

Writing, running and including the output of external documents from within a main \LaTeX document –v. 0.37b

Herbert Voß hvoss@tug.org*

November 22, 2023

Contents

1	Loading the package	2
2	Syntax	2
3	First examples	2
3.1	Without showing the code	2
3.2	Showing code and output of a Python example	3
4	Setting marker in the source	6
5	Optional arguments	7
5.1	Programs and runs	7
5.2	Grafik options	9
5.3	Listings options	10
5.4	Background color	10
5.5	Type of the source code	11
5.6	Output more than one page	11
5.7	Output as floating object with caption and label	12
5.8	Cropping the PDF	12
5.9	Code and output side by side	13
5.10	Horizontal alignment of the output	14
5.11	Inline images	14
5.12	Input text instead of an image	15
5.13	Running additional external programs	16
5.14	Using listings	18
5.15	Vertical space	20
5.16	No output	20
6	Defining new marker	21
7	Supported engines	22
7.1	METAPOST example	22
7.2	plain \TeX example	22
7.3	Lua \LaTeX example	23

*Thanks to Karl Berry; Denis Bitouzé; Werner Lemberg; Rolf Niepraschk

7.4 ConTeXt example	24
8 Running external commands	25
9 Other options	26

1 Loading the package

```
\usepackage[Option]{hvxextern}
```

There exists only one option `checkCode` which is valid for all TeX-compiler. In this case an already existing external file will only be compiled, if the external code changed. This doesn't depends on the setting of the option `force`. `checkCode` can speed up the compilation time.

2 Syntax

This package allows to write external METAPOST, TeX, ConTeXt, LaTeX, LuaTeX, LuaLaTeX, XeTeX, XeLaTeX, Lua, Perl, Java and/or Python source code, which will then be run via shell escape to create a PDF or text output to include it into the main LaTeX document.

There is only one environment and one command:

```
\begin{externalDocument}[<options>]{<external filename without extension>}
...
source code
...
\end{externalDocument}

\runExtCmd[<options>]
  {<command with arguments>}
  {<external filename without extension>}
```

The very first compilation run of the main document must be done with the `-shell-escape` command-line option, otherwise it won't work. Follow-up runs, for example, to resolve references, should usually be done without `-shell-escape`. The currently used filename for the example is saved in the macro `\hvExternFilename`.

```
lualatex --shell-escape <file>
```

The purpose for this package is to show the output of documents which have to be compiled with a different preamble or a different engine or a complete different system, but integrating the output automatically in the main document..

All examples in this document are created on-the-fly while running this LaTeX document with lualatex with the `--shell-escape` option.

3 First examples

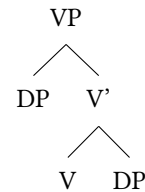
3.1 Without showing the code

This document was run with LuaLaTeX. Suppose you want to insert the output of a document which needs for several reasons a XeTeX run. Instead of created and running a document outside of the main document and then to insert the output we can do this from within this LuaLaTeX document itself. The external document is compiled with XeTeX and the output is insert as pdf image: 美好的一天. The current

filename of the above example is voss-1 and for the source see page 14.

Let's show another example which needs a pdf_{La}TeX run. The source code itself is also not shown by the environment externalDocument.

```
\begin{externalDocument}[
  compiler=pdflatex,force=true,cleanup]{voss}
\documentclass{standalone}
%StartVisiblePreamble
\usepackage{fontenc}
\usepackage{libertinus}
\usepackage[linguistics]{forest}
\forestapplylibrarydefaults{linguistics, edges}
%StopVisiblePreamble
\begin{document}
\begin{forest}
[VP
  [DP]
  ['V
    [V
      [DP]
    ]
  ]
]
\end{forest}
\end{document}
\end{externalDocument}
```



3.2 Showing code and output of a Python example

The png image is created on the fly with the following arguments of externalDocument:

```
\begin{externalDocument}[
  compiler=python3,
  code,
  ext=py,
  docType=py,
  usefancyvrb,
  grfOptions={width=\linewidth}]{python}
... Python code ...
\end{externalDocument}
```

The code which is declared as header and main can be marked by:

```
\hv@extern@exampleType{py}
{\NumChar StartVisibleMain}
{\NumChar StopVisibleMain}
{\NumChar StartVisiblePreamble}
{\NumChar StopVisiblePreamble}
```

