interior engine**: empty
- **/tcb/segmentation engine**: empty
- **/tcb/title engine**: empty
This example demonstrates a breakable customized box. Here, we define an environment `freebox`. The first application of `freebox` produces an unbroken `tcolorbox`. The box is drawn by the code given by `/tcb/frame code`\(^\text{P.138}\) and `/tcb/interior code`\(^\text{P.139}\). The second application of `freebox` is broken into several parts which are drawn by the codes given by `/tcb/skin first` is subskin of \(^\text{P.141}\), `/tcb/skin middle` is subskin of \(^\text{P.141}\), and `/tcb/skin last` is subskin of \(^\text{P.141}\).

% Preamble: %
\usepackage{tikz,lipsum}
\tcbuselibrary{skins,breakable}
\tikzset{coltria/.style={fill=red!15!white}}

\newtcolorbox{freebox}{[1][1]}{empty,breakable,leftrule=5mm,left=2mm, frame style={fill,top color=red!75!black,bottom color=red!75!black,middle color=red}, colback=yellow!50!white, watermark color=red!50!yellow!75!white, watermark text on=unbroken is unbroken box, watermark text on=first is first part, watermark text on=middle is middle part, watermark text on=last is last part, % code for unbroken boxes: frame code={\path[tcb fill frame] (frame.south west)--(frame.north west) --((xshift=-5mm)frame.north east)--((yshift=-5mm)frame.north east) --((yshift=5mm)frame.south east)--((xshift=-5mm)frame.south east)--cycle; }, interior code={\path[tcb fill interior] (interior.south west)--(interior.north west)--(interior.south east)--(interior.north east)--cycle; }, % code for the first part of a break sequence: skin first is subskin of={emptyfirst}{} frame code={\path[tcb fill frame] (frame.south west)--(frame.north west) --((xshift=-5mm)frame.north east)--((yshift=-5mm)frame.north east) --((yshift=5mm)frame.south east)--((xshift=-5mm)frame.south east)--cycle; \path[coltria] ([xshift=2.5mm,yshift=-1mm]frame.north west) -- +(240:2mm) -- +(300:2mm) -- cycle; \path[coltria] ([xshift=2.5mm,yshift=1mm]frame.south west) -- +(120:2mm) -- +(60:2mm) -- cycle; }, interior code={\path[tcb fill interior] (interior.south west|frame.south) --(interior.north west|frame.north) --((xshift=-4.8mm)interior.north east)--((yshift=-4.8mm)interior.south east)--cycle; }, % code for the middle part of a break sequence: skin middle is subskin of={emptymiddle}{} frame code={\path[tcb fill frame] (frame.south west)--(frame.north west) --((xshift=-5mm)frame.north east)--((yshift=-5mm)frame.north east) --((yshift=5mm)frame.south east)--((xshift=-5mm)frame.south east)--cycle; \path[coltria] ([xshift=2.5mm,yshift=-1mm]frame.north west) -- +(240:2mm) -- +(300:2mm) -- cycle; \path[coltria] ([xshift=2.5mm,yshift=1mm]frame.south west) -- +(120:2mm) -- +(60:2mm) -- cycle; }, interior code={\path[tcb fill interior] (interior.south west|frame.south) --(interior.north west|frame.north) --(interior.north east|frame.north east)--(interior.south east|frame.south)--cycle; }, % code for the last part of a break sequence: skin last is subskin of={emptylast}{} frame code={\path[tcb fill frame] (frame.south west)--(frame.north west) --((xshift=-5mm)frame.north east)--((yshift=-5mm)frame.north east) --((yshift=5mm)frame.south east)--((xshift=-5mm)frame.south east)--cycle; \path[coltria] ([xshift=2.5mm,yshift=-1mm]frame.north west) -- +(240:2mm) -- +(300:2mm) -- cycle; }, interior code={\path[tcb fill interior] (interior.south west) --(interior.north west|frame.north) --(interior.north east|frame.north east)--(interior.south east|frame.south)--cycle; }.


10.20 Skin 'spartan'

This skin is quite a spartan. It supports no rounded corners, no overlays, no shadows, no borderlines, and no finishes. The only exception are underlays. One cannot do very fancy things with this skin, but it compiles very fast. Therefore, the spartan skin is used for the draft mode, see Section 10.12 on page 203. Nevertheless, it can be used as a normal skin.

Environment and engines for the skin 'spartan'

\begin{tcbraster}[spartan,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
10.21 Skin ‘draft’

```latex
\begin{tcbraster}
\begin{tcolorbox}[draft,raster equal height,raster columns=4,
  colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,
  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
  This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}
\begin{tcolorbox}
  \tcblower
  More content.
\end{tcolorbox}
\end{tcbraster}
```

This skin is intended to be used while drafting new geometric settings for a `tcolorbox`.

### Environment and engines for the skin ‘draft’

<table>
<thead>
<tr>
<th>Engine</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>P.135</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>P.135</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>P.135</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>P.136</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>P.136</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>P.136</td>
</tr>
</tbody>
</table>

This is an abbreviation for setting `skin=draft`.


Curabitur consectetuer.

This skin family 'freelance' is deprecated with \tcolorbox 3.00. It is no longer needed, because \tcb/frame code\textsuperscript{P.138}, \tcb/interior code\textsuperscript{P.139}, \tcb/interior titled code\textsuperscript{P.138}, and \tcb/title code\textsuperscript{P.140} can be applied to every skin now. In this sense, everything has become freelance now.

For users of \tcb/freelance: Old code should continue to work. There may be exceptions for breakable freelance boxes under certain circumstances. For new code, use \tcb/empty\textsuperscript{P.237} or \tcb/enhanced\textsuperscript{P.206} where you would have used \tcb/freelance before.

\texttt{/tcb/skin=freelance} \hspace{0.3cm}(skin)

This skin gives full freedom for the appearance of the \tcolorbox. All drawing engines are set to type freelance; they use the \texttt{tikz} package and compute the \texttt{/tcb/geometry nodes}\textsuperscript{P.137}.

\begin{tabular}{|l|}
\hline
\texttt{/tcb/graphical environment}\textsuperscript{P.135}: \texttt{tikzpicture} \\
\texttt{/tcb/frame engine}\textsuperscript{P.135}: freelance \\
\texttt{/tcb/interior titled engine}\textsuperscript{P.135}: freelance \\
\texttt{/tcb/interior engine}\textsuperscript{P.136}: freelance \\
\texttt{/tcb/segmentation engine}\textsuperscript{P.136}: freelance \\
\texttt{/tcb/title engine}\textsuperscript{P.136}: freelance \\
\hline
\end{tabular}

\texttt{/tcb/freelance} \hspace{0.3cm}(style, no value)

This is an abbreviation for setting \texttt{skin=freelance}.

\texttt{/tcb/skin=freelancefirst} \hspace{0.3cm}(skin)

This skin equals freelance with exception of the break sequence, see Section 17.8 on page 377.

\texttt{/tcb/skin=freelancemiddle} \hspace{0.3cm}(skin)

This skin equals freelance with exception of the break sequence, see Section 17.8 on page 377.

\texttt{/tcb/skin=freelancelast} \hspace{0.3cm}(skin)

This skin equals freelance with exception of the break sequence, see Section 17.8 on page 377.

\texttt{/tcb/extend freelance\textsuperscript{options}} \hspace{0.3cm}(no default, initially empty)

The \texttt{\textit{options}} are added to the skin definition of freelance.

\texttt{/tcb/extend freelancefirst\textsuperscript{options}} \hspace{0.3cm}(no default, initially empty)

The \texttt{\textit{options}} are added to the skin definition of freelancefirst which is used as first part of the break sequence of freelance. See \texttt{/tcb/skin first is subskin of}\textsuperscript{P.141} for a substitute of this key.

\texttt{/tcb/extend freelancemiddle\textsuperscript{options}} \hspace{0.3cm}(no default, initially empty)

The \texttt{\textit{options}} are added to the skin definition of freelancemiddle which is used as middle part of the break sequence of freelance. See \texttt{/tcb/skin middle is subskin of}\textsuperscript{P.141} for a substitute of this key.

\texttt{/tcb/extend freelancelast\textsuperscript{options}} \hspace{0.3cm}(no default, initially empty)

The \texttt{\textit{options}} are added to the skin definition of freelancelast which is used as last part of the break sequence of freelance. See \texttt{/tcb/skin last is subskin of}\textsuperscript{P.141} for a substitute of this key.
11 Inclusion of Boxed Image Files

The \texttt{skins} library adds some commands to conveniently include boxed image files. For the following macros and options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{skins}
\end{verbatim}

See Section 10 on page 148 for the documentation of all other options of the \texttt{skins} library.

11.1 Macros

\begin{verbatim}
\texttt{\tcbincludegraphics[(options)]\{file name\}}
\end{verbatim}

In principle, this macro includes an image file denoted by \texttt{\textit{file name}} using the standard \texttt{\includegraphics} and puts it into a \texttt{tcolorbox}. The \texttt{\textit{options}} are \texttt{tcolorbox} keys to set up the colored box. Use \texttt{/tcb/graphics options} to specify options for the underlying \texttt{\includegraphics}. Some \texttt{tcolorbox} option keys are automatically set, namely \texttt{/tcb/enhanced} and options to center the image inside the box.

The sizing of the included image is done depending on the following:

- If a \texttt{/tcb/width} is specified, but no fixed \texttt{/tcb/height}, the image is sized to fill the inner width of the box. The height of the box adapts to the image.
- If a fixed \texttt{/tcb/height} is specified, the image is sized to fill the fixed inner area of the box.
- If the \texttt{/tcb/capture mode} \texttt{tcb/hbox} is specified, the image is sized according to given \texttt{\includegraphics} options only. The box adapts to the image.

\begin{verbatim}
\% \tcbuselibrary{raster}
\begin{tcbraster}[raster columns=3,raster force size=false,size=fbox, colframe=red!50!black,colback=red!20!black, fonttitle=\textbf{center title},drop fuzzy shadow]
\tcbincludegraphics[title=Normal]{goldshade.png}
\tcbincludegraphics[title=Fixed height,\textit{height}=3cm]{goldshade.png}
\tcbincludegraphics[title=hbox mode,hbox,\textit{graphics options}={\textit{width}=3cm}]{goldshade.png}
\end{tcbraster}
\end{verbatim}
The auxiliary macro $\texttt{imagename}$ may be used inside $\texttt{tcbincludegraphics}$ to display the name of the file. $\texttt{imagename}$ is already partially detokenized and is allowed to contain special characters like the underscore. Note that an appropriate font is required to display such characters.

\begin{tcbexample}[size=fbox, colframe=red!50!black, colback=red!20!black, fonttitle=\bfseries\ttfamily,center title,drop fuzzy shadow]
\texttt{tcbincludegraphics}[title=$\texttt{imagename}$]{goldshade.png}
\texttt{tcbincludegraphics}[finish={
\node[fill=white,fill opacity=0.5,text opacity=1]
at (frame.center) {$\bfseries\ttfamily \texttt{imagename}$};}]{blueshade.png}
\end{tcbexample}
This is a generalized version of \texttt{\textbackslash includegraphics} \cite{P.251} which allows to include a complete PDF file denoted by \texttt{(file name)}. Every page is boxed into an own \texttt{tcolorbox} \cite{P.12} customized by the given \texttt{(options)}. It is reasonable to put such a series of boxes inside a \texttt{tcbraster} \cite{P.279} for alignment.

Use \texttt{/tcb/graphics\ pages} \cite{P.254} to use a selection of pages instead of using the whole file. The auxiliary macro \texttt{\textbackslash imagepage} may be used inside \texttt{\textbackslash includepdf} to display the current page number.

\begin{verbatim}
\% \texttt{\textbackslash tcbuselibrary\{raster\}}
\begin{tcbaster}{raster columns=3,colframe=blue,colback=white,
colbacktitle=blue!50\textcolor{white},
fonttitle=\texttt{small}\texttt{\textbackslash ttfamily},
left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt,
toptitle=1mm,bottomtitle=1mm,drop lifted shadow,center title,
graphics pages={1,\ldots,6},title={\texttt{\textbackslash imasename}\ \texttt{\textbackslash imagepage}}}\\
\texttt{\textbackslash includepdf}\{tcolorbox-example.pdf\}
\end{tcbaster}
\end{verbatim}
11.2 Option Keys

/tcb/graphics options=(options)  (no default, initially empty)
Used for \includegraphics P.251 and \includepdf P.253 to specify \includegraphics (options).

\begin{tcbraster}
\[raster columns=3,size=fbox,raster equal height,
colframe=red!50!black,colback=red!20!black,drop fuzzy shadow]\n\tcbincludegraphics{goldshade.png}
\tcbincludegraphics[graphics options={angle=20}]{goldshade.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 8cm 4cm,clip}]{goldshade.png}
\end{tcbraster}

/tcb/graphics directory=(directory)  (no default, initially empty)
Used for \includegraphics P.251 and \includepdf P.253 to specify a file system (directory) where the image files are located.

\begin{tcbraster}
\[raster columns=3,size=fbox,raster equal height,
colframe=red!50!black,colback=red!20!black,drop fuzzy shadow]\n\tcbincludegraphics{goldshade.png}
\tcbincludegraphics[graphics options={\myangle}]{goldshade.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 8cm 4cm,clip}]{goldshade.png}
\end{tcbraster}

The \graphicspath macro from the graphics package is superior to this option. /tcb/graphics directory may be used especially for \includepdf P.253.

/tcb/graphics pages=(selection)  (no default, initially 1,...,\pdfpages)
Used for \includepdf P.253 to specify a (selection) of pages to be included. The largest page number is accessible by \pdfpages. The (selection) has to be given using the \foreach syntax of TikZ.

\begin{tcbraster}
\[raster columns=3,size=fbox,raster equal height,
colframe=red!50!black,colback=red!20!black,drop fuzzy shadow]\n\tcbincludegraphics{goldshade.png}
\tcbincludegraphics[graphics options={\myangle}]{goldshade.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 8cm 4cm,clip}]{goldshade.png}
\end{tcbraster}
\texttt{/tcb/graphics orientation\{orientation\}} \hfill (no default, initially \texttt{as-is})

Used for \texttt{\tcbincludegraphics} \texttt{P.251} and \texttt{\tcbincludepdf} \texttt{P.253} to guarantee a certain \texttt{\{orientation\}} of the included image. After all other options for the image are processed, the result is possibly rotated to be in landscape or portrait mode.

Feasible values for \texttt{\{orientation\}} are:

- \texttt{as-is}: no rotation of the processed image.
- \texttt{landscape}: the processed image is possibly rotated by 90 degrees to ensure that the final width is not smaller than the final height.
- \texttt{landscape*}: the processed image is possibly rotated by -90 degrees to ensure that the final width is not smaller than the final height.
- \texttt{portrait}: the processed image is possibly rotated by 90 degrees to ensure that the final height is not smaller than the final width.
- \texttt{portrait*}: the processed image is possibly rotated by -90 degrees to ensure that the final height is not smaller than the final width.

\begin{tcbraster}[raster columns=6, size=fbox, raster equal height, colframe=red!50!black, colback=red!20!black, drop fuzzy shadow]
\tcbincludegraphics{Basilica_5.png}
\tcbincludegraphics[graphics orientation=landscape]{Basilica_5.png}
\tcbincludegraphics[graphics orientation=portrait]{Basilica_5.png}
\tcbincludegraphics[graphics orientation=portrait*]{Basilica_5.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 2cm 3cm, clip}]{goldshade.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 2cm 3cm, clip},
graphics orientation=landscape]{goldshade.png}
\end{tcbraster}

% \tcbuselibrary{raster}
\begin{tcbraster}[raster columns=6,size=fbox,raster equal height, colframe=red!50!black,colback=red!20!black,drop fuzzy shadow]
\tcbincludegraphics{Basilica_5.png}
\tcbincludegraphics[graphics orientation=landscape]{Basilica_5.png}
\tcbincludegraphics[graphics orientation=portrait]{Basilica_5.png}
\tcbincludegraphics[graphics orientation=portrait*]{Basilica_5.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 2cm 3cm, clip}]{goldshade.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 2cm 3cm, clip},
graphics orientation=landscape]{goldshade.png}
\end{tcbraster}
12 Ti\k Image and Picture Fill Extensions; Auxiliary Macros

The \texttt{skins} library adds some image and picture fill options to the vast option set of Ti\k [22]. These options can be used in any \texttt{tikzpicture}. For the following options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{skins}
\end{verbatim}

See Section 10 on page 148 for the documentation of all other options of the \texttt{skins} library.

12.1 Fill Plain

\texttt{/tikz/fill plain image=⟨file name⟩} (no default, initially unset)

Fills the current path with an external image referenced by \texttt{⟨file name⟩}. The image is put in the center of the path, but it is not resized to fit into the path area.

\begin{verbatim}
\begin{tikzpicture}
\path[draw,fill plain image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
\end{verbatim}

\texttt{/tikz/fill plain image*=⟨file name⟩} (no default, initially unset)

Fills the current path with an external image referenced by \texttt{⟨file name⟩}. The image is put in the center of the path, but it is not resized to fit into the path area. The \texttt{⟨graphics options⟩} are given to the underlying \texttt{includegraphics} command.

\begin{verbatim}
\begin{tikzpicture}
\path[draw,fill plain image*=\{width=2.5cm\} goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
\end{verbatim}

\texttt{/tikz/fill plain picture=⟨graphical code⟩} (no default, initially unset)

Fills the current path with the given \texttt{⟨graphical code⟩}. The result is put in the center of the path, but it is not resized to fit into the path area. Note that this is almost identical to the standard path \texttt{picture} option.

\begin{verbatim}
\begin{tikzpicture}
\path[draw,fill plain picture={%}
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
\end{verbatim}
12.2 Fill Stretch

/tikz/fill stretch image=(file name) (no default, initially unset)
Fills the current path with an external image referenced by (file name). The image is stretched to fill the path area.

\begin{tikzpicture}
\path[fill stretch image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill stretch image*={(graphics options)}{(file name)} (no default, initially unset)
Fills the current path with an external image referenced by (file name). The (graphics options) are given to the underlying \includegraphics command. The image is stretched to fill the path area.

\begin{tikzpicture}
\path[fill stretch image*={angle=90,origin=c}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill stretch picture=(graphical code) (no default, initially unset)
Fills the current path with the given (graphical code). The result is stretched to fill the path area.

\begin{tikzpicture}
\path[draw,fill stretch picture={
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.3 Fill Overzoom

\begin{tikzpicture}
\path[fill overzoom image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\begin{tikzpicture}
\path[fill overzoom image*=\{angle=90,origin=c\}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\begin{tikzpicture}
\path[draw,fill overzoom picture=\%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
\}
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.4 Fill Zoom

/tikz/fill zoom image=(file name)  (no default, initially unset)
Fills the current path with an external image referenced by (file name). The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

/tikz/fill zoom image*={(graphics options)}{(file name)}  (no default, initially unset)
Fills the current path with an external image referenced by (file name). The (graphics options) are given to the underlying \includegraphics command. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

/tikz/fill zoom picture=(graphical code)  (no default, initially unset)
Fills the current path with the given (graphical code). The result is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.
12.5 Fill Shrink

/tikz/fill shrink image=(file name) (no default, initially unset)
Fills the current path with an external image referenced by (file name). The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill shrink image**(file name) (no default, initially unset)
Fills the current path with an external image referenced by (file name). The (graphics options) are given to the underlying \includegraphics command. The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink image**={width=1.5cm}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill shrink picture=(graphical code) (no default, initially unset)
Fills the current path with the given (graphical code). The result is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink picture=%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.6 Fill Tile

/tikz/fill tile image=⟨file name⟩ (no default, initially unset)
Fills the current path with a tile pattern using an external image referenced by ⟨file name⟩.

\begin{tikzpicture}
\path[fill tile image=pink_marble.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- \w:1.5cm } -- cycle;
\end{tikzpicture}

/tikz/fill tile image*=⟨⟨graphics options⟩}{⟨file name⟩⟩ (no default, initially unset)
Fills the current path with a tile pattern using an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command.

\begin{tikzpicture}
\path[fill tile image*={width=1cm}{pink_marble.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- \w:1.5cm } -- cycle;
\end{tikzpicture}

/tikz/fill tile picture=⟨graphical code⟩ (no default, initially unset)
Fills the current path with a tile pattern using the given ⟨graphical code⟩.

\begin{tikzpicture}
\path[draw,fill tile picture={\%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- \w:1.5cm } -- cycle;
\end{tikzpicture}

/tikz/fill tile picture*=⟨⟨fraction⟩⟩{⟨graphical code⟩} (no default, initially unset)
Fills the current path with a tile pattern using the given ⟨graphical code⟩. The graphic is resized by ⟨fraction⟩.

\begin{tikzpicture}
\path[draw,fill tile picture*={0.25}{\%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- \w:1.5cm } -- cycle;
\end{tikzpicture}
12.7 Filling Options

/tikz/fill image opacity=(fraction) (no default, initially 1.0)
Sets the fill opacity for the image or picture fill options to the given (fraction).

\begin{tikzpicture}
\path[fill stretch image=goldshade.png] (0,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.75] (2,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.5] (4,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.25] (6,0) circle (1cm);
\path[fill=red] (8,0) circle (1cm);
\end{tikzpicture}

/tikz/fill image scale=(fraction) (no default, initially 1.0)
Stretches, zooms, overzooms or shrinks the image or picture to the given (fraction) of the width and height of the current path.

\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png] (0,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=0.75] (3,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=1.5] (6,0) rectangle +(2,2);
\end{tikzpicture}

/tikz/fill image options=(graphics options) (no default, initially empty)
The (graphics options) are given to the underlying \includegraphics command for the image fill options. This can be just together with /tikz/fill stretch image \textsuperscript{P.257}, /tikz/fill overzoom image \textsuperscript{P.258}, /tikz/fill zoom image \textsuperscript{P.259}, and /tikz/fill tile image \textsuperscript{P.261}.

\begin{tikzpicture}
\path[fill image options={width=1cm},fill tile image=pink_marble.png] (2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.8 Straightening of the Arcs

This patch is considered as an experimental feature. It changes some of the original Ti\textit{k}Z code. This change may break with future updates of Ti\textit{k}Z.

\begin{tikzpicture}
\node[fill stretch image=blueshade.png] (A) at (120:3cm) {A};
\node[fill stretch image=goldshade.png] (B) at (60:3cm) {B};
\node[
  preaction={fill stretch image=blueshade.png},
  fill stretch image=goldshade.png,
  fill image opacity=0.5
] (C) {C};
\path (A) -- node{$+$} (B);
\draw[->,very thick] (A)--(C);
\draw[->,very thick] (B)--(C);
\end{tikzpicture}

\texttt{\textbackslash tcbpatcharcangular}

The Ti\textit{k}Z package provides a nice \texttt{rounded corners} option to replace all corners by little arcs. \texttt{\textbackslash tcbpatcharcangular} is a patch which straightens the arcs. To say it more prosaic, the little arcs are replaced by little straight lines.

\begin{tikzpicture}
\draw[thick,rounded corners=8pt]
 (0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0)
   -- (0,2) -- (2,2) -- (0,0) -- (2,0);
\tcbpatcharcangular
\draw[thick,rounded corners=8pt,xshift=2.5cm]
 (0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0)
   -- (0,2) -- (2,2) -- (0,0) -- (2,0);
\end{tikzpicture}

\texttt{\textbackslash tcbpatcharcround}

This macro reverts \texttt{\textbackslash tcbpatcharcangular}, i.e., the patch from \texttt{\textbackslash tcbpatcharcangular} is replaced by the original code.
12.9 Extracting Node Dimensions

The following auxiliary macros are defined by the \texttt{skins} library. They allow to determine the width and height of an arbitrary \LaTeX{} node. To be more specific, they determine the east-to-west and the north-to-south dimensions which may be not the maximal dimensions for a non-rectangular node. Note that the following dimensions are measured exactly including the line width of the border line. If a new rectangle or node with the same dimensions and a border is to be drawn, this border width has to be substracted.

\begin{verbatim}
\begin{tikzpicture}
\node[align=center,draw=red,fill=yellow] (A) {This is my\example node};
\tcbsetmacrotowidthofnode{mywidth}{A}
\tcbsetmacrotoheightofnode{myheight}{A}
\path[fill=blue!25!white] % rectangle widthout border
([xshift=2mm]A.south east) rectangle node{Copy} +([mywidth,myheight];
\node[draw=blue,fill=blue!25!white, % standard border width 0.4pt
minimum width=\mywidth-0.4pt, % minus width of border
minimum height=\myheight-0.4pt % minus height of border
] at ([xshift=5cm]A) {Copy 2};
\end{tikzpicture}
\end{verbatim}

12.10 Hyper Nodes

The following auxiliary macro is defined by the \texttt{skins} library.

\begin{verbatim}
% \usepackage{hyperref}
\begin{tikzpicture}
\node[align=center,draw=red,fill=red!5] (mybutton) {Click me to jump to Section\ref*{sec:tikzimagefilling}};
\tcbhypernode{\hyperref[sec:tikzimagefilling]}{mybutton}
\end{tikzpicture}
\end{verbatim}
The library is loaded by a package option or inside the preamble by:

```
\usepackage{vignette}
```

This also loads the \texttt{skins} library, see Section 10 on page 148, and the \texttt{fadings} library of \texttt{tikz} [22].

13.1 Vignette Drawing

\texttt{\textbackslash tcbvignette\{\textit{options}\}}

In this context, a \textit{vignette} is a four part rectangular frame. It is constructed as several TikZ paths and, therefore, can only be used inside a \texttt{tikzpicture} environment or inside \texttt{tcolorbox} \textsuperscript{P.12} options.

The \texttt{\{options\}} control position, size and style settings of the vignette. Theses options have the common key path \texttt{/tcb/vig/} and are described in the following.

The next examples show direct \texttt{\textbackslash tcbvignette} usage without a \texttt{tcolorbox} \textsuperscript{P.12}.

\begin{tikzpicture}
\tcbvignette{}
\end{tikzpicture}

\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Test};
\tcbvignette{outside node=A,raised color=blue}
\end{tikzpicture}

\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Another Test};
\tcbvignette[size=3mm,outside node=A,north style=red,east style=yellow,
south style=blue,west style=green}
\end{tikzpicture}

\begin{tikzpicture}
\node[inner sep=3mm,fill=red!75] (A) {Test};
\tcbvignette[over node=A,fade in}
\end{tikzpicture}

\texttt{\textbackslash tcbvignette} can be used directly inside appropriate options keys for \texttt{tcolorbox} \textsuperscript{P.12}. Note that options like \texttt{/tcb/underlay} \textsuperscript{P.195} need \texttt{/tcb/enhanced} \textsuperscript{P.206} or similar settings.
13.2 Generic Geometry Settings

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (3,2);
\path [pattern=checkerboard,pattern color=black!30]
(0,0) rectangle (3,2);
\tcbvignette{xmin=1cm,xmax=2.5cm,ymin=0.5cm,ymax=1.75cm}
\end{tikzpicture}

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (3,2);
\path [pattern=checkerboard,pattern color=black!30]
(0,0) rectangle (3,2);
\tcbvignette{lower left corner={1,0.5},
upper right corner={2.5,1.75}}
\end{tikzpicture}

```
\begin{tcolorbox}[enhanced,size=small,sharp corners,
colback=green!10,colframe=green!50!black,
boxrule=1mm,titlerule=0mm,
title=My title,center title,fonttitle=\textbf{series},
underlay={\tcbvignette{size=1mm,inside node=frame,raised color=green!50!black}}]
This is a tcolorbox.
\end{tcolorbox}
```

Mostly, convenient short cuts like `/tcb/underlay vignette` \(^{P.272}\) can be used to add a `vignette` to a `tcolorbox` \(^{P.12}\). Here, `\tcbvignette` \(^{P.265}\) is used internally.

```
\begin{tcolorbox}[enhanced,size=small,sharp corners,
colback=green!10,colframe=green!50!black,
boxrule=1mm,titlerule=0mm,
title=My title,center title,fonttitle=\textbf{series},
underlay vignette]
This is a tcolorbox.
\end{tcolorbox}
```

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (3,2);
\path [pattern=checkerboard,pattern color=black!30]
(0,0) rectangle (3,2);
\tcbvignette{xmin=1cm,xmax=2.5cm,ymin=0.5cm,ymax=1.75cm}
\end{tikzpicture}

```
N 2016-04-22 /tcb/vig/xmin={\textit{length}} (no default, initially 0pt)
Sets the lower horizontal limit of a `\tcbvignette` \(^{P.265}\).
\end{tcolorbox}

```
N 2016-04-22 /tcb/vig/xmax={\textit{length}} (no default, initially 1cm)
Sets the upper horizontal limit of a `\tcbvignette` \(^{P.265}\).
\end{tcolorbox}

```
N 2016-04-22 /tcb/vig/ymin={\textit{length}} (no default, initially 0pt)
Sets the lower vertical limit of a `\tcbvignette` \(^{P.265}\).
\end{tcolorbox}

```
N 2016-04-22 /tcb/vig/ymax={\textit{length}} (no default, initially 1cm)
Sets the upper vertical limit of a `\tcbvignette` \(^{P.265}\).
\end{tcolorbox}

```
N 2016-04-22 /tcb/vig/lower left corner={\textit{coordinates}} (style, initially 0,0)
Sets the lower left corner of a `\tcbvignette` \(^{P.265}\). This style sets `/tcb/vig/xmin` and `/tcb/vig/ymin.`
\end{tcolorbox}

```
N 2016-04-22 /tcb/vig/upper right corner={\textit{coordinates}} (style, initially 1,1)
Sets the upper right corner of a `\tcbvignette` \(^{P.265}\). This style sets `/tcb/vig/xmax` and `/tcb/vig/ymax.`
\end{tcolorbox}

266
/tcb/vig/inside node=⟨name⟩ (style, initially unset)
Places the \texttt{tcbvignette} inside the node with the given ⟨name⟩. The outer limits of the \textit{vignette} are adapted to the node geometry.

\begin{tikzpicture}
  \node[minimum width=2cm,minimum height=1cm] (A) {Node A};
  \tcbvignette{inside node=A}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

/tcb/vig/outside node=⟨name⟩ (style, initially unset)
Places the \texttt{tcbvignette} outside the node with the given ⟨name⟩. The inner limits of the \textit{vignette} are adapted to the node geometry.

\begin{tikzpicture}
  \node[minimum width=2cm,minimum height=1cm] (A) {Node A};
  \tcbvignette{outside node=A}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

/tcb/vig/over node=⟨name⟩ (style, initially unset)
Places the \texttt{tcbvignette} over the node with the given ⟨name⟩. The outer limits of the \textit{vignette} are adapted to the node geometry, but are shifted to the outside by /tcb/vig/over node offset.

\begin{tikzpicture}
  \node[minimum width=2cm,minimum height=1cm] (A) {Node A};
  \tcbvignette{over node offset=1mm,over node=A}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

/tcb/vig/over node offset=⟨length⟩ (no default, initially 0.1mm)
Determines the shift value for /tcb/vig/over node. Note that /tcb/vig/over node offset has to be set before /tcb/vig/over node is used.

/tcb/vig/north size=⟨length⟩ (no default, initially 2mm)
Sets the thickness of the north \textit{vignette} part.

\begin{tikzpicture}
  \tcbvignette{north size=4mm}
\end{tikzpicture}

/tcb/vig/south size=⟨length⟩ (no default, initially 2mm)
Sets the thickness of the south \textit{vignette} part.

\begin{tikzpicture}
  \tcbvignette{south size=4mm}
\end{tikzpicture}

/tcb/vig/east size=⟨length⟩ (no default, initially 2mm)
Sets the thickness of the east \textit{vignette} part.

\begin{tikzpicture}
  \tcbvignette{east size=4mm}
\end{tikzpicture}

267
/tcb/vig/west size = (length)  
(no default, initially 2mm)
Sets the thickness of the west *vignette* part.

\begin{tikzpicture}
\tcbvignette{west size=4mm}
\end{tikzpicture}

/tcb/vig/vertical size = (length)  
(style, initially 2mm)
Sets /tcb/vig/north size \(^\textsuperscript{P.267}\) and /tcb/vig/south size \(^\textsuperscript{P.267}\), to the given \langle length \rangle.

\begin{tikzpicture}
\tcbvignette{vertical size=4mm}
\end{tikzpicture}

/tcb/vig/horizontal size = (length)  
(style, initially 2mm)
Sets /tcb/vig/east size \(^\textsuperscript{P.267}\) and /tcb/vig/west size, to the given \langle length \rangle.

\begin{tikzpicture}
\tcbvignette{horizontal size=4mm}
\end{tikzpicture}

/tcb/vig/size = (length)  
(style, initially 2mm)
Sets /tcb/vig/north size \(^\textsuperscript{P.267}\), /tcb/vig/south size \(^\textsuperscript{P.267}\), /tcb/vig/east size \(^\textsuperscript{P.267}\), and /tcb/vig/west size to the given \langle length \rangle.

\begin{tikzpicture}
\tcbvignette{size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
\tcbvignette{north style=blue}
\end{tikzpicture}

/tcb/vig/north style = \{(style)\}  
(no default, initially \textcolor{red}{red!50!white})
Sets TikZ \langle style \rangle options for the north *vignette* part.

/tcb/vig/south style = \{(style)\}  
(no default, initially \textcolor{red}{red!50!black})
Sets TikZ \langle style \rangle options for the south *vignette* part.

13.3 Generic Color and Style Settings

/tcb/vig/north size \(^\textsuperscript{P.267}\) /tcb/vig/south size \(^\textsuperscript{P.267}\), etc. have to be set before /tcb/vig/outside node \(^\textsuperscript{P.267}\) is used.

/tcb/vig/north style \(^\textsuperscript{P.267}\) /tcb/vig/south style \(^\textsuperscript{P.267}\), etc.
Sets TikZ \langle style\rangle options for the east \textit{vignette} part.
\begin{tikzpicture}
  \tcbvignette{east style={left color=yellow!75!black, right color=blue!75!black}}
\end{tikzpicture}

Sets TikZ \langle style\rangle options for the west \textit{vignette} part.
\begin{tikzpicture}
  \tcbvignette{west style={preaction={fill=black!20}, pattern=checkerboard, pattern color=black!30}}
\end{tikzpicture}

The four \textit{vignette} parts are drawn inside a TikZ \texttt{scope} environment which takes the given \langle style\rangle as option.
\begin{tikzpicture}
  \tcbvignette{scope={transparency group,opacity=0.25}}
\end{tikzpicture}

Creates a raised frame impression by setting the four style options \texttt{/tcb/vig/north style} \texttt{P.268}, \texttt{/tcb/vig/south style} \texttt{P.268}, \texttt{/tcb/vig/east style}, and \texttt{/tcb/vig/west style} to darkened and lightened variations of the given \langle color\rangle.
\begin{tikzpicture}
  \tcbvignette{raised color=blue}
\end{tikzpicture}

Creates a lowered frame impression by setting the four style options \texttt{/tcb/vig/north style} \texttt{P.268}, \texttt{/tcb/vig/south style} \texttt{P.268}, \texttt{/tcb/vig/east style}, and \texttt{/tcb/vig/west style} to darkened and lightened variations of the given \langle color\rangle.
\begin{tikzpicture}
  \tcbvignette{lowered color=green!75!black}
\end{tikzpicture}

Sets the four style options \texttt{/tcb/vig/north style} \texttt{P.268}, \texttt{/tcb/vig/south style} \texttt{P.268}, \texttt{/tcb/vig/east style}, and \texttt{/tcb/vig/west style} such that the color shades from the \langle inner\rangle color to the \langle outer\rangle color.
\begin{tikzpicture}
  \tcbvignette{color from=red to blue!50}
\end{tikzpicture}

Sets the base color for \texttt{/tcb/vig/raised color}, \texttt{/tcb/vig/lowered color}, \texttt{/tcb/finish fading vignette} \texttt{P.275}. Typically, this value has not to be set directly.
\begin{tikzpicture}
  \tcbvignette{base color=blue}
\end{tikzpicture}
Especially, if shadings or fadings are used, the drawn vignette graphs are displayed sometimes not as perfect as expected. Glitches and imperfections are very dependent on the previewer software. The \texttt{/tcb/vig/draw method} intends to give a choice of alternative drawing methods.

- \textbf{direct}: The \textit{vignette} parts are drawn/filled by using a single Ti\textit{k}Z graph. This is the preferred (and default) method for solid color graphs.
- \textbf{clipped}: The \textit{vignette} parts are drawn somewhat oversized and are clipped to the intended region. In combination with shadings and fadings this seems to give a better/different optical result (depends on the previewer).

This option is a stopgap and may be changed or preferably removed in future.

\begin{tikzpicture}
\tcbvignette[color from=red to yellow] \end{tikzpicture}

\begin{tikzpicture}
\tcbvignette[color from=red to yellow,draw method=clipped] \end{tikzpicture}

\subsection*{13.4 Generic Fading Settings}

The \texttt{fadings} library of \texttt{tikz} \cite{22} is loaded automatically by the \texttt{vignette} library. Amongst others, the fadings \texttt{west}, \texttt{east}, \texttt{north}, and \texttt{south} are defined inside the \texttt{fadings} library.

The \texttt{vignette} library adds some more fadings called \texttt{semi west}, \texttt{semi east}, \texttt{semi north}, and \texttt{semi south}. These fadings are much \textit{weaker} than the normal fadings.

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (1,1);
\path [pattern=checkerboard,pattern color=black!30]
(0,0) rectangle (1,1);
\fill [path fading=semi west,blue] (0,0) rectangle (1,1);
\end{tikzpicture}

\begin{Verbatim}
\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (1,1);
\path [pattern=checkerboard,pattern color=black!30]
(0,0) rectangle (1,1);
\fill [path fading=semi west,blue] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{Verbatim}

\begin{tabular}{|c|c|}
\hline
\textbf{Comparison of the Fadings} & \\
\hline
west & east \\
\hline
north & south \\
\hline
semi west & semi east \\
\hline
semi north & semi south \\
\hline
\end{tabular}
Sets the four style options /tcb/vig/north style \(^\text{P}.268\), /tcb/vig/south style \(^\text{P}.268\), /tcb/vig/east style \(^\text{P}.269\), and /tcb/vig/west style \(^\text{P}.269\) such that the paths fade from outside to inside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{fade in=blue}
\end{tikzpicture}

Sets the four style options /tcb/vig/north style \(^\text{P}.268\), /tcb/vig/south style \(^\text{P}.268\), /tcb/vig/east style \(^\text{P}.269\), and /tcb/vig/west style \(^\text{P}.269\) such that the paths fade from inside to outside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{fade out=blue}
\end{tikzpicture}

Sets the four style options /tcb/vig/north style \(^\text{P}.268\), /tcb/vig/south style \(^\text{P}.268\), /tcb/vig/east style \(^\text{P}.269\), and /tcb/vig/west style \(^\text{P}.269\) such that the paths fade weak from outside to inside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{semi fade in=blue}
\end{tikzpicture}

Sets the four style options /tcb/vig/north style \(^\text{P}.268\), /tcb/vig/south style \(^\text{P}.268\), /tcb/vig/east style \(^\text{P}.269\), and /tcb/vig/west style \(^\text{P}.269\) such that the paths fade weak from inside to outside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{semi fade out=blue}
\end{tikzpicture}
13.5 Vignette as Underlay

This puts a \tcbvignette with the given \langle options \rangle as /tcb/underlay to a \texttt{tcolorbox}. The dimensions of the \textit{vignette} are matched to the dimensions of the \texttt{tcolorbox}. For example, /tcb/leftrule is used as /tcb/vig/west size. Also, /tcb/colframe is used as /tcb/vig/raised color. For a /tcb/breakable \texttt{tcolorbox}, the \textit{vignette} is also been broken. Alternatively, \texttt{tcbvignette} could be used directly inside an /tcb/underlay with appropriate settings.

\begin{tcolorbox}[enhanced,size=small,sharp corners, colback=green!10,colframe=green!50!black, boxrule=2mm,tilterule=0mm, title=My title,center title,fonttitle=\bfseries, underlay vignette]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,arc=0pt, colback=blue!10,colframe=blue,boxrule=2mm, underlay vignette={size=1.5mm}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners, colframe=red,interior hidden,boxrule=2mm, colupper=white,center upper,fontupper=\bfseries, underlay vignette]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners, colback=red!50!yellow,frame hidden,boxrule=2mm, underlay vignette={color from=red!50!yellow to white, draw method=clipped,size=2.1mm}]
This is a tcolorbox.
\end{tcolorbox}

\tcbox{Test}
\tcbox[enhanced,sharp corners,colback=red!10,colframe=red]{Test}
\tcbox[enhanced,sharp corners,colback=red!10,colframe=red, underlay vignette]{Test}
This is a special style derived from '/tcb/underlay vignette' \(^\text{P. 272}\), where the frame color is shaded to create a soft raised frame impression.

\begin{tcolorbox}[enhanced,sharp corners,
  colback=green!10,
  colframe=green!50!black,
  size=small,boxrule=2mm,titlerule=0mm,
  title=My title,center title,fonttitle=\bfseries,
  underlay raised shading vignette]
  This is a tcolorbox.
\end{tcolorbox}

This style gives a similar effect as '/tcb/underlay raised shading vignette', but a path fading is used here. Different optical impression are very previewer-dependent.

\begin{tcolorbox}[enhanced,sharp corners,
  colback=green!10,
  colframe=green!50!black,
  size=small,boxrule=2mm,titlerule=0mm,
  title=My title,center title,fonttitle=\bfseries,
  underlay raised fading vignette]
  This is a tcolorbox.
\end{tcolorbox}

This is a special style derived from '/tcb/underlay vignette' \(^\text{P. 272}\), where the frame color is shaded into the interior color.

\begin{tcolorbox}[enhanced,sharp corners,frame hidden,
  colback=green!10,
  colframe=green!50!black,
  size=small,boxrule=2mm,titlerule=0mm,
  underlay shade in vignette]
  This is a tcolorbox.
\end{tcolorbox}
13.6 Vignette as Finish

\begin{tcolorbox}[enhanced,size=small,colback=green!10,colframe=green!50!black,boxrule=0.5mm,titlerule=0mm,title=My title,center title,fonttitle=\bfseries,finish vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,colback=green!10,colframe=green!50!black,boxrule=0.5mm,titlerule=0mm,title=My title,center title,fonttitle=\bfseries,finish raised fading vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}

\tcbincludegraphics[blankest,width=3cm,finish vignette={size=3mm}]{pink_marble.png}
\begin{tcolorbox}[enhanced,size=small,  
colback=green!10,colframe=green!50!black,  
boxrule=0.5mm,titlerule=0mm,  
title=My title,center title,fonttitle=\bfseries,  
finish fading vignette={size=2mm}]
This is a tcolorbox.
\end{tcolorbox}

\tcbincluderimages[blankest,width=3cm,  
finish fading vignette={size=3mm}]{pink_marble.png}

\begin{tcolorbox}[colback=blue!50!black,size=small,  
title=Example]  
\tcbincluderimages[blankest,  
finish fading vignette={base color=blue!50!black,size=3mm,  
over node offset=0.2mm}]{pink_marble.png}
\end{tcolorbox}
\begin{tcbitemize}
\tcbitem A
\tcbitem [underlay vignette] B
\tcbitem [underlay={\tcbvignette{inside node=interior, lowered color=red,size=1mm}}] C
\tcbitem [underlay vignette, underlay={\tcbvignette{inside node=interior, lowered color=red,size=1mm}}] D
\tcbitem [boxrule=3mm,underlay vignette={size=2mm}, underlay={\tcbvignette{inside node=interior, lowered color=red,size=1mm}}] E
\tcbitem [underlay raised shading vignette] F
\tcbitem [underlay raised shading vignette, underlay={\tcbvignette{inside node=interior, lowered color=red,size=1mm}}] G
\tcbitem [title=H1,underlay={\tcbvignette{inside node=interior, lowered color=red,size=1mm}},finish vignette] H2
\tcbitem [boxrule=0.25mm,colback=red!30,finish vignette] I1 \tcblower I2
\tcbitem [title,colback=red!30,finish raised fading vignette] J1 \tcblower J2
\tcbitem [boxrule=1mm,underlay={\tcbvignette{inside node=interior, raised color=red,size=1mm}}] K
\tcbitem [boxrule=1mm,title=L1,underlay={\tcbvignette{inside node=title, lowered color=red,size=0.5mm}}] L2
\end{tcbitemize}
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{raster}

14.1 Concept of Rasters

A *raster* is used to align several colored boxes in a regular way. It can be seen as a far related counterpart to the *matrix* construct of Ti\kZ, but it differs in many aspects.

In principle, *tcolorboxes* are arranged in rows and columns when put inside a *tcbraster* environment. The boxes are fluently added to the raster like adding text to a paragraph. Especially, line/row breaks are done automatically and one cannot end a line/row ahead of schedule. Further, a *raster* is not restricted to a single page but may break into an arbitrary series of pages.

Box #1


Box #2


Box #3

Box #4

A raster arranges enclosed boxes in a regular way, mainly into rows and columns. The 
⟨options⟩ are used to control the raster parameters and to set the properties for the enclosed 
boxes.

- The raster is only allowed to contain a series of \texttt{tcolorbox}\textsuperscript{P.12} environments or 
derived constructs. With some small restrictions, boxes created with \texttt{tcboxfit}\textsuperscript{P.410} can also be added. Boxes created with \texttt{tcbox}\textsuperscript{P.14} are not reasonable here, but may 
be used to a certain degree.
- Do not add anything else between the boxes inside the raster with exception of white-
space. Especially, do not use \texttt{\backslash\backslash} or \texttt{\textbackslash par} to end a row; row breaks are done automati-
cally.
- The boxes inside a raster are numbered automatically. \texttt{\texttt{\textbackslash thetcbrasternum}} may be 
used inside a box to access this number.

\begin{tcbraster}\[raster columns=3, raster equal height, 
size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, 
title={Box \# \texttt{\texttt{\textbackslash thetcbrasternum}}}\]
\begin{tcolorbox}First box\end{tcolorbox} 
\begin{tcolorbox}Second box\end{tcolorbox} 
\begin{tcolorbox}This is a box\ with a second line\end{tcolorbox} 
\begin{tcolorbox}Another box\end{tcolorbox} 
\begin{tcolorbox}A box again\end{tcolorbox} 
\end{tcbraster}
This is a special case of a \texttt{tcbraster}\textsuperscript{P.279} with the given \texttt{(options)}.

- Here, the enclosed boxes are created using \texttt{tcbitem}.
- There has to be at least one \texttt{tcbitem}.
- One cannot use anything else than \texttt{tcbitem} to add something to the \texttt{raster}.

This leads to a very compact syntax.

\begin{tcbitemize}[raster columns=2, raster equal height=rows, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \# etcbrasternum}]
\tcbitem First box
\tcbitem Second box
\tcbitem This is a box\textbackslash \textbackslash with a second line
\tcbitem[colback=yellow,colbacktitle=yellow!50!black] Another box
\tcbitem A box again
\end{tcbitemize}

\begin{tcbitemize}
\tcbitem Box # 1
\tcbitem First box
\tcbitem Box # 3
\tcbitem This is a box with a second line
\tcbitem Box # 5
\tcbitem A box again
\end{tcbitemize}

\texttt{tcbitemize} has more restrictions than \texttt{tcbraster}\textsuperscript{P.279}. Especially, the /tcb/capture\textsuperscript{P.94} mode has to be \texttt{minipage}. For example, /tcb/fit\textsuperscript{P.412} cannot be used safely. If /tcb/fit\textsuperscript{P.412} should be used, turn over to \texttt{tcbraster}\textsuperscript{P.279}.

\texttt{tcbitem}\texttt{(options)}

Used inside \texttt{tcbitemize} to create a new \texttt{tcolorbox}\textsuperscript{P.12} with the given \texttt{(options)}.  

280
This is a convenience environment which combines a `tcolorbox` with an embedded `tcbraster`. The ⟨box options⟩ are given to the outer `tcolorbox`, while the ⟨raster options⟩ are given to the embedded `tcbraster`. This environment is especially useful for rasters inside rasters.

```latex
\begin{tcboxedraster}[raster columns=3, raster equal height, size=small, colframe=red!50!black, colback=red!10!white, colbacktitle=red!50!white, title={Box \# \text{tcbbrasternum}}]
\begin{tcolorbox}[colback=yellow!10, fonttitle=\bfseries, title=Boxed Raster]
\begin{tcolorbox}First box\end{tcolorbox}
\begin{tcolorbox}Second box\end{tcolorbox}
\begin{tcolorbox}This is a box with a second line\end{tcolorbox}
\begin{tcolorbox}Another box\end{tcolorbox}
\begin{tcolorbox}A box again\end{tcolorbox}
\end{tcolorbox}
\end{tcboxedraster}
```

```
% \tcbuselibrary{skins}
\begin{tcbraster}[raster columns=2, raster equal height, raster every box/.style={size=small, colframe=red!50!black, colback=red!10!white, valign=center, halign=center}]
\begin{tcolorbox}One\end{tcolorbox}
\begin{tcolorbox}Two\end{tcolorbox}
\begin{tcboxedraster}{blankest}
\begin{tcolorbox}Three\end{tcolorbox}
\begin{tcolorbox}Four\end{tcolorbox}
\begin{tcolorbox}Five\end{tcolorbox}
\begin{tcolorbox}Six\end{tcolorbox}
\end{tcboxedraster}
\begin{tcolorbox}Seven\end{tcolorbox}
\end{tcbraster}
```

```
1234567
```

```
\begin{tcboxedraster}[raster columns=3, raster equal height, size=small, colframe=red!50!black, colback=red!10!white, title={Box \# \text{tcbbrasternum}}]
\begin{tcolorbox}First box\end{tcolorbox}
\begin{tcolorbox}Second box\end{tcolorbox}
\begin{tcolorbox}This is a box with a second line\end{tcolorbox}
\begin{tcolorbox}Another box\end{tcolorbox}
\begin{tcolorbox}A box again\end{tcolorbox}
\end{tcboxedraster}
```
This is a convenience environment which combines a `tcolorbox` with an embedded `tcbitemize`. The `(box options)` are given to the outer `tcolorbox`, while the `(raster options)` are given to the embedded `tcbitemize`. This environment is especially useful for rasters inside rasters.

\begin{tcboxeditemize}[raster columns=3, raster equal height, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \thetcbrasternum}]
\tcbitem First box
\tcbitem Second box
\tcbitem This is a box with a second line
\tcbitem Another box
\tcbitem A box again
\end{tcboxeditemize}

\begin{tcboxeditemize}
\item First box
\item Second box
\item This is a box with a second line
\item Another box
\item A box again
\end{tcboxeditemize}
14.3 Option Keys of the Library

\texttt{/tcb/raster columns=⟨number⟩} (no default, initially 2)

Sets the \textit{(number)} of columns for a \textit{raster}.

\begin{tcbitemize}[raster columns=3, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

\begin{tcbitemize}[raster columns=4, size=small,colframe=blue!50!black,colback=blue!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

\texttt{/tcb/raster rows=⟨number⟩} (no default, initially 2)

Sets the \textit{(number)} of rows for a \textit{raster}. Note that this is only relevant in connection with setting \texttt{/tcb/raster height} \textsuperscript{P.284} to a value greater than 0pt. Then, it defines the number of rows per given height.

\texttt{/tcb/raster width=⟨length⟩} (no default, initially \texttt{\linewidth})

Sets the total raster width to the given \textit{(length)}. \texttt{/tcb/raster left skip} \textsuperscript{P.285} and \texttt{/tcb/raster right skip} \textsuperscript{P.285} are part of the total width.

\begin{tcbitemize}[raster width=\texttt{\linewidth}/2, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}
/tcb/raster height=⟨length⟩  
(no default, initially 0pt)

Sets the raster height per /tcb/raster rows\textsuperscript{P.283} to the given ⟨length⟩. This forces an appropriate height for the enclosed boxes. /tcb/raster before skip and /tcb/raster after skip are not part of this calculation. If the ⟨length⟩ is set to 0pt, this feature is deactivated.

\begin{tcbitemize}[raster height=4cm, raster rows=2, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem[enhanced, finish={\draw[blue,very thick,<->] (frame.south) -- node[right,pos=.75]{4cm} +(0,4); }]
    Three
  \tcbitem Four
  \tcbitem Five
\end{tcbitemize}

\begin{tcbitemize}[raster equal skip=4mm, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

/tcb/raster before skip=⟨glue⟩  
(no default, initially 2mm)

Space of the given ⟨glue⟩ is inserted vertically before the raster. This space is discardable.

/tcb/raster after skip=⟨glue⟩  
(no default, initially 2mm)

Space of the given ⟨glue⟩ is inserted vertically after the raster. This space is discardable.

/tcb/raster equal skip=⟨length⟩  
(style, no default)

Shortcut to set /tcb/raster before skip, /tcb/raster after skip, /tcb/raster column skip\textsuperscript{P.285}, and /tcb/raster row skip\textsuperscript{P.285} to the same ⟨length⟩ value.

\begin{tcbitemize}[raster equal skip=4mm, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}
Space of the given \textit{length} is inserted horizontally left of the raster.

\begin{tcbitemize}[raster left skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

Space of the given \textit{length} is inserted horizontally right of the raster.

\begin{tcbitemize}[raster right skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

Space of the given \textit{length} is inserted horizontally between the columns.

\begin{tcbitemize}[raster column skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

Space of the given \textit{length} is inserted vertically between the rows.

\begin{tcbitemize}[raster row skip=0pt, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}
\begin{tcbitemize}[raster halign=center,\raster valign=bottom, \size=small,\colframe=green!50!black,\colback=green!10!white]\tcbitem \Huge One \tcbitem \Large Two \tcbitem Three \end{tcbitemize}
/tcb/raster equal height\=(type) \hspace{1cm} \text{(default all, initially none)}

Puts the enclosed boxes into a common /tcb/equal height\ group \cite{P.61}. The \langle id\rangle of the equal height group is chosen automatically, but it may be set manually by /tcb/raster equal height group. Also see /tcb/minimum for current equal height group \cite{P.62}. Feasible values for \langle type\rangle are:

- \textbf{none}: no equal height setting,
- \textbf{rows}: all boxes in a row are set to equal height,
- \textbf{all}: all boxes in the raster are set to equal height.

Note that you have to compile twice to see changes.

\begin{tcbitemize}[raster equal height=rows, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem \Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

\begin{tcbitemize}[raster equal height, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem \Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

\begin{tcbitemize}[raster equal height group=raster-manual-id]
\tcbitem One
\tcbitem \Huge Two
\end{tcbitemize}

\begin{tcbitemize}[raster equal height,raster equal height group=raster-manual-id]
\tcbitem One
\tcbitem \Huge Two
\end{tcbitemize}

\tcbset{size=small,colframe=red!50!black,colback=red!10!white}
\begin{tcolorbox}[equal height group=raster-manual-id]
A single box
\end{tcolorbox}
Enforces the raster size computations onto the enclosed boxes. If set to \textit{false}, individual settings can be used (for the better or worse).

\begin{tcbitemize}[raster force size=false, raster halign=center, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item[add to width=-3cm] Three
\item[add to width=-3cm] Four
\item[add to width=-3cm] Five
\item[add to width=3cm] Six
\end{tcbitemize}

Sets all raster settings back to their default values. Note that \texttt{/tcb/reset} does not execute this option. Style settings like \texttt{/tcb/raster odd column} etc. are not touched by \texttt{/tcb/raster reset}.

14.4 Adding Styles for Specific Boxes

The following styles can be defined to address certain boxes inside a raster. Note that such style definitions are not removed by \texttt{/tcb/reset} or \texttt{/tcb/raster reset}. The style definitions are used in the order given below.

\texttt{/tcb/raster every box} (style)

This style is used for every box.

\texttt{/tcb/raster odd column} (style)

This style is used for every box in an odd column.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster odd column/.style={colframe=blue!50!black,colback=blue!10!white}]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

\texttt{/tcb/raster even column} (style)

This style is used for every box in an even column.

\texttt{/tcb/raster column n} (style)

This style is used for every box in the n-th column. n has to be replaced by a number.

\texttt{/tcb/raster odd row} (style)

This style is used for every box in an odd row.
This style is used for every box in an even row.

This style is used for every box in the m-th row. m has to be replaced by a number.

This style is used for every box with an odd number.

This style is used for every box with an even number.

This style is used for the box in the m-th row and n-th column. m and n have to be replaced by numbers.

This style is used for the box with number n. n has to be replaced by a number.
### 14.5 Combining Columns or Rows

**/tcb/raster multicolumn=⟨number⟩**  
(no default, initially unset)

This option has to be set inside the option list of a `tcolorbox` on page 12 inside a `tcbraster` on page 279 or inside `\tcbitem` on page 280 inside `tcbitemize` on page 280. It merges the given ⟨number⟩ of boxes into one single box on the same line. The resulting box gets the `\thetcbrasternum` of the first box. If there are not enough boxes available on the current line, this option is ignored and a warning is given.

```latex
\begin{tcbitemize}[raster equal height=rows,raster columns=3, title=\thetcbrasternum, colframe=red!50!black, colback=red!10!white, raster multicolumn=1]
  \tcbitem{colframe=blue!50!black, colback=blue!10!white, raster multicolumn=1}
  \tcbitem
  \tcbitem
  \tcbitem{colframe=blue!50!black, colback=blue!10!white, raster multicolumn=2}
  \tcbitem{colframe=blue!50!black, colback=blue!10!white, raster multicolumn=3}
  \tcbitem{colframe=blue!50!black, colback=blue!10!white, raster multicolumn=2}
\end{tcbitemize}
```

```
1
\hspace{1cm} multicolumn=1

4
\hspace{1cm} multicolumn=2

7
\hspace{1cm} multicolumn=3

10
\hspace{1cm} multicolumn=2

2

3

6

11

290
This option has to be set inside the option list of a \texttt{tcolorbox} \cite{P.12} inside a \texttt{tcbraster} \cite{P.279} or inside \texttt{tcbitem} \cite{P.280} inside \texttt{tcbitemize} \cite{P.280}. This option not really merges boxes, but simply sizes the current box to fit the space of \langle \textit{number} \rangle rows.

\texttt{/tcb/raster multirow} needs \texttt{/tcb/raster height} \cite{P.284} to be set. How to achieve a similar result for boxes without fixed \texttt{/tcb/raster height} \cite{P.284} is shown afterwards.

\begin{tcbitemize}[raster rows=3,raster columns=3,raster height=6cm, raster every box/.style={colframe=red!50!black,colback=red!10!white}]
  \tcbitem
  \tcbitem
  \tcbitem[\textcolor{blue!50!black},\textcolor{blue!10!white},raster multirow=2]
  \tcbitem[raster multicolumn=2,raster multirow=2,blankest]
\end{tcbitemize}

\begin{tcbitemize}[raster rows=2,raster columns=2,raster height=\texttt{tcbtextheight}]
  \tcbitem
  \tcbitem
  \tcbitem
  \tcbitem
\end{tcbitemize}
For rasters without fixed \texttt{/tcb/raster height} \textsuperscript{P.284}, \texttt{/tcb/raster multirow} \textsuperscript{P.291} cannot be used. Note that \texttt{/tcb/textheight} \textsuperscript{P.147} also cannot be used like in the previous example.

But, with combination of \texttt{/tcb/raster equal height} \textsuperscript{P.287} and \texttt{/tcb/space to} \textsuperscript{P.59}, a similar effect can be created:

\begin{tcbitenize}[raster columns=3,raster equal height=rows,  
    raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\tcbitenitem
\tcbitenitem
\tcbitenitem
\lipsum[2]
\tcbitenitem[raster multicolumn=2,blankest,space to=\myspace]
\begin{tcbitenize}[raster columns=2]
\tcbitenitem This is a box of the inner raster.
\tcbitenitem
\tcbitenitem[height=\myspace]
\tcbitenitem[height=\myspace]
\end{tcbitenize}
\end{tcbitenize}

14.6 Rasters inside Rasters

A raster inside a raster cannot be used directly, because a raster can only contain a tcolorbox or something derived from a tcolorbox. So, a raster can be put inside a tcolorbox inside a raster.

Some examples for such constructions can be found at tcboxedraster \(^\text{P.281}\), \text{/tcb/raster multicolumn} \(^\text{P.290}\), \text{/tcb/raster multirow} \(^\text{P.291}\).

14.6.1 Raster Setup

The intermediating tcolorbox \(^\text{P.12}\) can be made invisible by using \text{/tcb/blankest} \(^\text{P.239}\).

\begin{tcbraster}[raster equal height=rows,\raster every box/.style={colframe=red!50!black,colback=red!10!white}]\begin{tcolorbox}[blankest]\begin{tcbraster}[raster columns=1]\begin{tcolorbox}One\end{tcolorbox}\begin{tcolorbox}Two\end{tcolorbox}\end{tcbraster}\end{tcolorbox}\begin{tcolorbox}raster+tcolorbox+raster\end{tcolorbox}\end{tcbraster}

\begin{tcbraster}[raster equal height=rows,\raster every box/.style={colframe=red!50!black,colback=red!10!white}]\begin{tcboxedraster}[raster columns=1]{blankest}\begin{tcolorbox}One\end{tcolorbox}\begin{tcolorbox}Two\end{tcolorbox}\end{tcboxedraster}\begin{tcolorbox}raster+tcboxedraster\end{tcolorbox}\end{tcbraster}

\begin{tcbitemize}[raster equal height=rows,\raster every box/.style={colframe=red!50!black,colback=red!10!white}]\tcbitem{blankest}\begin{tcbitemize}[raster columns=1]\tcbitem One\tcbitem Two\end{tcbitemize}\tcbitem tcbitem+tcbitem+tcbitem\end{tcbitemize}
14.6.2 Placing Spaces

If the heights of boxes inside staggered rasters should be matched, the space has to be distributed accordingly.

- For fixed height boxes/rasters using `/tcb/raster height`\(^{P.284}\), the height of boxes is available by `\tcbtextheight`\(^{P.147}\). This can be used to size deeper layered boxes/rasters.
- For boxes/rasters layed out using `/tcb/raster equal height`\(^{P.287}\), space can be distributed by `/tcb/space to`\(^{P.59}\). It can take several compilations until all spaces are distributed correctly.

\begin{tcbitemize}[raster rows=2,raster height=6cm,
  raster every box/.style={colframe=red!50!black,colback=red!10!white}]
  \tcbitem[blankest]
  \begin{tcbitemize}[raster columns=1,raster rows=2,raster height=`\tcbtextheight`]
    \tcbitem One
    \tcbitem Two
  \end{tcbitemize}
  \tcbitem This is a fixed height box.
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

One
Two
Three
Four
This is a fixed height box.
One
Two
Three
Four

Twelve
Eleven

This is an example with fixed height boxes.

Five
Six

Ten
Nine
Eight
Seven
One
This box will adapt its height.

This is a flexible height box.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae la
vinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amat
nisl. Vivamus quis tortor vitae risus porta vehicula.

One
This box will adapt its height.
One

This box will adapt its height.


This box will adapt its height.
15 Libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted}

15.1 Loading the Libraries

In contrast to other \texttt{tcolorbox} libraries, the libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted} are concurrent in the sense that they all do the same thing, i.e. displaying listings with or without typesetting the listing in \TeX parallel. The difference is the underlying \TeX package which does the core job for displaying a listing. So, typically, you need just one of these libraries. If you do not have a clue, which one of them you should use, you should take \texttt{listingsutf8}.

The order in which the libraries are included influences the default settings and the \texttt{/tcb/reset} behavior. The settings of a later loaded library overwrite the settings of a previous loaded library. A library is never loaded twice.

15.1.1 Loading \texttt{listings}

This library uses the package \texttt{listings} \cite{listings} to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{listings}
\end{verbatim}

This also loads the package \texttt{listings} \cite{listings}.

The \texttt{/tcb/listing engine} \cite{listingengine} is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}

15.1.2 Loading \texttt{listingsutf8}

\begin{itemize}
\item This library is not needed (and troublesome) when using \texttt{XeLaTeX}.
\end{itemize}

To extend \texttt{listings} for UTF-8 encoded sources, you can use the support from the package \texttt{listingsutf8} \cite{listingsutf8} by loading the library variant \texttt{listingsutf8}.

\begin{verbatim}
\tcbuselibrary{listingsutf8}
\tcbset{listing utf8=latin1} % optional; 'latin1' is the default.
\end{verbatim}

This also loads the library \texttt{listings} and the packages \texttt{listings} \cite{listings} and \texttt{listingsutf8} \cite{listingsutf8}.

The \texttt{/tcb/listing engine} \cite{listingengine} is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}
15.1.3 Loading \minted

This library uses the package \minted\cite{12} to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{tcbuselibrary}{minted}
\end{tcbuselibrary}

This also loads the package \minted\cite{12}.

The \minted package uses the external tool Pygments\cite{14} to apply syntax highlighting. It has to be installed and set up, before the library can be used, see \cite{12} and \cite{14}. The \tcolorbox library \minted does not work, if the package \minted\cite{12} does not work.

The /tcb/listing engine\cite{P,310} is set to \minted by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{tcbset}{listing engine=minted}
\end{tcbset}

15.2 Common Macros of the Libraries

\begin{tcblisting}{⟨options⟩}
⟨environment content⟩
\end{tcblisting}

Creates a colored box based on a \tcolorbox\cite{P,12}. Controlled by the given (⟨options⟩), the environment content is typeset normally and/or as a listing. Furthermore, the ⟨⟨options⟩⟩ control appearance and functions of the \tcolorbox. By default, the listing is interpreted as a \LaTeX listing.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black}
This is a \LaTeX example which displays the text as source code and in compiled form.
\end{tcblisting}

This is a \LaTeX example which displays the text as source code and in compiled form.
This is source code in another language (XML)

```xml
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=".">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>
```

This is source code in another language (XML)

```xml
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=".">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>
```

```
\begin{tikzpicture}
  \fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
```

This box is as wide as needed (listing only !!)
\begin{tcboutputlisting}
\begin{environment content}
\end{environment content}
\end{tcboutputlisting}
Saves the environment content to a file which is named by the key value of \texttt{listing file}. Later, this file can be loaded by \texttt{tcbinputlisting} or \texttt{tcbuselistingtext} or \texttt{tcbuselistinglisting}.

\begin{tcboutputlisting}
This \texttt{\textbf{text}} is written to a standardized file for later usage.
\end{tcboutputlisting}

\texttt{tcbinputlisting}(/\texttt{options})
Creates a colored boxed based on a \texttt{tcolorbox}. The text content is read from a file named by the key value of \texttt{listing file}. Apart from that, the function is equal to that of \texttt{tcblisting}\textsuperscript{P.299}.

\begin{tcbinputlisting}
\texttt{colback=red!5!white, colframe=red!75!black, text only}
\texttt{colback=green!5, colframe=green!75!black, listing only}
\end{tcbinputlisting}

\texttt{tcbuselistingtext}
Loads text from a file named by the key value of \texttt{listing file}.

\begin{tcbuselistingtext}
\end{tcbuselistingtext}

\texttt{tcbuselistinglisting}
Typesets text as listing from a file named by the key value of \texttt{listing file}.

\begin{tcbuselistinglisting}
\end{tcbuselistinglisting}

\texttt{tcbusetemplisting}
Typesets text as listing from a temporary file which was written by \texttt{tcbwritetemp}\textsuperscript{P.126}.
See Section 22.4 on page 441 and Section 22.5 on page 443 for more elaborate methods to create new environments and commands.

If a new sort of `tcblisting` environments should be created with one optional argument only, one is highly recommended to use `\DeclareTcBListing` \footnote{P. 441} or `\NewTCBListing` \footnote{P. 441} instead of `\newtcblisting` to avoid content scanning problems.

\begin{tcblisting}[\langle init \ options \rangle][\langle name \rangle][\langle number \rangle][\langle default \rangle][\langle options \rangle]
\end{tcblisting}

Creates a new environment \langle name \rangle based on `tcblisting` \footnote{P. 299}. Basically, `\newtcblisting` operates like `\newenvironment`. This means, the new environment \langle name \rangle optionally takes \langle number \rangle arguments, where \langle default \rangle is the default value for the optional first argument. The \langle options \rangle are given to the underlying `tcblisting`. Note that `/tcb/savedelimiter` \footnote{P. 26} is set to the given \langle name \rangle automatically. The \langle init \ options \rangle allow setting up automatic numbering, see Section 5 from page 108.

\begin{Verbatim}
\newtcblisting{mybox}{{$\%$
\begin{tabular}{l}
\colback=red!5!white, \\
\colframe=red!75!black
\end{tabular}
\end{Verbatim}
\begin{mybox}
This is my \LaTeX box.
\end{mybox}

\begin{Verbatim}
\newtcblisting{mybox}{1}{$\%$
\begin{tabular}{l}
\colback=red!5!white, \\
\colframe=red!75!black, \\
\fonttitle=\bfseries, \\
\title=\#1
\end{tabular}
\end{Verbatim}
\begin{mybox}{Listing Box}
This is my \LaTeX box.
\end{mybox}

\begin{Verbatim}
\newtcblisting{mybox}{2}{[$\%$
\begin{tabular}{l}
\colback=red!5!white, \\
\colframe=red!75!black, \\
\fonttitle=\bfseries, \\
\title=\#2,\#1
\end{tabular}
\end{Verbatim}
\begin{mybox}[listing only]
\begin{tabular}{l}
\textit{Listing Box}
\end{tabular}
This is my \LaTeX box.
\end{mybox}
\begin{mybox}[listing side text]
\begin{tabular}{l}
\textit{Listing Box}
\end{tabular}
This is my \LaTeX box.
\end{mybox}
\bigskip
\begin{mybox}[listing only]
\begin{tabular}{l}
\textit{Listing Box}
\end{tabular}
This is my \LaTeX box.
\end{mybox}
\begin{mybox}[listing side text]
\begin{tabular}{l}
\textit{Listing Box}
\end{tabular}
This is my \LaTeX box.
\end{mybox}
Definition in the preamble:
\newtcblisting[auto counter]{mycbox}[1]{%
colback=red!5!white,colframe=red!75!black,fonttitle=bfs,  
title=Listing \thetcbcounter: #1}

\begin{mycbox}{Listing Box}
This is my LaTeX box.
\end{mycbox}

\renewtcblisting[(init options)]{(name)]{(number)]{(default)}{(options)]
Operates like \newtcblisting P.302, but based on \renewenvironment instead of \newenvironment. An existing environment is redefined.
\newtcbinputlisting\{(init options)\}\{\langle name\rangle\}\{\langle number\rangle\}\{\langle default\rangle\}\{\langle options\rangle\}

Creates a new macro \langle name\rangle based on \tcbinputlisting {\footnote{P.301}}. Basically, \newtcbinputlisting operates like \newcommand. The new macro \langle name\rangle optionally takes \langle number\rangle arguments, where \langle default\rangle is the default value for the optional first argument. The \langle options\rangle are given to the underlying \tcbinputlisting. The \langle init options\rangle allow setting up automatic numbering, see Section 5 from page 108.

\newtcbinputlisting\[use counter from=mycbox\]\{\mylisting\}[2]\{\%
lstlisting file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
listing only,breakable,#1\}

\mylisting[before upper=\textit{This is the included file content:}]\{\jobname.tcbtemp\}

Listing (2) of \texttt{tcolorbox.tcbtemp}

This is the included file content:
\newtcbinputlisting\[use counter from=mycbox\]\{\mylisting\}[2]\{\%
lstlisting engine=minted,minted language=latex,minted style=colorful,
lstlisting file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
listing only,breakable,#1\}

\mylisting[before upper=\textit{This is the included file content:}]\{\jobname.tcbtemp\}

Listing (3) of \texttt{tcolorbox.tcbtemp}

This is the included file content:
\newtcbinputlisting\[use counter from=mycbox\]\{\mylisting\}[2]\{\%
lstlisting engine=minted,minted language=latex,minted style=colorful,
lstlisting file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
listing only,breakable,#1\}

\mylisting[before upper=\textit{This is the included file content:}]\{\jobname.tcbtemp\}

\renewtcbinputlisting\{(init options)\}\{\langle name\rangle\}\{\langle number\rangle\}\{\langle default\rangle\}\{\langle options\rangle\}

Operates like \newtcbinputlisting, but based on \renewcommand instead of \newcommand. An existing macro is redefined.
15.3 Option Keys of the \texttt{listings} Library

\texttt{/tcb/listing options=\{key list\}} \ (no default, initially \texttt{style=tcblatex})

Sets the options from the package \texttt{listings} [6] which are used during typesetting of the listing. For \LaTeX\ listings, there is a predefined \texttt{listings} style named \texttt{tcblatex} which can be used.

\begin{tcblisting}{colback=red!5!white,colframe=red!25,left=6mm,\texttt{listing options=\{style=tcblatex,numbers=left,numberstyle=\tiny\color{red!75!black}\}}}
This is a \LaTeX\ example which displays the text as source code and in compiled form. Additionally, we use line numbers here.
\end{tcblisting}

1 This is a \LaTeX\ example which displays the text as source code and in compiled form. Additionally, we use line numbers here.

This is a \LaTeX\ example which displays the text as source code and in compiled form. Additionally, we use line numbers here.

\texttt{/tcb/no listing options} \ (no value, initially unset)

Abbreviation for \texttt{listing options=}{}. This removes all options for the \texttt{listings} package. This includes the \texttt{tcblisting} standard style \texttt{tcblatex} and the encoding presets. Use this option, if you want to set the \texttt{listings} options outside of \texttt{tcblisting}, e.g. globally in the preamble.

\begin{tcblisting}{no listing options}
All \texttt{listings} options removed.
\end{tcblisting}

All \texttt{listings} options removed.

All \texttt{listings} options removed.

\texttt{/tcb/listing style=\{style\}} \ (no default, initially \texttt{tcblatex})

Abbreviation for \texttt{listing options=\{style=\ldots\}}. This key sets a \{style\} for the \texttt{listings} package, see [6]. For \LaTeX, there is a predefined style named \texttt{tcblatex}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,\texttt{listing style=tcblatex}}
Here, we use the predefined style.
\end{tcblisting}

Here, we use the predefined style.

Here, we use the predefined style.
/tcb/listing inputencoding=(encoding)  
(no default, initially \inputencodingname)  
Sets the input encoding value for the predefined listing style tcblatex and  
tcbdocumentation from the library \documentclass. The initial value is derived  
from the package inputenc if used.

/tcb/listing remove caption=true|false  
(default true, initially true)  
If set to true, some part of the caption building code of the listings package is silenced to  
preserve some unwanted interaction with the hyperref package resulting in additional verti- 
cal space. If set to false, the listings package code is kept unchanged. Note that listings  
outside tcblisting \llistings and \tcbinputlisting \llisting are always processed normally.  
Typically, a user is not expected to use this key at all.

/tcb/every listing line=(text)  
(no default, initially unset/empty)  
Inserts some \langle text \rangle to the begin of every line of a listing. Note that this a hack of the  
listings package code. This may become unusable or superfluous in the future.

\begin{commandshell}  
ls -al  
cd /usr/lib  
\end{commandshell}

\begin{commandshell}  
ls -al  
cd /usr/lib  
\end{commandshell}

See further options in Section 15.6 on page 310.

For an combined example of using \lstinline inside a tcolorbox, see \lDeclareTotalTCBox \llistings inside a tcolorbox, see  
\lDeclareTotalTCBox \llistings inside a tcolorbox, see \lDeclareTotalTCBox \llistings inside a tcolorbox, see \lDeclareTotalTCBox \llistings inside a tcolorbox, see \lDeclareTotalTCBox.
15.4 Option Keys of the \texttt{listingsutf8} Library

The \texttt{listingsutf8} library is not needed (and troublesome) when using Xe\LaTeX{}.

The \texttt{listingsutf8} library is an extension of the \texttt{listings} library, so all options from Section 15.3 on page 305 are applicable.

\texttt{/tcb/listing utf8=(one-byte-encoding)} \hspace{1cm} \texttt{(style, no default, initially \texttt{latin1})}

Abbreviation for using \texttt{/tcb/listing inputencoding} \cite{P.306} together with UTF-8 support from the package \texttt{listingsutf8} \cite{10}. This option is available only for the library variant \texttt{listingsutf8}. The \texttt{(one-byte-encoding)} is one of the applicable encodings from \cite{10}, e.g. \texttt{latin1}.

See further options in Section 15.6 on page 310.
15.5 Option Keys of the \texttt{minted} Library

Sets a \emph{programming language} known to \texttt{Pygments} \cite{pygments}.

```
\begin{tcblisting}{listing engine=minted,minted style=trac,
minted language=java,
colback=red!5!white,colframe=red!75!black,listing only}
public class HelloWorld {
  // A 'Hello World' in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
}
\end{tcblisting}
```

```
public class HelloWorld {
  // A 'Hello World' in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
}
```

Sets the options from the package \texttt{minted} \cite{minted} which are used during typesetting of the listing.

```
\begin{myjava}
public class HelloWorld {
  // A 'Hello World' in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
}
\end{myjava}
```

```
\begin{myjava}
public class HelloWorld {
  // A 'Hello World' in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
}
\end{myjava}
```
\textit{tcb/minted style}=(\textit{style}) \hspace{1cm} \text{(no default, initially unset)}

Sets a \textit{style} known to \texttt{Pygments} \cite{14}. This is independent from \texttt{tcb/minted options} \textsuperscript{P.308}. Note that styles are always applied globally; all following examples will be set in the given \textit{style} until a new style is set. Also note that setting \texttt{\usemintedstyle{\textit{style}}} only once per document is more economic, if all styles in a document are the same. For examples of different styles, see \texttt{tcb/minted language} \textsuperscript{P.308} and \texttt{tcb/minted options} \textsuperscript{P.308}.

See further options in Section 15.6 on the following page.
15.6 Common Option Keys of all Libraries

For the \langle options\rangle in \texttt{tcblisting} \textsuperscript{P.299} respectively \texttt{tcbinputlisting} \textsuperscript{P.301} the following pgf keys can be applied. The key tree path /tcb/ is not to be used inside these macros.

\texttt{/tcb/listing engine=\langle engine\rangle} (no default)
Sets the \langle engine\rangle which typesets the listings. Feasible values are
- \texttt{listings}, if library \texttt{listings} or \texttt{listingsutf8} is loaded.
- \texttt{minted}, if library \texttt{minted} is loaded.

\texttt{/tcb/listing file=\langle file name\rangle} (no default, initially \texttt{\jobname.listing})
Sets the \langle file name\rangle of the file which is used to save listings.

\texttt{/tcb/listing and text} (no value, initially set)
Typesets the environment content as listing in the upper part and as compiled text in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and text}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{singlespace}
This is a \LaTeX\ example.
\end{singlespace}

\begin{singlespace}
This is an \TeX\ example.
\end{singlespace}

\texttt{/tcb/text and listing} (no value)
Typesets the environment content as compiled text in the upper part and as listing in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text and listing}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{singlespace}
This is an \TeX\ example.
\end{singlespace}

\begin{singlespace}
This is a \LaTeX\ example.
\end{singlespace}

\texttt{/tcb/listing only} (no value)
Typesets the environment content as listing.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing only}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{singlespace}
This is a \LaTeX\ example.
\end{singlespace}
/tcb/text only
Typesets the environment content as compiled text.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text only}
This is a \LaTeX \ example.
\end{tcblisting}

This is a \LaTeX \ example.

/tcb/comment={text} (no default, initially empty)
Records a comment with \langle text \rangle as content. The comment is displayed e.g. in conjunction with /tcb/listing and comment \textsuperscript{P.314} and /tcb/comment and listing \textsuperscript{P.314}.

\begin{tcblisting}{comment={This comment is really only a comment},
colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}

This is a \textbf{tcolorbox}.

This is a tcolorbox.

/tcb/comment only (no value)
Typesets only the environment content with the comment text.

\begin{tcblisting}{comment only,
colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}

This is a comment.

/tcb/image comment={(options)}{(filename)} (style, no default, initially unset)
Uses an image denoted by \langle filename \rangle as comment for the listing. The image is included by the standard \includegraphics macro with given \langle options \rangle.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment,
image comment={width=2.5cm}{example-image-a.pdf},center lower}
This is a \LaTeX \ example.
\end{tcblisting}

This is a \LaTeX \ example.
/tcb/tcbimage comment=(filename) (style, no default, initially unset)
Uses an image denoted by \textit{filename} as \textit{comment} for the listing. The image is included by the \texttt{tcbincludegraphics} \cite{P.251} macro. The inclusion can be customized by /tcb/comment style \cite{P.314}.

\textbf{!} The library \texttt{skins} is needed to apply this option.

\texttt{\% \tcbuselibrary{skins}}
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, righthand width=3cm,lower separated=false, tcbimage comment={example-image-a.pdf}, comment style={size=fbox,colframe=blue,colback=blue!50,sharp corners, drop fuzzy shadow}}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, righthand width=3cm,lower separated=false, tcbimage comment={example-image-a.pdf}, comment style={size=fbox,colframe=blue,colback=blue!50,sharp corners, drop fuzzy shadow}}
This is a \LaTeX\ example.
\end{tcblisting}

\texttt{\% /tcb/pdf comment=(filename)} (style, default listing file, initially unset)
Uses a PDF file denoted by \textit{filename} as \textit{comment} for the listing. The image is included by \texttt{tcbincludepdf} \cite{P.253} inside a \texttt{tcbraster} \cite{P.279}. The inclusion can be customized by /tcb/comment style \cite{P.314}.

\textbf{!} The libraries \texttt{skins} and \texttt{raster} are needed to apply this option.

\texttt{\% /tcb/pdf comment=(filename)}
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, righthand width=3cm,lower separated=false, tcbimage comment={example-image-a.pdf}, comment style={size=fbox,colframe=blue,colback=blue!50,sharp corners, drop fuzzy shadow}}
This is a \LaTeX\ example.
\end{tcblisting}
This is a \LaTeX\ example.
/tcb/pdf extension={(extension)} (no default, initially pdf)
Sets the PDF file name extension for /tcb/pdf comment \(^P.312\) to \(\langle\text{extension}\rangle\). Note that \(\langle\text{extension}\rangle\) always overwrites any actual extension given inside /tcb/pdf comment \(^P.312\).

/tcb/comment style={(options)} (no default, initially empty)
Sets the \(\langle\text{options}\rangle\) for /tcb/tcbimage comment \(^P.312\) and /tcb/pdf comment \(^P.312\). These are tcolorbox options to customize the colored box drawn around the image(s), also image options encapsulated by /tcb/graphics options \(^P.254\), and tcbraster \(^P.279\) options for /tcb/pdf comment \(^P.312\).

/tcb/listing and comment (no value)
Typesets the environment content as listing in the upper part and a given comment in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and comment,\cr\par
   \texttt{This is my comment. It may contain line breaks.}\cr
   \texttt{It can even use the environment content «This is a \LaTeX\ example.»}}}
\end{tcblisting}

This is a \LaTeX\ example.

This is my comment. It may contain line breaks.
It can even use the environment content «This is a \LaTeX\ example.»

/tcb/comment and listing (no value)
Typesets a given comment in the upper part and the environment content as listing in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment and listing,\cr\par
   \texttt{This is my comment.}}}
\end{tcblisting}

This is a \LaTeX\ example.

This is my comment.
/tcb/listing side text  (style, no value)
Typesets the environment content side by side as listing in the left (upper) part and as compiled text in the right (lower) part. This is a shortcut for setting /tcb/listing and text ~P.310 and /tcb/sidebyside ~P.116.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side text}
This is a \LaTeX\ example.
\end{tcblisting}

![This is a \LaTeX\ example. This is a \LATEX\ example.]

Note that sidebyside=false has to be added, if the setting of /tcb/listing side text is to be annihilated.

/tcb/text side listing  (style, no value)
Typesets the environment content side by side as compiled text in the left (upper) part and as listing in the right (lower) part. This is a shortcut for setting /tcb/text and listing ~P.310 and /tcb/sidebyside ~P.116.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text side listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example. This is a \LATEX\ example.

/tcb/listing outside text  (no value)
Typesets the environment content side by side as listing in a tcolorbox and as compiled text outside the box in the right part of the page. Nevertheless, the outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 116.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example. This is a \LATEX\ example.

/tcb/text outside listing  (no value)
Typesets the environment content side by side as listing in a tcolorbox and as compiled text outside the box in the left part of the page. Nevertheless, the outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 116.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text outside listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example. This is a \LATEX\ example.
/tcb/listing side comment
Typesets the environment content side by side as listing in the left (upper) part and a
given comment in the right (lower) part. This is a shortcut for setting /tcb/listing and
comment → P.314 and /tcb/sidebyside → P.116.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment,
righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment side listing,
leffhand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

/tcb/listing outside comment
Typesets the environment content side by side as listing in a \texttt{tcolorbox} and a given com-
ment outside the box in the right part of the page. Nevertheless, the outside text is treated
as lower part of the \texttt{tcolorbox} and can be formatted with all lower part options. The space
partitioning is done with the side by side options from Section 6 on page 116.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside comment,
righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment outside listing,
leffhand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}
/tcb/listing above text
Typesets the environment content as listing in a \texttt{tcolorbox} and as compiled text outside and below the box. The outside text is treated as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The distance between box and text is controlled by /tcb/middle \textsuperscript{P.43}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above text}
This is a \LaTeX\ example.
\end{tcblisting}
This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above text}
This is a \LaTeX\ example.
\end{tcblisting}

/tcb/listing above* text
Widely equal to /tcb/listing above text, but the outside text is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and text is controlled by /tcb/after \textsuperscript{P.78}.

/tcb/text above listing
Typesets the environment content as listing in a \texttt{tcolorbox} and as compiled text outside and above the box. The outside text is treated as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The distance between box and text is controlled by /tcb/middle \textsuperscript{P.43}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text above listing}
This is a \LaTeX\ example.
\end{tcblisting}
This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text above listing}
This is a \LaTeX\ example.
\end{tcblisting}

/tcb/text above* listing
Widely equal to /tcb/text above listing, but the outside text is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and text is controlled by /tcb/before \textsuperscript{P.78}.
/tcb/listing above comment

Typesets the environment content as listing in a tcolorbox and a given comment outside and below the box. The outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The distance between box and comment is controlled by /tcb/middle → P.43.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above comment, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

/tcb/listing above* comment

Widely equal to /tcb/listing above comment, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by /tcb/after → P.78.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment above listing, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

/tcb/comment above listing

Typesets the environment content as listing in a tcolorbox and a given comment outside and above the box. The outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The distance between box and comment is controlled by /tcb/middle → P.43.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment above listing, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

/tcb/comment above* listing

Widely equal to /tcb/comment above listing, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by /tcb/before → P.78.
15.7 Option Keys for Processing and Full Document Examples

A complete \LaTeX{} document including \texttt{documentclass}, \texttt{\begin{document}}, and \texttt{\end{document}} cannot be processed directly by \texttt{tcolorbox}. It always has to be compiled separately. There are two methods supported by the package to process and display such a full document example:

- Prepare and compile the example document independent from your main document. The source file and the resulting PDF file can be included into the main document afterwards. This is the most economic way since the example document can be left untouched after the example is complete.

- The other possibility is to compile the example on the fly while the main document is compiled. This way has some charm, because the example can be edited inside the main document. But be aware that the compilation of the example is issued on every run of the main document. Also, there are fewer degrees of freedom how the example is compiled.

For both methods, the resulting example PDF file can be included as a \texttt{/tcb/pdf comment} \footnote{P.312}. The following example shows how to apply the first method. There already is a file \texttt{tcolorbox-example.tex} and a PDF file \texttt{tcolorbox-example.pdf}. Both of them are input partly by the following:

```latex
\documentclass{article}
\usepackage{tikz,lipsum,lmodern}
\usepackage[most]{tcolorbox}
\begin{document}
%----------------------------------------------------------
\section{Colored boxes}
\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black]
My box.
\end{tcolorbox}
\begin{tcolorbox}[colback=blue!5!white,colframe=blue!75!black,title=My title]
My box with my title.
\end{tcolorbox}
\begin{tcolorbox}[colback=green!5!white,colframe=green!75!black]
Upper part of my box.
\end{tcolorbox}
```

\begin{Verbatim}
\% \tcbuselibrary{breakable,skins,raster}
\tcbinputlisting{
  enhanced jigsaw,breakable,pad at break*=2mm,height fixed for=first and middle,
  lower separated=false,
  leftlower=Opt,rightlower=Opt,middle=Opt,
  colframe=red!50!black,colback=yellow!10!white,
  listing and comment,
  listing file={tcolorbox-example},
  listing options={
    style=tcblatex,texcsstyle=\color{red!70!black},firstline=20,lastline=85},
  after upper=\par\bigskip\texttt{\ldots}\par,
  pdf comment,
  comment style={drop lifted shadow,graphics pages={1,...,4}},
}
\documentclass{article}
\usepackage{tikz,lipsum,lmodern}
\usepackage[most]{tcolorbox}
\begin{document}
%----------------------------------------------------------
\section{Colored boxes}
\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black]
My box.
\end{tcolorbox}
\begin{tcolorbox}[colback=blue!5!white,colframe=blue!75!black,title=My title]
My box with my title.
\end{tcolorbox}
\begin{tcolorbox}[colback=green!5!white,colframe=green!75!black]
Upper part of my box.
\end{tcolorbox}
```

319
Lower part of my box.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!5!white,colframe=yellow!50!black, colbacktitle=yellow!75!black,title=My title]
I can do this also with a title.
\tcblower
Lower part of my box.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!10!white,colframe=red!75!black,lowerbox=invisible, savelowerto=\jobname_ex.tex]
Now, we play hide and seek. Where is the lower part?
\tcblower
I'm invisible until you find me.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!10!white,colframe=red!75!black,title=Here I am]
\input{\jobname_ex.tex}
\end{tcolorbox}

\begin{tcolorbox}[enhanced,sharp corners=uphill, colback=blue!50!white,colframe=blue!25!black,coltext=yellow, fontupper=\Large\bfseries,arc=6mm,boxrule=2mm,boxsep=5mm, borderline={0.3mm}{0.3mm}{white}]
Funny settings.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,frame style image=blueshade.png, opacityback=0.75,opacitybacktitle=0.25, colback=blue!5!white,colframe=blue!75!black, title=My title]
This box is filled with an external image.\par
Title and interior are made partly transparent to show the image.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,attach boxed title to top center={yshift=-3mm,yshifttext=-1mm}, colback=blue!5!white,colframe=blue!75!black,colbacktitle=red!80!black, title=My title,fonttitle=\bfseries, boxed title style={size=small,colframe=red!50!black} ]
This box uses a \textit{boxed title}. The box of the title can be formatted independently from the main box.
\end{tcolorbox}

...
1 Colored boxes

My title

My box with an title.