\NumChar is the default Python comment character # and needs to be saved with a different category, which is done internally by the package. The complete definition of the code is:

```
\begin{externalDocument}[
  compiler=python3,
  code,
  ext=py,
  force=true,
  docType=py,
  usefancyvrb,
```

3 First examples

```
grfOptions={width=\linewidth}}{python}
import os
#StartVisiblePreamble
from PIL import Image
import subprocess
# drawing area (xa < xb and ya < yb)
xa = -0.1716
xb = -0.1433
ya = 1.022
yb = 1.044
maxIt = 1024 # iterations
imgx = 1000 # image size
imgy = 750
image = Image.new("RGB", (imgx, imgy))
#StopVisiblePreamble

#StartVisibleMain
for y in range(imgy):
    cy = y * (yb - ya) / (imgy - 1) + ya
    for x in range(imgx):
        cx = x * (xb - xa) / (imgx - 1) + xa
        c = complex(cx, cy)
        z = 0
        for i in range(maxIt):
            if abs(z) > 2.0: break
            z = z * z + c
        r = i % 4 * 6
        g = i % 8 * 32
        b = i % 16 * 16
        image.putpixel((x, y), b * 65536 + g * 256 + r)
#StopVisibleMain
# now get the filename created by the latex document
imageName = os.path.basename(os.path.splitext(__file__)[0])+".png" # get filename
image.save(imageName, "PNG")
\end{externalDocument}
```

And with using this code we get the image as png inserted. The given filename of the external document is internally extended by a consecutive number which isn't known to the Python code. However, it is no problem in any programming language to get the name of a running file. The forlast line in the above code shows how it can be done with Python.

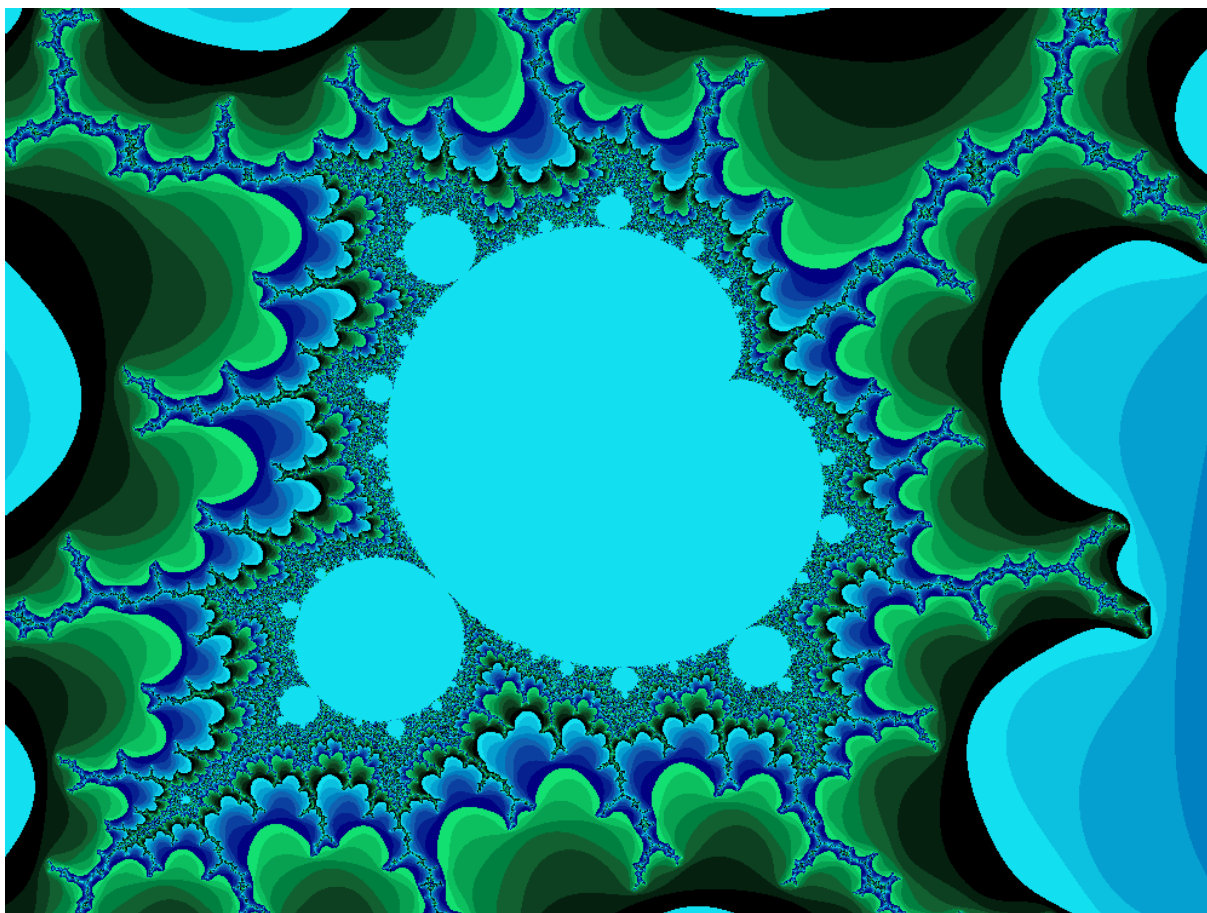
```
from PIL import Image
import subprocess
# drawing area (xa < xb and ya < yb)
xa = -0.1716
xb = -0.1433
ya = 1.022
yb = 1.044
maxIt = 1024 # iterations
imgx = 1000 # image size
imgy = 750
image = Image.new("RGB", (imgx, imgy))
```