I can also have a color.

I can also have another color.

I can also use a different font.

I can also try to be invisible.

I can also have a title with a picture.

Here, you see my nice box with a picture as a watermark.

This picture is automatically resized to fit the dimensions of my box.

This title can be formatted independently from the main box.

This box uses a boxed title.

The box of the title can be formatted independently from the main box.

I can also add text inside the box.

The text is automatically resized to fit the dimensions of my box.

Instead of a title, I can use an image.

This box has a border.

This box is filled with an artificial image.

2 IDPGX-Examples

This is a IDPGX example:

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}. \]

This is a IDPGX example:

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}. \]

3 Theorems

Theorem 3.1: Summation of Numbers

For all natural number \( n \) it holds:

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}. \]
/tcb/no process

Removes all processing commands if set before.

/tcb/process code=(code)

(no default, initially empty)

Adds \langle code \rangle which is executed during \texttt{\textbackslash inputlisting} and \texttt{\textbackslash listing}. At the time of executing the given \langle code \rangle, the listing is already written to \texttt{/tcb/listing}, but the colored box is not constructed yet. Its intended use is to process the listing somehow before displaying. The processing result can be used inside a \texttt{\textbackslash comment}. Several \texttt{\tcb/process code} options can be given which are processed in the given order. Typically, \langle code \rangle is added by using the following styles \texttt{\tcb/run system command}, \texttt{\tcb/run pdflatex}, etc.

To use the further options, the compiler has to be called with the \texttt{\textasciitilde shell-escape} permission to authorize potentially dangerous system calls. Be warned that this is a security risk.

Anyway, it’s more economic to compile examples independent from the main document and to include them as shown in the previous pages.

/tcb/run system command=(system command)

(style, no default, initially unset)

Runs a \langle system command \rangle, if the document is compiled with the \texttt{\textasciitilde shell-escape} permission. The current listing file can be accessed as \texttt{\jobname\@area\jobname\@base\jobname\@ext}. This \langle system command \rangle is added to \texttt{/tcb/process code}.

/tcb/compilable listing

(style, no default)

Sets \texttt{/tcb/listing \jobname\@listing\langle counter \rangle}. The default \texttt{/tcb/listing \jobname\@listing} setting cannot be used to compile a listing, since the base name equals the \jobname and the included PDF files should be unique. Therefore, to use \texttt{\textbackslash run pdflatex} etc., the \texttt{/tcb/listing \jobname\@listing} has to be set to a unique value. One may use \texttt{\tcb/compilable listing} for this purpose.

/tcb/run pdflatex=(arguments)

(style, no default, initially unset)

Issues a \texttt{pdflatex} compilation of the listing with the given \langle arguments \rangle.

- The main document has to be compiled with the \texttt{\textasciitilde shell-escape} permission.
- The \texttt{/tcb/listing} \jobname\@listing has to be unique for the listing.
- If the listing has to be compiled twice, add \texttt{run pdflatex} two times to the option list.

\begin{verbatim}
\documentclass{beamer}
\usetheme{Warsaw}
\begin{document}
\begin{frame}{Beamer example}
\begin{block}{Hello World}
\begin{itemize}[<+->]
\item One
\item Two
\end{itemize}
\end{block}
\begin{alertblock}{Integral}
\begin{equation}
\end{equation}
\end{alertblock}
\end{frame}
\end{document}
\end{verbatim}
\visible<3-{\int\limits_1^x \frac{1}{t}~dt} \visible<4-{ = \ln(x).} \end{equation} \end{alertblock} \end{frame} \end{document}
\begin{tcblisting}{enhanced jigsaw, 
title={PSTricks with pdflatex},fonttitle=\bfseries, 
colframe=red!50!black,colback=yellow!10!white, 
listing options={style=tcblatex,texcsstyle=\color{red!70!black}}, 
lower separated=false,middle=0pt, 
listing side comment,righthand width=4cm, 
compilable listing, 
run latex,run dvips,run ps2pdf, 
pdf comment,\freeze pdf, 
comment style={raster columns=1, 
graphics options={viewport=0.5in 7.7in 3.5in 10.5in,clip}}, 
}
\documentclass{article} 
\usepackage{pstricks,multido} 
\begin{document} 
\psset{unit=3} % 
\multido{\nHue=0.01+0.01}{100}{\pscircle{\nHue}} % 
\definecolor{MyColor}{hsb}{\nHue,1,1} % 
\pscircle[linewidth=0.01,linestyle=MyColor,\nHue} % 
\end{document} 
\end{tcblisting}

\documentclass{article} 
\usepackage{pstricks,multido} 
\begin{document} 
\psset{unit=3} % 
\multido{\nHue=0.01+0.01}{100}{\pscircle{\nHue}} % 
\definecolor{MyColor}{hsb}{\nHue,1,1} % 
\pscircle[linewidth=0.01,linestyle=MyColor,\nHue} % 
\end{document}
For most applications, you will like to add \texttt{/tcb/freeze pdf} as option, since the included pdf file is only refreshed, if the source for this file has changed.

\texttt{/tcb/freeze file=\{file\}} (no default, initially unset)

Observes some \{file\}, usually the final file produced by \texttt{/tcb/process code} \textsuperscript{P.322}, \texttt{/tcb/run system command} \textsuperscript{P.322}, \texttt{/tcb/run pdflatex} \textsuperscript{P.322}, etc. If the MD5 checksum of the current \texttt{/tcb/listing file} \textsuperscript{P.310} is unchanged and \{file\} exists, the processing is skipped and the \{file\} is kept (frozen). Typically, the style \texttt{/tcb/freeze pdf} can be used for convenience.

\texttt{/tcb/freeze none} (no default, initially set)

Freeze no file and always execute the given process commands.

\texttt{/tcb/freeze extension=\{text\}} (style, no default)

Calls \texttt{/tcb/freeze file} with the current \texttt{/tcb/listing file} \textsuperscript{P.310} stripped with its extension plus \{text\} as new extension.

```
... listing file=myfile.tex,
    freeze extension=-modified.pdf,  % -> myfile-modified.pdf is observed
...  
```

\texttt{/tcb/freeze pdf} (no value)

Calls \texttt{/tcb/freeze file} with the current \texttt{/tcb/listing file} \textsuperscript{P.310} stripped with its extension plus .pdf as new extension.

\texttt{/tcb/freeze png} (no value)

Calls \texttt{/tcb/freeze file} with the current \texttt{/tcb/listing file} \textsuperscript{P.310} stripped with its extension plus .png as new extension. See the examples for \texttt{/tcb/run pdflatex} \textsuperscript{P.322} and \texttt{/tcb/run ps2pdf} \textsuperscript{P.324}.

\texttt{/tcb/freeze jpg} (no value)

Calls \texttt{/tcb/freeze file} with the current \texttt{/tcb/listing file} \textsuperscript{P.310} stripped with its extension plus .jpg as new extension.
15.8 Creation of L\(\text{\LaTeX}\) Tutorials

The following source code gives a guideline for the creation of L\(\text{\LaTeX}\) tutorials. In the next section, a framework for L\(\text{\LaTeX}\) exercises is described. All examples shall be numbered optionally.

Firstly, some additional \texttt{tcb} keys are defined for the appearance. For the examples, three environments \texttt{texexp}, \texttt{texexptitled}, and \texttt{texexptitledspec} are defined with automatic numbering.

- \texttt{texexp} is used for untitled examples,
- \texttt{texexptitled} is used for titled examples,
- \texttt{texexptitledspec} is used for titled examples with special treatment.

Definition in the preamble:

\begin{verbatim}
\tcbset{
  \texexp/.style={colframe=red!50!yellow!50!black, colback=red!50!yellow!5!white, 
  coltitle=red!50!yellow!3!white, 
  fonttitle=\small\textbf, fontupper=\small, fontlower=\small}, 

example/.style 2 args={\texexp, 
  title={Example the\tcblnumber: #1},label={#2}}, 
}
\newtcblisting{\texexp}{1}{\texexp,#1}
\newtcblisting[auto counter,number within=section]{\texexptitled}{3}[][]{
  example={#2}{#3},#1}
\newtcolorbox[use counter from=\texexptitled]{\texexptitledspec}{3}[][]{
  example={#2}{#3},#1}
\end{verbatim}

\begin{tcblisting}{\textexp}
This is a \LaTeX\ example which displays the text as source code 
and in compiled form.
\end{tcblisting}

\begin{tcblisting}{\textexptitled}{First example with a title line}{firstExample}
Here, we use Example \ref{firstExample} with a title line.
\end{tcblisting}

\begin{tcblisting}{\textexptitledspec}{Example 15.1: First example with a title line}
Here, we use Example \ref{firstExample} with a title line.
\end{tcblisting}
This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.

Here, we see Example 15.2.
The keys can be used in combination. Here, an example with a heading line and source code only is given. Here, we see Example \ref{heading2}.

Example 15.3: Another Example with a Heading

The keys can be used in combination. Here, an example with a heading line and source code only is given. Here, we see Example 15.3.

Example 15.4: A floating Example with a Heading

This is another \LaTeX\ example with numbered heading line. But now, the box is a floating object.

The floating box of the last example is seen as Example \ref{heading3} on page \pageref{heading3}.

Example 15.5: Special application

Some \LaTeX\ source code. For special cases, the environment |texexptitledspec| with style |example| can be used directly. As one can see, the upper and the lower part of the box can be used uncoupled also.

The following series of examples demonstrate the application of \texttt{tcolorbox} \textsuperscript{P.12} options for diversification.
Example 15.6: How to use options (1):
The basic example

```latex
\begin{tikzpicture}
  \path[fill=yellow!50!white] (0,0) circle (11mm);
  \path[fill=white] (0,0) circle (9mm);
  \foreach \w/\c in {90/red,210/green,330/blue}
    {\path[shading=ball, ball color=\c \w:1cm] circle (7mm);}
\end{tikzpicture}
```

Example 15.7: How to use options (2):
The text output is centered and the segmentation line has vanished.

```latex
\begin{tikzpicture}
  \path[fill=yellow!50!white] (0,0) circle (11mm);
  \path[fill=white] (0,0) circle (9mm);
  \foreach \w/\c in {90/red,210/green,330/blue}
    {\path[shading=ball, ball color=\c \w:1cm] circle (7mm);}
\end{tikzpicture}
```
Example 15.8: How to use options (3):
Here, the \texttt{tikzpicture} is totally hidden. The \texttt{bicolor} skin highlights the output.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 15.9: How to use options (4):
The \texttt{bicolor} skin also works with side by side mode.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
Example 15.10: How to use options (5): Putting our picture outside is just a matter of one word.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 15.11: How to use options (6): The picture may also be put above the listing box.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}
Our style is easily transformed into a beamerish one.

\begin{tikzpicture}
\path [fill=yellow!50!white] (0,0) circle (11mm);
\path [fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path [shading=ball,ball color=\c]
  (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 15.12: How to use options (7):
Our style is easily transformed into a beamerish one.

\begin{tikzpicture}
\path [fill=yellow!50!white] (0,0) circle (11mm);
\path [fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path [shading=ball,ball color=\c]
  (\w:1cm) circle (7mm);}
\end{tikzpicture}
15.9 Creation of \LaTeX\ Exercises

In the following, a guideline is given for the creation of \LaTeX\ exercises with solutions. These solutions are saved to disk for application at a place of choice. Therefore, all used exercises are logged to a file \jobname\_records for automatic processing. The solution contents themselves are saved to a subdirectory named solutions. Also see Section 8 on page 128.

- Before the first exercise is given, \texttt{tcbstartrecording} has to be called to start recording.
- The solution is given as content of a \texttt{tcboutputlisting} environment. Note, that you can use this content also inside the exercise with \texttt{tcbuselistingtext} in compiled form.
- After the last exercise is given (and before using the solutions), \texttt{tcbstoprecording} has to be called to stop recording.
- The solutions are loaded by \texttt{tcbinputrecords}.

Inside the exercise text, there may be text parts which are needed as \LaTeX\ source code and as compiled text as well. These parts can be saved by \texttt{tcbwritetemp} and used in compiled form by \texttt{tcbusetemp} or as source code by \texttt{tcbusetemplisting}.

At first, we generate some a common style for the exercises and the solutions. Further, since exercises and solutions should be numbered, we force to use a label ⟨marker⟩. Automatically, the label \texttt{exe:⟨marker⟩} is used to mark the exercise and the label \texttt{sol:⟨marker⟩} is used to mark the solution.

```latex
\tcbset{texercisestyle/.style={arc=0.5mm, colframe=blue!25!yellow!90!white, colback=blue!25!yellow!5!white, coltitle=blue!25!yellow!40!black, fonttitle=\small\sffamily\bfseries, fontupper=\small, fontlower=\small, listing options={style=tcblatex,textcsstyle=*\color{red!40!black}},}}
```

With these preparations, the kernel environment \texttt{texercise} for our exercises is created quickly:

```latex
\newtcolorbox[auto counter,number within=section,list inside=exam]{texercise}[2][]{%
texercisestyle, listing file={solutions/texercise\thetcbcounter.tex}, label={exe:#2}, record={\string\processsol{solutions/texercise\thetcbcounter.tex}{#2}}, title={Exercise \thetcbcounter Solution on page \pageref{sol:#2}}, list text={Exercise with solution on page \pageref{sol:#2}},#1}
```

Definition in the preamble:

```latex
\newtcolorbox[auto counter,number within=section,list inside=exam]{texercise}[2][]{%
texercisestyle, listing file={solutions/texercise\thetcbcounter.tex}, label={exe:#2}, record={\string\processsol{solutions/texercise\thetcbcounter.tex}{#2}}, title={Exercise \thetcbcounter Solution on page \pageref{sol:#2}}, list text={Exercise with solution on page \pageref{sol:#2}},#1}
```
The following examples demonstrate the application.

```
\begin{exercise}{tabular_example}
\textit{Create the following table:}
\par\smallskip
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}
\hline
\multicolumn{4}{|c|}{\bfseries\itshape Das alte Italien} \\
\hline
\multicolumn{2}{|c|}{\bfseries\itshape Antike} & \multicolumn{2}{c|}{\bfseries\itshape Mittelalter} \\
\hline
\multicolumn{1}{|c|}{\itshape Republik} & \multicolumn{1}{c|}{\itshape Kaiserreich} & \multicolumn{1}{c|}{\itshape Franken} & \multicolumn{1}{c|}{\itshape Teilstaaten} \\
\hline
\end{tabular}
\end{exercise}
```

Exercise 15.1

Create the following table:

<table>
<thead>
<tr>
<th>Das alte Italien</th>
<th>Mittelalter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Republik</td>
<td>Kaiserreich</td>
</tr>
<tr>
<td>In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. &amp; Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. &amp; In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. &amp; Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten.</td>
<td></td>
</tr>
<tr>
<td>In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. &amp; Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. &amp; In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. &amp; Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten.</td>
<td></td>
</tr>
</tbody>
</table>
Exercise 15.2  Solution on page 337

Create a new macro \verb+\headingline+ which produces the following output:
\headingline{Very important heading}

Very important heading

Exercise 15.3  Solution on page 337

Create a new macro \verb+\minitable+ which produces the following output:
\minitable{My heading}{In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.}

\begin{tabular}{p{10cm}}
\hline
\multicolumn{1}{c}{\bfseries My heading}\\
\hline
\multicolumn{1}{c}{In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.}\n\hline
\end{tabular}
Exercise 15.4

Create a new macro \verb+\synop+ which typesets a synoptic text according to the following example. Base your macro on a tabular which takes the total line width.\par\smallskip

\synop{Neil Armstrong}{That's one small step for a man, one giant leap for mankind.}{Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit.}

\begin{tabular}{|p{0.5\textwidth}|p{0.5\textwidth}|}
\hline
\bfseries Neil Armstrong & \\
\hline
That's one small step for a man, one giant leap for mankind. & Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit. \\
\hline
\end{tabular}

Now, we give a list of all exercises with:

\tcblistof{subsection}{List of Exercises%}
\label{listofexercises}
15.11 Solutions for the given \LaTeX\ Exercises

For all solutions, a macro \texttt{\textbackslash processsol} was written to the file \texttt{\jobname.records}. Now, we need a definition for this macro to use the solutions.

\begin{verbatim}
% \usepackage{hyperref} % for phantomlabel
\newtcbinputlisting{\processsol}[2]{
  texercisestyle, listing only, listing file={#1},
  phantomlabel={sol:#2},
  title={Solution for Exercise \ref{exe:#2} on page \pageref{exe:#2}},
}
\end{verbatim}

The loading of all solutions is done by:

\texttt{\tcbinputrecords}

With this, we get:

\begin{table}[!h]
\centering
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}
\hline
\multicolumn{4}{|c|}{\bfseries\itshape Das alte Italien} \\
\hline
\multicolumn{2}{|c|}{\bfseries Antike} & \multicolumn{2}{c|}{\bfseries Mittelalter} \\
\hline
\multicolumn{1}{|c|}{\itshape Republik} & \multicolumn{1}{c|}{\itshape Kaiserreich} & \multicolumn{1}{c|}{\itshape Franken} & \multicolumn{1}{c|}{\itshape Teilstaaten} \\
\hline
In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. & Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. & In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. & Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten. \\
\hline
\end{tabular}
\end{table}

\begin{verbatim}
\newcommand{\headingline}[1]{
  \begin{center}\Large\bfseries #1\end{center}}
\end{verbatim}

\begin{verbatim}
\newcommand{\minitable}[2]{
  \begin{center}\begin{tabular}{p{10cm}}
\multicolumn{1}{c}{\bfseries#1} \\
#2
\end{tabular}\end{center}}
\end{verbatim}

\begin{verbatim}
\begin{center}\Large\bfseries #1\end{center}
\end{verbatim}

\begin{verbatim}
\begin{center}\begin{tabular}{p{10cm}}
\multicolumn{1}{c}{\bfseries#1} \\
#2
\end{tabular}\end{center}
\end{verbatim}
\newcommand{\synop}{% 
\begin{tabular}{@{}p{\linewidth-\tabcolsep*2-\arrayrulewidth}/2|} 
\multicolumn{2}{c}{\bfseries #1} \\
\multicolumn{1}{c|}{\itshape English} & \multicolumn{1}{c}{\itshape German} \\
\hline 
#2 & #3 \\
\hline 
\end{tabular}}

Solution for Exercise 15.4 on page 336

\synop{Solution for Exercise 15.4 on page 336}{
\begin{tabular}{@{}p{\linewidth-\tabcolsep*2-\arrayrulewidth}/2|} 
\multicolumn{2}{c}{\bfseries #1} \\
\multicolumn{1}{c|}{\itshape English} & \multicolumn{1}{c}{\itshape German} \\
\hline 
#2 & #3 \\
\hline 
\end{tabular}}
The library is loaded by a package option or inside the preamble by:
\cbuselibrary{theorems}

This also loads the package \texttt{amsmath}.

\subsection{Macros of the Library}

\begin{tcbtheorem}[number within=section]{mytheo}{My Theorem} %
\begin{mytheo}{This is my title}{theoexample}
This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with \ref{th:theoexample}, it is given on page \pageref{th:theoexample}, and it is titled «This is my title».
\end{mytheo}

My Theorem 16.1: This is my title

This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with 16.1, it is given on page 339, and it is titled «This is my title».

\begin{mytheo}[label=myownlabel]{This is my title}{}
The label parameter can be left empty without \LaTeX\ error. Or you may use an own label to reference Theorem \ref{myownlabel}.
\end{mytheo}

My Theorem 16.2: This is my title

The label parameter can be left empty without \BibTeX\ error. Or you may use an own label to reference Theorem 16.2.
\begin{mytheo}\{}\{}
\text{The title can also be left empty without problem. Note that the ':' vanished magically.}\n\end{mytheo}

My Theorem 16.3

The title can also be left empty without problem. Note that the ':' vanished magically.

\begin{mytheo*}{Unnumbered Theorem}
This theorem is not numbered.
\end{mytheo*}

My Theorem: Unnumbered Theorem

This theorem is not numbered.

\begin{mytheo*}\{}\{}
This theorem has no number and no title.
\end{mytheo*}

My Theorem

This theorem has no number and no title.

To switch off the nameref feature permanently, add \texttt{nameref/.style={}} inside the \texttt{⟨options⟩} list.

\renewtcbtheorem\{⟨init options⟩\}\{⟨name⟩\}\{⟨display name⟩\}\{⟨options⟩\}\{⟨prefix⟩\}

Operates like \texttt{newtcbtheorem P.339}, but based on \texttt{renewenvironment} instead of \texttt{newenvironment}. An existing environment is redefined.

\tcbmaketheorem\{⟨name⟩\}\{⟨display name⟩\}\{⟨options⟩\}\{⟨counter⟩\}\{⟨prefix⟩\}

\texttt{newtcbtheorem P.339} supersedes this macro.

Creates a new environment ⟨name⟩ based on \texttt{tcolorbox} to frame a (mathematical) theorem. The ⟨display name⟩ is used in the title line with a number, e.g. «Theorem 5.1». The ⟨options⟩ are given to the underlying \texttt{tcolorbox} to control the appearance. The ⟨counter⟩ is used for automatic numbering. The new environment ⟨name⟩ takes one optional and two mandatory parameters. The optional parameter supplements the options and should be used only in rare cases. The first mandatory parameter is the title text for the theorem and the second mandatory parameter is a ⟨marker⟩. The theorem is automatically labeled with ⟨prefix⟩⟨separator⟩⟨marker⟩ where ⟨separator⟩ is predefined as '::', see \texttt{/tcb/label separator P.346}.  

340
\tcbmath\{\textit{options}\}\{\textit{mathematical box content}\}

Creates a \texttt{tcolorbox} \footnote{P.12} which is fitted to the width of the given \textit{(mathematical box content)}. This box is intended to be applied as part of a larger formula and may be used as replacement for the \texttt{boxed} macro of \texttt{amsmath}.

\begin{equation}
\tcbset\{\text{fonttitle=\scriptsize}\}
\tcbmath\{\text{colback=LightBlue!25!white, colframe=blue}\}{ a^2 = 16 }
\quad \Rightarrow \quad
\tcbmath\{\text{colback=Salmon!25!white, colframe=red, title=Implication}\}
\quad\{ a = 4 \lor a = -4. \}
\end{equation}

\begin{align}
\tcbhighmath\{\text{\textit{options}}\}\{\text{\textit{mathematical box content}}\}
\tcbhighmath\{\text{\textit{options}}\}\{\text{\textit{mathematical box content}}\}
\end{align}

This is a special case of the \texttt{tcbmath} macro which uses the style \texttt{/tcb/highlight math} \footnote{P.349}. It is intended to provide context sensitive highlighting of formula parts. The color settings via \texttt{/tcb/highlight math style} \footnote{P.349} may be different inside theorems or other colored areas and outside.

\begin{align}
\tcbmath\{\text{myformula/.style=\{colback=yellow!10!white, colframe=red!50!black, every box/.style=\{colback=LightBlue!50!white, colframe=Navy\}\}}
\end{align}

\begin{tcolorbox} \[\texttt{ams align,myformula}\]
\tcbhighmath\{\texttt{\sum limits}_{n=1}^{\infty}\{\texttt{frac\{1\}}\{n\}\}\} &= \infty. \\
\int x^2 \ \text{d}x &= \frac13 x^3 + c.
\end{tcolorbox}

\begin{align}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \quad (4) \\
\int x^2 \ \text{d}x &= \frac13 x^3 + c. \quad (5)
\end{align}

\begin{align}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \quad (6) \\
\int x^2 \ \text{d}x &= \frac13 x^3 + c. \quad (7)
\end{align}
\texttt{\verb|\tcbhighmath|} can be used in symbiosis with the \texttt{empheq} package which allows to specify own boxing commands to mark multiline formulas.

\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\tcbset{highlight math style={enhanced, 
colframe=red!60!black,colback=yellow!50!white,arc=4pt,boxrule=1pt, 
drop fuzzy shadow}}

\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

Besides \texttt{\verb|\tcbhighmath|}, one can easily define an independent new box based on \texttt{\verb|\tcbbox|} which acts like \texttt{\verb|\tcbhighmath|}:

\begin{empheq}[box=\otherbox]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

% \usepackage{empheq}
\newtcbox{\otherbox}[1][]{nobeforeafter,math upper,tcbox raise base, 
  enhanced,frame hidden,boxrule=0pt,interior style={top color=green!10!white, 
  bottom color=green!10!white,middle color=green!50!yellow}, 
  fuzzy halo=1pt with green,#1}

\begin{empheq}[box=\otherbox]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\texttt{\verb|\tcbhighmath|} \texttt{\verb|E|} = \otherbox{mc^2}
## 16.2 Option Keys of the Library

### /tcb/separatort sign \( (sign) \)
(no default, initially \( : \))

The given \( (sign) \) is used inside the title text of a theorem as separator between display name combined with number and the specific title text. It is omitted, if there is no specific title text.

```latex
\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{
    colback=white,colframe=red!50!black,fonttitle=\bfseries,
    separator sign={\ $\blacktriangleright$}}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

Theorem 16.4 ▶ My example

My theorem text.

### /tcb/separatort sign colon
(style, no value, initially set)

Sets /tcb/separatort sign to the default colon \( : \) sign.

```
\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{
    colback=white,colframe=red!50!black,fonttitle=\bfseries,
    separator sign dash}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

Theorem 16.5 – My example

My theorem text.

### /tcb/separatort sign dash
(style, no value)

Sets /tcb/separatort sign to an en-dash sign.

```latex
\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{
    colback=white,colframe=red!50!black,fonttitle=\bfseries,
    separator sign none}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

Theorem 16.6 My example

My theorem text.

### /tcb/separatort sign none
(style, no value)

Sets /tcb/separatort sign to empty.
The given \langle left \rangle and \langle right \rangle delimiter signs are used to frame the descriptive title text of a theorem.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries, description delimiters={\flqq}{\frqq}}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 16.7: «My example»
My theorem text.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries, description delimiters parenthesis}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 16.8: (My example)
My theorem text.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries, description color=red!25!yellow}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 16.9: My example
My theorem text.
Sets \langle text \rangle (e.g. font settings) before the descriptive title text deviating from \texttt{/tcb/fonttitle}. The \langle text \rangle is removed, if \texttt{description font} is used without value.

\begin{tcbtheorem}
  \usecounter{mytheo}
  \sometheorem
  \begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}
  \begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}
  \setlength{\parindent}{0pt}
  \begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}
  Theorem 16.10: \textquote{My example}.
  My theorem text.
  \end{sometheorem}
  \end{sometheorem}
  \end{sometheorem}
  \end{sometheorem}
  \end{sometheorem}
  \end{sometheorem}
\end{tcbtheorem}

\begin{tcbtheorem}
  \usecounter{mytheo}
  \sometheorem
  \begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}
  \setlength{\parindent}{0pt}
  Theorem 16.11: \texttt{My example}.
  My theorem text.
  \end{sometheorem}
  \end{sometheorem}
  \end{sometheorem}
  \end{sometheorem}
  \end{sometheorem}
  \end{sometheorem}
\end{tcbtheorem}

The given \langle sign \rangle is used as terminator at the end of the title text of a theorem.
The given ⟨separator⟩ is used for labels created with environments which are defined themselves by \newtcbtheorem \P.339. This ⟨separator⟩ is put between ⟨prefix⟩ (defined by \newtcbtheorem \P.339) and ⟨marker⟩ (defined by an actual theorem environment).
The given \textit{(style)} is used in connection with labels created with environments which are defined themselves by \texttt{\newtcbtheorem}. This \textit{(style)} uses one argument which is automatically set to the full label marker of the environment, i.e. a text consisting of \textit{(prefix)} (defined by \texttt{\newtcbtheorem}), \texttt{/tcb/label separator}, and \textit{(marker)} (defined by an actual theorem environment).

\begin{alltt}
\verb|\tcbset{theorem full label supplement={hypertarget={#1}}}|\end{alltt}

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries}{theo}
\begin{sometheorem}{My example}{myex2}
My theorem text.
\end{sometheorem}
This automated \hyperlink{theo:myex2}{hyper target can be linked to with a hyper link}.

Theorem 16.16: My example

My theorem text.

This automated hyper target can be linked to with a hyper link.

A second usage of \texttt{/tcb/theorem full label supplement} overwrites the first setting.

\begin{alltt}
\verb|\tcbset{theorem label supplement={hypertarget={#1}}}|\end{alltt}

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,\textit{\texttt{\newtcbtheorem}}}{theo}
\begin{sometheorem}{My example}{myex3}
My theorem text.
\end{sometheorem}
This automated \hyperlink{XYZ-myex3}{hyper target can be linked to with a hyper link}.

Theorem 16.17: My example

My theorem text.

This automated hyper target can be linked to with a hyper link.
\textbf{Theorem 16.18: My example}

My theorem text.

\textbf{16.19 Theorem: My example}

My theorem text.

\textbf{Theorem: My example}

16.20

My theorem text.
This key is internally used by \texttt{\textbackslash tcbmaketheorem} \textsuperscript{P.340}, but can be used directly in a \texttt{tcolorbox} for a more flexible approach. The \texttt{(display name)} is used together with the increased \texttt{(counter)} value and the \texttt{(title)} for the title line of the box. Additionally, a \texttt{\textbackslash label} with the given \texttt{(marker)} is created.

\begin{tcolorbox}[colback=green!10,colframe=green!50!black,arc=4mm,\]
\begin{tcbmaketheorem}{Test}{texercise}{Direct usage}{myMarker}\]
Here, we see the test \texttt{\textbackslash ref{myMarker}}.\]
\end{tcolorbox}

Test 1: Direct usage
Here, we see the test 1.

For a common appearance inside the document, the key \texttt{\textit{theorem}} should not be used directly as in the example above, but as part of a new environment created by hand or using \texttt{\textbackslash tcbmaketheorem} \textsuperscript{P.340} or using its successor \texttt{\newtcbtheorem} \textsuperscript{P.339}.

\texttt{\textit{tcb/highlight math}} \textsuperscript{(style, no value)}
Predefined style which is used for \texttt{\textbackslash tcbhighmath} \textsuperscript{P.341}. It can be changed comfortably with \texttt{\textit{tcb/highlight math style}}.

\texttt{\textit{tcb/highlight math style}=(style definition)} \textsuperscript{(style, no default)}
Changes the definition for \texttt{\textit{tcb/highlight math}} to the given \texttt{(style definition)}. See \texttt{\textbackslash tcbhighmath} \textsuperscript{P.341} for another example.

\begin{align*}
\texttt{\textbackslash tcbhighmath}[\texttt{\textbackslash remember as=}fx\texttt{]}\{f(x)\}
&= \int\limits_{1}^{x} \frac{1}{t^2}~dt
= \left[ -\frac{1}{t} \right]_{1}^{x}
&= -\frac{1}{x} + \frac{1}{1}
&= 1 - \frac{1}{x}
\end{align*}
Sets the upper part to mathematical mode with font $\texttt{\textbackslash displaystyle}$.

Sets the lower part to mathematical mode with font $\texttt{\textbackslash displaystyle}$.

Sets the upper part and lower part to mathematical mode with font $\texttt{\textbackslash displaystyle}$.

```
\begin{tcolorbox}[math,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
```

∞ \sum_{n=1}^{\infty} \frac{1}{n} = \infty.

The following styles are only tested to work with the original \texttt{amsmath} environments. If e.g. the \texttt{equation} environment is redefined as \texttt{gather}, then \texttt{/tcb/ams equation} should / could not be used. Obviously, you are encouraged to use \texttt{/tcb/ams gather} ^P.352 in this case.

```
\begin{tcolorbox}[ams equation,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
```

```
\begin{tcolorbox}[ams equation*,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
```

∞ \sum_{n=1}^{\infty} \frac{1}{n} = \infty.

```
\begin{tcolorbox}[ams equation*,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
```

∞ \sum_{n=1}^{\infty} \frac{1}{n} = \infty.
\begin{tcolorbox}[ams align,colback=yellow!10!white,colframe=red!50!black]
\[\sum_{n=1}^{\infty} \frac{1}{n} = \infty.\]
\[\int x^2 \, dx = \frac{1}{3} x^3 + c.\]
\end{tcolorbox}

\begin{tcolorbox}[ams align*,colback=yellow!10!white,colframe=red!50!black]
\[\sum_{n=1}^{\infty} \frac{1}{n} = \infty.\] (16)
\[\int x^2 \, dx = \frac{1}{3} x^3 + c.\] (17)
\end{tcolorbox}
/tcb/ams gather upper  (style, no value)
  Adds an amsmath gather environment to the start and end of the upper part.

/tcb/ams gather lower  (style, no value)
  Adds an amsmath gather environment to the start and end of the lower part.

/tcb/ams gather  (style, no value)
  Adds an amsmath gather environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams gather,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^\infty \frac{1}{n} = \infty.\\\quad (18)
\int x^2 ~\text{d}x = \frac13 x^3 + c.\\\quad (19)
\end{tcolorbox}

/tcb/ams gather* upper  (style, no value)
  Adds an amsmath gather* environment to the start and end of the upper part.

/tcb/ams gather* lower  (style, no value)
  Adds an amsmath gather* environment to the start and end of the lower part.

/tcb/ams gather*  (style, no value)
  Adds an amsmath gather* environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams gather*,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^\infty \frac{1}{n} = \infty.
\int x^2 \,dx = \frac{1}{3} x^3 + c.
\end{tcolorbox}
Neutralizes the \abovedisplayskip of a following align or gather environment for the upper part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following align or gather environment for the lower part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following align or gather environment for the upper part and lower part. Note that the text content has to start with such a formula.

\begin{tcolorbox}[ams nodisplayskip,colback=yellow!10!white,colframe=red!50!black]
\begin{align}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{align}
\end{tcolorbox}

And now for something completely different.

New colored mathematical environments are easily created using \newtcolorbox^{P.15}:

\begin{tcolorbox}
\begin{mymath}[ams gather*,colback=yellow!10!white,colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{mymath}
\end{tcolorbox}

\begin{tcolorbox}
\begin{mymath}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{mymath}
\end{tcolorbox}

All described options like /tcb/ams gather upper^{P.352}, /tcb/ams gather lower^{P.352}, /tcb/ams gather^{P.352} are (partially) setting (overwriting) the keys /tcb/before upper^{P.65}, /tcb/after upper^{P.65}, /tcb/before lower^{P.66}, /tcb/after lower^{P.66}. Therefore, e.g. \tcbset{ams gather,before upper={\text{Pythagoras:}}} produces an invalid result. For this case, you are invited to use \tcbset{ams gather,before upper app={\text{Pythagoras:}}}, see /tcb/before upper app^{P.423}.

353
/tcb/theorem style=(name) \hspace{1cm} (no default, initially standard)
Applies a predefined style \texttt{(name)} to the theorem environment. Some of the feasible \texttt{(name)} values resemble style names from the packages \texttt{theorem} and \texttt{ntheorem} to give convenient access to known patterns.

The styles alter /tcb/separater sign \textsuperscript{P.343}, /tcb/description delimiters \textsuperscript{P.344}, /tcb/terminator sign \textsuperscript{P.345}, and more. Therefore, one should apply such keys after a theorem style.

For the following examples, we use:

\begin{verbatim}
\newtcbtheorem[use counter from=mytheo]{theorem}{Theorem}{%
  fonttitle=\bfseries\upshape,fontupper=\itshape,
  colframe=green!50!black,colback=green!10!white,
  colbacktitle=green!20!white,coltitle=blue!75!black}{theo}
\end{verbatim}

The predefined styles are:

- \texttt{standard}: This is the initial value.

\begin{verbatim}
\begin{theorem}[theorem style=standard]{standard}{
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}
\end{verbatim}

16.21 Theorem: standard
This is my theorem.
\[ a^2 + b^2 = c^2. \]

- \texttt{change standard}

\begin{verbatim}
\begin{theorem}[theorem style=change standard]{change standard}{
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}
\end{verbatim}

16.22 Theorem: change standard
This is my theorem.
\[ a^2 + b^2 = c^2. \]

- \texttt{plain}

\begin{verbatim}
\begin{theorem}[theorem style=plain]{plain}{
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}
\end{verbatim}

Theorem 16.23 (plain): This is my theorem.
\[ a^2 + b^2 = c^2. \]
\begin{theorem}[theorem style=break]{break}{\break}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

Theorem 16.24 (break):
This is my theorem.
\[ a^2 + b^2 = c^2. \]

\begin{theorem}[theorem style=plain apart]{plain apart}{\plain apart}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

Theorem 16.25 (plain apart)
This is my theorem.
\[ a^2 + b^2 = c^2. \]

\begin{theorem}[theorem style=change]{change}{\change}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

16.26 Theorem (change): This is my theorem.
\[ a^2 + b^2 = c^2. \]

\begin{theorem}[theorem style=change break]{change break}{\change break}\break
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

16.27 Theorem (change break):
This is my theorem.
\[ a^2 + b^2 = c^2. \]

\begin{theorem}[theorem style=change apart]{change apart}{\change apart}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

16.28 Theorem (change apart)
This is my theorem.
\[ a^2 + b^2 = c^2. \]
• **margin**

\begin{theorem}[theorem style=margin,left=10mm]{margin}\}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

\begin{theorem}[theorem style=margin,left=10mm,oversize]{margin}\}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

16.29 Theorem (margin): This is my theorem. 
\[ a^2 + b^2 = c^2. \]

16.30 Theorem (margin): This is my theorem. 
\[ a^2 + b^2 = c^2. \]

• **margin break**

\begin{theorem}[theorem style=margin break,left=10mm]{margin break}\}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

\begin{theorem}[theorem style=margin break,left=10mm,oversize]{margin break}\}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

16.31 Theorem (margin break): 
This is my theorem. 
\[ a^2 + b^2 = c^2. \]

16.32 Theorem (margin break): 
This is my theorem. 
\[ a^2 + b^2 = c^2. \]

• **margin apart**

\begin{theorem}[theorem style=margin apart,left=10mm]{margin apart}\}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

\begin{theorem}[theorem style=margin apart,left=10mm,oversize]{margin apart}\}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

16.33 Theorem (margin apart) 
This is my theorem. 
\[ a^2 + b^2 = c^2. \]

16.34 Theorem (margin apart) 
This is my theorem. 
\[ a^2 + b^2 = c^2. \]
16.3 Examples for Definitions and Theorems

In the following, the application of \texttt{tcbmaketheorem}\textsuperscript{P.340} to highlight mathematical definitions, theorems, or the like is demonstrated.

At first, additional \texttt{tcb} keys are created for the appearance of the colored boxes. It is assumed that theorems and corollaries should be identically colored. All following environments are numbered with a common counter, but this can be changed easily. Here, the counter output is supplemented by the subsection number. Further, the \texttt{cleveref} package \textsuperscript{[5]} is used for clever references.

\begin{tcolorbox}
\textit{Definition in the preamble:}

\begin{verbatim}
% \usepackage{cleveref}
\tcbset{
  defstyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape,
  arc=0mm, colback=blue!5!white,colframe=blue!75!black},
  theostyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape,
  colback=red!10!white,colframe=red!75!black},
}
\newtcbtheorem[number within=subsection,crefname={definition}{definitions}]{defstyle}{def}
\newtcbtheorem[use counter from=Definition,crefname={theorem}{theorems}]{theostyle}{theo}
\newtcbtheorem[use counter from=Definition,crefname={corollary}{corollaries}]{theostyle}{cor}
\end{verbatim}
\end{tcolorbox}

By \texttt{\newtcbtheorem}\textsuperscript{P.339}, commonly numbered theorem environments are created now. \texttt{defstyle} and \texttt{theostyle} are used for the appearance.

Now, everything is prepared for the following examples.

\begin{tcolorbox}
The following theorem is numbered as \texttt{\Cref{theo:diffbarstetig}} and referenced with the marker \texttt{theo:diffbarstetig}.

\begin{Theorem}{Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist}{diffbarstetig}
Eine Funktion $f:I\to\mathbb{R}$ ist in $x_0\in I$ stetig, wenn $f$ in $x_0$ differenzierbar ist.
\end{Theorem}

The following theorem is numbered as Theorem 16.3.1 and referenced with the marker \texttt{theo:diffbarstetig}.

\begin{tcolorbox}
\textbf{Theorem 16.3.1: Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist}

Eine Funktion $f:I\to\mathbb{R}$ ist in $x_0\in I$ stetig, wenn $f$ in $x_0$ differenzierbar ist.
\end{tcolorbox}

357
The following definition is numbered as \Cref{def:diffbarkeit} and referenced with the marker \texttt{def:diffbarkeit}.

\begin{Definition}{Differenzierbarkeit}{diffbarkeit}
Eine Funktion $f:~I\to\mathbb{R}$ auf einem Intervall $I$ hei\ss{}t in $x_0\in I$ differenzierbar oder linear approximierbar, wenn der Grenzwert
\begin{equation*}
\lim\limits_{x\to x_0}\frac{f(x)-f(x_0)}{x-x_0} = \lim\limits_{h\to 0}\frac{f(x_0+h)-f(x_0)}{h}
\end{equation*}
existiert. Bei Existenz heißt dieser Grenzwert Ableitung oder Differentialquotient von $f$ in $x_0$ und man schreibt f"{u}r ihn
\begin{equation*}
f'(x_0)\quad\text{oder}\quad\frac{df}{dx}(x_0).
\end{equation*}
\end{Definition}

The following corollary is numbered as \Cref{cor:nullstellen} and referenced with the marker \texttt{cor:nullstellen}.

\begin{Corollary}{Nullstellenexistenz}{nullstellen}
Ist $f: [a,b]\to\mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte Vorzeichen, also $f(a)f(b)<0$, so besitzt $f$ eine Nullstelle $x_0\in(a,b)$.
\end{Corollary}

The following corollary is numbered as Corollary 16.3.3 and referenced with the marker \texttt{cor:nullstellen}.

\begin{Corollary}{Nullstellenexistenz}{nullstellen}
Ist $f: [a,b] \to \mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte Vorzeichen, also $f(a)f(b)<0$, so besitzt $f$ eine Nullstelle $x_0\in(a,b)$.
\end{Corollary}
Hinreichende Bedingung für Wendepunkte

$f$ sei eine auf einem Intervall $[a,b]$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0) = 0$ in $x_0 \in [a,b]$ und $f'''(x_0) \neq 0$, so ist $(x_0,f(x_0))$ ein Wendepunkt von $f$.

Theorem 16.3.4: Hinreichende Bedingung für Wendepunkte

$f$ sei eine auf einem Intervall $[a,b]$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0) = 0$ in $x_0 \in [a,b]$ und $f'''(x_0) \neq 0$, so ist $(x_0,f(x_0))$ ein Wendepunkt von $f$.

Theorem 16.3.5 (Mittelwertsatz für $n$ Variable)

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subset D$ einen Punkt $\xi \in [x_0,x]$ so dass gilt

\[ f(x) - f(x_0) = \langle \nabla f(\xi), x-x_0 \rangle \]

Here, \texttt{cleveref} support is used to reference \texttt{Theorem 16.3.5} on Page 359. This theorem can also be referenced by \texttt{Vref} resulting in Theorem 16.3.5.

Note that \texttt{/tcb/label type P.98} was used in the example above to feed \texttt{cleveref} [5] with the needed name information.
Here, using \texttt{\Vref} resulting in \texttt{\Vref{theo:meanvaluetheorem}} is more interesting…

Here, using \texttt{\Vref} resulting in Theorem 16.3.5 on the preceding page is more interesting...

\begin{YetAnotherTheorem}{Mittelwertsatz für \(n\) Variable}{mittelwertsatz_n2}
Es sei \(n\in\mathbb{N}\), \(D\subseteq\mathbb{R}^n\) eine offene Menge und \(f\in C^1(D,\mathbb{R})\). Dann gibt es auf jeder Strecke \([x_0,x]\subset D\) einen Punkt \(\xi\in[x_0,x]\), so dass gilt
\[
  f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top(x-x_0)
\]
\end{YetAnotherTheorem}

16.3.6 Theorem (Mittelwertsatz für \(n\) Variable)

Es sei \(n \in \mathbb{N}\), \(D \subseteq \mathbb{R}^n\) eine offene Menge und \(f \in C^1(D,\mathbb{R})\). Dann gibt es auf jeder Strecke \([x_0,x] \subset D\) einen Punkt \(\xi \in [x_0,x]\), so dass gilt
\[
f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top(x-x_0)
\]

\begin{YetAnotherTheorem}{Mittelwertsatz für \(n\) Variable}{mittelwertsatz_n3}
Es sei \(n \in \mathbb{N}\), \(D \subseteq \mathbb{R}^n\) eine offene Menge und \(f \in C^1(D,\mathbb{R})\). Dann gibt es auf jeder Strecke \([x_0,x] \subset D\) einen Punkt \(\xi \in [x_0,x]\), so dass gilt
\[
f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top(x-x_0)
\]
\end{YetAnotherTheorem}

Theorem 16.3.7: Mittelwertsatz für \(n\) Variable

Es sei \(n \in \mathbb{N}\), \(D \subseteq \mathbb{R}^n\) eine offene Menge und \(f \in C^1(D,\mathbb{R})\). Dann gibt es auf jeder Strecke \([x_0,x] \subset D\) einen Punkt \(\xi \in [x_0,x]\), so dass gilt
\[
f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top(x-x_0)
\]
You need more attention for your theorems? Here, you are ...

Theorem 16.3.8: Fundamental Theorem of Theorems


Let’s try a more conservative approach:

Theorem 16.3.9 (Mittelwertsatz für $n$ Variable): Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0, x] \subset D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt

$$f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x - x_0)$$
16.4 Using other theorem environments with tcolorbox

Instead of creating theorem environments with the methods described before, environments from other packages can be boxed with a tcolorbox.

Environments may be created e.g. by methods from the \texttt{theorem} package or the \texttt{amsthm} package. \texttt{\tcolorboxenvironment} \texttt{P.17} can be used to put a box around these environments.

\begin{tcolorbox}
\begin{verbatim}
\usepackage{amsthm}

\newcommand*{\example}[1]{\texttt{#1}}

\begin{example}
\begin{lem}
\lipsum[2]
\end{lem}
\lipsum[3]
\begin{proof}
\lipsum*[4]
\end{proof}
\end{example}
\end{verbatim}
\end{tcolorbox}


The library is loaded by a package option or inside the preamble by:

\tcbuselib{breakable}

### 17.1 Technical Overview

The library supports the automatic breaking of a `tcolorbox`. This feature is enabled by `/tcb/breakable` and disabled by `/tcb/unbreakable`.

If a `tcolorbox` is set to be `/tcb/breakable`, then the following algorithm is executed:

1. The box content is read to a box register similar but not identical to the unbreakable case.
2. If the total box fits into the current page, it is shipped out visibly unbroken and the algorithm stops.
3. Otherwise, it is checked if at least `/tcb/lines before break` of the upper box can be placed on the current page. If not, a page break is inserted and the algorithm goes back to Step 2.
4. Now, the break sequence starts. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named first part of the break sequence and shipped out.
5. If the remaining content of the total box fits into the current page, the algorithm continues with Step 7, else with Step 6.
6. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named middle part of the break sequence and shipped out. Then, the algorithm goes back to Step 5.
7. The remaining part is named last part of the break sequence and shipped out. The algorithm stops.

The algorithm takes care that the optional segmentation line never appears at the end of a box. The optional lower box part is also checked to have at least `/tcb/lines before break`.
In principle, all boxes of the \textit{break sequence} share the same geometric parameters. The differences are:

- The given /tcb/before $^\text{P.78}$ and /tcb/after $^\text{P.78}$ values are used only before the \textit{first} and after the \textit{last} part of the \textit{break sequence}.

- A special behavior between the parts of the \textit{break sequence} can be given by /tcb/toprule \textit{at break} $^\text{P.369}$, /tcb/bottomrule \textit{at break} $^\text{P.369}$, /tcb/enlarge top \textit{at break} $^\text{P.83}$, and /tcb/enlarge bottom \textit{at break} $^\text{P.83}$.

- The /tcb/skin $^\text{P.134}$ decides how the \textit{first}, \textit{middle}, and \textit{last} part look like. Actually, every part type has its own skin given by the options /tcb/skin first $^\text{P.134}$, /tcb/skin middle $^\text{P.134}$, and /tcb/skin last $^\text{P.134}$. Typically, these options are set automatically by the main skin, see Subsection 17.8 from page 377.

17.2 Limitations and Known Bugs

- The maximal total height of the upper and of the lower part of normal breakable \texttt{tcolorbox}es is about 65536pt (ca. 2300cm) apiece. If such a part gets longer, the output will get buggy without warning. For very oversized boxes which are longer than 65536pt, use the \texttt{unlimited} value for /tcb/breakable $^\text{P.365}$. With the \texttt{unlimited} setting, the applied algorithm has (virtually) no height limit for boxes, but very likely the compiler memory will have to be increased for boxes longer than 300 pages (depending on compiler settings and box content). But it is recommended to use \texttt{unlimited} for critical large boxes only.

- You can nest an unbreakable \texttt{tcolorbox} inside another \texttt{tcolorbox}, even inside a breakable one. But you cannot nest a breakable box inside a breakable box. The /tcb/breakable $^\text{P.365}$ key for a nested box is ignored automatically$^3$, i.e. inner boxes are always unbreakable.

After all, in the unlikely case you really want to have the nested box to be breakable, use /tcb/enforce breakable $^\text{P.366}$ for the nested box$^4$. \textbf{But, a breakable box inside a breakable box will usually give a mess.}

- If your text content contains some text color changing commands, your color will not survive the break to the next box. But, with the \texttt{fontspec} package and \texttt{xelatex} or \texttt{lualatex}, you can use \texttt{\addfontfeatures{Color=mycolor}} to add a font color which survives the break.

- The \texttt{perpage} option of the \texttt{footmisc} package is deliberately deactivated inside a breakable box since all footnotes are placed at the end of the box (possibly far away from the reference point).

- Making a box /tcb/breakable $^\text{P.365}$ which actually is not broken creates a box which acts \textit{almost} like an unbreakable box. Visual differences are kept as indiscernible as possible, but can appear with certain /tcb/before $^\text{P.78}$ and /tcb/after $^\text{P.78}$ settings, especially, if there is an automatic page break before the box.

- Lua\TeX\ version 0.95 changes the behaviour of the basic \texttt{\vsplit} (a bug?!?) resulting in badly broken boxes. Thanks to Jeremy Engel, the \texttt{breakable} library contains a patch for this which also loads the the \texttt{ifluatex} package.

---

$^3$Until \texttt{tcolorbox 3.04}, the /tcb/breakable $^\text{P.365}$ key was not ignored for nested boxes.

$^4$/tcb/enforce breakable $^\text{P.366}$ acts like /tcb/breakable $^\text{P.365}$ until \texttt{tcolorbox 3.04}. 

364
17.3 Main Option Keys

allows the \texttt{tcolorbox} to be breakable. If the box is larger than the available space at the current page, the box is automatically broken and continued to the next next page. All sorts of \texttt{tcolorbox} can be made breakable. It depends on the skin how the breaking looks like. If you do not know better, use \texttt{/tcb/enhanced} for breaking a box. The parts of the \texttt{break sequence} are numbered by the counter \texttt{tcbbreakpart}.

- \texttt{false}: Sets the \texttt{tcolorbox} to be unbreakable.
- \texttt{true}: Breaks the \texttt{tcolorbox} from one page to another. The maximal total height of the upper and of the lower part is about 65536pt (ca. 2300cm or ca. 90 pages) apiece.
- \texttt{unlimited}: Experimental code for unlimited total height of breakable boxes. For boxes longer than 300 pages (or even shorter ones) the compiler memory will have to be increased.

\begin{tcolorbox}[breakable,title=My breakable box]
\lipsum[1-6]
\end{tcolorbox}


/tcb/unbreakable
Sets the tcolorbox to be unbreakable.

/tcb/enforce breakable
A tcolorbox inside a tcolorbox is automatically set to be unbreakable. Using \tcb/breakable\footnote{P.365} on such an inner box has no effect. If one really wants the inner box to be breakable, use /tcb/enforce breakable. This will usually give a mess of shattered boxes. You are advised to not use this option.

Note that /tcb/enforce breakable has the functionality that /tcb/breakable\footnote{P.365} had until package version 3.04 and exists for backward compatibility.

/tcb/title after break=⟨text⟩
(no default, initially empty)
The /tcb/title\footnote{P.18} is used only for the first part of a break sequence. Use title after break to create a heading line with ⟨text⟩ as content for all following parts.

/tcb/notitle after break
(no value, initially set)
Removes the title line or following parts in a break sequence if set before.

/tcb/adjusted title after break=⟨text⟩
(style, no default, initially unset)
Works like /tcb/adjusted title\footnote{P.18} but applied to /tcb/title after break.

/tcb/lines before break=⟨number⟩
(no default, initially 2)
Assures that the given ⟨number⟩ of lines of the upper box part or the lower box part are placed before a break happens.
 Defines break points at the given \(<|length|>\) values. The first \(<|length|>_1\) defines the (maximal) height of the first partial box, the second \(<|length|>_2\) defines the (maximal) height of the second partial box, and so on. The last \(<|length|>_n\) value is applied to all following partial boxes if any.

- Setting a \(<|length|>\) to \(0pt\) means that the naturally available space is used for breaking.
- Setting a \(<|length|>\) to a negative value means that the sum of this negative value and the naturally available space is used for breaking (boxes will shrink in height). That is, before version 4.10 negative values were treated like \(0pt\).

\begin{tcolorbox}[enhanced jigsaw, size=small, vfill before first, colframe=red, colback=yellow!10!white, before title=\raggedright, title=\textcolor{red}{\textbf{Broken box inside a |multicols| environment}}, fonttitle=\textbf{\bfseries}, enforce breakable, \% use only breakable in the real world! pad at break=1mm, break at=3cm/6.3cm ]
\lipsum[1]
\end{tcolorbox}

\refKey /tcb/height fixed for may also be considered for |multicols| environments.
\end{multicols}

If an automated page break occurs before the first partial box, the page enlargement is applied to the page before the first partial box \emph{and} again to the page of the first partial box. Insert a manual break to prevent this.

In general, \texttt{enlargepage} should be used at the final stage of a document for fine-tuning only.
/tcb/enlargepage flexible={length}  (no default, initially 0pt)
This allows an automated page enlargement for up to \langle \textit{length} \rangle. The algorithm can use this to avoid breaking a box, if there is enough room after enlargement. Also, the \textit{last} partial box of a break sequence may be enlarged to avoid further breaking.
Note that this potential enlargement is \textit{additive} to settings of /tcb/enlargepage \textsuperscript{\textsuperscript{P.367}}. But /tcb/enlargepage flexible overwrites settings of /tcb/pad before break* \textsuperscript{\textsuperscript{P.369}} or /tcb/pad at break* \textsuperscript{\textsuperscript{P.369}}.

\begin{quote}
\% The following setting hinders orphan lines for the last partial box  
\texttt{\textbackslash tcbset\{enlargepage flexible=\textbackslash baselineskip\}}
\end{quote}

\texttt{Tcb/compress page=(option)}  (default all, initially baselineskip)
This option controls the space management on the page which contains the unbroken box or the first part of a break sequence. Feasible \textit{(option)} values are:
\begin{itemize}
\item \texttt{all} (default value): All shrinkable glue on the page is potentially used for the unbroken box or the first part of a break sequence. Thus, all vertical spaces on the page will potentially be reduced to their minimal values.
\item \texttt{baselineskip} (initial value): Shrinkable glue up to one \texttt{\textbackslash baselineskip} on the page is potentially used for the unbroken box or the first part of a break sequence.
\item \texttt{none}: The break algorithm respects the target size of the given glue values on the page. This was the initial value before version 3.34.
\end{itemize}
\begin{quote}
\texttt{Note that the box \textit{content} is not influenced by this option.}
\end{quote}

\texttt{Tcb/shrink break goal=(length)}  (no default, initially 0pt)
This is an emergency parameter if the break algorithm produces unpleasant breaks. It shrinks the goal height of the current box part by \langle \textit{length} \rangle which may result in smaller boxes. Never use negative values. \textit{Usually, this option will never be needed at all.}
17.4 Option Keys for the Break Appearance

\texttt{/tcb/toprule at break=(length)} \hspace{2cm} \text{(no default, initially 0.5mm)}
Sets the line width of the top rule to \textit{(length)} if the box is /tcb/breakable. In this case, it is applied to \textit{middle} and \textit{last} parts in a break sequence. Note that /tcb/toprule \textsupscript{P.35} overwrites this value if used afterwards.

\texttt{/tcb/bottomrule at break=(length)} \hspace{2cm} \text{(no default, initially 0.5mm)}
Sets the line width of the bottom rule to \textit{(length)} if the box is /tcb/breakable. In this case, it is applied to \textit{first} and \textit{middle} parts in a break sequence. Note that /tcb/bottomrule \textsupscript{P.35} overwrites this value if used afterwards.

\texttt{/tcb/topsep at break=(length)} \hspace{2cm} \text{(no default, initially 0mm)}
Additional vertical space of \textit{(length)} which is added at the top of \textit{middle} and \textit{last} parts in a break sequence. In general, it is not advisable to change this value if these parts start with a rule or a title.

\texttt{/tcb/bottomsep at break=(length)} \hspace{2cm} \text{(no default, initially 0mm)}
Additional vertical space of \textit{(length)} which is added at the bottom of \textit{first} and \textit{middle} parts in a break sequence. In general, it is not advisable to change this value if these parts end with a rule.

\texttt{/tcb/pad before break=(length)} \hspace{2cm} \text{(style, no default, initially 3.5mm)}
Sets the total amount of vertical space after the text content and before the break point to \textit{(length)}. This style sets /tcb/toprule at break to 0pt and changes /tcb/topsep at break as required. In general, it is not advisable to change this value if the \textit{middle} and \textit{last} parts in a break sequence start with a rule or a title.

\texttt{/tcb/pad before break*=length} \hspace{2cm} \text{(style, no default)}
Sets /tcb/pad before break to \textit{(length)} and /tcb/enlargepage flexible \textsuperscript{P.368} to an appropriate value such that empty closing frames are avoided.

\texttt{/tcb/pad after break=(length)} \hspace{2cm} \text{(style, no default, initially 3.5mm)}
Sets the total amount of vertical space after the break point and before the text content to \textit{(length)}. This style sets /tcb/bottomrule at break to 0pt and changes /tcb/bottomsep at break as required. In general, it is not advisable to change this value if the \textit{first} and \textit{middle} parts in a break sequence end with a rule.

\texttt{/tcb/pad at break=(length)} \hspace{2cm} \text{(style, no default, initially 3.5mm)}
Abbreviation for setting \textit{(length)} to /tcb/pad before break and /tcb/pad after break.

\texttt{/tcb/pad at break*=length} \hspace{2cm} \text{(style, no default)}
Sets /tcb/pad at break to \textit{(length)} and /tcb/enlargepage flexible \textsuperscript{P.368} to an appropriate value such that empty closing frames are avoided.

\begin{verbatim}
% \usepackage{lipsum} \% preamble
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=bfseries}
\begin{tcolorbox}[enhanced jigsaw,breakable,pad at break*=0mm,
  title={For this box, the pad space at the break point is set to 0mm}]
\lipsum[1-2]
\end{tcolorbox}
\end{verbatim}

\textbf{For this box, the pad space at the break point is set to 0mm}


/tcb/pad at break\*P.369 or /tcb/pad at break*P.369 should be used as very last option in an option list, because they adapt other settings.

Also see /tcb/enlarge top at break by*P.83 and /tcb/enlarge bottom at break by*P.83.

/tcb/height fixed for=(part) (no default, initially none)

When certain amount of space is available for a partial box of a break sequence, the partial box typically is smaller than this space (depending on the box content). For given (part)(s), the height can be set to all available space.

- **none**: Every partial tcolorbox is set with its natural height.
- **first**: The first partial box is set to a height which matches the available space.
- **middle**: All middle partial boxes are set to a height which matches the available space.
- **last**: The last partial box is set to a height which matches the available space.
- **first and middle**: The first and all middle partial boxes are set to a height which matches the available space.
- **middle and last**: All middle partial boxes and the last partial box are set to a height which matches the available space.
- **all**: All partial boxes are set to a height which matches the available space.

If the box keeps unbroken, this option is not applied. See /tcb/height*P.53 for setting a fixed height for unbroken boxes. See /tcb/height fill*P.56 for giving unbroken boxes maximum height.

/tcb/vfill before first=true|false (default true, initially false)

Inserts a \vfill at the begin of the first partial box to move this partial box to the end of the current page. This may be used as an alternative to /tcb/height fixed for=first to get justified columns or pages. The \vfill is not inserted, if the box gets not actually broken.

/tcb/segmentation at break=true|false (default true, initially true)

If a breakable box contains an upper part and a lower part and the break happens at the segmentation between both parts, then

- the segmentation line (or similar) is drawn as first element of the partial box containing the lower part, if /tcb/segmentation at break is set to be true.
- the segmentation line (or similar) is not drawn at all, if /tcb/segmentation at break is set to be false. This may be preferable for skins like bicolor*P.219, tile*P.224, or beamer*P.228.
17.5 Extra Options for Partial Boxes

\( /tcb/extras=(\langle \text{options} \rangle) \) (no default, initially unset)

Adds \texttt{tcolorbox} \( \langle \text{options} \rangle \) to every box of a \texttt{break sequence} after skin settings are done. This is quite late in box processing. Geometry and break settings should \textit{not be used} here, because they will either be ignored or have unexpected negative results. But it is possible to change most colors, skin effects, shadows, borders, frame code, etc. Note that using \( /tcb/extras \) for every box is very seldom an advantage over setting the options directly. Usually, \( /tcb/extras \) for every box is very seldom an advantage over setting the options directly.

\( /tcb/no\ extras \) (style, no default, initially set)

Removes all extras if set before.

\( /tcb/extras\ broken=(\langle \text{options} \rangle) \) (no default, initially unset)

If the box is set to be \( /tcb/breakable \) \textsuperscript{P.365} and \textit{is} broken actually, then the \( \langle \text{options} \rangle \) are added to every box of the \texttt{break sequence}. \( /tcb/extras \) overwrites this key.

\( /tcb/extras\ unbroken=(\langle \text{options} \rangle) \) (no default, initially unset)

If the box is set to be \( /tcb/breakable \) \textsuperscript{P.365} but \textit{is not} broken actually or if the box is set to be \( /tcb/unbreakable \) \textsuperscript{P.366}, then the \( \langle \text{options} \rangle \) are added to the box. \( /tcb/extras \) overwrites this key.

\( /tcb/no\ extras\ unbroken \) (style, no default, initially set)

Removes the unbroken extras if set before.

\( /tcb/extras\ first=(\langle \text{options} \rangle) \) (no default, initially unset)

If the box is set to be \( /tcb/breakable \) \textsuperscript{P.365} and \textit{is} broken actually, then the \( \langle \text{options} \rangle \) are added to the \textit{first} box of the break sequence. \( /tcb/extras \) overwrites this key.

\( /tcb/no\ extras\ first \) (style, no default, initially set)

Removes the first extras if set before.

\( /tcb/extras\ middle=(\langle \text{options} \rangle) \) (no default, initially unset)

If the box is set to be \( /tcb/breakable \) \textsuperscript{P.365} and \textit{is} broken actually, then the \( \langle \text{options} \rangle \) are added to every \textit{middle} box (if any) of the break sequence. \( /tcb/extras \) overwrites this key.

\( /tcb/no\ extras\ middle \) (style, no default, initially set)

Removes the middle extras if set before.

\( /tcb/extras\ last=(\langle \text{options} \rangle) \) (no default, initially unset)

If the box is set to be \( /tcb/breakable \) \textsuperscript{P.365} and \textit{is} broken actually, then the \( \langle \text{options} \rangle \) are added to the \textit{last} box of the break sequence. \( /tcb/extras \) overwrites this key.

\( /tcb/no\ extras\ last \) (style, no default, initially set)

Removes the last extras if set before.

\( /tcb/extras\ unbroken\ and\ first=(\langle \text{options} \rangle) \) (no default, initially unset)

This is an abbreviation for setting \( /tcb/extras\ unbroken \) and \( /tcb/extras\ first \) together. \( /tcb/extras \) overwrites this key.

\( /tcb/extras\ middle\ and\ last=(\langle \text{options} \rangle) \) (no default, initially unset)

This is an abbreviation for setting \( /tcb/extras\ middle \) and \( /tcb/extras\ last \) together. \( /tcb/extras \) overwrites this key.

\( /tcb/extras\ unbroken\ and\ last=(\langle \text{options} \rangle) \) (no default, initially unset)

This is an abbreviation for setting \( /tcb/extras\ unbroken \) and \( /tcb/extras\ last \) together. \( /tcb/extras \) overwrites this key.

\( /tcb/extras\ first\ and\ middle=(\langle \text{options} \rangle) \) (no default, initially unset)

This is an abbreviation for setting \( /tcb/extras\ first \) and \( /tcb/extras\ middle \) together. \( /tcb/extras \) overwrites this key.

17.6 Breakable boxes and the \texttt{multicol} package

With version 4.10, the algorithm for detecting the available height for a \texttt{tcolorbox} inside a \texttt{multicol} environment was improved with help of Frank Mittelbach. This change \textit{may} impact existing user code which \textit{may} have to be adapted.

Unbreakable \texttt{tcolorbox}es can be used without special care inside a \texttt{multicols} environment from the \texttt{multicol} package \cite{9}. Since version 3.10, a breakable \texttt{tcolorbox} detects, if it is used inside a \texttt{multicols} environment. But choosing break points for a breakable box cannot be done by the balancing routine of \texttt{multicols}. By default, boxes will break at maximum column height. To get pleasant results, use the \texttt{/tcb/break at} \texttt{\textbackslash {P.367}} and \texttt{/tcb/height fixed for} \texttt{\textbackslash {P.370}} options.


My breakable box


This example is already set inside a \texttt{multicols} environment. This time, a \texttt{middle} part has full column height (here \texttt{\textwidth}). \texttt{tcb/height fixed for\texttt{\textwidth}} is used to spread this box part over the full height to align with neighboring columns.

\begin{tcolorbox}[enhanced jigsaw, breakable, size=title, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries, title=My breakable box, pad at break=2mm, break at=-\baselineskip/0pt, height fixed for=middle ]
\lipsum[2-7]
\end{tcolorbox}

\lipsum[8]


\begin{itemize}
\item Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi.
\item Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erad ligula aliquet magna, vitae ornare odio metus a mi.
\item Pellentesque cursus luctus mauris.
\item Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis.
\item Donec nonummy pellentesque ante.
\end{itemize}
quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.


The following example has a \textcolorbox which fills the \multicols environment completely. Here, /tcb/height fixed for \textit{P.370} is used to give all three columns the full height. Note that the appropriate /tcb/break at \textit{P.367} value is not computed automatically but set manually.

```
% \usepackage{lipsum,multicol} \small
\begin{multicols}{3}
\begin{tcboxed}[enhanced jigsaw, breakable, size=small, colback=red!5!white, colframe=red!75!black, fonttitle=bfseries, title=My breakable box, pad at break=2mm, drop fuzzy shadow, height fixed for=all, break at=11.4cm ]
\lipsum[1-3]
\end{tcboxed}
\end{multicols}
```

My breakable box

17.7 Break Point Insertion

A *breakable* box is not broken, if there is enough space on the current page or column. Therefore, typical penalty insertion with `\break`, `\pagebreak`, `\columnbreak`, … may only work as expected, if the box is broken at least into two parts *without* inserting the penalties.

To *force* a page or column break, `\tcbreak` starts a new paragraph and inserts an insane tall rule which causes a break and which is immediately discarded. You may ignore this technical information and just use it as you would use `\pagebreak`.

For an *unbreakable box*, `\tcbreak` is identical to insert `\par`, i.e. it just starts a new paragraph.

Also see `/tcb/break` at P.367 for defining height dependent breaks.

\begin{multicols}{3}
\begin{tcolorbox}[breakable,enhanced jigsaw,size=small,  
   colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,  
   title=Break into parts]
   First part \tcbreak  
   Second part \tcbreak  
   Third part \tcbreak
\end{tcolorbox}
\end{multicols}

\begin{multicols}{3}
\begin{tcolorbox}[enhanced jigsaw,size=small,  
   colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,  
   title=You shall not break]
   First part \tcbreak  
   Second part \tcbreak  
   Third part \tcbreak
\end{tcolorbox}
\end{multicols}
17.8  Break Sequence for the Skins

The following diagrams document the break sequence for different skins. Depending on the main skin of a \texttt{tcolorbox}, the actual skins of the break sequence parts are displayed.

\begin{figure}
\centering
\begin{tabular}{|c|}
\hline
\textbf{Unbroken Box} \\
\texttt{skin=standard} \\
\hline
\end{tabular}
\hspace{1cm}
\begin{tabular}{|c|}
\hline
\textbf{Broken Boxes} \\
\texttt{skin=standard} \\
\hline
\end{tabular}
\hspace{1cm}
\begin{tabular}{|c|}
\hline
\textbf{Unbroken Box} \\
\texttt{skin=standard jigsaw} \\
\hline
\end{tabular}
\hspace{1cm}
\begin{tabular}{|c|}
\hline
\textbf{Broken Boxes} \\
\texttt{skin=standard jigsaw} \\
\hline
\end{tabular}
\hspace{1cm}
\begin{tabular}{|c|}
\hline
\textbf{Unbroken Box} \\
\texttt{skin=spartan} \\
\hline
\end{tabular}
\hspace{1cm}
\begin{tabular}{|c|}
\hline
\textbf{Broken Boxes} \\
\texttt{skin=spartan} \\
\hline
\end{tabular}
\end{figure}
<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhanced</td>
<td>skin=enhancedfirst</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
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<tbody>
<tr>
<td>skin=enhancedfirst</td>
<td>skin=enhancedmiddle</td>
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<tr>
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<td>skin=enhancedmiddle</td>
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<td>skin=enhancedmiddle</td>
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<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
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<tbody>
<tr>
<td>skin=enhancedmiddle</td>
<td>skin=enhancedmiddle</td>
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<td>skin=enhancedmiddle</td>
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<td>skin=enhancedmiddle</td>
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<th>Unbroken Box</th>
<th>Broken Boxes</th>
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<tbody>
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<td>skin=enhancedlast</td>
<td>skin=enhancedmiddle</td>
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<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>skin=enhanced jigsaw</td>
<td>skin=enhanced first jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast jigsaw</td>
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</tbody>
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<th>Unbroken Box</th>
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<tbody>
<tr>
<td>skin=enhancedfirst jigsaw</td>
<td>skin=enhancedmiddle jigsaw</td>
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<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
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<td></td>
<td>skin=enhancedlast jigsaw</td>
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<th>Unbroken Box</th>
<th>Broken Boxes</th>
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<tbody>
<tr>
<td>skin=enhancedmiddle jigsaw</td>
<td>skin=enhancedmiddle jigsaw</td>
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<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
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<tr>
<td></td>
<td>skin=enhancedlast jigsaw</td>
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<th>Unbroken Box</th>
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<tbody>
<tr>
<td>skin=enhancedlast jigsaw</td>
<td>skin=enhancedmiddle jigsaw</td>
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<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast jigsaw</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>skin=bicolor</td>
<td>skin=bicolorfirst</td>
</tr>
<tr>
<td></td>
<td>skin=bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>skin=bicolorlast</td>
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</tbody>
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<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
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<tbody>
<tr>
<td>skin=bicolorfirst</td>
<td>skin=bicolorfirst</td>
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<tr>
<td></td>
<td>skin=bicolormiddle</td>
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<td></td>
<td>skin=bicolormiddle</td>
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<th>Unbroken Box</th>
<th>Broken Boxes</th>
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<tbody>
<tr>
<td>skin=bicolormiddle</td>
<td>skin=bicolormiddle</td>
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<td>skin=bicolormiddle</td>
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<tr>
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<td>skin=bicolormiddle</td>
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<th>Unbroken Box</th>
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<td>skin=bicolorlast</td>
<td>skin=bicolormiddle</td>
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<td></td>
<td>skin=bicolormiddle</td>
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<tr>
<td></td>
<td>skin=bicolorlast</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
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<td>--------------</td>
</tr>
<tr>
<td>skin=tile</td>
<td>skin=tilefirst</td>
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<tr>
<td></td>
<td>skin=tilemiddle</td>
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<tr>
<td></td>
<td>skin=tilemiddle</td>
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<tr>
<td></td>
<td>skin=tilemiddle</td>
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<tr>
<td></td>
<td>skin=tilelast</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>skin=beamer</td>
<td>skin=beamerfirst</td>
</tr>
<tr>
<td></td>
<td>skin=beamermiddle</td>
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<tr>
<td></td>
<td>skin=beamermiddle</td>
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<td></td>
<td>skin=beamerlast</td>
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<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
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<tr>
<td>skin=beamerfirst</td>
<td>skin=beamerfirst</td>
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<td>skin=beamermiddle</td>
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<td>Unbroken Box</td>
<td>Broken Boxes</td>
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<td>skin=beamermiddle</td>
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<td>skin=beamerlast</td>
<td>skin=beamermiddle</td>
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<td>skin=beamermiddle</td>
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383
<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelance</td>
<td>skin=freelancefirst</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=frelancelast</td>
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<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
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<tbody>
<tr>
<td>skin=freelancefirst</td>
<td>skin=freelancefirst</td>
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<tr>
<td></td>
<td>skin=freelancemiddle</td>
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<td></td>
<td>skin=freelancemiddle</td>
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<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelancemiddle</td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
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<tr>
<td></td>
<td>skin=freelancemiddle</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=frelancelast</td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=frelancelast</td>
</tr>
</tbody>
</table>
17.9  Break by Hand (Faked Break)

See Section 17.6 on page 373 for real column breaks.

Since the appearance of broken boxes is done by skins, it is quite easy to 'fake a break'. For this, you actually don’t need the \texttt{breakable} library at all.

\begin{tcolorbox}[title=My broken box,skin=enhancedfirst]
This is a box which breaks from one column to another
\end{tcolorbox}
\hfill
\begin{tcolorbox}[skin=enhancedmiddle]
column. I am sorry to say that this is a trick. Nevertheless, you may use this trick for your
\end{tcolorbox}
\hfill
\begin{tcolorbox}[skin=enhancedlast]
own purposes.
\end{tcolorbox}
The main purpose of this library is to store a \texttt{tcolorbox} into an array of box registers for later usage. If the \texttt{tcolorbox} is not breakable, there is not much addition compared to usual \texttt{TeX}/\texttt{LaTeX} box storage and usage (and you do not really need this library for that use case). For a breakable \texttt{tcolorbox}, this library allows to capture all partial boxes into a sequence of registers. The partial boxes can be used anywhere in arbitrary order.

The name of this library indicates \textit{magazine} in the sense of storage, but also in the sense of a journal where an article often is \textit{continued on page} \textit{x}. An example for this kind of application is given throughout this section starting on the right hand side. The creation of this library was motivated by Ulrike Fischer and Steven B. Segletes.

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{magazine}
\end{verbatim}

This also loads the library \texttt{LIB breakable}, see Section 17 on page 363.

The box register operations of this library are global. \texttt{TeX} grouping will not clear the registers when leaving the current group. Also be aware that extensive use of large box arrays may eat up \texttt{TeX}'s available memory and registers.

### 18.1 Creation and Resetting of Box Arrays

\texttt{\newboxarray\{}\langle name\rangle\texttt{\}}

This creates a new box array called \langle name\rangle. There already is a box array available with name \texttt{default} which can be used directly. Note that the creation is a global operation.

\begin{verbatim}
\newboxarray{myarray}
\end{verbatim}

\texttt{\boxarrayreset\{}\langle name\rangle\texttt{\}}

Resets the size counter of a box array \langle name\rangle to zero. If \langle name\rangle is not provided, \texttt{default} is used as name. Use this or \texttt{/tcb/reset box array} before you apply \texttt{/tcb/store to box array} \footnote{P.388}. Otherwise, all boxes would be appended to the already existing boxes. This command does not clear box registers.

\begin{verbatim}
\boxarrayreset
\boxarrayreset{myarray}
\end{verbatim}

\texttt{/tcb/reset box array=\langle name\rangle}

(default \texttt{default}, initially unset)

Resets the size counter of a box array \langle name\rangle to zero. Use this or \texttt{\boxarrayreset} (which does the same) before you apply \texttt{/tcb/store to box array} \footnote{P.388}.

\begin{verbatim}
\tcbset{
    reset box array,  \% resets \texttt{\textquote{default'}}
    reset box array=myarray, \% resets \texttt{\textquote{myarray'}}
}
\end{verbatim}
\[\textbf{18.2 Storing Content}\]

\texttt{\textbackslash boxarrayclear\{name\}}

Works like \texttt{\textbackslash boxarrayreset} to reset the size counter of a box array \texttt{\{name\}} to zero. Additionally, all allocated box registers of the box array are cleared of their content. Note that the allocated box registers stay allocated. So, this may be useful to clear memory, but not to free registers for other applications. If \texttt{\textbackslash consumeboxarray} or \texttt{\textbackslash consumetcboxarray} was used to apply the stored boxes, there is no advantage in using \texttt{\textbackslash boxarrayclear}.

\begin{verbatim}
\boxarrayclear \% clears ‘default’
\boxarrayclear\{myarray\} \% clears ‘myarray’
\end{verbatim}

\texttt{\textbackslash boxarrayclear\{name\}} \% clears ‘default’

\texttt{\textbackslash boxarrayclear\{myarray\}} \% clears ‘myarray’

\texttt{\textbackslash boxarrayclear\{name\}}

% \usepackage{lipsum}
\begin{tcolorbox}[enhanced jigsaw,size=fbox,width=4cm,
colback=yellow!10,colframe=yellow!10!black,
enforce breakable,% use only breakable in the real world!
break at=7cm/4cm,
height fixed for=all,
watermark text=\textit{arabic\{tcbbreakpart\}},
reset box array,
store to box array
]
\lipsum[1]
\end{tcolorbox}

\useboxarray\{1\}\hfill
\begin{tabular}{cc}
\multicolumn{2}{c}{\includegraphics[width=7cm]{Basilica_5.png}}
\end{tabular}

\useboxarray\{2\} & \useboxarray\{3\}

\lipsum[1]

If the first box part should fill the rest of the available space of the current page, you can use `\pagegoal-\pagetotal` minus some distance for the first element of `/tcb/break at` \P{367}. You may want to have some additional distance to the preceding text.

```latex
% \usepackage{lipsum}
\begin{tcolorbox}[enhanced,breakable, reset box array,
store to box array,
break at=\pagegoal-\pagetotal-5mm/0pt,
height fixed for=first and middle]
\lipsum[1-15]
\end{tcolorbox}
% 
\consumetcboxarray{1}{blanker,before=\par\vfill\noindent}

\begin{tcolorbox}[blanker,width=4cm, fontupper=\footnotesize,enforce breakable,% use only breakable in the real world!
break at=4cm,
height fixed for=all,
watermark text=\arabic{tcbbreakpart},
reset box array,
store to box array]
\includegraphics[width=\linewidth]{Basilica_5.png}\par
\lipsum[1-2]
\end{tcolorbox}

\begin{tcbitemize}[raster columns=3,raster equal height, size=small,halign=center,sharp corners,colback=blue!5]
\tcbitem\consumeboxarray{5}
\tcbitem\consumeboxarray{6}
\tcbitem\consumeboxarray{1}
\tcbitem\consumeboxarray{2}
\tcbitem\consumeboxarray{3}
\tcbitem\consumeboxarray{4}
\end{tcbitemize}
```

lorem non justo. Nam lac-

```latex
\lipsum[389]
```

arcuris libero, nonummy eget,
```latex
\lipsum[389]
```
Combination of \tcb/reset box array \(^\text{P.387}\) and \tcb/store to box array \(^\text{P.388}\).

\tcb/do not store to box array \(^\text{P.388}\)

Disables the \tcb/store to box array \(^\text{P.388}\) option, if set before.

\begin{boxarraystore}{⟨name⟩}
⟨environment content⟩
\end{boxarraystore}

Stores the environment content into a box array ⟨name⟩. This corresponds to the standard \LaTeX environment \texttt{lrbox}, but the storage operation is global. As long as \texttt{\boxarrayreset} \(^\text{P.387}\) is not used, every new \texttt{\boxarraystore} adds a further box to the array.

\begin{tikzpicture}
\node [anchor=west,align=left] at (0,0) {
\begin{lstlisting}
\boxarrayreset
\begin{boxarraystore}{default}\fbox{Mary}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Had}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{a}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Little}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Lamb}\end{boxarraystore}
\end{tikzpicture}

\begin{tabular}{llll}
Mary & Had & a & Little & Lamb
\end{tabular}

18.3 Retrieving Content

\begin{tikzpicture}
\node [anchor=west,align=left] at (0,0) {
\begin{tikzpicture}
\node [anchor=west,align=left] at (0,0) {
\begin{lstlisting}
\boxarraygetsize{⟨name⟩}{⟨macro⟩}
\end{tikzpicture}

Stores the current size of a box array ⟨name⟩ into a given ⟨macro⟩. If no ⟨name⟩ is given, the already existing default box array is used.

\begin{tikzpicture}
\node [anchor=west,align=left] at (0,0) {
\begin{tikzpicture}
\node [anchor=west,align=left] at (0,0) {
\begin{lstlisting}
\boxarraygetsize{\mysize}
Current size of the default box array: \mysize.
\end{tikzpicture}

Current size of the default box array: 5.

\begin{tikzpicture}
\node [anchor=west,align=left] at (0,0) {
\begin{tikzpicture}
\node [anchor=west,align=left] at (0,0) {
\begin{lstlisting}
\useboxarray{⟨index⟩}
\end{tikzpicture}

Typesets the box with the given ⟨index⟩ number from the box array ⟨name⟩. If no ⟨name⟩ is given, the already existing default box array is used. It is considered an error, if a not existing box array ⟨name⟩ is used. It is silently ignored, if the ⟨index⟩ is out of range. Note that \texttt{\useboxarray} corresponds to the standard \texttt{\usebox} macro, respectively, \texttt{\copy}.

\begin{tikzpicture}
\node [anchor=west,align=left] at (0,0) {
\begin{tikzpicture}
\node [anchor=west,align=left] at (0,0) {
\begin{lstlisting}
\boxarraygetsize{\mysize}
\foreach \n in {1,...,\mysize} { \useboxarray{\n} }
\end{tikzpicture}

\begin{tabular}{llll}
Mary & Had & a & Little & Lamb
\end{tabular}

— continued from page 387 —

— continued on page 391 —
\usetctboxarray\{\langle name \rangle\}\{\langle index \rangle\}\{\langle options \rangle\}

Typesets the box with the given \langle index \rangle number from the box array \langle name \rangle using \useboxarray\textsuperscript{P.390} as content of a \tcbox\textsuperscript{P.14}. If no \langle name \rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. It is silently ignored, if the \langle index \rangle is out of range. The \tcbox\textsuperscript{P.14} can be customized by \tcolorbox\langle options \rangle.

\begin{verbatim}
\boxarraygetsize{\mysize}
\foreach \n in {1,...,\mysize} { \usetctboxarray{\n}{on line,colframe=yellow, colback=yellow!10} }
\end{verbatim}

Mary Had a Little Lamb

--- continued from page 390 ---

\consumeboxarray\{\langle name \rangle\}\{\langle index \rangle\}

Typesets the box with the given \langle index \rangle number from the box array \langle name \rangle. If no \langle name \rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. It is silently ignored, if the \langle index \rangle is out of range. In contrast to \useboxarray\textsuperscript{P.390}, \consumeboxarray corresponds to the standard \box macro, i.e. after typesetting the box register is cleared and cannot be used again.

\begin{verbatim}
\boxarraygetsize{\mysize}
{\foreach \n in {1,...,\mysize} { \consumeboxarray{\n} }}
\par
{\foreach \n in {1,...,\mysize} { \consumeboxarray{\n} }}
\end{verbatim}

First run: Mary Had a Little Lamb
First run: Mary Had a Little Lamb
Second run: Mary Had a Little Lamb

--- continued on page 394 ---

\consumetcboxarray\{\langle name \rangle\}\{\langle index \rangle\}\{\langle options \rangle\}

Typesets the box with the given \langle index \rangle number from the box array \langle name \rangle using \consumeboxarray as content of a \tcbox\textsuperscript{P.14}. If no \langle name \rangle is given, the already existing default box array \langle name \rangle is used. It is considered an error, if a not existing box array \langle name \rangle is used. It is silently ignored, if the \langle index \rangle is out of range. The \tcbox\textsuperscript{P.14} can be customized by \tcolorbox \langle options \rangle. After typesetting the box register is cleared and cannot be used again.

— continued from page 390 —

the appropriate places you see. The linking texts like \textit{continued on page x} are created by /tcb/finish\textsuperscript{P.197} commands for the embedding \tcbox\textsuperscript{P.14}. To label the box parts, /tcb/phantomlabel\textsuperscript{P.98} is used.

These quite small partial boxes are

— continued on page 394 —

\textbf{boxarraygetbox}[(name)]{(macro)}{(index)}

Assigns the box with the given \textit{index} number from the box array \textit{name} to a \textit{macro}. If no \textit{name} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \textit{name} is used. If the \textit{index} is out of range, the \textit{macro} will be undefined.

\textbf{ifboxarrayempty}[(name)]{(index)}{(true)}{(false)}

Tests the box with the given \textit{index} number from the box array \textit{name} for emptiness be empty and executes \texttt{true} if it is empty, and \texttt{false} otherwise. If no \textit{name} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \textit{name} is used.
18.4 Box Dimensions

\boxedarraygetwidth\{⟨name⟩\}\{⟨macro⟩\}\{⟨index⟩\}

Assigns the width of the box with the given ⟨index⟩ number from the box array ⟨name⟩ to a ⟨macro⟩. If no ⟨name⟩ is given, the already existing default box array is used. It is considered an error, if a not existing box array ⟨name⟩ is used. If the ⟨index⟩ is out of range, the ⟨macro⟩ will be set to 0pt.

\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}
\begin{tabular}{ll}
\useboxarray{1} & width of box 1: \boxedarraygetwidth\{\mylen\}\{1\} \mylen \\
\useboxarray{2} & width of box 2: \boxedarraygetwidth\{\mylen\}\{2\} \mylen \\
\end{tabular}

Test width of box 1: 30.35799pt
width of box 2: 0pt

\boxedarraygetheight\{⟨name⟩\}\{⟨macro⟩\}\{⟨index⟩\}

Assigns the height of the box with the given ⟨index⟩ number from the box array ⟨name⟩ to a ⟨macro⟩. If no ⟨name⟩ is given, the already existing default box array is used. It is considered an error, if a not existing box array ⟨name⟩ is used. If the ⟨index⟩ is out of range, the ⟨macro⟩ will be set to 0pt.

\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}
\begin{tabular}{ll}
\useboxarray{1} & height of box 1: \boxedarraygetheight\{\mylen\}\{1\} \mylen \\
\useboxarray{2} & height of box 2: \boxedarraygetheight\{\mylen\}\{2\} \mylen \\
\end{tabular}

Test height of box 1: 9.89883pt
height of box 2: 0pt

\boxedarraygetdepth\{⟨name⟩\}\{⟨macro⟩\}\{⟨index⟩\}

Assigns the depth of the box with the given ⟨index⟩ number from the box array ⟨name⟩ to a ⟨macro⟩. If no ⟨name⟩ is given, the already existing default box array is used. It is considered an error, if a not existing box array ⟨name⟩ is used. If the ⟨index⟩ is out of range, the ⟨macro⟩ will be set to 0pt.

\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}
\begin{tabular}{ll}
\useboxarray{1} & depth of box 1: \boxedarraygetdepth\{\mylen\}\{1\} \mylen \\
\useboxarray{2} & depth of box 2: \boxedarraygetdepth\{\mylen\}\{2\} \mylen \\
\end{tabular}

Test depth of box 1: 3.69884pt
depth of box 2: 0pt
Assigns the total height of the box with the given \(index\) number from the box array \(name\) to a \(macro\). If no \(name\) is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \(name\) is used. If the \(index\) is out of range, the \(macro\) will be set to 0pt.

\texttt{\vboxarrayreset}\texttt{\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line, store to box array]{Test}}

\begin{tabular}{ll}
\useboxarray{1} & total height of box 1: \boxarraygettotalheight{\mylen}{1} \mylen \\
\useboxarray{2} & total height of box 2: \boxarraygettotalheight{\mylen}{2} \mylen
\end{tabular}

\texttt{Test}  
total height of box 1: 13.59767pt  
total height of box 2: 0pt

--- continued from page 391 ---

for demonstration purposes. With the tools of this section, a magazine type document could be created, but this still needs a lot of manual control.
18.5  Leaflet Example

The following full application example can be used to create leaflets. Obviously, the code can be adapted and customized in many ways.

\documentclass[a4paper,landscape]{article}
\usepackage[noheadfoot,margin=0pt]{geometry}
\usepackage[skins,raster,magazine]{tcolorbox}
\usepackage{lipsum}
\newenvironment{leaflet}{%\begin{tcolorbox}[nobeforeafter,empty,colback=white, sharp corners,size=minimal,left=10mm,right=10mm,top=10mm,bottom=10mm, width=\textwidth/3, breakable, break at=\textheight, height fixed for=all, reset box array, store to box array,#1]}{\end{tcolorbox}}
\pagestyle{empty}
\begin{document}
\begin{leaflet}[underlay={\node[above=5mm,font=\footnotesize] at (frame.south) {- \arabic{tcbbreakpart} -};}]
\includegraphics[width=\linewidth]{Basilica_5.png}
\begin{center}
\bfseries\LARGE Example
\end{center}
\section{Introduction}
\lipsum[1]
\section{Main Part A}
\lipsum[2-8]
\section{Main Part B}
\lipsum[9-15]
\section{Conclusion}
\lipsum[16-18]
\end{leaflet}
\end{document}
4 Conclusion

5 Main Part B

3 Main Part B

2 Main Part A

1 Introduction

Example

The main purpose of this library is to support creation of single page posters with \tcolorbox\es.

A \texttt{tcbposter} \textsuperscript{P.398} is a \texttt{tikzpicture} where \texttt{tcolorbox\es} can be placed in a column oriented manner using \texttt{\posterbox}\textsuperscript{P.403} commands. This base concept is more or less copied from the great \texttt{baposter} package.

The \texttt{raster} library, see Section 14 on page 277, can produce similar looking results and may be more appropriate depending on the actual project.

- The \texttt{raster} library has a flow oriented concept, just like a conventional text flow. The text flow (box flow) is a merely endless ribbon which gets broken into lines (and paragraphs) and the lines are broken into pages. \texttt{raster} shapes the boxes to convenient sizes to fill lines and pages in a pleasant way.

- The \texttt{tcbposter} library supports a quite free placement of boxes inside a page. Basically, boxes are placed like \texttt{nodes} are placed inside a \texttt{tikzpicture}. In contrast to \texttt{raster}, this is a \texttt{single} page and not a flow of pages. The poster is divided into columns and rows. There is a more or less gentle force to use the columns (or spans of columns) for positioning and sizing while the row placement is completely optional.

The creation of this library was motivated by Ignasi.

![Inside a \texttt{tikzpicture} there should be no embedded \texttt{tikzpictures}. This rule is violated by the \texttt{poster} library. Be aware that there may be some unwanted interactions between the main \texttt{tikzpicture} and the embedded ones inside the \texttt{tcolorbox\es}.](image)

The library is loaded by a package option or inside the preamble by:

\texttt{\tcbuselibrary\{poster\}}

This also loads the libraries \texttt{skins}, see Section 10 on page 148, \texttt{breakable}, see Section 17 on page 363, \texttt{magazine}, see Section 18 on page 387, and \texttt{fitting}, see Section 20 on page 410.

### 19.1 Overview

Click me to see the tutorial

You get the best overview of the \texttt{poster} library and its facilities, if you look at the \texttt{Poster Tutorial} which is part of the \texttt{tcolorbox} documentation:

\texttt{tcolorbox-tutorial-poster.pdf}
19.2 Main Poster Environment

This creates a tikzpicture environment with suitable additional settings defined by the given \texttt{options}. Basically, \texttt{posterbox} \texttt{P.403} and \texttt{posterboxenv} \texttt{P.403} are used to place \texttt{tcolorboxes} as nodes into the environment, but additional Ti\textsc{k}Z code can also be used.

As \texttt{options} all \texttt{/tcb/posterset/} keys may be applied, namely:

- \texttt{/tcb/posterset/poster} \texttt{P.400}: poster settings like columns, rows, sizes...
- \texttt{/tcb/posterset/coverage} \texttt{P.401} and \texttt{/tcb/posterset/no coverage} \texttt{P.401}: settings for a surrounding \texttt{tcolorbox} for background and margins.
- \texttt{/tcb/posterset/boxes} \texttt{P.402}: style of the \texttt{tcolorboxes} used for the poster.
- \texttt{/tcb/posterset/fontsize} \texttt{P.402}: scaling of used fonts.

\begin{tcbposter}
\begin{varwidth}{\textwidth}
poster = {showframe,height=10cm,spacing=2mm},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{varwidth}
\posterbox[name=A,column=3,row=2]{My first box}
\posterbox[adjusted title=Second box]
{name=B,column=2,span=2,below=A}{My second box}
\posterbox[adjusted title=Third box]
{name=C,column=2,between=B and bottom}{My third box}
\end{tcbposter}
Inside \texttt{tcbposter} \cite{P.398}, there are several predefined Ti\kern.5ptkZ nodes. These nodes share a common \texttt{/tcb/poster/prefix} \cite{P.400} which is \texttt{TCBPOSTER@} by default. This prefix is used to discriminate the poster nodes from local nodes of any embedded \texttt{tikzpicture} environment. You will never need this prefix using \texttt{\posterbox} \cite{P.403} and its placement options, but if you want to refer to a predefined node using pure Ti\kern.5ptkZ code. The predefined nodes (shown without prefix) are:

- \texttt{poster}: defines the bounding box of the poster (without the coverage).
- \texttt{top}: top position plus row spacing
- \texttt{bottom}: bottom position minus row spacing
- \texttt{middle}: vertical middle position
- \texttt{col1}, \texttt{col2}, \ldots: bounding box of column 1, column 2, \ldots
- \texttt{row1}, \texttt{row2}, \ldots: bounding box of row 1, row 2, \ldots

Further nodes are defined using the \texttt{/tcb/posterloc/name} \cite{P.404} option.

\begin{itemize}
  \item Never use a \texttt{tcbposter} \cite{P.398} inside a \texttt{tcbposter} \cite{P.398}. But, if you do anyway, use a different \texttt{/tcb/poster/prefix} \cite{P.400} for the embedded poster or you surely get a total mess.
\end{itemize}

There are several properties inside a \texttt{tcbposter} \cite{P.398} which may be useful for advanced code (skip the following on first reading):

\begin{itemize}
  \item \texttt{\tcbposterwidth}: Width of the poster (without margins).
  \item \texttt{\tcbposterheight}: Height of the poster (without margins).
  \item \texttt{\tcbpostercolspacing}: Column distance.
  \item \texttt{\tcbposterrowspacing}: Row distance.
  \item \texttt{\tcbpostercolumns}: Column quantity.
  \item \texttt{\tcbposterrows}: Row quantity.
  \item \texttt{\tcbpostercolwidth}: Width of a column.
  \item \texttt{\tcbposterrowheight}: Height of a row.
\end{itemize}

\texttt{\tcbposterset\{\langle options\rangle\}}

Sets options for every following \texttt{tcbposter} \cite{P.398} inside the current \TeX\ group. For example, the numbers for rows and columns may be defined for the whole document by this:

\begin{verbatim}
\tcbposterset\{poster={columns=2,rows=3}\}
\end{verbatim}

See \texttt{tcbposter} \cite{P.398} for all feasible options.
19.3 Poster Settings

This option can be applied inside `tcbposter` and \tcbbposterset to set the given poster \(\text{option list}\), e.g.

\begin{tcbposter}
  \poster = \{\text{showframe}, \text{columns}=5, \text{rows}=2, \text{spacing}=1\text{mm}, \text{height}=4\text{cm}\},
\end{tcbposter}

\tcbbposterset{\poster = \{\text{width}=20\text{cm}, \text{height}=15\text{cm}\}}

For the \(\text{option list}\), see the following keys.

- \tcbbposter{columns=(\text{number})} (no default, initially 3)
  Sets the \(\text{number}\) of columns for a \text{tcbposter}.

- \tcbbposter{rows=(\text{number})} (no default, initially 4)
  Sets the \(\text{number}\) of rows for a \text{tcbposter}.

- \tcbbposter{colspacing=(\text{length})} (no default, initially 4mm)
  Sets \(\text{length}\) as distance between columns.

- \tcbbposter{rowspacing=(\text{length})} (no default, initially 4mm)
  Sets \(\text{length}\) as distance between rows.

- \tcbbposter{spacing=(\text{length})} (style, no default, initially 4mm)
  Sets \(\text{length}\) as distance between columns and rows.

- \tcbbposter{showframe=true|false} (default true, initially false)
  Displays a red auxiliary mesh as optical support during poster creation. Also, every \tcbbposterloc{name} is displayed.

- \tcbbposter{width=(\text{length})} (no default, initially \textwidth)
  Sets \(\text{length}\) as width of the poster. For a typical poster, this has not to be set manually.

- \tcbbposter{height=(\text{length})} (no default, initially unset)
  Sets \(\text{length}\) as height of the poster. For a typical poster, this has not to be set manually, but is set automatically to an appropriate value.

- \tcbbposter{prefix=(\text{name})} (no default, initially TCBPOSTER@)
  \(\text{name}\) is set as prefix for any TikZ node which is generated automatically by the poster library. This encompasses predefined nodes like top, bottom, …, and nodes defined by using \tcbbposterloc{name}. Also, see Section 19.2 on page 398. For a typical poster, this value can stay as it is.
19.4 Coverage

/tcb/posterset/coverage={⟨option list⟩} (style, no default)

This option can be applied inside \tcbposter \textsuperscript{P.398} and \tcbposterset \textsuperscript{P.399} and it adds an optional coverage for the poster which is a surrounding \tcolorbox with the given ⟨option list⟩. Here, margins and background settings for the poster can be given. The \textit{coverage} has several default \tcolorbox settings suitable for the purpose:

- enhanced, frame hidden, sharp corners, boxsep=0pt, boxrule=0pt,
- top=4mm, bottom=4mm, left=4mm, right=4mm,
- toptitle=2mm, bottomtitle=2mm, colback=white

The ⟨option list⟩ can contain any \tcolorbox option.

\begin{tcbposter}[
  poster = {showframe, spacing=1mm},
  coverage = {height=5cm, 
              interior style={top color=yellow, bottom color=yellow!50!red},
              watermark text={My Poster}, watermark color=white, 
            },
]
\end{tcbposter}

- For a typical poster, the option /tcb/spread \textsuperscript{P.88} will use the whole page for the poster coverage.
- Poster margins can be adapted by /tcb/left \textsuperscript{P.39}, /tcb/right \textsuperscript{P.40}, /tcb/top \textsuperscript{P.42}, /tcb/bottom \textsuperscript{P.43}.
- Poster background can be changed by /tcb/colback \textsuperscript{P.27}, /tcb/interior style \textsuperscript{P.149}, /tcb/interior style image \textsuperscript{P.150}, etc.

/tcb/posterset/no coverage (style, no value, initially set)

Removes the surrounding \tcolorbox completely.
19.5 Common Box Settings

This option can be applied inside \texttt{tcbposter} \textsuperscript{P.398} and \texttt{tcbposterset} \textsuperscript{P.399} and it is used to set up the style of the \texttt{tcolorbox}es inside the poster. The \texttt{(option list)} can contain any \texttt{tcolorbox} option, but box size options are not assumed to be useful here, because the size will be determined by the placement options.

\begin{tcbposter}
\begin{code}
\texttt{\begin{tcbposter}[
poster = {spacing=2mm,columns=3,rows=2},
coverage = {height=5cm,
  interior style={top color=yellow,bottom color=yellow!50!red},
},
boxes = {sharp corners=downhill,arc=3mm,boxrule=1mm,
  colback=white,colframe=cyan,
  title style={left color=black,right color=cyan},
  fontsize=15pt, % \texttt{\normalcode}\texttt{normalsize} is now 15pt
}\end{tcbposter}}
\end{code}
\end{tcbposter}

19.6 Font Scaling

This option can be applied inside \texttt{tcbposter} \textsuperscript{P.398} and \texttt{tcbposterset} \textsuperscript{P.399}. It uses \texttt{/tcb/fit basedim} \textsuperscript{P.413} and \texttt{/tcb/fit fontsize macros} \textsuperscript{P.414} to redefine \texttt{\normalcode\texttt{normalsize}} to \texttt{(length)} and all other standard font size macros like \texttt{\small} and \texttt{\large} accordingly. This needs a freely scalable font family like \texttt{lmodern} to work. If \texttt{/tcb/posterset/fontsize} is not applied, there standard font size macros are not changed in any way.

\begin{tcbposter}
\begin{code}
\texttt{\begin{tcbposter}[
poster = {spacing=2mm,columns=3,rows=2},
coverage = {height=5cm,
  interior style={top color=yellow,bottom color=yellow!50!red},
},
\end{tcbposter}}
\end{code}
\end{tcbposter}
19.7 Box Placement

\posterbox[(options)]{(placement)}{(box content)}

Inside a \texttt{tcbposter} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox (options)} and the given \texttt{(box content)} at a place determined by \texttt{(placement)}. All \texttt{(placement)} options are described in the following. Note that \texttt{(box content)} cannot contain \texttt{verbatim} material, see \texttt{posterboxenv}.

\begin{tcbposter}
poster = {showframe,height=4cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}
\begin{posterboxenv}[title=My title]{name=A,column=2,row=2}{My first box}
\end{posterboxenv}

\begin{tcblisting}{size=small,colback=yellow!10}
My \textbf{first} poster listing.
\end{tcblisting}

This is the environment version of \texttt{posterbox}, i.e. inside a \texttt{tcbposter} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox (options)} and the given \texttt{(environment content)} at a place determined by \texttt{(placement)}. In contrast to \texttt{posterbox}, the \texttt{(environment content)} is allowed to contain \texttt{verbatim} material. Note that the implementation of \texttt{posterbox} is more efficient than the implementation of \texttt{posterboxenv}.

\begin{tcbposter}
poster = {showframe,height=4cm,spacing=2mm,rows=2},
boxes = {size=small,beamer,
         colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}
\begin{posterboxenv}[title=My title]{name=A,column=2,between=top and bottom}
My first box.
\end{posterboxenv}
\begin{tcblisting}{size=small,colback=yellow!10}
My \textbf{first} poster listing.
\end{tcblisting}
\end{tcbposter}
\begin{tcbposter}
\begin{align*}
\text{\texttt{poster = \{showframe, height=2.5cm, spacing=2mm, rows=2\}},} \\
\text{\texttt{boxes = \{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50\},}} \\
\end{align*}
\end{tcbposter}

\begin{tcbposter}
\begin{align*}
\text{\texttt{posterbox\{name=A, column=2, row=2\}\{My first box\}}} \\
\text{\texttt{node\{below right=4mm, fill=yellow\} (X) at \{(TCBPOSTER@poster.north west)\}\{Example A\};}} \\
\text{\texttt{\draw\{blue, very thick, \rightarrow\} (X) \rightarrow (TCBPOSTER@A);} \\
\end{align*}
\end{tcbposter}

\begin{tcbposter}
\begin{align*}
\text{\texttt{\begin{tcbposter}
\begin{align*}
\text{\texttt{poster = \{showframe, height=2.5cm, spacing=2mm, rows=2\}},} \\
\text{\texttt{boxes = \{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50\},}} \\
\end{align*}
\end{tcbposter}} \\
\text{\texttt{\posterbox\{row=1, column=2, span=2\}\{First box\}}} \\
\text{\texttt{\posterbox\{row=2, column=2, span=0.8\}\{Second box\}}} \\
\end{align*}
\end{tcbposter}

\begin{tcbposter}
\begin{align*}
\text{\texttt{\begin{tcbposter}
\begin{align*}
\text{\texttt{poster = \{showframe, height=2.5cm, spacing=2mm, rows=2\}},} \\
\text{\texttt{boxes = \{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50\},}} \\
\end{align*}
\end{tcbposter}} \\
\text{\texttt{\posterbox\{row=1, column=2, span=2\}\{First box\}}} \\
\text{\texttt{\posterbox\{row=2, column=2, span=0.8\}\{Second box\}}} \\
\end{align*}
\end{tcbposter}
/tcb/posterloc/span={number}  
(no default, initially 1)
Sets the width of the current box to span {number} columns. {number} is also allowed to be a real number like 0.5 or 1.7. See /tcb/posterloc/column=P.404 and /tcb/posterloc/column*=P.404 for examples.

/tcb/posterloc/row={number}  
(no default, initially unset)
If this option is applied, the box is placed at the row denoted by {number}. Also, the height is set as fixed according to /tcb/posterloc/rowspan.

\begin{tcbposter}\
poster = {showframe,height=2.5cm,spacing=2mm,rows=2},\nboxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},\n\end{tcbposter}

\begin{tcbposter}\
poster = {showframe,height=2.5cm,spacing=2mm,rows=2},\nboxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},\n\end{tcbposter}

/tcb/posterloc/rowspan={number}  
(no default, initially 1)
Sets the height of the current box to span {number} rows. {number} is also allowed to be a real number like 0.5 or 1.7.

\begin{tcbposter}\
poster = {showframe,height=2.5cm,spacing=2mm,rows=2},\nboxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},\n\end{tcbposter}

/tcb/posterloc/fixed height  
(no value, initially 0pt)
Sets the height of the current box span rows as denoted by /tcb/posterloc/rowspan. This can be used, if not /tcb/posterloc/row, but another height placement option is applied.
The box is placed below another box with the given \texttt{name}. Also, \texttt{name} can be a predefined node, see Section 19.2 on page 398.

\begin{tcbposter}
\begin{verbatim}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{verbatim}
\posterbox{name=A,column=1,below=top}{First box}
\posterbox{name=B,column=1,below=A}{Second box}
\posterbox{name=C,column=2,below=B}{Third box}
\posterbox{name=D,column=3,below=row1}{Fourth box}
\end{tcbposter}

The box is placed above another box with the given \texttt{name}. Also, \texttt{name} can be a predefined node, see Section 19.2 on page 398.

\begin{tcbposter}
\begin{verbatim}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{verbatim}
\posterbox{name=A,column=1,above=bottom}{First box}
\posterbox{name=B,column=1,above=A}{Second box}
\posterbox{name=C,column=2,above=B}{Third box}
\posterbox{name=D,column=3,above=row2}{Fourth box}
\end{tcbposter}
The box is placed at the position with the given \textit{name}. This is quite likely a predefined node, see Section 19.2 on page 398.

\begin{tcbposter}
\begin{tcbraster}
\tcbox[colframe=blue!50!black,colback=blue!50,colupper=yellow!50,at=middle,\textit{name}=A,\textit{column}=1] {First box}
\tcbox[colframe=blue!50!black,colback=blue!50,colupper=yellow!50,\textit{at}=\textit{row}1,\textit{column}=2] {Second box}
\end{tcbraster}
\end{tcbposter}

\begin{tcbposter}
\begin{tcbraster}
\tcbox[colframe=blue!50!black,colback=blue!50,colupper=yellow!50,\textit{below}=\textit{top},\textit{column}=1,\textit{name}=A] {First box}
\tcbox[colframe=blue!50!black,colback=blue!50,colupper=yellow!50,\textit{between}=\textit{A} and \textit{bottom},\textit{column}=1] {Second box}
\tcbox[colframe=blue!50!black,colback=blue!50,colupper=yellow!50,\textit{above}=\textit{bottom},\textit{column}=2] {Third box}
\tcbox[colframe=blue!50!black,colback=blue!50,colupper=yellow!50,\textit{between}=\textit{top} and \textit{C},\textit{span}=2,\textit{column}=2] {Fourth box}
\tcbox[colframe=blue!50!black,colback=blue!50,colupper=yellow!50,\textit{between}=\textit{D} and \textit{bottom},\textit{column}=3] {Fifth box}
\end{tcbraster}
\end{tcbposter}
The box is broken into partial boxes. These partial boxes are placed following the given \(\text{sequence}\) of placements. The feasible syntax for the \(\text{sequence}\) is:

\[
\langle \text{column } a \rangle \text{ between } \langle \text{name } a1 \rangle \text{ and } \langle \text{name } a2 \rangle \text{ then} \\
\langle \text{column } b \rangle \text{ between } \langle \text{name } b1 \rangle \text{ and } \langle \text{name } b2 \rangle \text{ then} \\
\langle \text{column } c \rangle \text{ between } \langle \text{name } c1 \rangle \text{ and } \langle \text{name } c2 \rangle \text{ then} \ldots
\]

Obviously, this places the first part box at \(\langle \text{column } a \rangle\) between \(\langle \text{name } a2 \rangle\) and \(\langle \text{name } a2 \rangle\). The second box part is placed at \(\langle \text{column } b \rangle\) between \(\langle \text{name } b2 \rangle\) and \(\langle \text{name } b2 \rangle\), and so on.

If the box content of a \(\text{/tcb/posterloc/sequence}\) is too short to fill all reserved box parts, the empty boxes are drawn with the \(\text{/tcb/placeholder}\) style. This style can be redefined, e.g. to \(\text{/tcb/blankest}\) if nothing should be drawn for empty boxes.
Horizontal shift of a box by \( \langle \text{length} \rangle \).

\begin{tcbposter}
\[ \text{poster} = \{\text{showframe, height=3cm, spacing=2mm, rows=2}\}, \]
\[ \text{boxes} = \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}\}, \]
\end{tcbposter}

\begin{tcbposter}
\[ \text{posterbox} \{\text{name=A, column=1, row=1, xshift=6mm}\}\{\text{First box}\} \]
\[ \text{posterbox} \{\text{name=B, column=2, row=2, xshift=-6mm}\}\{\text{Second box}\} \]
\end{tcbposter}

Vertical shift of a box by \( \langle \text{length} \rangle \).

\begin{tcbposter}
\[ \text{poster} = \{\text{showframe, height=3cm, spacing=2mm, rows=2}\}, \]
\[ \text{boxes} = \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}\}, \]
\end{tcbposter}

\begin{tcbposter}
\[ \text{posterbox} \{\text{name=A, column=1, row=1, yshift=-4mm}\}\{\text{First box}\} \]
\[ \text{posterbox} \{\text{name=B, column=2, row=2, yshift=4mm}\}\{\text{Second box}\} \]
\end{tcbposter}
The library is loaded by a package option or inside the preamble by:
\tcbuselibrary{fitting}

20.1 Macros of the Library
\tcboxfit[(options)]{(box content)}

Creates a colored box where the given \textit{box content} is fitted to the width and height of the box. A \texttt{tcboxfit} has to have a fixed height. If no fixed height is given, a square box is constructed. In principle, most \textit{options} for a \texttt{tcolorbox} can be used for \texttt{tcboxfit} with some restrictions. A \texttt{tcboxfit} cannot have a lower part and cannot be broken.

\begin{verbatim}
\% \usepackage{lipsum} \tcbuselibrary{raster}
\tcset{colframe=blue!50!black, colback=red!10!white, boxsep=0pt, top=1mm, bottom=1mm, left=1mm, right=1mm, fit algorithm=hybrid*, raster equal skip=1mm}
\begin{tcbraster}[raster columns=3, raster valign=bottom]
\tcboxfit[height=8cm]{\lipsum[1]}
\tcboxfit[height=4cm]{\lipsum[1]}
\tcboxfit[height=2cm]{\lipsum[1]}
\end{tcbraster}
\begin{tcbraster}[colback=green!10!white, boxsep=1mm]
\tcboxfit[height=4cm]{\lipsum[2]}
\tcboxfit[height=4cm, title=With a title]{\lipsum[2]}
\end{tcbraster}
\end{verbatim}


With a title

\newtcbboxfit\{(init options)\}\{(name)\}\{(number)\}\{(default)\}\{(options)\}

Creates a new macro \(\langle name\rangle\) based on \tcbfit\textsuperscript{P.410}. Basically, \newtcbboxfit operates like \newcommand. The new macro \(\langle name\rangle\) optionally takes \(\langle number\rangle+1\) arguments, where \(\langle default\rangle\) is the default value for the optional first argument. The \(\langle options\rangle\) are given to the underlying tcbfit. The \(\langle init options\rangle\) allow setting up automatic numbering, see Section 5 from page 108.

\begin{tcolorbox}
\begin{align*}
\text{This is my own box.} \\
\text{This is my own box with more text to be written.}
\end{align*}
\end{tcolorbox}

\begin{tcolorbox}
\begin{align*}
\text{First box} \\
\text{Second box with more text} \\
\text{Third box with text}
\end{align*}
\end{tcolorbox}

\begin{tcolorbox}
\begin{align*}
\text{Very tiny,} \\
\text{Small,} \\
\text{Normal,} \\
\text{Large,} \\
\text{Huge.}
\end{align*}
\end{tcolorbox}
20.2 Option Keys of the Library

The font size for the content of a box with fixed width and fixed height can be adjusted automatically. This is called the fitbox capture mode. Note that the fit control algorithm constructs a series of versions for the box and selects the ‘best’. Therefore, the compilation time is quite longer than for a normal box. The algorithm will fail, if a different selected font size does not change the overall size of the box content. The \texttt{tcboxfit} macro uses this algorithm by default.

The fit control keys are only applicable to unbreakable boxes without a lower part. The box content should not change counters.

\texttt{/tcb/fit} \hspace{1cm} (style, initially unset)

Sets the \texttt{/tcb/capture} mode to fitbox, i.e. enables the font size adjustment algorithm. Thereby, a \texttt{tcolorbox} acts like \texttt{tcboxfit} where the given \texttt{(box content)} is fitted to the width and height of the box. Therefore, the box has to have a fixed height. If no fixed height is given, a square box is constructed. The font dimension \texttt{tcbfitdim} can also be used to adjust the margins of the box since a box with a tiny font may not need large margins. The number of constructed boxes is saved to the macro \texttt{tcbfitsteps} for analysis.

% \usepackage{lipsum}
% \tcbuselibrary{skins}
\newtcolorbox{fitting}[2][]{fit,height=#2,boxsep=1pt,valign=center,opacityupper=0.5,
tcbfitdim,top=0.4,tcbfitdim,bottom=0.4,tcbfitdim,left=0.75,tcbfitdim,right=0.75,tcbfitdim,
enhanced,watermark text={tcbfitsteps},colframe=blue!75!black,colback=white,#1}

\begin{fitting}{4cm}
\lipsum[1]
\end{fitting}
\begin{fitting}{2cm}
\lipsum[2]
\end{fitting}
\begin{fitting}{1cm}
\lipsum[3]
\end{fitting}
/tcb/fit to ⟨width⟩ and ⟨height⟩

Shortcut for using /tcb/fit\footnote{P.412} and setting the ⟨width⟩ and ⟨height⟩ values separately.

\begin{tcolorbox}[fit to=3cm and 2cm]
This box content is fitted to the given dimensions.
\end{tcolorbox}

This box content is fitted to the given dimensions.

/tcb/fit to height=⟨height⟩

Shortcut for using /tcb/fit\footnote{P.412} and setting the ⟨height⟩ value separately.

\begin{tcolorbox}[fit to height=2cm]
This box content is fitted to the given height.
\end{tcolorbox}

This box content is fitted to the given height.

/tcb/fit basedim=⟨length⟩

(no default, initially 10pt)

Sets the starting font dimension for the font size adjustment algorithm to ⟨length⟩. The algorithm never enlarges this dimension.

\begin{tcolorbox}[fit to=4cm and 2cm, fit basedim=50pt]
Too few words for the box.
\end{tcolorbox}

Too few words for the box.

\begin{tcolorbox}[fit to=4cm and 2cm]
Enough words for the box.
\end{tcolorbox}

Enough words for the box.

/tcb/fit skip=⟨real value⟩

(no default, initially 1.2)

Sets the skip value of the selected font to ⟨real value⟩ times \texttt{\textbackslash tcbfitdim}.

\begin{tcolorbox}[fit to=5cm and 4cm, fit skip=1.0 ]
\lipsum[1]
\end{tcolorbox}

/tcb/fit fontsize macros

Redefines the standard \LaTeX font size macros \tiny, \scriptsize, \footnotesize, \small, \normalsize, \large, \Large, \LARGE, \huge, and \Huge, to set font sizes relative to the current \tcbfitdim. Note that the display skip values for mathematical formulas are respected by the redefined macros.

% \usepackage{lipsum}
\tcbset{colback=red!5!white,}
colframe=red!75!black,left=1mm,\scriptsize
right=1mm,boxsep=0mm}
\begin{tcolorbox}[fit to height=4cm]
{\Large\bfseries This text is not adapted:}\par
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit to height=4cm,\
ormalsize
fit fontsize macros \]
{\Large\bfseries This text is adapted:}\par
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit basedim=7pt,\
ormalsize\bfseries
fit fontsize macros\]
The relative relative font size macros are also usable without the \textit{fit} algorithm.\par
{\Huge Adapted Huge} ---
{\realHuge Original Huge}
\end{tcolorbox}

\let\realHuge=\Huge
\begin{tcolorbox}[fit basedim=7pt,\
ormalsize\bfseries
fit fontsize macros\]
The relative relative font size macros are also usable without the \textit{fit} algorithm.\par
{\Huge Adapted Huge} ---
{\realHuge Original Huge}
\end{tcolorbox}

% \usepackage{lipsum}
\tcbset{size=fbox,colback=red!5!white,}
colframe=red!75!black}
\tcbxofit[height=5cm,\
ormalsize\bfseries
fit fontsize macros,\
ormalsize\bfseries
title=Adapted title]
{\lipsum[2]}

This text is not adapted:


This text is adapted:


The relative relative font size macros are also usable without the \textit{fit} algorithm.

Adapted Huge — Original Huge

Adapted title

The box is allowed to enlarge the fixed height up to the given \( \langle \text{dimension} \rangle \), before a font size fit is applied. An optional \texttt{/tcb/fit width plus} is tried after the height adaption.

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[fit,fit height plus=1cm]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit,fit height plus=1cm]
\lipsum[2]
\end{tcolorbox}

The box is allowed to enlarge the fixed width up to the given \( \langle \text{dimension} \rangle \), before a font size fit is applied. An optional \texttt{/tcb/fit height plus} is tried before the width adaption.

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[fit,fit width plus=1cm]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}
Typically but not necessarily, the optional title of a \texttt{tcolorbox} is not part of the fit operation. If a \texttt{/tcb/fit width plus} is applied, the title is also adapted to the new width. If counters are increased inside the title text, they may be increased more than one time. To avoid this, you are encouraged to use \texttt{/tcb/phantom} or \texttt{/tcb/step and label} to set counters or use automatic numbering, see Subsection 5.1 from page 108.

\texttt{/tcb/fit width from=\langle min \rangle to \langle max \rangle}  \hfill (style, no default)

Sets the box width to \langle min \rangle and allows the width to grow up to \langle max \rangle.

% \usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm,
right=1mm,boxsep=0mm,height=4cm}
\begin{tcolorbox}[fit,width=\linewidth/2]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit width from=\linewidth/2 to \linewidth]
\lipsum[2]
\end{tcolorbox}

Sets the box height to \(\langle\text{min}\rangle\) and allows the height to grow up to \(\langle\text{max}\rangle\).
Sets the algorithm for the fitting process after optionally width and height are adapted. Feasible values for \(\text{name}\) are:

- **fontsize** (initial): The algorithm is a bisection method that adapts the font size until certain stop conditions are fulfilled. This is the most time-consuming method but it is robust and gives pleasant results.
  
  ! The used font has to be freely scalable for this method! Other content than text is not scaled down. The aspect ratio is fully guaranteed.

- **fontsize**: First, the **fontsize** algorithm is applied. If the font was scaled down and the resulting height is too small, the box is squeezed to fit the area.
  
  ! The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **areasize**: The algorithm calculates the area size for the text without scaling the font. The text box is shaped for the needed aspect ratio in one or two steps. Finally, it is scaled down with a standard \texttt{\textbackslash resizebox} macro.
  
  ! The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.

- **areasize**: The **areasize** algorithm is applied, but if the content was scaled down and the resulting height is too small, the box is squeezed to fit the area.
  
  ! The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.

- **hybrid**: First, this algorithm estimates the needed font size in one or two steps. Then an **areasize** fitting as above is applied.
  
  ! The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **hybrid**: First, this algorithm estimates the needed font size in one or two steps. Then an **areasize** fitting as above is applied.
  
  ! The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **squeeze**: The text box is brutally scaled down to fit.
  
  ! The aspect ratio is very likely to be horrible. You should not use this method for final documents.
Quality \dotfill versus \dotfill Speed

- **fontsize**

- **hybrid**

- **areasize**

- **squeeze**

hybrid (possible gap at end)


hybrid* (no gap but possibly squeezed)

The following options set control parameters for the fit algorithm. Mainly, they apply to the fontsize variant, see /tcb/fit algorithm. The options should be seen as experimental and are likely to change in future versions, if necessary.

/tcb/fit maxstep=⟨number⟩ (no default, initially 20)
Sets the maximal step size for the font size adjustment algorithm. In normal situations, the algorithm stops before reaching the initial value of 20 steps. If the box content does not shrink, this value prevents an endless loop.

/tcb/fit maxfontdiff=⟨dimension⟩ (no default, initially 0.1pt)
The algorithm stops, if the font size is determined within a deviation of ⟨dimension⟩.

/tcb/fit maxfontdiffgap=⟨dimension⟩ (no default, initially 1pt)
The algorithm stops, if the number of lines is determined and the font size is determined within a deviation of ⟨dimension⟩.

/tcb/fit maxwidthdiff=⟨dimension⟩ (no default, initially 1pt)
The algorithm stops, if the (optionally) flexible box width is determined within a deviation of ⟨dimension⟩.

/tcb/fit maxwidthdiffgap=⟨dimension⟩ (no default, initially 10pt)
The algorithm stops, if the number of lines is determined and the (optionally) flexible box width is determined within a deviation of ⟨dimension⟩.

/tcb/fit warning=⟨value⟩ (no default, initially off)
Typically, the fit control algorithm constructs several auxiliary boxes to determine the optimal one. If not switched off, the construction of the auxiliary boxes may produce many \hbox warnings. This option key changes the \hbadness value.
- off: Most of ‘Underfull \hbox’ and ‘Overfull \hbox’ warnings are switched off (including the ones for the finally used box).
- on: All warnings for all auxiliary boxes are displayed.
- final: Only warnings for the finally used box are displayed. Note that an additional box has to be contructed for these messages.
21  Library \texttt{hooks}

The library is loaded by a package option or inside the preamble by:

```latex
\tcbuselibrary{hooks}
```

For the skin related options, the library \texttt{skins} has to be loaded separately.

### 21.1 Concept of Hooks

A hook is a placeholder in some \LaTeX{} code where additional code can be added. For example, the \LaTeX{} macro `\texttt{AtBeginDocument}` adds code to a hook which is placed at the beginning of every document.

Several option keys of \texttt{tcolorbox} allow providing some code which is added to specific places of a colored box. For example, `/tcb/before upper` \textsuperscript{P.65} places code before the content of the upper part. A following usage of this key overwrites any prior settings.

The library \texttt{hooks} extends `/tcb/before upper` \textsuperscript{P.65} and several more existing keys to 'hookable' versions, e.g. `/tcb/before upper app` \textsuperscript{P.423} and `/tcb/before upper pre` \textsuperscript{P.423}. The 'hookable' keys don’t overwrite prior settings but either append or prepend the newly given code to the existing code.

The general naming convention (with some small exceptions) is:

- `{option key} app`: works like `{option key}` but appends its code to the existing code.
- `{option key} pre`: works like `{option key}` but prepends its code to the existing code.

If the original `{option key}` is used (again), all code will be overwritten. Therefore, the order of the option key usage is crucial.
% \usepackage{array,tabularx}
% newcolumntype{Y}{>{\raggedleft\arraybackslash}X}% see tabularx
\tcbset{enhanced,fonttitle={bfseries\large,fontupper=\normalsize\sffamily,}
colback=yellow!10!white,colframe=red!50!black,colbacktitle=Salmon!30!white,
coltitle=black,center title, tabularx={X||Y|Y|Y|Y||Y},% this sets 'before upper' and 'after upper'
before upper app={Group & One & Two & Three & Four & Sum\\hline},
\begin{tcolorbox}[title=My table]
\begin{tabular}{|l|c|c|c|c|c|}
\hline
Group & One & Two & Three & Four & Sum \\
\hline
Red  & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\hline
Blue  & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
Sum   & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabular}
\end{tcolorbox}

21.2 Box Content Additions

The following option keys extend the options given in Subsection 4.11 from page 64.

/tcb/before title app=(code) (no default)
Appends the given ⟨code⟩ to /tcb/before title P.64 after the color and font settings and before the content of the title.

/tcb/before title pre=(code) (no default)
Prepends the given ⟨code⟩ to /tcb/before title P.64 after the color and font settings and before the content of the title.

/tcb/after title app=(code) (no default)
Appends the given ⟨code⟩ to /tcb/after title P.64 after the content of the title.

/tcb/after title pre=(code) (no default)
Prepends the given ⟨code⟩ to /tcb/after title P.64 after the content of the title.

/tcb/before upper app=(code) (no default)
Appends the given ⟨code⟩ to /tcb/before upper P.65 after the color and font settings and before the content of the upper part.

/tcb/before upper pre=(code) (no default)
Prepends the given ⟨code⟩ to /tcb/before upper P.65 after the color and font settings and before the content of the upper part.

/tcb/after upper app=(code) (no default)
Appends the given ⟨code⟩ to /tcb/after upper P.65 after the content of the upper part.

/tcb/after upper pre=(code) (no default)
Prepends the given ⟨code⟩ to /tcb/after upper P.65 after the content of the upper part.

% \tcbuselibrary{theorems}
\tcbset{ams align, % this sets 'before upper' and 'after upper'
  colback=yellow!10!white, colframe=red!50!black,
  before upper app={\frac{2}{\sqrt{2}}&=&\sqrt{2}.\},
  after upper pre={\\sin\left(\frac{\pi}{2}\right)&=&1.},
}
\begin{tcolorbox}
\sum_{n=1}^{\infty} \frac{1}{n} = \infty.\)
\int x^2 ~\text{d}x = \frac13 x^3 + c.
\end{tcolorbox}

\begin{tcolorbox}
\begin{align}
\frac{2}{\sqrt{2}} &= \sqrt{2}. \quad (22) \\
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \tag{23} \\
\int x^2 \, dx &= \frac13 x^3 + c. \quad (24) \\
\sin\left(\frac{\pi}{2}\right) &= 1. \tag{25}
\end{align}
\end{tcolorbox}
Appends the given \texttt{code} to /tcb/before lower\textsuperscript{\ref{P.66}} after the color and font settings and before the content of the lower part.

Prepends the given \texttt{code} to /tcb/before lower\textsuperscript{\ref{P.66}} after the color and font settings and before the content of the lower part.

Appends the given \texttt{code} to /tcb/after lower\textsuperscript{\ref{P.66}} after the content of the lower part.

Prepends the given \texttt{code} to /tcb/after lower\textsuperscript{\ref{P.66}} after the content of the lower part.

\begin{tcolorbox}[title=My title,before app={The box follows:\[4pt\]},after app={This is the end.}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

The box follows:

\textbf{My title}

This is a \textbf{tcolorbox}.

This is the end.
21.4 Overlays

The following option keys extend the options given in Subsection 4.12 from page 71.

\texttt{/tcb/overlay app=⟨graphical code⟩} \hspace{1cm} \text{(no default)}

Appends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/overlay} \textsuperscript{P.71}.

\texttt{/tcb/overlay pre=⟨graphical code⟩} \hspace{1cm} \text{(no default)}

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/overlay} \textsuperscript{P.71}.

\texttt{/tcb/overlay unbroken app=⟨graphical code⟩} \hspace{1cm} \text{(no default)}

Appends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/overlay unbroken} \textsuperscript{P.72}.

\texttt{/tcb/overlay unbroken pre=⟨graphical code⟩} \hspace{1cm} \text{(no default)}

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/overlay unbroken} \textsuperscript{P.72}.

\texttt{/tcb/overlay first app=⟨graphical code⟩} \hspace{1cm} \text{(no default)}

Appends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/overlay first} \textsuperscript{P.72}.

\texttt{/tcb/overlay first pre=⟨graphical code⟩} \hspace{1cm} \text{(no default)}

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/overlay first} \textsuperscript{P.72}.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/overlay middle app=⟨graphical code⟩ (no default)</td>
<td>Appends the given ⟨graphical code⟩ to /tcb/overlay middle. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay middle pre=⟨graphical code⟩ (no default)</td>
<td>Prepends the given ⟨graphical code⟩ to /tcb/overlay middle. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay last app=⟨graphical code⟩ (no default)</td>
<td>Appends the given ⟨graphical code⟩ to /tcb/overlay last. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay last pre=⟨graphical code⟩ (no default)</td>
<td>Prepends the given ⟨graphical code⟩ to /tcb/overlay last. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay broken app=⟨graphical code⟩ (no default)</td>
<td>Appends the given ⟨graphical code⟩ to /tcb/overlay broken. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay broken pre=⟨graphical code⟩ (no default)</td>
<td>Prepends the given ⟨graphical code⟩ to /tcb/overlay broken. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay unbroken and first app=⟨graphical code⟩ (no default)</td>
<td>Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken and first. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay unbroken and first pre=⟨graphical code⟩ (no default)</td>
<td>Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken and first. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay middle and last app=⟨graphical code⟩  (no default)</td>
<td>Appends the given ⟨graphical code⟩ to /tcb/overlay middle and last. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay middle and last pre=⟨graphical code⟩ (no default)</td>
<td>Prepends the given ⟨graphical code⟩ to /tcb/overlay middle and last. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay unbroken and last app=⟨graphical code⟩ (no default)</td>
<td>Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken and last. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay unbroken and last pre=⟨graphical code⟩ (no default)</td>
<td>Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken and last. P.72.</td>
</tr>
<tr>
<td>/tcb/overlay first and middle app=⟨graphical code⟩</td>
<td>(no default)</td>
</tr>
<tr>
<td>/tcb/overlay first and middle pre=⟨graphical code⟩</td>
<td>(no default)</td>
</tr>
</tbody>
</table>
21.5 Watermarks

The following option keys extend the options given in Subsection 10.3 from page 165.

Watermarks are special overlays. The \texttt{\textcolor{red}{\textbf{hooks}}} library allows the combination of several watermarks and overlays.

\begin{itemize}
  \item \texttt{/tcb/watermark text app=(text)} \hspace{1cm} (no default)
    \begin{description}
    \item[Appe]nds a \texttt{/tcb/watermark text} \hspace{1cm} P.165 to the colored box.
    \end{description}
  \item \texttt{/tcb/watermark text pre=(text)} \hspace{1cm} (no default)
    \begin{description}
    \item[Prep]ends a \texttt{/tcb/watermark text} \hspace{1cm} P.165 to the colored box.
    \end{description}
  \item \texttt{/tcb/watermark text app on=(part) is (text)} \hspace{1cm} (no default)
    \begin{description}
    \item[Appe]nds a \texttt{/tcb/watermark text on} \hspace{1cm} P.165 the named \texttt{(part)} of a break sequence.
    \end{description}
  \item \texttt{/tcb/watermark text pre on=(part) is (text)} \hspace{1cm} (no default)
    \begin{description}
    \item[Prep]ends a \texttt{/tcb/watermark text on} \hspace{1cm} P.165 the named \texttt{(part)} of a break sequence.
    \end{description}
\end{itemize}
/tcb/watermark graphics app=(file name)  (no default)
Appends a /tcb/watermark graphics on P.166 referenced by (file name) to the colored box.

/tcb/watermark graphics pre=(file name)  (no default)
Prepends a /tcb/watermark graphics on P.166 referenced by (file name) to the colored box.

/tcb/watermark graphics app on=(part) is (file name)  (no default)
Appends a /tcb/watermark graphics on P.166 the named (part) of a break sequence. The picture is referenced by (file name).

/tcb/watermark graphics pre on=(part) is (file name)  (no default)
Prepends a /tcb/watermark graphics on P.166 the named (part) of a break sequence. The picture is referenced by (file name).

/tcb/watermark tikz app=(graphical code)  (no default)
Appends a /tcb/watermark tikz on P.167 with the given tikz (graphical code) to the colored box.

/tcb/watermark tikz pre=(graphical code)  (no default)
Prepends a /tcb/watermark tikz on P.167 with the given tikz (graphical code) to the colored box.

\begin{tcolorbox}[enhanced,title=My title, watermark text=Watermark, smiley]  
\end{tcolorbox}

/tcb/watermark tikz app on=(part) is (graphical code)  (no default)
Appends a /tcb/watermark tikz on P.167 the named (part) of a break sequence.

/tcb/watermark tikz pre on=(part) is (graphical code)  (no default)
Prepends a /tcb/watermark tikz on P.167 the named (part) of a break sequence.
21.6 Underlays

The following option keys extend the options given in Section 10.8 on page 195. There are no app type keys since underlays are stackable by default.

/tcb/underlay pre\(=\)⟨graphical code⟩ (no default)
- Prepends the given ⟨graphical code⟩ to /tcb/underlay\(^{\text{P.195}}\).

/tcb/underlay unbroken pre\(=\)⟨graphical code⟩ (no default)
- Prepends the given ⟨graphical code⟩ to /tcb/underlay unbroken\(^{\text{P.196}}\).

/tcb/underlay first pre\(=\)⟨graphical code⟩ (no default)
- Prepends the given ⟨graphical code⟩ to /tcb/underlay first\(^{\text{P.196}}\).

/tcb/underlay middle pre\(=\)⟨graphical code⟩ (no default)
- Prepends the given ⟨graphical code⟩ to /tcb/underlay middle\(^{\text{P.196}}\).

/tcb/underlay last pre\(=\)⟨graphical code⟩ (no default)
- Prepends the given ⟨graphical code⟩ to /tcb/underlay last\(^{\text{P.196}}\).

/tcb/underlay boxed title pre\(=\)⟨graphical code⟩ (no default)
- Prepends the given ⟨graphical code⟩ to /tcb/underlay boxed title\(^{\text{P.196}}\).

/tcb/underlay broken pre\(=\)⟨graphical code⟩ (no default)
- Prepends the given ⟨graphical code⟩ to /tcb/underlay broken\(^{\text{P.196}}\).

/tcb/underlay unbroken and first pre\(=\)⟨graphical code⟩ (no default)
- Prepends the given ⟨graphical code⟩ to /tcb/underlay unbroken and first\(^{\text{P.196}}\).

/tcb/underlay middle and last pre\(=\)⟨graphical code⟩ (no default)
- Prepends the given ⟨graphical code⟩ to /tcb/underlay middle and last\(^{\text{P.196}}\).

/tcb/underlay unbroken and last pre\(=\)⟨graphical code⟩ (no default)
- Prepends the given ⟨graphical code⟩ to /tcb/underlay unbroken and last\(^{\text{P.196}}\).

/tcb/underlay first and middle pre\(=\)⟨graphical code⟩ (no default)
- Prepends the given ⟨graphical code⟩ to /tcb/underlay first and middle\(^{\text{P.196}}\).
21.7  Finishes

The following option keys extend the options given in Section 10.9 on page 197. There are no app type keys since finishes are stackable by default.

```
/tcb/finish pre=(graphical code)  (no default)
    Prepends the given (graphical code) to /tcb/finish ÷P.197.
/tcb/finish unbroken pre=(graphical code) (no default)
    Prepends the given (graphical code) to /tcb/finish unbroken ÷P.198.
/tcb/finish first pre=(graphical code)  (no default)
    Prepends the given (graphical code) to /tcb/finish first ÷P.198.
/tcb/finish middle pre=(graphical code) (no default)
    Prepends the given (graphical code) to /tcb/finish middle ÷P.198.
/tcb/finish last pre=(graphical code)  (no default)
    Prepends the given (graphical code) to /tcb/finish last ÷P.198.
/tcb/finish broken pre=(graphical code) (no default)
    Prepends the given (graphical code) to /tcb/finish broken ÷P.198.
/tcb/finish unbroken and first pre=(graphical code) (no default)
    Prepends the given (graphical code) to /tcb/finish unbroken and first ÷P.198.
/tcb/finish middle and last pre=(graphical code) (no default)
    Prepends the given (graphical code) to /tcb/finish middle and last ÷P.198.
/tcb/finish unbroken and last pre=(graphical code) (no default)
    Prepends the given (graphical code) to /tcb/finish unbroken and last ÷P.198.
/tcb/finish first and middle pre=(graphical code) (no default)
    Prepends the given (graphical code) to /tcb/finish first and middle ÷P.198.
```

21.8  Skin Code

The following option keys extend the options given in Subsection 9.2 from page 138.

```
/tcb/frame code app=(graphical code)  (no default)
    Appends the given (graphical code) to /tcb/frame code ÷P.138.
/tcb/frame code pre=(graphical code)  (no default)
    Prepends the given (graphical code) to /tcb/frame code ÷P.138.
/tcb/interior titled code app=(graphical code) (no default)
    Appends the given (graphical code) to /tcb/interior titled code ÷P.138.
```
The following option keys extend the options given in Section 17.5 on page 371. There are no \texttt{app} type keys since extras are stackable by default.

- \texttt{/tcb/extras pre}={\langle options\rangle} \hspace{1cm} (no default)
  Prepends the given \langle options\rangle to /tcb/extras\textsuperscript{\textit{P.371}}.
- \texttt{/tcb/extras unbroken pre}={\langle options\rangle} \hspace{1cm} (no default)
  Prepends the given \langle options\rangle to /tcb/extras unbroken\textsuperscript{\textit{P.371}}.
- \texttt{/tcb/extras first pre}={\langle options\rangle} \hspace{1cm} (no default)
  Prepends the given \langle options\rangle to /tcb/extras first\textsuperscript{\textit{P.371}}.
- \texttt{/tcb/extras middle pre}={\langle options\rangle} \hspace{1cm} (no default)
  Prepends the given \langle options\rangle to /tcb/extras middle\textsuperscript{\textit{P.371}}.
- \texttt{/tcb/extras last pre}={\langle options\rangle} \hspace{1cm} (no default)
  Prepends the given \langle options\rangle to /tcb/extras last\textsuperscript{\textit{P.371}}.
- \texttt{/tcb/extras broken pre}={\langle options\rangle} \hspace{1cm} (no default)
  Prepends the given \langle options\rangle to /tcb/extras broken\textsuperscript{\textit{P.371}}.
- \texttt{/tcb/extras unbroken and first pre}={\langle options\rangle} \hspace{1cm} (no default)
  Prepends the given \langle options\rangle to /tcb/extras unbroken and first\textsuperscript{\textit{P.371}}.
- \texttt{/tcb/extras middle and last pre}={\langle options\rangle} \hspace{1cm} (no default)
  Prepends the given \langle options\rangle to /tcb/extras middle and last\textsuperscript{\textit{P.371}}.
- \texttt{/tcb/extras unbroken and last pre}={\langle options\rangle} \hspace{1cm} (no default)
  Prepends the given \langle options\rangle to /tcb/extras unbroken and last\textsuperscript{\textit{P.371}}.
- \texttt{/tcb/extras first and middle pre}={\langle options\rangle} \hspace{1cm} (no default)
  Prepends the given \langle options\rangle to /tcb/extras first and middle\textsuperscript{\textit{P.371}}.
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{xparse}

This also loads the package \texttt{xparse} \cite{13}.

The purpose of this library is to give comfortable access to the powerful document command production with \texttt{xparse} for \texttt{tcolorbox}. See the \texttt{xparse} package documentation \cite{13} for details about the argument (\textit{specification}) used in this section.

### 22.1 Option Keys

\texttt{/tcb/verbatim} \hspace{1cm} (style, no value)

Sets options for a \textit{verbatim} style \texttt{tcolorbox} \cite{14}. Since the indented boxes may contain only very few words, the dimensions are made smaller and \texttt{/tcb/nobeforeafter} \cite{78} and \texttt{/tcb/tcbox raise base} \cite{96} are set.

\begin{tcolorbox}[verbatim, colframe=red!75!black,colupper=blue]
\verb|\textbf| is a \LaTeX\ command.
\end{tcolorbox}

\begin{tcolorbox}
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[goldshade.png]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/IfNoValueTF} \hspace{1cm} (no default)

Wraps the \texttt{IfNoValueTF} command of \texttt{xparse} for option setting. If the \langle argument \rangle has no value, the \langle true options \rangle are set. Otherwise, the \langle false options \rangle are set.

\begin{tcolorbox}[o]  
\verb|\textbf| is a \LaTeX\ command.
\end{tcolorbox}

\begin{tcolorbox}
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}
This is a tcolorbox.
\end{tcolorbox}
/tcb/IfValueTF={⟨argument⟩}{⟨true options⟩}{⟨false options⟩} (no default)
Wraps the IfValueTF command of xparse for option setting. If the ⟨argument⟩ has a
value, the ⟨true options⟩ are set. Otherwise, the ⟨false options⟩ are set.

\begin{mybox}{o}{colframe=red!75!black,colback=red!5!white,
IfValueTF={#1}{title={\textls{#1}},{fonttitle=\bfseries}{}}}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}{My title}
This is a tcolorbox.
\end{mybox}
\begin{mybox}{My title}
This is a tcolorbox.
\end{mybox}

/tcb/IfBooleanTF={⟨argument⟩}{⟨true options⟩}{⟨false options⟩} (no default)
Wraps the IfBooleanTF command of xparse for option setting. If the ⟨argument⟩ is
\BooleanTrue, the ⟨true options⟩ are set. If the ⟨argument⟩ is \BooleanFalse, the ⟨false
options⟩ are set.

\begin{mybox}{s}{colframe=red!75!black,
IfBooleanTF={#1}{colback=yellow!50!red}{colback=red!5!white}}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}*
This is a tcolorbox.
\end{mybox}
22.2 Producing \texttt{tcolorbox} Environments and Commands

\begin{quote}
\texttt{\textbackslash DeclareTColorBox[(init\ options)]\{\textbackslash name\}\{\textbackslash specification\}\{\textbackslash options\}}

Creates a new environment \textbackslash name based on \texttt{tcolorbox}. Basically, \texttt{\textbackslash DeclareTColorBox} operates like \texttt{\textbackslash DeclareDocumentEnvironment}. This means, the new environment \textbackslash name is constructed with the given argument \textbackslash specification. The \textbackslash options are given to the underlying \texttt{tcolorbox}. Note that \texttt{/tcb/savedelimiter} is set to the given \textbackslash name automatically. The \texttt{/init\ options} allow setting up automatic numbering, see Section 5 from page 108. The new environment is always created, irrespective of an already existing environment with the same name.
\end{quote}

% counter from previous example
\texttt{\textbackslash DeclareTColorBox[use counter from=pabox]\{mybox\}{ O\{red\} m d" O\{\}} }
\{enhanced,colframe=#1!75!black,colback=#1!5!white, fonttitle=\textbackslash bfseries,title={\textbackslash thetcbcounter-\#2}, IfValueTF={#3}{watermark text={#3}}{},#4\}

\begin{mybox}{My title}
This is a \texttt{tcolorbox}.
\end{mybox}

\begin{mybox}[blue]{My title}
This is a \texttt{tcolorbox}.
\end{mybox}

\begin{mybox}[green]{My title}"My Watermark"
This is a \texttt{tcolorbox}.
\end{mybox}

\begin{mybox}[yellow]{My title}[colbacktitle=yellow!50!white,coltitle=black]
This is a \texttt{tcolorbox}.
\end{mybox}

\begin{mybox}[purple]{My title}"All together"[coltitle=yellow]
This is a \texttt{tcolorbox}.
\end{mybox}

\begin{quote}
\begin{tabular}{|c|}
\hline
\textbf{22.1 My title} \tab This is a \texttt{tcolorbox}. \\
\hline
\textbf{22.2 My title} \tab This is a \texttt{tcolorbox}. \\
\hline
\textbf{22.3 My title} \tab This is a \texttt{tcolorbox}. \tab \textbf{My Watermark} \\
\hline
\textbf{22.4 My title} \tab This is a \texttt{tcolorbox}. \\
\hline
\textbf{22.5 My title} \tab This is a \texttt{tcolorbox}. \tab \textbf{All together} \\
\hline
\end{tabular}
\end{quote}

435
\NewTColorBox\{\textit{init options}\}\{\textit{name}\}\{\textit{specification}\}\{\textit{options}\}

Operates like \DeclareTColorBox\textsuperscript{P. 435}, but based on \NewDocumentEnvironment instead of \DeclareDocumentEnvironment. An error is issued if \textit{name} has already been defined.

\RenewTColorBox\{\textit{init options}\}\{\textit{name}\}\{\textit{specification}\}\{\textit{options}\}

Operates like \DeclareTColorBox\textsuperscript{P. 435}, but based on \RenewDocumentEnvironment instead of \DeclareDocumentEnvironment. An existing environment is redefined.

\ProvideTColorBox\{\textit{init options}\}\{\textit{name}\}\{\textit{specification}\}\{\textit{options}\}

Operates like \DeclareTColorBox\textsuperscript{P. 435}, but based on \ProvideDocumentEnvironment instead of \DeclareDocumentEnvironment. The environment \textit{name} is only created if it is not already defined.
\Declarerelbox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Creates a new command \langle name\rangle based on \tcolorbox. In contrast to \Declarerelbox, also the \langle content\rangle of the \tcolorbox is specified.

Basically, \Declarerelbox operates like \DeclareDocumentCommand. This means, the new command \langle name\rangle is constructed with the given argument \langle specification\rangle.

The \langle options\rangle are given to the underlying \tcolorbox which is filled with the specified \langle content\rangle.

Note that /tcb/savedelimiter is set to the given \langle name\rangle automatically.

The \langle init options\rangle allow setting up automatic numbering, see Section 5 from page 108.

The new command is always created, irrespective of an already existing command with the same name.

\Declarerelbox{diabox}{\O{} v m}
{ bicolor,nobeforeafter,equal height group=diabox,width=5.7cm,
  fonttitle=\bfseries\ttfamily,adjusted title=\#2,center title,
  colframe=blue!20!black,leftupper=0mm,rightupper=0mm,colback=black!75!white,#1}
{ \tikz\path[fill zoom image=\#2] (0,0) rectangle (\linewidth,4cm);
  \tcblower #3}

\diabox{blueshade.png}{Created with |GIMP|.\url{http://www.gimp.org}}
\diabox{goldshade.png}{Created with |GIMP|.\url{http://www.gimp.org}}

\Newrelbox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \Declarerelbox, but based on \NewDocumentCommand instead of \DeclareDocumentCommand. An error is issued if \langle name\rangle has already been defined.

\Renewelbox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \Declarerelbox, but based on \RenewDocumentCommand instead of \DeclareDocumentCommand. An existing command is redefined.

\Proverelbox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \Declarerelbox, but based on \Proverelbox instead of \DeclareDocumentCommand. The command \langle name\rangle is only created if it is not already defined.
### 22.3 Producing \texttt{tcbox} Commands

\begin{verbatim}
\DeclareTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}
\end{verbatim}

Creates a new command \texttt{⟨name⟩} based on \texttt{tcbox} \cite{P.14}. Basically, \texttt{\DeclareTCBox} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \texttt{⟨name⟩} is constructed with the given argument \texttt{⟨specification⟩}. The \texttt{⟨options⟩} are given to the underlying \texttt{tcbox} \cite{P.14}.

Note that \texttt{/tcb/savedelimiter} \cite{P.26} is set to the given \texttt{⟨name⟩} automatically.

The \texttt{⟨init options⟩} allow setting up automatic numbering, see Section 5 from page 108.

The new command is always created, irrespective of an already existing command with the same name.

% counter from previous example
\begin{verbatim}
\DeclareTCBox[use counter from=pabox]{mybox}{ s m s }
{ nobeforeafter,colback=red!5!white,colframe=red!75!black,
  title={#2 (Box \thetcbcounter)},fonttitle=\bfseries,
  IfBooleanTF={#1}{enhanced,drop shadow}{},
  IfBooleanTF={#3}{colbacktitle=red!50!white}{} }
\end{verbatim}

\begin{verbatim}
\mybox{Bird}{This is my first box.}
\hfill\mybox*{Tree}{This is my second box.}
\par\bigskip
\mybox{Bike}{This is my third box.}
\hfill\mybox*{City}{This is my fourth box.}
\end{verbatim}

\texttt{\NewTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}}

Operates like \texttt{\DeclareTCBox}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \texttt{⟨name⟩} has already been defined.

\texttt{\RenewTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}}

Operates like \texttt{\DeclareTCBox}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\texttt{\ProvideTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}}

Operates like \texttt{\DeclareTCBox}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \texttt{⟨name⟩} is only created if it is not already defined.
\DeclareTotalTCBox\{\(\text{name}\)\}{\langle \text{specification} \rangle}{\langle \text{options} \rangle}{\langle \text{content} \rangle}

Creates a new command \(\text{name}\) based on \texttt{\tcbox}\textsuperscript{P.14}. In contrast to \texttt{\DeclareTCBox}\textsuperscript{P.438}, also the \(\text{content}\) of the \texttt{tcbox} is specified. Basically, \texttt{\DeclareTotalTCBox} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \(\text{name}\) is constructed with the given argument \(\text{specification}\). The \(\text{options}\) are given to the underlying \texttt{\tcbox}\textsuperscript{P.14} which is filled with the specified \(\text{content}\).

Note that \texttt{/tcb/savedelimiter}\textsuperscript{P.26} is set to the given \(\text{name}\) automatically. The \(\text{init options}\) allow setting up automatic numbering, see Section 5 from page 108. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\DeclareTotalTCBox{\myverb}{ O{\textcolor{red}{v} O{} } }
{ fontupper=\ttfamily,nobeforeafter,tcbox raise base,arc=0pt,outer arc=0pt,
top=0pt,bottom=0pt,left=0mm,right=0mm,
leftrule=0pt,rightrule=0pt,toprule=0.3mm,bottomrule=0.3mm,boxsep=0.5mm,
colback=#1!10!white,colframe=#1!50!black,#3}{#2}
\end{verbatim}

To set a word \texttt{\textbf{bold}} in \myverb{\LaTeX}, use \myverb[green]{\textbf{bold}}. Alternatively, write \myverb[yellow]{{\bfseries bold}}. In \myverb[blue]{\LaTeX}[enhanced,fuzzy halo], other font settings are done in the same way, e.\,g. \myverb[\texttt]{\textit}, \myverb[\itshape] or \myverb[brown]{\texttt} or \myverb[brown]{\ttfamily}.

The next example uses \texttt{\lstinline} from the \texttt{listings} package to typeset the verbatim content.

\begin{verbatim}
% \usepackage{listings} or \tcbuselibrary{listings}
\DeclareTotalTCBox\{\commandbox\}{ s v }
{verbatim,colupper=white,colback=black!75!white,colframe=black}
{\IfBooleanTF{#1}{\textcolor{red}{\ttfamily\bfseries > }}{%\lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]\^#2^}}
\commandbox*{cd "My Documents"} changes to directory \commandbox{My Documents}.
\commandbox*{dir /A} lists the directory content.
\commandbox*{copy example.txt d:\target} copies \commandbox{example.txt} to \commandbox{d:\target}.
\end{verbatim}

\begin{verbatim}
> cd "My/Documents" changes to directory My/Documents.
> dir /A lists the directory content.
> copy example.txt d:\target copies example.txt to d:\target.
\end{verbatim}
\texttt{NewTotalTCBox}\{\langle \textit{init options} \rangle\}{\langle \textit{name} \rangle}\{\langle \textit{specification} \rangle\}{\langle \textit{options} \rangle}\{\langle \textit{content} \rangle\}

Operates like \texttt{DeclareTotalTCBox} \cite{P.439}, but based on \texttt{NewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An error is issued if \langle \textit{name} \rangle has already been defined.

\texttt{RenewTotalTCBox}\{\langle \textit{init options} \rangle\}{\langle \textit{name} \rangle}\{\langle \textit{specification} \rangle\}{\langle \textit{options} \rangle}\{\langle \textit{content} \rangle\}

Operates like \texttt{DeclareTotalTCBox} \cite{P.439}, but based on \texttt{RenewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An existing command is redefined.

\texttt{ProvideTotalTCBox}\{\langle \textit{init options} \rangle\}{\langle \textit{name} \rangle}\{\langle \textit{specification} \rangle\}{\langle \textit{options} \rangle}\{\langle \textit{content} \rangle\}

Operates like \texttt{DeclareTotalTCBox} \cite{P.439}, but based on \texttt{ProvideDocumentCommand} instead of \texttt{DeclareDocumentCommand}. The command \langle \textit{name} \rangle is only created if it is not already defined.

\texttt{tcboxverb}\{\langle \textit{options} \rangle\}{\langle \textit{verbatim box content} \rangle}

Creates a colored box based on \texttt{tcbox} \cite{P.14} which is fitted to the width of the given \langle \textit{verbatim box content} \rangle. The underlying \texttt{tcbox} \cite{P.14} is styled with /tcb/verbatim \cite{P.433} plus the given \langle \textit{options} \rangle. The difference to \texttt{tcbox} \cite{P.14} is that the \langle \textit{verbatim box content} \rangle is interpreted \textit{verbatim}. Therefore, \texttt{tcboxverb} acts similar to \texttt{verb}.

\texttt{tcboxverb}\{\LaTeX\}, \texttt{tcboxverb}[colback=blue!10!white,colupper=blue]{\LaTeX}, \texttt{tcboxverb}[blank,fuzzy halo]{\LaTeX}, \texttt{tcboxverb}[beamer]{\LaTeX}, \texttt{tcboxverb}[enhanced,skin=enhancedmiddle jigsaw,colframe=red]{\LaTeX}.

\LaTeX, \LaTeX, \LaTeX, \LaTeX, \LaTeX.
22.4 Producing \texttt{tcblisting} Environments

Besides \texttt{xpars}, the following commands also need the \texttt{listings} library to be included.

$\texttt{\textbackslash DeclareTCBListing}[(\textit{init options})]\{\textit{name}\}\{\textit{specification}\}\{\textit{options}\}$

Creates a new environment \textit{name} based on \texttt{tcblisting}. Basically, \texttt{\textbackslash DeclareTCBListing} operates like \texttt{\textbackslash DeclareDocumentEnvironment}. This means, the new environment \textit{name} is constructed with the given argument \textit{specification}. The \textit{options} are given to the underlying \texttt{tcblisting}. Note that \texttt{/tcb/savedelimiter} is set to the given \textit{name} automatically.

The new environment is always created, irrespective of an already existing environment with the same name.

\begin{quote}
\texttt{\textbackslash DeclareTCBListing}{mybox}{ s O{} m }{%
  colback=red!5!white, colframe=red!75!black, fonttitle=\textbf, IfBooleanTF={#1}{
    \{listing side text\} \{text side listing\}, title=\#3,\#2}
\begin{mybox}{Listing Box}
This is my \LaTeX box. \end{mybox}
\begin{mybox}{Listing Box}
This is my \LaTeX box. \end{mybox}
\begin{mybox}{Listing Box}
This is my \LaTeX box. \end{mybox}
\end{quote}

$\texttt{\textbackslash NewTCBListing}[(\textit{init options})]\{\textit{name}\}\{\textit{specification}\}\{\textit{options}\}$

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash NewDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. An error is issued if \textit{name} has already been defined.

$\texttt{\textbackslash RenewTCBListing}[(\textit{init options})]\{\textit{name}\}\{\textit{specification}\}\{\textit{options}\}$

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash RenewDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. An existing environment is redefined.

$\texttt{\textbackslash ProvideTCBListing}[(\textit{init options})]\{\textit{name}\}\{\textit{specification}\}\{\textit{options}\}$

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash ProvideDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. The environment \textit{name} is only created if it is not already defined.
Caveats of using an environment ending with an optional argument

\DeclareTCBListing{mybox}{ O{} }{listing only,#1}
\begin{mybox}[colframe=red]
\good
\end{mybox}
\begin{mybox}[colframe=red]\good\end{mybox}
\begin{mybox}
\good
\end{mybox}
\begin{mybox} \good\end{mybox}
\begin{mybox}\bad!\end{mybox}
\begin{mybox}
\[\good\]
\end{mybox}
\begin{mybox} \[\good\]\end{mybox}
\begin{mybox}\[\bad!\]\end{mybox}
22.5 Producing \texttt{tcbinputlisting} Commands

The following commands need the \texttt{listings} library to be included.

\begin{verbatim}
\DeclareTCBInputListing[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
\end{verbatim}

Creates a new command \texttt{\langle name \rangle} based on \texttt{tcbinputlisting}.\footnote{P.301} Basically, \texttt{\DeclareTCBInputListing} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \texttt{\langle name \rangle} is constructed with the given argument \texttt{\langle specification \rangle}. The \texttt{\langle options \rangle} are given to the underlying \texttt{tcbinputlisting}.\footnote{P.301}

The \texttt{\langle init options \rangle} allow setting up automatic numbering, see Section 5 from page 108. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\% counter from previous example
\DeclareTCBInputListing[use counter from=pabox]{\mylisting}{O{}O{red}m}%
listing file={#3},title=Listing-\thetcbcounter,
colback=#2!5!white,colframe=#2!50!black,colbacktitle=#2!75!black,
fonttitle=\bfseries,listing only,#1
\mylisting[before upper=\textit{This is the included file content:}]
[blue]{\jobname.tcbtemp}
\end{verbatim}

\begin{verbatim}
\% counter from previous example
\DeclareTCBInputListing[use counter from=pabox]{\mylisting}{O{}O{red}m}%
listing file={#3},title=Listing-\thetcbcounter,
colback=#2!5!white,colframe=#2!50!black,colbacktitle=#2!75!black,
fonttitle=\bfseries,listing only,#1
\mylisting[before upper=\textit{This is the included file content:}]
[blue]{\jobname.tcbtemp}
\end{verbatim}

\begin{verbatim}
\NewTCBInputListing[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
\end{verbatim}

Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \texttt{\langle name \rangle} has already been defined.

\begin{verbatim}
\RenewTCBInputListing[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
\end{verbatim}

Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\begin{verbatim}
\ProvideTCBInputListing[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
\end{verbatim}

Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \texttt{\langle name \rangle} is only created if it is not already defined.
22.6 Producing `tboxfit` Commands

The following commands need the `fitting` library to be included.

\begin{verbatim}
\DeclareTCBoxFit{(init options)}{(name)}{(specification)}{(options)}
\end{verbatim}

Creates a new command \(\langle\text{name}\rangle\) based on \`tcbboxfit` \footnote{P.410}. Basically, \`\DeclareTCBoxFit\` operates like \`\DeclareDocumentCommand\`. This means, the new command \(\langle\text{name}\rangle\) is constructed with the given argument \(\langle\text{specification}\rangle\). The \(\langle\text{options}\rangle\) are given to the underlying \`tcbboxfit` \footnote{P.410}.

Note that `/tcb/savedelimiter` \footnote{P.26} is set to the given \(\langle\text{name}\rangle\) automatically.

The \(\langle\text{init options}\rangle\) allow setting up automatic numbering, see Section 5 from page 108. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% \usepackage{lipsum}
\DeclareTCBoxFit{mybox}{O{} m o}{colback=red!5!white, colframe=red!75!black, width=#2,height=#2/3*2, IfValueTF={#3}{height=#3}{}, #1}
\mybox[colback=yellow]{5cm}
% \lipsum[2]
\mybox[colback=yellow]{5cm}{\lipsum[2]}
\end{verbatim}

\NewTCBoxFit{(init options)}{(name)}{(specification)}{(options)}

Operates like \`\DeclareTCBoxFit\`, but based on \`\NewDocumentCommand\` instead of \`\DeclareDocumentCommand\`. An error is issued if \(\langle\text{name}\rangle\) has already been defined.

\RenewTCBoxFit{(init options)}{(name)}{(specification)}{(options)}

Operates like \`\DeclareTCBoxFit\`, but based on \`\RenewDocumentCommand\` instead of \`\DeclareDocumentCommand\`. An existing command is redefined.

\ProvideTCBoxFit{(init options)}{(name)}{(specification)}{(options)}

Operates like \`\DeclareTCBoxFit\`, but based on \`\ProvideDocumentCommand\` instead of \`\DeclareDocumentCommand\`. The command \(\langle\text{name}\rangle\) is only created if it is not already defined.

444
\DeclareTotalTCBoxFit\{\texttt{init options}\}\{\texttt{name}\}\{\texttt{specification}\}\{\texttt{options}\}\{\texttt{content}\}

Creates a new command \texttt{name} based on \texttt{tcboxfit} P.410. In contrast to \texttt{DeclareTCBoxFit} P.444, also the \texttt{content} of the \texttt{tcboxfit} is specified.

Basically, \texttt{DeclareTotalTCBoxFit} operates like \texttt{DeclareDocumentCommand}. This means, the new command \texttt{name} is constructed with the given argument \texttt{specification}. The \texttt{options} are given to the underlying \texttt{tcboxfit} P.410 which is filled with the specified \texttt{content}.

Note that \texttt{/tcb/savedelimiter} P.26 is set to the given \texttt{name} automatically. The \texttt{init options} allow setting up automatic numbering, see Section 5 from page 108.

The new command is always created, irrespective of an already existing command with the same name.

\% \usepackage{lipsum}

\\DeclareTotalTCBoxFit\{\texttt{multibox}\}{0\{}{0\{10\} \m}
\{\texttt{nobeforeafter},colback=red!5!white,colframe=red!75!black,width=#2,height=#2/3*2,valign=center,\#1\}
\{\foreach \texttt{\&} in {1,...,#3} { \#4} \}

\multibox{5cm}{\texttt{I shall not repeat.}}
\texttt{\multibox[\texttt{colframe=blue!75!white}]{5cm}{\texttt{I shall not repeat.}}[20]{\texttt{I shall not repeat.}}}\texttt{\multibox[\texttt{colback=yellow,height=5cm}]{14cm}{\texttt{I shall not repeat.}}[100]{\texttt{I shall not repeat.}}}

\NewTotalTCBoxFit\{\texttt{init options}\}\{\texttt{name}\}\{\texttt{specification}\}\{\texttt{options}\}\{\texttt{content}\}

Operates like \texttt{DeclareTotalTCBoxFit}, but based on \texttt{NewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An error is issued if \texttt{name} has already been defined.

\RenewTotalTCBoxFit\{\texttt{init options}\}\{\texttt{name}\}\{\texttt{specification}\}\{\texttt{options}\}\{\texttt{content}\}

Operates like \texttt{DeclareTotalTCBoxFit}, but based on \texttt{RenewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An existing command is redefined.

\ProvideTotalTCBoxFit\{\texttt{init options}\}\{\texttt{name}\}\{\texttt{specification}\}\{\texttt{options}\}\{\texttt{content}\}

Operates like \texttt{DeclareTotalTCBoxFit}, but based on \texttt{ProvideDocumentCommand} instead of \texttt{DeclareDocumentCommand}. The command \texttt{name} is only created if it is not already defined.

445
The library is loaded by a package option or inside the preamble by:

\usepackage{external}

The purpose of this library is to support externalization of document snippets like graphics or boxes which can be compiled stand-alone. These snippets are written to external files, compiled and the resulting pdf files are included to the main document as images. The whole procedure saves compilation time, if such a snippet is costly to compile but needs to compile just once or very seldom.

There are very good alternatives to this library. One should consider the standalone package or the TikZ externalization library instead. The \texttt{external} library is something in between and can be seen as poor man variant of the TikZ externalization library.

The main differences between TikZ externalization and \texttt{external} are:

- TikZ \texttt{external} compiles the whole original document in a sophisticated way while \texttt{external} uses only the preamble or a part of the preamble of the original document.
- TikZ \texttt{external} can automatically externalize all \texttt{tikzpicture} environments while \texttt{external} externalizes marked snippets only.
- Code snippets to be externalized by \texttt{external} are not restricted to \texttt{tikzpicture} environments. But these snippets have to be stand-alone without dependencies to the rest of the document.

Why should somebody use \texttt{external} instead of the more powerful TikZ \texttt{external}? One reason could be compilation speed, but the main reason for creating the library at all was that TikZ \texttt{external} tends to choke on complicated documents where the sophisticated mechanism stumbles. Since \texttt{external} does not use the original document body for compilation, this cannot happen.

Source snippets are compiled, if their md5 checksum has changed. They are not compiled automatically, if option settings are changed or anything outside the snippet is changed. Use \texttt{/tcb/external/force remake} \textsuperscript{P.147} to force compilation in this case or simply delete the externalized pdf oder md5 files.

To use the externalization options, the compiler has to be called with the \texttt{-shell-escape} permission to authorize potentially dangerous system calls. Be warned that this is a security risk.
23.1 Preparation of a Document for Externalization

The preamble of the main document has to contain the \texttt{\texttt{tcbEXTERNALIZE}} command. Without this command, no externalization operation will be executed.

\begin{verbatim}
\documentclass[a4paper]{book} % for example
\usepackage{...} % anything
\%
% Typically, all or the very most settings for the document.
\texttt{\texttt{tcbEXTERNALIZE}} % Typically, just before \texttt{\texttt{\begin{document}}}
% Additional settings which are ABSOLUTELY irrelevant for the
% stand-alone snippets.
%
\begin{document}
% The document.
% This also contains the marked snippets for externalization.
\end{document}
\end{verbatim}

During compilation, a \texttt{/tcb/external/runner} file is dynamically created (several times). This is the actual main file for compiling an externalized snippet.

\begin{verbatim}
\texttt{/tcb/external/runner=(file name)} % (no default, initially \texttt{\jobname\_run.tex})
\end{verbatim}

Sets the \texttt{(file name)} for dynamically created \texttt{runner} file. This is the actual main file for a document snippet. Typically, the initial setting is not needed to be changed.

\begin{verbatim}
\texttt{\texttt{tcbset}{external/runner=myrunner.tex}}
\end{verbatim}

\begin{verbatim}
\texttt{/tcb/external/prefix=(text)} % (no default, initially \texttt{\texttt{external/}})
\end{verbatim}

The \texttt{(text)} is prefixed to any \texttt{/tcb/external/name} file for an externalization snippet. The initial setting implies saving all snippets into an \texttt{external/} subdirectory. Depending on the operation system, the subdirectory may have to be created manually once.

\begin{verbatim}
\%
% Use a 'real' prefix instead of writing into a subdirectory:
\texttt{\texttt{tcbset}{external/prefix=ext_}}
\end{verbatim}

\begin{verbatim}
\texttt{/tcb/external/externalize=true|false} % (default \texttt{true}, initially \texttt{true})
\end{verbatim}

If set to \texttt{true}, the marked snippets are compiled if necessary. If set to \texttt{false}, the marked snippets are not compiled but included as text. \texttt{/tcb/external/externalize} can only be used after \texttt{\texttt{tcbEXTERNALIZE}}.

\begin{verbatim}
\texttt{/tcb/external/force remake=true|false} % (default \texttt{true}, initially \texttt{false})
\end{verbatim}

If set to \texttt{true}, the marked snippets are always compiled. If set to \texttt{true}, the marked snippets are compiled only if necessary. The necessity is given, if a compiled pdf file is missing or the md5 checksum of the source snippet has changed.

\begin{verbatim}
\texttt{/tcb/external/!} % (style)
\end{verbatim}

Shortcut for setting \texttt{/tcb/external/force remake} to \texttt{true}.

\begin{verbatim}
\texttt{/tcb/external/-} % (style)
\end{verbatim}

Shortcut for setting \texttt{/tcb/external/externalize} to \texttt{false}.
23.2 Marking Externalization Snippets

\begin{tcbexternal}{(options)}{(name)}
\end{tcbexternal}

Marks the environment content as a snippet for externalization. Typically, the content is a \texttt{tikzpicture} or something similar. It is important to note that the snippet should not have any dependencies with the rest of the document, e.g. referencing counters or setting counters is not possible. The \langle name \rangle is automatically prefixed with /tcb/external/prefix. In combination, this has to be a unique file name. It is advised to not use spaces or umlauts for the name. The \langle options \rangle are keys from the /tcb/external/ key tree.

\begin{tcbexternal}{example_tikzpicture}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{tcbexternal}

If a \texttt{tcolorbox} is externalized, one should use /tcb/nobeforeafter for the box. Indention and distances to the text before and after have to be given separately outside the \texttt{tcbexternal} environment.

\begin{tcbexternal}
\begin{tcolorbox}[nobeforeafter,enhanced,fonttitle=\textbf,title=Externalized Box,colframe=red!50!black,drop fuzzy shadow,interior style={fill overzoom image=goldshade.png}]
This complete tcolorbox is externalized. One cannot use numbered boxes here. Note the \texttt{minipage} option which tells the current line width to the external snippet.
\end{tcolorbox}
\end{tcbexternal}
The interior of the tcolorbox is externalized. One can use numbered boxes without problems. Note that the text color has to be set for the text manually since it is converted into an image.

\begin{tcbexternal}[\minipage]{example_tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}
\begin{tabularx}{\linewidth}{|l||Y|Y|Y|Y||Y|}
\hline
Group & One & Two & Three & Four & Sum \\
\hline
Red  & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
Blue  & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
Sum   & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabularx}
\end{tcbexternal}

\begin{tcbexternal}[\minipage]{example_tcolorbox2}
\begin{tcbexternal}[\minipage]{example_tabularx}
\begin{tabularx}{\linewidth}{|l||Y|Y|Y|Y||Y|}
\hline
Group & One & Two & Three & Four & Sum \\
\hline
Red  & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
Blue  & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
Sum   & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabularx}
\end{tcbexternal}
\end{tcbexternal}

\texttt{/tcb/external/name=⟨name⟩}

(no default, initially \texttt{unnamed})

The \texttt{⟨name⟩} is automatically prefixed with \texttt{/tcb/external/prefix}. In combination, this has to be a unique file name for externalization. Typically, this key is not used directly but is set indirectly as mandatory parameter, see \texttt{tcbexternal}.
This is an externalized version of \tcolorbox \textsuperscript{P.12} created using \newtcbexternalizetcolorbox \textsuperscript{P.455}:

\begin{extcolorbox}
\[example_extcolorbox\]
\begin{tcolorbox}[colframe=blue,colback=blue!5,before skip=6pt]
Inner box.
\end{tcolorbox}
\end{extcolorbox}

\begin{extcolorbox}[minipage]\[example_extcolorbox\]
\begin{tcolorbox}[colframe=blue,colback=blue!5,before skip=6pt]
Inner box.
\end{tcolorbox}
\end{extcolorbox}

My external box

This box is completely externalized.

Inner box.

\begin{itemize}
\item Never externalize numbered boxes.
\item Never externalize boxes which contain references to other things, e.g. using \texttt{\ref} or \texttt{\cite}.
\item Never externalize breakable boxes.
\end{itemize}
This is an externalized version of \texttt{tikzpicture} created using \texttt{\newtcbexternalizeenvironment} \cite{P.455}: \newtcbexternalizeenvironment\{extikzpicture\}{tikzpicture}\{}\{}\}

\{options\} and \{name\} are given to the underlying \texttt{tcbexternal} \cite{P.448} environment, while \{tikz options\} are given to \texttt{tikzpicture}.

\begin{center}
\begin{extikzpicture}
Preamble={\usepackage{pgfplots}}, % add package for external graph
input source on error=false, % do not load source on error
\}{example_pgfplots}
\pgfplotsset{width=12cm}
\begin{axis}[3d box=background,grid=major,
xlabel=$x$, ylabel=$y$, zlabel=$z$, view/h=40,
mesh/interior colormap name=hot,
colormap/blackwhite,
z buffer=sort,domain=0:90,y domain=0:60,
zmin=0,zmax=2,z post scale=1.2,
]
\addplot3[surf,mesh/interior colormap name=blackwhite,
colormap/hot,] ( {cos(x)},{sin(x)},{2*sin(y)} );
\addplot3[surf] ( {2*cos(x)*cos(y)},{2*sin(x)*cos(y)},{2*sin(y)} );
\end{axis}
\end{extikzpicture}
\end{center}
The text content of a `tcblisting` is externalized with the given \textit{name}. Note that the listing part is not externalized.

\begin{tcblisting}{externalize listing=example_listing,\
 bicolor,colback=yellow!10,colframe=yellow!50!black,\
 colbacklower=white,center lower}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{tcblisting}

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}

Combination of \texttt{/tcb/externalize listing} and \texttt{/tcb/external/force remake}.

The text content of a `dispExample*` is externalized with the given \textit{name}. Note that the listing part is not externalized.

\begin{dispExample*}{sidebyside,externalize example=example_example}
\tikz\path[shading=ball,\
 ball color=red] circle (7mm);
\end{dispExample*}

\begin{tikzpicture}
\path[shading=ball,\
 ball color=red] circle (7mm);
\end{tikzpicture}

Combination of \texttt{/tcb/externalize example} and \texttt{/tcb/external/force remake}.
23.3 Customization

\begin{tcbexternal}[minipage,runs=2]{example_raster}
\begin{tcbitemize}[raster equal height, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}
\end{tcbexternal}

\begin{tcbitemize}[raster equal height, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

\begin{tcbexternal}[input source on error=true]{example_raster}
\begin{tcbitemize}[raster equal height, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}
\end{tcbexternal}

\[453\]
The given \(\langle\text{code}\rangle\) is added before the snippet document. Typically, this means before \texttt{\textbackslash \documentclass}. This is not used for compilation of the main document.

The given \(\langle\text{options}\rangle\) are passed to the given \(\langle\text{package}\rangle\) for the snippet document. This is a shortcut for using \texttt{/tcb/external/preclass} with \texttt{\PassOptionsToPackage}. This is not used for compilation of the main document.

The given \(\langle\text{options}\rangle\) are passed to the given \(\langle\text{class}\rangle\) for the snippet document. This is a shortcut for using \texttt{/tcb/external/preclass} with \texttt{\PassOptionsToClass}. This is not used for compilation of the main document.

Removes all additional \texttt{/tcb/external/preclass} settings.

The given \(\langle\text{code}\rangle\) is added to the preamble of the snippet document. This is not used for compilation of the main document.

The given \(\langle\text{options}\rangle\) are added as parameter for \texttt{\tcbset} to the preamble of the snippet document. This is not used for compilation of the main document.

Removes all additional \texttt{/tcb/external/preamble} settings.

Expands to \(\langle\text{true}\rangle\), if executed during snippet compilation, and to \(\langle\text{false}\rangle\), if executed during main document compilation. This can be used before \texttt{\tcbEXTERNALIZE} to give different setting to snippet and main document.

```latex
\tcbifexternal{\langle\text{true}\rangle}{\langle\text{false}\rangle}

\begin{verbatim}
\tcbifexternal{
  \usepackage{onlyforexternal}
}{{
  \usepackage{onlyformain}
}
```
\newtcbexternalizeenvironment\{(newenv)\}{\langle\text{env}\rangle}\{\langle\text{options}\rangle}\{\langle\text{begin}\rangle}\{\langle\text{end}\rangle}\}

Creates a new environment \textit{(newenv)} which is based on \texttt{tcbexternal} \cite{P.448}. This environment takes at least one optional parameter and one mandatory parameter. These two parameters are passed to \texttt{tcbexternal} \cite{P.448}. Further, the given \textit{(options)} are always added to the option list of \texttt{tcbexternal} \cite{P.448}.

The environment content is externalized and the external snippet is surrounded by an environment \textit{(env)}. All further parameters of \textit{(newenv)} are given to \textit{(env)} as parameters. The included image is prepended by \textit{(begin)} and appended by \textit{(end)}.

\texttt{extikzpicture} \cite{P.451} is an example application for \texttt{\newtcbexternalizeenvironment}.

\begin{extabular}{example_tabular}{|l|p{6cm}|r|}
\hline
A & B & C \\
\hline
a & This table is externalized as snippet. Obviously, this only makes sense for highly complex tables. & b \\
\hline
\end{extabular}

\renewtcbexternalizeenvironment\{(newenv)\}{\langle\text{env}\rangle}\{\langle\text{options}\rangle}\{\langle\text{begin}\rangle\langle\text{end}\rangle\}

Identical to \texttt{\newtcbexternalizeenvironment}, but the environment \textit{(newenv)} is created by \texttt{\renewenvironment} instead of \texttt{\newenvironment}.

\newtcbexternalizetcolorbox\{(newenv)\}{\langle\text{env}\rangle}\{\langle\text{options}\rangle}\{\langle\text{begin end options}\rangle\}

Creates a new environment \textit{(newenv)} which is based on \texttt{tcbexternal} \cite{P.448}. This environment takes at least one optional parameter and one mandatory parameter. These two parameters are passed to \texttt{tcbexternal} \cite{P.448}. Further, the given \textit{(options)} are always added to the option list of \texttt{tcbexternal} \cite{P.448}.

The environment content is externalized and the external snippet is surrounded by an environment \textit{(env)}. All further parameters of \textit{(newenv)} are given to \textit{(env)} as parameters. \textbf{In contrast to \texttt{\newtcbexternalizeenvironment}, the environment \textit{(env)} is intended to be based on \texttt{tcolorbox} \cite{P.12} or \texttt{tcblisting} \cite{P.299}.}

The \textit{(begin end options)} are options for settings the space before and after the included image using \texttt{/tcb/before} \cite{P.78}, \texttt{/tcb/before skip} \cite{P.80}, \texttt{/tcb/after} \cite{P.78}, or \texttt{/tcb/after skip} \cite{P.80}.

Use the exact identical values for \texttt{/tcb/before} \cite{P.78} and \texttt{/tcb/after} \cite{P.78} inside \textit{(begin end options)} as they where used for definition of \textit{(env)}! Otherwise, externalized and non-externalized version will have different spacings.

\texttt{extcolorbox} \cite{P.450} is an example application for \texttt{\newtcbexternalizetcolorbox}.

\textbf{Definition in the preamble:}

\newtcblisting{myownlisting}[2]
\{enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,colbacktitle=red!50!yellow,before skip=6pt,after skip=6pt,title={#2},#1\}

\newtcbexternalizetcolorbox{exmyownlisting}{myownlisting}{minipage}\%same values as for mylisting
\begin{exmyownlisting}{example_mylisting}\% <- name for the external file
\hspace*{-1em}
{My externalized example box}
This is my \LaTeX\ box.
\end{exmyownlisting}

This is my \LaTeX\ box.

This is my \BibTeX\ box.

\texttt{\textbackslash renewtcbexternalizetcolorbox\{\textbackslash newenv\}\{\textbackslash env\}\{\textbackslash options\}\{\textbackslash begin\ \textbackslash end\ \textbackslash options\}\}

Identical to \texttt{\textbackslash newtcbexternalizetcolorbox}\,\textbf{P.455}, but the environment \texttt{\textbackslash newenv} is created by \texttt{\textbackslash renewenvironment} instead of \texttt{\textbackslash newenvironment}.

\texttt{\textbackslash tcbiffileprocess\{\textbackslash condition\}\{\textbackslash source\}\{\textbackslash md5-file\}\{\textbackslash target\}\{\textbackslash true\}\{\textbackslash false\}\}

This is a low-level macro which is internally used. The MD5 digest of a \texttt{\textbackslash source} file is compared with a stored MD5 digest from an auxiliary \texttt{\textbackslash md5-file}. If they are not equal, the auxiliary \texttt{\textbackslash md5-file} is updated to store the current MD5 digest. Further,

- if \texttt{\textbackslash condition} equals 0, \texttt{\textbackslash true} is executed.
- if \texttt{\textbackslash condition} equals 1:
  - If the current and stored MD5 digests were different, \texttt{\textbackslash true} is executed.
  - Otherwise, if the \texttt{\textbackslash target} file is not existing, \texttt{\textbackslash true} is executed.
  - Otherwise, if the \texttt{\textbackslash target} file is older than the \texttt{\textbackslash md5-file}, \texttt{\textbackslash true} is executed.
  - Otherwise, \texttt{\textbackslash false} is executed.

- if \texttt{\textbackslash condition} equals 2, \texttt{\textbackslash false} is executed.

The intended processing purpose of the \texttt{\textbackslash true} code is to produce a \texttt{\textbackslash target} file from the given \texttt{\textbackslash source} file.
23.4 Troubleshooting and FAQ

- I use the default settings, but the external subdirectory is not created.
  Depending on operating system and compiler, an external subdirectory is automatically
  created or not. If not, create such a directory manually or add the following to your
  document:

  \ShellEscape{mkdir external}

  or

  \ShellEscape{mkdir -p external}

  If the combination of /tcb/external/prefix\textsuperscript{P.447} and chosen snippet name points to
  another subdirectory than external, this has to be adapted.

- I use the \texttt{minted} package and I get a cache directory for every externalized
  snippet.
  To avoid this problem, there are several ways.
  - If you do not need \texttt{minted} inside the snippet code, you may use
    \texttt{\usepackage{minted}} after \texttt{\tcbEXTERNALIZE}\textsuperscript{P.447} or use \texttt{\tcbifexternal}\textsuperscript{P.454}
    to switch \texttt{minted} off for the external code. If \texttt{minted} is already included by another
    package, add the following to your preamble:

    \texttt{\tcbset{external/PassOptionsToPackage={draft}{minted}}}

  - If \texttt{minted} is needed for the snippet code, caching can be switched off by adding the
    following to your preamble:

    \texttt{\tcbset{external/PassOptionsToPackage={cache=false}{minted}}}

    Alternatively, the \texttt{cachedir} option of \texttt{minted} may be used to redirect the cache.

---

\textsuperscript{5}The \texttt{shellesc} package is loaded automatically by the library.
This library has the single purpose to support \LaTeX{} package documentations like this one. Actually, the visual nature follows the approach from Till Tantau’s \texttt{pgf} [22] documentation. Typically, this library is assumed to be used in conjunction with the class \texttt{ltxdoc} or alike.

The library is loaded by a package option or inside the preamble by:

\begin{quote}
\begin{verbatim}
tcbuselibrary{documentation}
\end{verbatim}
\end{quote}

This also loads the library \texttt{listings}, see Section 15 on page 298, the library \texttt{skins}, see Section 10 on page 148, the library \texttt{xparse}, see Section 22 on page 433, and a bunch of packages, namely \texttt{pifont}, \texttt{marvosym}, \texttt{makeidx}, \texttt{marginnote}, \texttt{refcount}, and \texttt{hyperref}.

\begin{itemize}
  \item The package \texttt{makeidx} is loaded only, if \texttt{\printindex} is not already defined. Therefore, one can include an alternative to \texttt{makeidx} like \texttt{imakeidx} before the library \texttt{documentation} is used.
  \item The package \texttt{marginnote} is loaded only, if \texttt{\marginnote} is not already defined.
  \item In contrast to other \texttt{tcolorbox} options, the option settings for \texttt{documentation} are typically not getting reset by \texttt{/tcb/reset}, i.e. they keep their values for embedded boxes.
  \item In combination with DocStrip, \texttt{/tcb/verbatim ignore percent} may be helpful.
\end{itemize}

For UTF-8 support load (ignore this when using XeLaTeX):

\begin{quote}
\begin{verbatim}
tcbuselibrary{listingsutf8,documentation}
\end{verbatim}
\end{quote}

For \texttt{minted} [12] support, load:

\begin{quote}
\begin{verbatim}
tcbuselibrary{documentation,minted}
tcbbset{listing engine=minted}
\end{verbatim}
\end{quote}

\section{Macros of the Library}

\begin{verbatim}
\begin{docCommand}{⟨options⟩}{⟨name⟩}{⟨parameters⟩}
⟨command description⟩
\end{docCommand}
\end{verbatim}

Documents a \LaTeX{} macro with given \texttt{(name)} where \texttt{(name)} is written without backslash. The given \texttt{(options)} are set with \texttt{/tcbset}. This macro takes mandatory or optional \texttt{(parameters)}. It is automatically indexed and can be referenced with \texttt{\refCom}{⟨name⟩}.

\begin{verbatim}
\begin{docCommand}{foomakedocSubKey}{\marg}{⟨name⟩}{⟨key path⟩}
\end{docCommand}
\end{verbatim}

Creates a new environment \texttt{\meta{name}} based on \texttt{\refEnv{docKey}} for the documentation of keys with the given \texttt{\meta{key path}}.

\begin{verbatim}
\foomakedocSubKey{⟨name⟩}{⟨key path⟩}
\end{verbatim}

Creates a new environment \texttt{(name)} based on \texttt{docKey} for the documentation of keys with the given \texttt{(key path)}.
Creates a new environment \meta{name} based on \refEnv{docKey} for the documentation of keys with the given \meta{key path}.

\begin{docCommand}{foomakedocSubKey*}{\{name\}|\{key path\}}
    Creates a new environment \langle name \rangle based on docKey for the documentation of keys with the given \langle key path \rangle.
\end{docCommand}

\begin{docCommand*}{\{options\}}{\{name\}}{\{parameters\}}
    Identical to docCommand for the documentation of keys with the given \langle key path \rangle.
\end{docCommand*}

\begin{docEnvironment}{foocolorbox}{\oarg{options}}
    This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}

\begin{foocolorbox}{\{options\}}
    This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{foocolorbox}

\begin{docEnvironment}%%
    [doclang/environment content=My content text]%%
    \foocolorbox*{\oarg{options}}
    This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}

\begin{foocolorbox*}{\{options\}}
    This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{foocolorbox*}

\begin{docEnvironment*}{\{options\}}{\{name\}}{\{parameters\}}
    Identical to docEnvironment, but without index entry.
\end{docEnvironment*}
\begin{docKey}\{(key\ path)\} \{(options)\} \{(name)\} \{(parameters)\} \{(description)\}
\end{docKey}

Documents a key with given \{(name)\} and an optional \{(key\ path)\}. The given \{(options)\} are set with \texttt{\tcbset} \textsuperscript{P.13}. This key takes mandatory or optional \{(parameters)\} as value with a short \{(description)\}. It is automatically indexed and can be referenced with \texttt{\refKey} \textsuperscript{P.466} \{(name)\}.

A feasible value for \texttt{\refKey}/foo/footitle is \texttt{\docValue{foovalue}}.

\begin{docKey*}\{(key\ path)\} \{(options)\} \{(name)\} \{(parameters)\} \{(description)\}
\end{docKey*}

Identical to \texttt{docKey}, but without index entry.

\begin{docValue}\{(name)\}
\end{docValue}

Documents a value with given \{(name)\}. Typically, this is a value for a key. This value is automatically indexed.

A feasible value for \texttt{\refKey}/foo/footitle is \texttt{\docValue{foovalue}}.

\begin{docValue*}\{(name)\}
\end{docValue*}

Identical to \texttt{docValue}, but without index entry.

\begin{docAuxCommand}\{(name)\}
\end{docAuxCommand}

Documents an auxiliary or minor \LaTeX\ macro with given \{(name)\} where \{(name)\} is written without backslash. This macro is automatically indexed.

The macro \texttt{\docAuxCommand{fooaux}} holds some interesting data.

\begin{docAuxCommand*}\{(name)\}
\end{docAuxCommand*}

Identical to \texttt{docAuxCommand}, but without index entry.

\begin{docAuxEnvironment}\{(name)\}
\end{docAuxEnvironment}

Documents an auxiliary or minor \LaTeX\ environment with given \{(name)\}. This macro is automatically indexed.

The environment \texttt{\docAuxEnvironment{fooauxenv}} holds some interesting data.

\begin{docAuxEnvironment*}\{(key\ path)\} \{(name)\}
\end{docAuxEnvironment*}

Identical to \texttt{docAuxEnvironment}, but without index entry.
\texttt{\textbackslash docAuxKey}\{\langle key path\rangle\}\{\langle name\rangle\}
Documents an auxiliary key with given \langle name\rangle and an optional \langle key path\rangle. It is automatically indexed.

The key \texttt{\textbackslash docAuxKey}\{foo\}\{fooaux\} holds some interesting data.
The key \texttt{/foo/fooaux} holds some interesting data.

\texttt{\textbackslash docAuxKey*}\{\langle key path\rangle\}\{\langle name\rangle\}
Identical to \texttt{\textbackslash docAuxKey}, but without index entry.

\texttt{\textbackslash docCounter}\{\langle name\rangle\}
Documents a counter with given \langle name\rangle. The counter is automatically indexed.

The counter \texttt{\textbackslash docCounter}\{foocounter\} can be used for computation.
The counter \texttt{foocounter} can be used for computation.

\texttt{\textbackslash docCounter*}\{\langle name\rangle\}
Identical to \texttt{\textbackslash docCounter}, but without index entry.

\texttt{\textbackslash docLength}\{\langle name\rangle\}
Documents a counter with given \langle name\rangle. The counter is automatically indexed.

The length \texttt{\textbackslash docLength}\{foolength\} can be used for computation.
The length \texttt{foolength} can be used for computation.

\texttt{\textbackslash docLength*}\{\langle name\rangle\}
Identical to \texttt{\textbackslash docLength}, but without index entry.

\texttt{\textbackslash docColor}\{\langle name\rangle\}
Documents a color with given \langle name\rangle. The color is automatically indexed.

The color \texttt{\textbackslash docColor}\{foocolor\} is available.
The color \texttt{foocolor} is available.

\texttt{\textbackslash docColor*}\{\langle name\rangle\}
Identical to \texttt{\textbackslash docColor}, but without index entry.
\cs{\langle name\rangle}
Macro from ltxdoc [3] to typeset a command word \langle name\rangle where the backslash is prefixed. The library overwrites the original macro.

This is a \cs{foocommand}.
This is a \foocommand.

\meta{\langle text\rangle}
Macro from doc [8] to typeset a meta \langle text\rangle. The library overwrites the original macro.

This is a \meta{text}.
This is a \langle text\rangle.

\marg{\langle text\rangle}
Macro from ltxdoc [3] to typeset a \langle text\rangle with curly brackets as a mandatory argument. The library overwrites the original macro.

This is a mandatory \marg{argument}.
This is a mandatory \langle argument\rangle.

\oarg{\langle text\rangle}
Macro from ltxdoc [3] to typeset a \langle text\rangle with square brackets as an optional argument. The library overwrites the original macro.

This is an optional \oarg{argument}.
This is an optional \langle argument\rangle.

\brackets{\langle text\rangle}
Sets the given \langle text\rangle with curly brackets.

Here we use \brackets{some text}.
Here we use \langle some text\rangle.
\begin{dispExample}
\begin{tcolorbox}
This is a $\LaTeX$ example.
\end{tcolorbox}
\end{dispExample}

This is a $\LaTeX$ example.

\begin{dispExample*}{sidebyside}
\begin{tcolorbox}
This is a $\LaTeX$ example.
\end{tcolorbox}
\begin{tcolorbox}
This is a $\LaTeX$ example.
\end{tcolorbox}
\end{dispExample*}

The starred version of dispExample takes tcolorbox as parameter. These \begin{dispExample*}{sidebyside}
\begin{tcolorbox}
This is a $\LaTeX$ example.
\end{tcolorbox}
\begin{tcolorbox}
This is a $\LaTeX$ example.
\end{tcolorbox}
\end{dispExample*}

\begin{dispExample*}{sidebyside}
\begin{tcolorbox}
This is a $\LaTeX$ example.
\end{tcolorbox}
\begin{tcolorbox}
This is a $\LaTeX$ example.
\end{tcolorbox}
\end{dispExample*}

\begin{dispExample*}{sidebyside}
\begin{tcolorbox}
This is a $\LaTeX$ example.
\end{tcolorbox}
\begin{tcolorbox}
This is a $\LaTeX$ example.
\end{tcolorbox}
\end{dispExample*}
\begin{dispListing}
\begin{tcolorbox}
This is a \LaTeX\ example.
\end{tcolorbox}
\end{dispListing}

Creates a colored box based on a \texttt{tcolorbox} \cite{P.12}. It displays the environment content as source code. The appearance is controlled by \texttt{/tcb/documentation listing style} \cite{P.468} and the style \texttt{/tcb/docexample} \cite{P.468}. It may be changed by redefining this style.

\begin{dispListing*}{(options)}
\begin{tcolorbox}[options]
\end{tcolorbox}
\end{dispListing*}

The starred version of \texttt{dispListing} takes \texttt{tcolorbox} \cite{P.12} \texttt{(options)} as parameter. These \texttt{(options)} are executed after \texttt{/tcb/docexample} \cite{P.468}.

\begin{dispListing*}{title=My listing}
\begin{tcolorbox}[title=My listing]
This is a \LaTeX\ example.
\end{tcolorbox}
\end{dispListing*}

\begin{absquote}
|tcolorbox| provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.
\end{absquote}

\texttt{tcolorbox} provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.
\texttt{\textbackslash tcbmakedocSubKey\{\langle name\rangle\}\{\langle key \ path\rangle\}}

Creates a new environment \langle name\rangle based on \texttt{docKey}\textsuperscript{P. 460} for the documentation of keys with the given \langle key \ path\rangle as default. The new environment \langle name\rangle takes the same parameters as \texttt{docKey}\textsuperscript{P. 460} itself. A second starred environment \langle name\rangle is also created, which is identical to \langle name\rangle but without index entry.

\begin{verbatim}
\texttt{\textbackslash tcbmakedocSubKey\{docFooKey\}\{foo\}}
\begin{docFooKey\{foodummy\}\{=\textbackslash meta\{nothing\}\}\{\text{no default, initially empty}\}}
Some key.
\end{docFooKey}
\begin{docFooKey*\{foo another dummy\}\{=\textbackslash meta\{nothing\}\}\{\text{no default, initially empty}\}}
Some key (not indexed).
\end{docFooKey*}
\end{verbatim}

\texttt{/foo/foodummy=\langle nothing\rangle} \quad \text{(no default, initially empty)}
Some key.

\texttt{/foo/foo another dummy=\langle nothing\rangle} \quad \text{(no default, initially empty)}
Some key (not indexed).

\texttt{\textbackslash refCom\{\langle name\rangle\}}

References a documented \LaTeX\ macro with given \langle name\rangle where \langle name\rangle is written without backslash. The page reference is suppressed if it links to the same page.

We have created \texttt{\textbackslash refCom\{foomakedocSubKey\}} as an example.

We have created \texttt{\textbackslash foomakedocSubKey}\textsuperscript{P. 458} as an example.

\texttt{\textbackslash refCom*\{\langle name\rangle\}}

References a documented \LaTeX\ macro with given \langle name\rangle where \langle name\rangle is written without backslash. There is no page reference.

We have created \texttt{\textbackslash refCom*\{foomakedocSubKey\}} as an example.

We have created \texttt{foomakedocSubKey} as an example.

\texttt{\textbackslash refEnv\{\langle name\rangle\}}

References a documented \LaTeX\ environment with given \langle name\rangle. The page reference is suppressed if it links to the same page.

We have created \texttt{\textbackslash refEnv\{foocolorbox\}} as an example.

We have created \texttt{foocolorbox}\textsuperscript{P. 459} as an example.

\texttt{\textbackslash refEnv*\{\langle name\rangle\}}

References a documented \LaTeX\ environment with given \langle name\rangle. There is no page reference.

We have created \texttt{\textbackslash refEnv*\{foocolorbox\}} as an example.

We have created \texttt{foocolorbox} as an example.
\refKey\{⟨name⟩\}
References a documented key with given ⟨name⟩ where ⟨name⟩ is the full path name of the key. The page reference is suppressed if it links to the same page.

We have created \refKey{/foo/footitle} as an example.
We have created /foo/footitle \P.460 as an example.

\refKey*\{⟨name⟩\}
References a documented key with given ⟨name⟩ where ⟨name⟩ is the full path name of the key. There is no page reference.

We have created \refKey{*{/foo/footitle}} as an example.
We have created /foo/footitle as an example.

\refAux\{⟨name⟩\}
References some auxiliary environment, key, value, or color. The hyperlink color is used, but there is no real link.

Some pages back, one can see \refAux{/foo/footitle} as an example.
Some pages back, one can see /foo/footitle as an example.

\refAuxcs\{⟨name⟩\}
References some auxiliary macro ⟨name⟩ where ⟨name⟩ is written without backslash. The hyperlink color is used, but there is no real link.

Some pages back, one can see \refAuxcs{fooaux} as an example.
Some pages back, one can see fooaux as an example.

\colDef\{⟨text⟩\}
Sets ⟨text⟩ with the command color, see /tcb/color command \P.470.

This is my \colDef{text}.
This is my text.

\colOpt\{⟨text⟩\}
Sets ⟨text⟩ with the option color, see /tcb/color option \P.470.

This is my \colOpt{text}.
This is my text.
\verb|$\text{\texttt{tcbdocmarginnote}}(\langle\text{options}\rangle)\{\langle\text{text}\rangle\}$

Creates a tcolorbox note with the given \langle\text{text}\rangle inside the margin using the marginnote package. The style of the tcolorbox is predefined and can be altered by /tcb/doc marginnote*P.475 and the given \langle\text{options}\rangle.

\begin{quote}
Some text\verb|$\text{\texttt{tcbdocmarginnote}}\{\text{Note A}\}$ which is commented by a note inside the margin. Alternatively to |\verb|$\text{\texttt{tcbdocmarginnote}}$|, you can always use |\verb|$\text{\texttt{marginnote}}$| with a |\texttt{tcolorbox}| directly.\par
This is further text|\verb|$\text{\texttt{tcbdocmarginnote}}[\text{colframe=blue!50!white,colback=blue!5!white}]\{\text{Note B}\}$| with another note.
\end{quote}

\begin{quote}
Some text which is commented by a note inside the margin. Alternatively to \verb|$\text{\texttt{tcbdocmarginnote}}$, you can always use \verb|$\text{\texttt{marginnote}}$ with a \texttt{tcolorbox} directly. This is further text with another note.
\end{quote}

\verb|$\text{\texttt{tcbdocnew}}\{\langle\text{date}\rangle\}$

Auxiliary macro which typesets the /tcb/doclang/new*P.471 text with the given \langle\text{date}\rangle. It may be redefined for customization.

\begin{quote}
\verb|$\text{\texttt{tcbdocnew}}\{1981-10-29\}$.
% Next one is displayed in the margin:
\verb|$\text{\texttt{tcbdocmarginnote}}\{\text{\texttt{tcbdocnew}}\{1978-02-09\}\}$
\end{quote}

\verb|$\text{\texttt{tcbdocupdated}}\{\langle\text{date}\rangle\}$

Auxiliary macro which typesets the /tcb/doclang/updated*P.471 text with the given \langle\text{date}\rangle. It may be redefined for customization.

\begin{quote}
\verb|$\text{\texttt{tcbdocupdated}}\{2014-09-19\}$.
\end{quote}
24.2 Option Keys of the Library

/tcb/docexample (style, no value)

Sets the style for dispExample\(^{P.463}\) and dispListing\(^{P.464}\) with the colors ExampleBack and ExampleFrame. To change the appearance of the examples, this style can be redefined.

\[
\text{% Predefined style:}
\begin{verbatim}
\tcbset{
  docexample/.style={colframe=ExampleFrame,colback=ExampleBack,
  before skip=\medskipamount,after skip=\medskipamount,
  fontlower=\footnotesize}
\}
\end{verbatim}
\]

/tcb/documentation listing options=\{key list\} (no default, initially style=tcbdocumentation)

Sets the options from the package listings\(^6\). They are used inside dispExample\(^{P.463}\) and dispListing\(^{P.464}\) to typeset the listings. Note that this is not identical to the key /tcb/listing options\(^{P.305}\) which is used for 'normal' listings. Used for /tcb/listing engine\(^{P.310}\)=listings only.

/tcb/documentation listing style=\{listing style\} (no default, initially tcbdocumentation)

Abbreviation for documentation listing options=\{style=\ldots\}. This key sets a \{style\} for the listings package, see\(^6\). Note that this is not identical to the key /tcb/listing style\(^{P.305}\) which is used for 'normal' listings. Used for /tcb/listing engine\(^{P.310}\)=listings only.

/tcb/documentation minted options=\{minted style\} (no default, initially tabsize=2,fontsize=\small)

Sets the options from the package minted\(^{12}\) which are used during typesetting of the listing, if used. Note that this is not identical to the key /tcb/minted options\(^{P.308}\) which is used for 'normal' listings. Used for /tcb/listing engine\(^{P.310}\)=minted only.

/tcb/documentation minted style=\{key list\} (no default, initially unset)

Sets a \{style\} known to Pygments\(^{14}\) for the package minted\(^{12}\), if used. Note that this is not identical to the key /tcb/minted style\(^{P.309}\) which is used for 'normal' listings. Used for /tcb/listing engine\(^{P.310}\)=minted only.

/tcb/documentation minted language=\{programming language\} (no default, initially latex)

Sets a \{programming language\} known to Pygments\(^{14}\) for the package minted\(^{12}\), if used. Note that this is not identical to the key /tcb/minted language\(^{P.309}\) which is used for 'normal' listings. Used for /tcb/listing engine\(^{P.310}\)=minted only.

The following two keys are deprecated and without function (v3.50 and above). Use /tcb/before\(^{P.78}\) and /tcb/after\(^{P.78}\) with appropriate values instead. Also see /tcb/docexample.

/tcb/before example=\{macros\} (no default, initially empty)

Sets the \{macros\} which are executed before dispExample\(^{P.463}\) and dispListing\(^{P.464}\) additional to /tcb/before\(^{P.78}\).

/tcb/after example=\{macros\} (no default, initially empty)

Sets the \{macros\} which are executed after dispExample\(^{P.463}\) and dispListing\(^{P.464}\) additional to /tcb/after\(^{P.78}\).
/tcb/keywords bold=true|false
Keyword used in docEnvironment \textsuperscript{P.459}, docCommand \textsuperscript{P.458}, etc. are printed boldface (or not). Since the typewriter font is used, the effect may be invisible with Computer Modern fonts or similar which do not have a bold variant. Note that references to keywords are not printed boldface at all.

\begin{verbatim}
\LARGE
\docAuxCommand{fooaux}, \refCom{tcbset}
\tcbset{keywords bold=false}
\docAuxCommand{fooaux}, \refCom{tcbset}
\end{verbatim}

/tcb/index command=⟨macro⟩
(no default, initially \index)
Replaces the internally used \index macro by the given ⟨macro⟩. The ⟨macro⟩ has to take one mandatory argument like \index. This option is mutually exclusive with /tcb/index command name.

\begin{verbatim}
\tcbset{index command=\myindexcommand}
\end{verbatim}

/tcb/index command name=⟨name⟩
(no default, initially unset)
Replaces the internally used \index macro by \index[⟨name⟩], i.e. \index{...} is replaced by \index[⟨name⟩]{...}. This option is intended to be used with \texttt{imakeidx} and is mutually exclusive with /tcb/index command.

\begin{verbatim}
\tcbset{index command name=mydoc}
\end{verbatim}

/tcb/index format=⟨format⟩
(no default, initially pgf)
Determines the basic ⟨format⟩ of the generated index. Feasible values are:
• pgfsection: The index is formatted like in the \texttt{pgf} documentation (as a section).
• pgfchapter: The index is formatted like in the \texttt{pgf} documentation (as a chapter).
• pgf: Alias for pgfsection.
• doc: The index is assumed to be formatted by \texttt{doc} or \texttt{ltxdoc}. The usage of \texttt{makeindex} with \texttt{-s gind.ist} is assumed. The package \texttt{hypdoc} has to be loaded \texttt{before} \texttt{tcolorbox}.
• off: The index is not formatted by \texttt{tcolorbox}. Use this, if the index is formatted by other package like \texttt{imakeidx}.

/tcb/index actual=⟨character⟩
(no default, initially @)
Sets the character for 'actual' in automatic indexing.

/tcb/index quote=⟨character⟩
(no default, initially ”)
Sets the character for 'quote' in automatic indexing.

/tcb/index level=⟨character⟩
(no default, initially !)
Sets the character for 'level' in automatic indexing.

/tcb/index default settings
(style, no value)
Sets the makeindex default values for /tcb/index actual, /tcb/index quote, and /tcb/index level.

/tcb/index german settings
(style, no value)
Sets the makeindex values recommended for German language texts. This is identical to setting the following:

\begin{verbatim}
\tcbset{index actual={=},index quote={!},index level={>}}
\end{verbatim}
\texttt{/tcb/index annotate=\texttt{true}|\texttt{false}} \hspace{1em} (default \texttt{true}, initially \texttt{true})

If set to \texttt{true}, the index entries are annotated with short descriptions given by \texttt{/tcb/doclang/environment}^P.471, \texttt{/tcb/doclang/key}^P.471, and others.

\texttt{/tcb/index colorize=\texttt{true}|\texttt{false}} \hspace{1em} (default \texttt{true}, initially \texttt{false})

If set to \texttt{true}, the index entries colorized according to the color settings given by \texttt{/tcb/color environment}, \texttt{/tcb/color key}, and others.

\texttt{/tcb/color command=\langle color\rangle} \hspace{1em} (no default, initially \texttt{Definition})

Sets the highlight color used by macro definitions.

\texttt{/tcb/color environment=\langle color\rangle} \hspace{1em} (no default, initially \texttt{Definition})

Sets the highlight color used by environment definitions.

\texttt{/tcb/color key=\langle color\rangle} \hspace{1em} (no default, initially \texttt{Definition})

Sets the highlight color used by key definitions.

\texttt{/tcb/color value=\langle color\rangle} \hspace{1em} (no default, initially \texttt{Definition})

Sets the highlight color used by value definitions.

\texttt{/tcb/color counter=\langle color\rangle} \hspace{1em} (no default, initially \texttt{Definition})

Sets the highlight color used by counter definitions.

\texttt{/tcb/color length=\langle color\rangle} \hspace{1em} (no default, initially \texttt{Definition})

Sets the highlight color used by length definitions.

\texttt{/tcb/color color=\langle color\rangle} \hspace{1em} (no default, initially \texttt{Definition})

Sets the highlight color used by color definitions.

\texttt{/tcb/color definition=\langle color\rangle} \hspace{1em} (no default, initially \texttt{Definition})

Sets the highlight color for \texttt{/tcb/color command}, \texttt{/tcb/color environment}, \texttt{/tcb/color key}, \texttt{/tcb/color value}, \texttt{/tcb/color counter}, \texttt{/tcb/color length}, and \texttt{/tcb/color color}.

\texttt{/tcb/color option=\langle color\rangle} \hspace{1em} (no default, initially \texttt{Option})

Sets the color used for optional arguments.

\texttt{/tcb/color hyperlink=\langle color\rangle} \hspace{1em} (no default, initially \texttt{Hyperlink})

Sets the color for all hyper-links, i.e. all internal and external links.
The following keys are provided for language specific settings. The English language is prede-
defined.

(`/tcb/english language` (style, no value)
Sets all language specific settings to English.

`/tcb/doclang/color=(text)` (no default, initially color)
Text used in the index for colors.

`/tcb/doclang/colors=(text)` (no default, initially Colors)
Heading text in the index for colors.

`/tcb/doclang/counter=(text)` (no default, initially counter)
Text used in the index for counters.

`/tcb/doclang/counters=(text)` (no default, initially Counters)
Heading text in the index for counters.

`/tcb/doclang/environment=(text)` (no default, initially environment)
Text used in the index for environments.

`/tcb/doclang/environments=(text)` (no default, initially Environments)
Heading text in the index for environments.

`/tcb/doclang/environment content=(text)` (no default, initially environment content)
Text used in `docEnvironment` +P. 459.

`/tcb/doclang/index=(text)` (no default, initially Index)
Heading text for the index.

`/tcb/doclang/key=(text)` (no default, initially key)
Text used in the index for keys.

`/tcb/doclang/keys=(text)` (no default, initially Keys)
Heading text used in the index for keys.

`/tcb/doclang/length=(text)` (no default, initially length)
Text used in the index for lengths.

`/tcb/doclang/lengths=(text)` (no default, initially Lengths)
Heading text in the index for lengths.

`/tcb/doclang/new=(text)` (no default, initially New)
Announcement text for new content.

`/tcb/doclang/pageshort=(text)` (no default, initially P.)
Short text for page references.

`/tcb/doclang/updated=(text)` (no default, initially Updated)
Announcement text for updated content.

`/tcb/doclang/value=(text)` (no default, initially value)
Text used in the index for values.

`/tcb/doclang/values=(text)` (no default, initially Values)
Heading text in the index for values.

471
Sets the left hand offset of the documentation texts from \texttt{docCommand} \cite{458}, \texttt{docEnvironment} \cite{459}, \texttt{docKey} \cite{460}, etc, to \{\texttt{length}\}.

\begin{docCommand*}[doc left=2cm,doc left indent=-2cm]{myCommandA}{\marg{argument}}
This is the documentation of \texttt{\refCom{myCommandA}} which takes one \texttt{\meta{argument}}. \texttt{myCommandA} does some funny things with its \texttt{\meta{argument}}.
\end{docCommand*}

\myCommandA{⟨argument⟩} (no default, initially \texttt{2em})
This is the documentation of \texttt{myCommandA} which takes one \texttt{⟨argument⟩}. \texttt{myCommandA} does some funny things with its \texttt{⟨argument⟩}.

Sets the right hand offset of the documentation texts from \texttt{docCommand} \cite{458}, \texttt{docEnvironment} \cite{459}, \texttt{docKey} \cite{460}, etc, to \{\texttt{length}\}.

\begin{docCommand*}[doc right=2cm]{myCommandB}{\marg{argument}}
This is the documentation of \texttt{\refCom{myCommandB}} which takes one \texttt{\meta{argument}}. \texttt{myCommandB} does some funny things with its \texttt{\meta{argument}}.
\end{docCommand*}

\myCommandB{⟨argument⟩} (no default, initially \texttt{0em})
This is the documentation of \texttt{myCommandB} which takes one \texttt{⟨argument⟩}. \texttt{myCommandB} does some funny things with its \texttt{⟨argument⟩}.

Sets the left hand indent of documentation heads from \texttt{docCommand} \cite{458}, \texttt{docEnvironment} \cite{459}, \texttt{docKey} \cite{460}, etc, to \{\texttt{length}\}.

\begin{docCommand*}[doc left indent=2cm]{myCommandC}{\marg{argument}}
This is the documentation of \texttt{\refCom{myCommandC}} which takes one \texttt{\meta{argument}}. \texttt{myCommandC} does some funny things with its \texttt{\meta{argument}}.
\end{docCommand*}

\myCommandC{⟨argument⟩} (no default, initially \texttt{-2em})
This is the documentation of \texttt{myCommandC} which takes one \texttt{⟨argument⟩}. \texttt{myCommandC} does some funny things with its \texttt{⟨argument⟩}.

Sets the right hand indent of documentation heads from \texttt{docCommand} \cite{458}, \texttt{docEnvironment} \cite{459}, \texttt{docKey} \cite{460}, etc, to \{\texttt{length}\}.

\begin{docCommand*}[doc right indent=-10mm,doc right=10mm, doc description=test value]{myCommandD}{\marg{argument}}
This is the documentation of \texttt{\refCom{myCommandD}} which takes one \texttt{\meta{argument}}. \texttt{myCommandD} does some funny things with its \texttt{\meta{argument}}.
\end{docCommand*}

\myCommandD{⟨argument⟩} (test value)
This is the documentation of \texttt{myCommandD} which takes one \texttt{⟨argument⟩}. \texttt{myCommandD} does some funny things with its \texttt{⟨argument⟩}.
The head lines of the main documentation environments \texttt{docCommand} \cite{P.458}, \texttt{docEnvironment} \cite{P.459}, \texttt{docKey} \cite{P.460}, etc, are set inside \texttt{tcolorbox}es. Options to these \texttt{tcolorbox}es can be given using the following keys.

\texttt{/tcb/doc head command=⟨options⟩} \hspace{1cm} (no default, initially empty)
Sets ⟨options⟩ for the head line of \texttt{docCommand} \cite{P.458} and \texttt{docCommand*} \cite{P.459}.

\begin{docCommand*}{myCommandE}{⟨argument⟩}
\end{docCommand*}
\texttt{/tcb/doc head environment=⟨options⟩} \hspace{1cm} (no default, initially empty)
Sets ⟨options⟩ for the head line of \texttt{docEnvironment} \cite{P.459} and \texttt{docEnvironment*} \cite{P.459}.

\begin{docEnvironment*}{myEnvironment}{⟨argument⟩}
end{docEnvironment*}
\texttt{/tcb/doc head key=⟨options⟩} \hspace{1cm} (no default, initially empty)
Sets ⟨options⟩ for the head line of \texttt{docKey} \cite{P.460} and \texttt{docKey*} \cite{P.460}.

\begin{docKey*}{/foo/myKey}{}{no value}
\end{docKey*}
\texttt{/tcb/doc head=⟨options⟩} \hspace{1cm} (no default, initially empty)
Shortcut for setting the same ⟨options⟩ for \texttt{/tcb/doc head command}, \texttt{/tcb/doc head environment}, and \texttt{/tcb/doc head key}.
The description texts of the main documentation environments \texttt{docCommand}\textsuperscript{\texttt{P}.458}, \texttt{docEnvironment}\textsuperscript{\texttt{P}.459}, \texttt{docKey}\textsuperscript{\texttt{P}.460}, etc, are set in a compact form without indentation and \texttt{parskip}=\texttt{Opt}. This settings can overruled by using the following keys to insert code before (or after) the description texts.

\begin{tcb}{before doc body command}=(\texttt{code})
\end{tcb}

(no default, initially empty)

Executes \texttt{\textless code\textgreater} before the description texts of \texttt{docCommand}\textsuperscript{\texttt{P}.458} and \texttt{docCommand*}\textsuperscript{\texttt{P}.459}.

\begin{tcb}{after doc body command}=(\texttt{code})
\end{tcb}

(no default, initially empty)

Executes \texttt{\textless code\textgreater} after the description texts of \texttt{docCommand}\textsuperscript{\texttt{P}.458} and \texttt{docCommand*}\textsuperscript{\texttt{P}.459}.

\begin{tcb}{before doc body environment}=(\texttt{code})
\end{tcb}

(no default, initially empty)

Executes \texttt{\textless code\textgreater} before the description texts of \texttt{docEnvironment}\textsuperscript{\texttt{P}.459} and \texttt{docEnvironment*}\textsuperscript{\texttt{P}.459}.

\begin{tcb}{after doc body environment}=(\texttt{code})
\end{tcb}

(no default, initially empty)

Executes \texttt{\textless code\textgreater} after the description texts of \texttt{docEnvironment}\textsuperscript{\texttt{P}.459} and \texttt{docEnvironment*}\textsuperscript{\texttt{P}.459}.

\begin{tcb}{before doc body key}=(\texttt{code})
\end{tcb}

(no default, initially empty)

Executes \texttt{\textless code\textgreater} before the description texts of \texttt{docKey}\textsuperscript{\texttt{P}.460} and \texttt{docKey*}\textsuperscript{\texttt{P}.460}.

\begin{tcb}{after doc body key}=(\texttt{code})
\end{tcb}

(no default, initially empty)

Executes \texttt{\textless code\textgreater} after the description texts of \texttt{docKey}\textsuperscript{\texttt{P}.460} and \texttt{docKey*}\textsuperscript{\texttt{P}.460}.

\begin{tcb}{before doc body}=(\texttt{options})
\end{tcb}

(no default, initially empty)

Shortcut for setting the same \texttt{\textless options\textgreater} for \texttt{/tcb/before doc body command}, \texttt{/tcb/before doc body environment}, and \texttt{/tcb/before doc body key}.

\begin{tcb}{after doc body}=(\texttt{options})
\end{tcb}

(no default, initially empty)

Shortcut for setting the same \texttt{\textless options\textgreater} for \texttt{/tcb/after doc body command}, \texttt{/tcb/after doc body environment}, and \texttt{/tcb/after doc body key}.
Sets a (short!) additional description \textit{text} for \texttt{docCommand} \textsuperscript{P.458} or \texttt{docEnvironment} \textsuperscript{P.459}. Such a description is mandatory for \texttt{docKey} \textsuperscript{P.460}.

\begin{docCommand*}[doc description=my description]{myCommandF}\{\marg{argument}\}
This is the documentation of \texttt{\refCom{myCommandF}} which takes one \texttt{\meta{argument}}. \texttt{\refCom{myCommandF}} does some funny things with its \texttt{\meta{argument}}.
\end{docCommand*}

\myCommandF\{\langle\argument\rangle\} \hspace{1cm} (my description)
This is the documentation of \texttt{\myCommandF} which takes one \texttt{\langle\argument\rangle}. \texttt{\myCommandF} does some funny things with its \texttt{\langle\argument\rangle}.

Note that the description \textit{text} may overlap with the text on the left hand side if too long. Linebreaks can be used inside the \textit{text}.

\texttt{\begin{docCommand}{\texttt{\doc into index=true|false}}\{\texttt{\texttt{\textit{false}}}\}} \hspace{1cm} (default true, initially true)
If set to \texttt{false}, no index entries are written for the main documentation environments. The same effect is achieved by using e.g. \texttt{\docCommand*} \textsuperscript{P.459} instead of \texttt{\docCommand} \textsuperscript{P.458}.

\texttt{\begin{docCommand}{\texttt{\doc marginnote=\langle\texttt{options}\rangle}}\{\texttt{\texttt{\texttt{\textit{false}}}\}} \hspace{1cm} (no default, initially empty)
Sets style \texttt{\langle\texttt{options}\rangle} for the displayed box of the \texttt{\tcbdocmarginnote} \textsuperscript{P.467} command.

\texttt{\begin{docCommand}{\texttt{\texttt{\textit{false}}}\}}\{\texttt{\texttt{\textit{false}}}\}} \hspace{1cm} (style, no default)
Adds a a marginnote with a 'New: \textit{data}' message at the beginning of the upper box part. The intended use is inside the option list of \texttt{\docCommand} \textsuperscript{P.458}, \texttt{\docEnvironment} \textsuperscript{P.459}, etc.

\texttt{\begin{docCommand}{\texttt{\texttt{\textit{false}}}\}}\{\texttt{\texttt{\textit{false}}}\}} \hspace{1cm} (style, no default)
Adds a marginnote with a 'Updated: \textit{data}' message at the beginning of the upper box part. See \texttt{\doc new}.

\texttt{\begin{docCommand}{\texttt{\texttt{\textit{false}}}\}}\{\texttt{\texttt{\textit{false}}}\}} \hspace{1cm} (style, no default)
Adds a marginnote with 'New: \textit{new data}' and 'Updated: \textit{update data}' messages at the beginning of the upper box part. See \texttt{\doc new}.

24.3 Predefined Colors of the Library

The following colors are predefined. They are used as default colors in some library commands.

\begin{itemize}
\item \texttt{Option} , \texttt{Definition} , \texttt{ExampleFrame} , \texttt{ExampleBack} , \texttt{Hyperlink}.
\end{itemize}
A Picture Credits

The following pictures were used inside this documentation.

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477


## Index

- key, 447  
| ! key, 447  
| 0 value, 147  
| 1 value, 147  
| 2 value, 147  

| above key, 406  
| absquote environment, 464  
| add to height key, 55  
| add to list key, 99  
| add to natural height key, 55  
| adjust text key, 18  
| adjusted title key, 18  
| adjusted title after break key, 366  
| after key, 78  
| after app key, 424  
| after doc body key, 474  
| after doc body command key, 474  
| after doc body environment key, 474  
| after doc body key key, 474  
| after example key, 468  
| after lower key, 66  
| after lower app key, 424  
| after lower pre key, 424  
| after lower* key, 66  
| after pre key, 424  
| after skip key, 80  
| after title key, 64  
| after title app key, 423  
| after title pre key, 423  
| after upper key, 65  
| after upper app key, 423  
| after upper pre key, 423  
| after upper* key, 65  
| all key, 10  
| all value, 48, 49, 287, 368, 370  
| ams align key, 351  
| ams align lower key, 351  
| ams align upper key, 351  
| ams align* key, 351  
| ams align* lower key, 351  
| ams align* upper key, 351  
| ams equation key, 350  
| ams equation lower key, 350  
| ams equation upper key, 350  
| ams equation* key, 350  
| ams equation* lower key, 350  
| ams equation* upper key, 350  
| ams gather key, 352  
| ams gather lower key, 352  
| ams gather upper key, 352  
| ams gather* key, 352  
| ams gather* lower key, 352  
| ams gather* upper key, 352  
| ams nodisplayskip key, 353  
| ams nodisplayskip lower key, 353  
| ams nodisplayskip upper key, 353  
| arc key, 36  
| arc is angular key, 38  
| arc is curved key, 38  
| areasize value, 418  
| areasize* value, 418  
| as-is value, 255  
| at key, 407  
| at begin tikz key, 192  
| at begin tikz reset key, 192  
| at end tikz key, 192  
| at end tikz reset key, 192  
| attach boxed title to bottom key, 156  
| attach boxed title to bottom center key, 155  
| attach boxed title to bottom left key, 155  
| attach boxed title to bottom right key, 155  
| attach boxed title to bottom* key, 156  
| attach boxed title to top key, 156  
| attach boxed title to top center key, 155  
| attach boxed title to top left key, 155  
| attach boxed title to top right key, 155  
| attach boxed title to top* key, 156  
| attach title key, 20  
| attach title to upper key, 20  
| auto value, 97  
| auto counter key, 108  
| auto limited value, 97  
| auto outer arc key, 38  
| autoparskip key, 78  
| base value, 79  
| base color key, 269  
| baseline key, 79  
| baselineskip value, 368  
| beamer key, 228  
| beamer Skin, 228  
| beamerfirst Skin, 230  
| beamerlast Skin, 232  
| beamermiddle Skin, 231  
| bean arc key, 37  
| before key, 78  
| before app key, 424  
| before doc body key, 474  
| before doc body command key, 474  
| before doc body environment key, 474  
| before doc body key key, 474  
| before example key, 468  
| before lower key, 66  
| before lower app key, 424  
| before lower pre key, 424  
| before nobreak key, 81  
| before pre key, 424  

479
before skip key, 80
before title key, 64
before title app key, 423
before title pre key, 423
before upper key, 65
before upper app key, 423
before upper pre key, 423
beforeafter skip key, 80
below key, 406
between key, 407
bicolor key, 219
bicolor Skin, 219
bicolorfirst Skin, 221
bicolorlast Skin, 223
bicolormiddle Skin, 222
blank key, 208
blanker key, 238
blankest key, 239
blend before title key, 113
blend before title code key, 114
blend into key, 112
bookmark key, 100
bookmark* key, 100
borderline key, 177
borderline east key, 180
borderline horizontal key, 181
borderline north key, 180
borderline south key, 180
borderline vertical key, 181
borderline west key, 180
both value, 123
bottom key, 43
bottom value, 33, 79, 117, 286
bottom seam value, 117
bottomrule key, 35
bottomrule at break key, 369
bottomsep at break key, 369
bottomtitle key, 43
box align key, 79
\boxarrayclear, 388
\boxarraygetbox, 392
\boxarraygetdepth, 393
\boxarraygetheight, 393
\boxarraygetsize, 390
\boxarraygettotalheight, 394
\boxarraygetwidth, 393
\boxarrayreset, 387
boxarraysstore environment, 390
boxed title size key, 158
boxed title style key, 159
boxes key, 402
boxrule key, 36
boxsep key, 39
\brackets, 462
break value, 355
break at key, 367
breakable key, 9, 365
broken value, 165–167
capture key, 94
center key, 85
center value, 30, 33, 79, 117, 286
center lower key, 32
center seam value, 117
center title key, 32
center upper key, 32
change value, 355
change apart value, 355
change break value, 355
change standard value, 354
check odd page key, 101
circular arc key, 37
clear preamble key, 454
clear preclass key, 454
clip lower key, 176
clip title key, 175
clip upper key, 175
clip watermark key, 171
clipped value, 270
code key, 106
colback key, 27
colbacklower key, 220
colbacktitle key, 27
\colDef, 466
colframe key, 27
collower key, 28
colon value, 113
colon hang value, 113
\colOpt, 466
color key, 471
color color key, 470
color command key, 470
color counter key, 470
color definition key, 470
color environment key, 470
color from key, 269
color hyperlink key, 470
color key key, 470
color length key, 470
color option key, 470
color value key, 470
Colors
Definition, 475
ExampleBack, 475
ExampleFrame, 475
foocolor, 461
Hyperlink, 475
Option, 475
colors key, 471
colspacing key, 400
coltext key, 28
coltitle key, 28
column key, 404
column* key, 404
columns key, 400
colupper key, 28
comment key, 311
comment above listing key, 318
comment above* listing key, 318

comment and listing key, 314
comment only key, 311
comment outside listing key, 316
comment side listing key, 316
comment style key, 314
compilable listing key, 322
compiler key, 453
compress page key, 368
\consumeboxarray, 391
\consumetcboxarray, 391
copy value, 158
counter key, 471
Counters
   foocounter, 461
counters key, 471
coverage key, 401
crefname key, 111
crefname key, 111
\cs, 462
dash value, 113
dash hang value, 113
\DeclareTCBInputListing, 443
\DeclareTCBListing, 441
\DeclareTCBox, 438
\DeclareTCBoxFit, 444
\DeclareTCColorBox, 435
\DeclareTotalTCBox, 439
\DeclareTotalTCBoxFit, 445
\DeclareTotalTCColorBox, 437
Definition color, 475
description color key, 344
description delimiters key, 344
description delimiters none key, 344
description delimiters parenthesis key, 344
description font key, 345
description formatter key, 345
detach title key, 20
direct value, 270
dispExample environment, 463
dispExample* environment, 463
dispListing environment, 464
dispListing* environment, 464
do not store to box array key, 390
doc value, 469
doc description key, 475
doc head key, 473
doc head command key, 473
doc head environment key, 473
doc head key, 473
doc into index key, 475
doc left key, 472
doc left indent key, 472
doc marginnote key, 475
doc new key, 475
doc new and updated key, 475
doc right key, 472
doc right indent key, 472
doc updated key, 475
\docAuxCommand, 460
\docAuxCommand*, 460
\docAuxEnvironment, 460
\docAuxEnvironment*, 460
\docAuxKey, 461
\docAuxKey*, 461
\docColor, 461
\docColor*, 461
docCommand environment, 458
docCommand* environment, 459
\docCounter, 461
\docCounter*, 461
docEnvironment environment, 459
docEnvironment* environment, 459
docexample key, 468
docKey environment, 460
docKey* environment, 460
\docLength, 461
\docLength*, 461
documentation key, 10
documentation listing options key, 468
documentation listing style key, 468
documentation minted language key, 468
documentation minted options key, 468
documentation minted style key, 468
\docValue, 460
\docValue*, 460
downhill value, 48, 49
draft key, 248
draft Skin, 248
draftmode key, 203
draw method key, 270
drop fuzzy midday shadow key, 183
drop fuzzy shadow key, 182
drop fuzzy shadow east key, 186
drop fuzzy shadow north key, 186
drop fuzzy shadow northeast key, 186
drop fuzzy shadow northwest key, 186
drop fuzzy shadow south key, 185
drop fuzzy shadow southeast key, 185
drop fuzzy shadow southwest key, 185
drop fuzzy shadow west key, 185
drop large lifted shadow key, 187
drop lifted shadow key, 187
drop midday shadow key, 182
drop shadow key, 182
drop shadow east key, 185
drop shadow north key, 184
drop shadow northeast key, 185
drop shadow northwest key, 184
drop shadow south key, 184
drop shadow southeast key, 184
drop shadow southwest key, 184
drop shadow west key, 184
drop small lifted shadow key, 187
east fading, 270
east value, 48, 49
east size key, 267
east style key, 269
empty key, 237
empty Skin, 237
empty value, 135, 136
emptylast Skin, 242
emptymiddle Skin, 241
enforce breakable key, 366
english language key, 471
enhanced key, 206
enhanced Skin, 206
enhanced jigsaw key, 213
enhanced jigsaw Skin, 213
enhanced standard key, 208
enhanced standard jigsaw key, 213
enhancedfirst Skin, 210
enhancedfirst jigsaw Skin, 214
enhancedlast Skin, 212
enhancedlast jigsaw Skin, 218
enhancedmiddle Skin, 211
enhancedmiddle jigsaw Skin, 215
enlarge bottom at break by key, 83
enlarge bottom by key, 83
enlarge bottom finally by key, 82
enlarge by key, 84
enlarge left by key, 83
enlarge right by key, 83
enlarge top at break by key, 83
enlarge top by key, 83
enlarge top initially by key, 82
enlargepage key, 367
enlargepage flexible key, 368
environment key, 453, 471
environment content key, 471
environment with percent key, 453
Environments
absquote, 464
boxarraystore, 390
dispExample, 463
dispExample*, 463
dispListing, 464
dispListing*, 464
docCommand, 458
docCommand*, 459
docEnvironment, 459
docEnvironment*, 459
docKey, 460
docKey*, 460
extcolorbox, 450
extikzpicture, 451
fооaussenv, 460
foocolorbox, 459
foocolorbox*, 459
posterboxenv, 403
tcbcliplframe, 172
tcbcliplnterior, 174
tcbclipltitle, 174
tcbexternal, 448
tcbinvcliplframe, 173
tcbitemize, 280
tcblisting, 299
tcboutputlisting, 301
tcboxeditemize, 282
tcboxedraster, 281
tcbposter, 398
tcbraster, 279
tcbverbatimwrite, 126
tcbwritetempt, 126
tcolorbox, 12
environments key, 471
equal height group key, 61
evenpage value, 46, 86
every box key, 91
every box on higher layers key, 92
every box on layer n key, 92
every float key, 77
every listing line key, 306
every listing line* key, 306
ExampleBack color, 475
ExampleFrame color, 475
extcolorbox environment, 450
extend freelance key, 250
extend freelancefirst key, 250
extend freelancelast key, 250
extend freelancemiddle key, 250
external key, 10, 105
externalize key, 447
externalize example key, 452
externalize example! key, 452
externalize listing key, 452
externalize listing! key, 452
extikzpicture environment, 451
extras key, 371
extras broken key, 371
extras broken pre key, 432
extras first key, 371
extras first and middle key, 371
extras first and middle pre key, 432
extras first pre key, 432
extras last key, 371
extras last pre key, 432
extras middle key, 371
extras middle and last key, 371
extras middle and last pre key, 432
extras middle pre key, 432
extras pre key, 432
extras unbroken key, 371
extras unbroken and first key, 371
extras unbroken and first pre key, 432
extras unbroken and last key, 371
extras unbroken and last pre key, 432
extras unbroken pre key, 432
extrude bottom by key, 90
extrude by key, 90
extrude left by key, 89
extrude right by key, 89
extrude top by key, 90
fade in key, 271
fade out key, 271
Fadings

- `east`, `north`, `semi east`, `semi north`, `semi south`, `semi west`, `south`, `west`
- `false` value, `78`, `81`, `288`, `365`
- `fbox` value, `44`
- `figures` value, `112`
- `fill downwards` key, `87`
- `fill image opacity` key, `262`
- `fill image options` key, `262`
- `fill image scale` key, `262`
- `fill overzoom image` key, `258`
- `fill overzoom image*` key, `258`
- `fill overzoom picture` key, `258`
- `fill plain image` key, `256`
- `fill plain image*` key, `256`
- `fill plain picture` key, `256`
- `fill shrink image` key, `260`
- `fill shrink image*` key, `260`
- `fill shrink picture` key, `260`
- `fill stretch image` key, `257`
- `fill stretch image*` key, `257`
- `fill stretch picture` key, `257`
- `fill tile image` key, `261`
- `fill tile image*` key, `261`
- `fill tile picture` key, `261`
- `fill tile picture*` key, `261`
- `fill zoom image` key, `259`
- `fill zoom image*` key, `259`
- `fill zoom picture` key, `259`
- `final` value, `420`
- `finish` key, `197`
- `finish broken` key, `198`
- `finish broken pre` key, `430`
- `finish fading vignette` key, `275`
- `finish first` key, `198`
- `finish first and middle` key, `198`
- `finish first and middle pre` key, `430`
- `finish first pre` key, `430`
- `finish last` key, `198`
- `finish last pre` key, `430`
- `finish middle` key, `198`
- `finish middle and last` key, `198`
- `finish middle and last pre` key, `430`
- `finish middle pre` key, `430`
- `finish pre` key, `430`
- `finish raised fading vignette` key, `274`
- `finish unbroken` key, `198`
- `finish unbroken and first` key, `198`
- `finish unbroken and first pre` key, `430`
- `finish unbroken and last` key, `198`
- `finish unbroken and last pre` key, `430`
- `finish unbroken pre` key, `430`
- `finish vignette` key, `274`
- `first` value, `165–167`, `370`
- `first and middle` value, `165`, `370`
- `fit` key, `412`
- `fit algorithm` key, `418`
- `fit basedim` key, `413`
- `fit fontsize macros` key, `414`
- `fit height from` key, `417`
- `fit height plus` key, `415`
- `fit maxfondiff` key, `420`
- `fit maxfondiffgap` key, `420`
- `fit maxstep` key, `420`
- `fit maxwidthdiff` key, `420`
- `fit maxwidthdiffgap` key, `420`
- `fit skip` key, `413`
- `fit to` key, `413`
- `fit to height` key, `413`
- `fit warning` key, `420`
- `fit width from` key, `416`
- `fit width plus` key, `415`
- `fitbox` value, `94`
- `fitting` key, `9`
- `fixed height` key, `405`
- `flip title` key, `156`
- `float` key, `76`
- `float*` key, `76`
- `floatplacement` key, `76`
- `flush center` value, `30`, `32`
- `flush left` key, `85`
- `flush left value` `30`, `32`
- `flush right` key, `85`
- `flush right value` `30`, `32`
- `flushleft lower` key, `32`
- `flushleft title` key, `32`
- `flushleft upper` key, `32`
- `flushright lower` key, `32`
- `flushright title` key, `32`
- `flushright upper` key, `32`
- `fontlower` key, `29`
- `fontsize` key, `402`
- `fontsize value` `418`
- `fontsize* value` `418`
- `fonttitle` key, `29`
- `fontupper` key, `29`
- `\fooaux`, `460`, `469`
- `fooaux` key, `461`
- `fooauxenviron` environment, `460`
- `foocolor` color, `461`
- `foocolorbox` environment, `459`
- `foocolorbox*` environment, `459`
- `foocounter` counter, `461`
- `foodummy` key, `465`
- `\foolength` length, `461`
- `\foomakedocSubKey`, `458`
- `\foomakedocSubKey*`, `459`
- `\foosomething`, `475`
- `footitle` key, `460`
- `foovalue` value, `460`
- `force remake` key, `447`
- `forced` value, `46`, `86`
forced center value, 97
forced left value, 97
forced right value, 97
forces nobeforeafter key, 78
frame code key, 138
frame code app key, 430
frame code pre key, 430
frame empty key, 138
frame engine key, 135
frame hidden key, 149
frame style key, 148
frame style image key, 148
frame style tile key, 149
freelance key, 250
freelance Skin, 250
freelance value, 135, 136
freelance first Skin, 250
freelance middle Skin, 250
freeze extension key, 325
freeze file key, 325
freeze jpg key, 325
freeze none key, 325
freeze pdf key, 325
freeze png key, 325
fuzzy halo key, 183
fuzzy shadow key, 189
geometry nodes key, 137
graphical environment key, 135
graphics directory key, 254
graphics options key, 254
graphics orientation key, 255
graphics pages key, 254
grow sideways by key, 85
grow to left by key, 84
grow to right by key, 84
halign key, 30
halign lower key, 31
halign title key, 32
halign upper key, 30
halo key, 183
 hbox key, 94
 hbox value, 94
 hbox boxed title key, 163
height key, 53, 400
height fill key, 56
height fixed for key, 370
height from key, 54
height plus key, 53
highlight math key, 349
highlight math style key, 349
hooks key, 9
horizontal size key, 268
hybrid value, 418
hybrid* value, 418
Hyperlink color, 475
hyperlink key, 199
hyperlink interior key, 200
hyperlink node key, 200
hyperlink title key, 200
hyperref key, 199
hyperref interior key, 199
hyperref node key, 199
hyperref title key, 199
hypertarget key, 100
hyperurl key, 200
hyperurl interior key, 200
hyperurl node key, 200
hyperurl title key, 200
hyperurl* key, 200
hyperurl* interior key, 200
hyperurl* node key, 200
hyperurl* title key, 200
hyphenationfix key, 96
if odd page key, 101
if odd page or oneside key, 101
if odd page or oneside* key, 102
IfBooleanTF key, 434
\ifboxarrayempty, 392
IfNoValueTF key, 433
IfValueTF key, 434
ignore nobreak key, 81
ignored value, 24
image comment key, 311
\imagename, 252
\imagepage, 253
index key, 471
index actual key, 469
index annotate key, 470
index colorize key, 470
index command key, 469
index command name key, 469
index default settings key, 469
index format key, 469
index german settings key, 469
index level key, 469
index quote key, 469
inherit height key, 57
input source on error key, 453
inside node key, 267
interior code key, 139
interior code app key, 431
interior code pre key, 431
interior empty key, 139
interior engine key, 136
interior hidden key, 150
interior style key, 149
interior style image key, 150
interior style tile key, 150
interior titled code key, 138
interior titled code app key, 430
interior titled code pre key, 431
interior titled empty key, 138
interior titled engine key, 138
invisible key, 22
invisible value, 22, 24

484
freeze jpg, 325
freeze none, 325
freeze pdf, 325
freeze png, 325
fuzzy halo, 183
fuzzy shadow, 189
graphical environment, 135
graphics directory, 254
graphics options, 254
graphics orientation, 255
graphics pages, 254
grow sidewards by, 85
grow to left by, 84
grow to right by, 84
halign, 30
halign lower, 31
halign title, 32
halign upper, 30
hbox, 94
hbox boxed title, 163
height, 53
height fill, 56
height fixed for, 370
height from, 54
height plus, 53
highlight math, 349
highlight math style, 349
hyperlink, 199
hyperlink interior, 200
hyperlink node, 290
hyperlink title, 200
hyperref, 199
hyperref interior, 199
hyperref node, 199
hyperref title, 199
hypertarget, 100
hyperurl, 200
hyperurl interior, 200
hyperurl node, 200
hyperurl title, 200
hyperurl*, 200
hyperurl* interior, 200
hyperurl* node, 200
hyperurl* title, 200
hyphenationfix, 96
if odd page, 101
if odd page or oneside, 101
if odd page or oneside*, 102
if odd page*, 102
IfBooleanTF, 434
IfNoValueTF, 433
IfValueTF, 434
ignore nobreak, 81
image comment, 311
index actual, 469
index annotate, 470
index colorize, 470
index command, 469
index command name, 469
index default settings, 469
index format, 469
index german settings, 469
index level, 469
index quote, 469
inherit height, 57
interior code, 139
interior code app, 431
interior code pre, 431
interior empty, 139
interior engine, 136
interior hidden, 150
interior style, 149
interior style image, 150
interior style tile, 150
interior titled code, 138
interior titled code app, 430
interior titled code pre, 431
interior titled empty, 138
interior titled engine, 135
invisible, 22
keywords bold, 469
label, 98
label separator, 346
label type, 98
left, 39
left skip, 81
left*, 39
lefthand ratio, 120
lefthand width, 119
leftlower, 40
leftright skip, 81
leftrule, 35
lefttitle, 40
leftupper, 40
lifted shadow, 190
lines before break, 366
list entry, 99
list text, 99
listing above comment, 318
listing above text, 317
listing above* comment, 318
listing above* text, 317
listing and comment, 314
listing and text, 310
listing engine, 310
listing file, 310
listing inputencoding, 306
listing only, 310
listing options, 305
listing outside comment, 316
listing outside text, 315
listing remove caption, 306
listing side comment, 316
listing side text, 315
listing style, 305
listing utf8, 307
lower separated, 25
lowerbox, 24
marker, 215
math, 350
math lower, 350
math upper, 350
middle, 43
minimum for current equal height
group, 62
minimum for equal height group, 62
minipage, 94
minipage boxed title, 163
minipage boxed title*, 163
minted language, 308
minted options, 308
minted style, 309
move upwards, 87
move upwards*, 87
nameref, 99
natural height, 53
no borderline, 179
no boxed title style, 162
no extras, 371
no extras first, 371
no extras last, 371
no extras middle, 371
no extras unbroken, 371
no finish, 198
no finish first, 198
no finish last, 198
no finish middle, 198
no finish unbroken, 198
no label type, 98
no listing options, 305
no overlay, 72
no process, 322
no recording, 128
no shadow, 182
no underlay, 195
no underlay boxed title, 196
no underlay first, 196
no underlay last, 196
no underlay middle, 196
no underlay unbroken, 196
no watermark, 167
nobeforeafter, 78
nofloat, 76
noparskip, 78
nophantom, 98
notitle, 18
notitle after break, 366
octogon arc, 37
on line, 96
only, 106
opacityback, 51
opacitybacktitle, 51
opacityfill, 51
opacityframe, 51
opacitylower, 52
opacitytext, 52
opacitytitle, 52
opacityupper, 52
outer arc, 38
overlay, 71
overlay app, 425
overlay broken, 72
overlay broken app, 426
overlay broken pre, 426
overlay first, 72
overlay first and middle, 72
overlay first and middle app, 426
overlay first and middle pre, 426
overlay first app, 425
overlay first pre, 425
overlay last, 72
overlay last app, 426
overlay last pre, 426
overlay middle, 72
overlay middle and last, 72
overlay middle and last app, 426
overlay middle and last pre, 426
overlay middle app, 426
overlay middle pre, 426
overlay pre, 425
overlay unbroken, 72
overlay unbroken and first, 72
overlay unbroken and first app, 426
overlay unbroken and first pre, 426
overlay unbroken and last, 72
overlay unbroken and last app, 426
overlay unbroken and last pre, 426
overlay unbroken app, 425
overlay unbroken pre, 425
oversize, 45
pad after break, 369
pad at break, 369
pad at break*, 369
pad before break, 369
pad before break*, 369
parbox, 95
parfillskip restore, 81
parskip, 78
pdf comment, 312
pdf extension, 314
phantom, 98
phantomlabel, 98
placeholder, 408
process code, 322
raster after skip, 284
raster before skip, 284
raster column n, 288
raster column skip, 285
raster columns, 283
raster equal column, 288
raster equal height, 287
raster equal height group, 287
raster equal skip, 284
raster even column, 288
raster even number, 289
horizontal size, 268
inside node, 267
lower left corner, 266
lowered color, 269
north size, 267
north style, 268
outside node, 267
over node, 267
over node offset, 267
raised color, 269
scope, 269
semi fade in, 271
semi fade out, 271
size, 268
south size, 267
south style, 268
upper right corner, 266
vertical size, 268
west size, 268
west style, 269
xmax, 266
xmin, 266
ymax, 266
ymin, 266

\tikz/
fill image opacity, 262
fill image options, 262
fill image scale, 262
fill overzoom image, 258
fill overzoom image*, 258
fill overzoom picture, 258
fill plain image, 256
fill plain image*, 256
fill plain picture, 256
fill shrink image, 260
fill shrink image*, 260
fill shrink picture, 260
fill stretch image, 257
fill stretch image*, 257
fill stretch picture, 257
fill tile image, 261
fill tile image*, 261
fill tile picture, 261
fill tile picture*, 261
fill zoom image, 259
fill zoom image*, 259
fill zoom picture, 259
tcb fill frame, 154
tcb fill interior, 154
tcb fill title, 154

keys key, 471
keywords bold key, 469

label key, 98
label separator key, 346
label type key, 98
landscape value, 255
landscape* value, 255
last value, 165–167, 370
left key, 39
left value, 30, 123, 286
left skip key, 81
left* key, 39
lefthand ratio key, 120
lefthand width key, 119
lefthower key, 40
leftright skip key, 81
leftrule key, 35
lefttitle key, 40
leftupper key, 40
length key, 471

Lengths
\footnotesize, 461
lengths key, 471
lifted shadow key, 190
lines before break key, 366
list entry key, 99
list inside key, 115
list text key, 99
list type key, 115
listing above comment key, 318
listing above text key, 317
listing above* comment key, 318
listing above* text key, 317
listing and comment key, 314
listing and text key, 310
listing engine key, 310
listing file key, 310
listing inputencoding key, 306
listing only key, 310
listing options key, 305
listing outside comment key, 316
listing outside text key, 315
listing remove caption key, 306
listing side comment key, 316
listing side text key, 315
listing style key, 305
listing utf8 key, 307
listings key, 9
listings value, 112, 310
listingsutf8 key, 9
lower left corner key, 266
lower separated key, 25
lowerbox key, 24
lowered color key, 269

magazine key, 9
many key, 10
\marg, 462
margin value, 356
margin apart value, 356
margin break value, 356
marker key, 215
math key, 350
math lower key, 350
math upper key, 350
maximum value, 56
\meta, 462
middle key, 43
middle value, 165–167, 370
middle and last value, 165–167, 370
minimal value, 44
minimum center value, 97
minimum for current equal height group key, 62
minimum for equal height group key, 62
minimum left value, 97
minimum right value, 97
minipage key, 94, 453
minipage value, 94, 280
minipage boxed title key, 163
minipage boxed title* key, 163
minted key, 9
minted value, 310
minted language key, 308
minted options key, 308
minted style key, 309
most key, 10
move upwards key, 87
move upwards* key, 87
name key, 404, 449
nameref key, 99
natural height key, 53
new key, 471
\newboxarray, 387
\newtcbexternalizeenvironment, 455
\newtcbexternalizetcolorbox, 455
\NewTCBInputListing, 443
\newtcbinputlisting, 304
\NewTCBListing, 441
\newtcblisting, 302
\NewTCBox, 438
\newtcbbox, 16
\NewTCBoxFit, 444
\newtcbboxfit, 411
\newtcbtheorem, 339
\NewTColorBox, 436
\newtcolorbox, 15
\NewTotalTCBox, 440
\NewTotalTCBoxFit, 445
\NewTotalTColorBox, 437
no borderline key, 179
no boxed title style key, 162
no counter key, 109
no coverage key, 401
no extras key, 371
no extras first key, 371
no extras last key, 371
no extras middle key, 371
no extras unbroken key, 371
no finish key, 198
no finish first key, 198
no finish last key, 198
no finish middle key, 198
no finish unbroken key, 198
no label type key, 98
no listing options key, 305
no overlay key, 72
no process key, 322
no recording key, 128
no shadow key, 182
no underlay key, 195
no underlay boxed title key, 196
no underlay first key, 196
no underlay last key, 196
no underlay middle key, 196
no underlay unbroken key, 196
no watermark key, 167
nobodyafter key, 78
nofloat key, 76
none value, 46, 86, 123, 287, 368, 370
noparskip key, 78
nopshontam key, 98
normal value, 44, 158
north fading, 270
north value, 48, 49
north size key, 267
north style key, 268
northeast value, 48, 49
northwest value, 48, 49
notitle key, 18
notitle after break key, 366
number format key, 110
number freestyle key, 110
number within key, 110
\oarg, 462
octagon arc key, 37
off value, 420, 469
on value, 420
on line key, 96
only key, 106
opacityback key, 51
opacitybacktitle key, 51
opacityfill key, 51
opacityframe key, 51
opacitylower key, 52
opacitytext key, 52
opacitytitle key, 52
opacityupper key, 52
Option color, 475
outer arc key, 38
outside node key, 267
over node key, 267
over node offset key, 267
overlay key, 71
overlay app key, 425
overlay broken key, 72
overlay broken app key, 426
overlay broken pre key, 426
overlay first key, 72
overlay first and middle key, 72
overlay first and middle app key, 426
overlay first and middle pre key, 426
overlay first app key, 425
overlay first pre key, 425
overlay last key, 72
overlay last app key, 426
overlay last pre key, 426
\RenewTCBoxFit, 444
\renewtcbxboxfit, 411
\renewtcbtheorem, 340
\RenewTColorBox, 436
\renewtcolorbox, 15
\RenewTotalTCBox, 440
\RenewTotalTCBoxFit, 445
\RenewTotalTColorBox, 437
reset key, 105
reset and store to box array key, 390
reset box array key, 387
right key, 40
right value, 30, 123, 286
right skip key, 81
right* key, 41
righthand ratio key, 120
righthand width key, 119
rightlower key, 42
rightrule key, 35
righttitle key, 41
rotate key, 193
rounded corners key, 49
row key, 405
rows key, 400
rows value, 287
rowspacing key, 400
rowspan key, 405
run arara key, 324
run biber key, 324
run bibtex key, 324
run dvips key, 324
run latex key, 324
run lualatex key, 324
run makeindex key, 324
run pdflatex key, 322
run ps2pdf key, 324
run system command key, 322
runner key, 447
runs key, 453
safety key, 453
savedelimiter key, 26
savetolower key, 24
saveto key, 23
scale key, 193
scale value, 33
scale* value, 33
scope key, 269
segmentation at break key, 370
segmentation code key, 139
segmentation code app key, 431
segmentation code pre key, 431
segmentation empty key, 139
segmentation engine key, 136
segmentation hidden key, 151
segmentation style key, 151
semi east fading, 270
semi fade in key, 271
semi fade out key, 271
semi north fading, 270
semi south fading, 270
semi west fading, 270
separator sign key, 343
separator sign colon key, 343
separator sign dash key, 343
separator sign none key, 343
sequence key, 408
shadow key, 188
sharp corners key, 48
sharpish corners key, 49
shield externalize key, 105
show bounding box key, 179
showframe key, 400
shrink break goal key, 368
shrink tight key, 89
sidebyside key, 116
sidebyside adapt key, 123
sidebyside align key, 117
sidebyside gap key, 119
sidebyside switch key, 125
size key, 44, 268
skin key, 134
skin first key, 134
skin first is subskin of key, 141
skin last key, 134
skin last is subskin of key, 141
skin middle key, 134
skin middle is subskin of key, 141
Skins
  beamer, 228
  beamerfirst, 230
  beamerlast, 232
  beamermiddle, 231
  bicolor, 219
  bicolorfirst, 221
  bicolorlast, 223
  bicolormiddle, 222
  draft, 248
  empty, 237
  emptyfirst, 240
  emptylast, 242
  emptymiddle, 241
  enhanced, 206
  enhanced jigsaw, 213
  enhancedfirst, 210
  enhancedfirst jigsaw, 214
  enhancedlast, 212
  enhancedlast jigsaw, 218
  enhancedmiddle, 211
  enhancedmiddle jigsaw, 215
  freelance, 250
  freelancefirst, 250
  freelancelast, 250
  freelancemiddle, 250
  spartan, 247
  standard, 204
standard jigsaw, 205
underlay unbroken and first pre key, 429
underlay unbroken and last key, 196
underlay unbroken and last pre key, 429
underlay vignette key, 272
unlimited value, 364, 365
updated key, 471
uphill value, 48, 49
upper right corner key, 266
upperbox key, 22
use counter key, 109
use counter from key, 109
use counter* key, 109
use height from group key, 63
\useboxarray, 390
\usetcbboxarray, 391

valign key, 33
valign lower key, 33
valign scale limit key, 33
valign upper key, 33
value key, 471

Values

0, 147
1, 147
2, 147
all, 48, 49, 287, 368, 370
areasize, 418
areasize*, 418
as-is, 255
auto, 97
auto limited, 97
base, 79
baselineskip, 368
both, 123
bottom, 33, 79, 117, 286
bottom seam, 117
break, 355
broken, 165–167
center, 30, 33, 79, 117, 286
center seam, 117
change, 355
change apart, 355
change break, 355
change standard, 354
clipped, 270
colon, 113
colon hang, 113
copy, 158
dash, 113
dash hang, 113
direct, 270
doc, 469
downhill, 48, 49
east, 48, 49
empty, 135, 136
evenpage, 46, 86
false, 78, 81, 288, 365
fbox, 44
figures, 112
final, 420
first, 165–167, 370
first and middle, 165, 370
fitbox, 94
flush center, 30, 32
flush left, 30, 32
flush right, 30, 32
fontsize, 418
fontsize*, 418
foovalue, 460
forced, 46, 86
forced center, 97
forced left, 97
forced right, 97
freelance, 135, 136
hbox, 94
hybrid, 418
hybrid*, 418
ignored, 24
invisible, 22, 24
justify, 30
landscape, 255
landscape*, 255
last, 165–167, 370
left, 30, 123, 286
listings, 112, 310
margin, 356
margin apart, 356
margin break, 356
maximum, 56
middle, 165–167, 370
middle and last, 165–167, 370
minimal, 44
minimum center, 97
minimum left, 97
minimum right, 97
minipage, 94, 280
minted, 310
none, 46, 86, 123, 287, 368, 370
normal, 44, 158
north, 48, 49
northeast, 48, 49
northwest, 48, 49
off, 420, 469
on, 420
path, 135, 136
pathfirst, 135, 136
pathfirstjigsaw, 135
pathjigsaw, 135
pathlast, 135, 136
pathlastjigsaw, 135
pathmiddle, 135, 136
pathmiddlejigsaw, 135
pgf, 469
pgfchapter, 469
pgfsection, 469
plain, 354
plain apart, 355
portrait, 255
portrait*, 255
right, 30, 123, 286
rows, 287
scale, 33
scale*, 33
small, 44
south, 48, 49
southeast, 48, 49
southwest, 48, 49
spartan, 135, 136
squeeze, 418
standard, 135, 136, 158, 354
tables, 112
tight, 44
title, 44, 158
top, 33, 79, 117, 286
top seam, 117
true, 81, 365
unbroken, 165–167
unbroken and first, 165–167
unlimited, 364, 365
uphill, 48, 49
visible, 22, 24
west, 48, 49
values key, 471
varwidth boxed title key, 164
varwidth boxed title* key, 164
varwidth upper key, 70
verbatim key, 433
verbatim ignore percent key, 127
vertical size key, 268
vfill before first key, 370
vignette key, 9
visible key, 22
visible value, 22, 24
void key, 107

watermark color key, 170
watermark graphics key, 166
watermark graphics app key, 428
watermark graphics app on key, 428
watermark graphics on key, 166
watermark graphics pre key, 428
watermark graphics pre on key, 428
watermark opacity key, 168
watermark overzoom key, 169
watermark shrink key, 169
watermark stretch key, 170
watermark text key, 165
watermark text app key, 427
watermark text app on key, 427
watermark text on key, 165
watermark text pre key, 427
watermark text pre on key, 427
watermark tikz key, 167
watermark tikz app key, 428
watermark tikz app on key, 428
watermark tikz on key, 167
watermark tikz pre key, 428
watermark tikz pre on key, 428