python-3.py

```

for y in range(imgy):
    cy = y * (yb - ya) / (imgy - 1) + ya
    for x in range(imgx):
        cx = x * (xb - xa) / (imgx - 1) + xa
        c = complex(cx, cy)
        z = 0
        for i in range(maxIt):
            if abs(z) > 2.0: break
            z = z * z + c
        r = i % 4 * 6
        g = i % 8 * 32
        b = i % 16 * 16
        image.putpixel((x, y), b * 65536 + g * 256 + r)

```



The external filename, extended by a consecutive number, can be printed in the margin by setting the keyword `showFilename`. In general it is printed in the outer margin or in twocolumn mode in the outer column. If the example is set in twocolumn mode but inside a starred floating environment over both column, then use the keyword `outerFN`. Then `hvxtern` doesn't test for twocolumn mode.

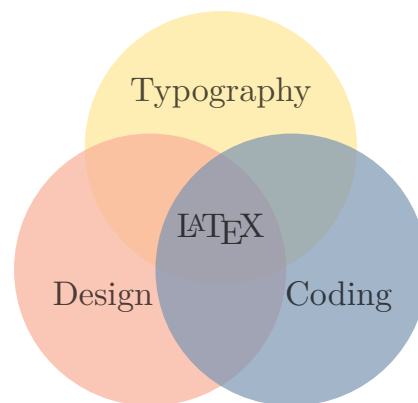
A vertical shift of the filename is possible by setting a length to the keyword `shiftFN`, e.g. `shiftFN=5ex`.

```

\usepackage{tikz}
\usepackage[hks,pantone,xcolor]{xespotcolor}

\SetPageColorSpace{HKS}
\definecolor{HYellow}{spotcolor}{HKS05N,0.5}
\definecolor{HRed}{spotcolor}{HKS14N,0.5}
\definecolor{HBlue}{spotcolor}{HKS38N,0.5}
\begin{tikzpicture}[scale=0.7,fill opacity=0.7]
  \fill[HYellow]( 90:1.2) circle (2);
  \fill[HRed]( 210:1.2) circle (2);
  \fill[HBlue]( 330:1.2) circle (2);
  \node at ( 90:2) {Typography};
  \node at ( 210:2) {Design};
  \node at ( 330:2) {Coding};
  \node {\LaTeX};
\end{tikzpicture}

```



4 Setting marker in the source

The marker for the code ranges which should be listed depend to the used programming language:

```

[...]
%StartVisiblePreamble
[... listed preamble code ]
%StopVisiblePreamble
[...]
\begin{document}
[...]
\end{document}

```

everything between %StartVisiblePreamble and %StopVisiblePreamble will be listed as preamble and in case of a \LaTeX source everything between \begin{document} and \end{document} as body. The marker must be defined with an own macro, e.g.:

```

\hv@extern@exampleType{py}
  {\NumChar StartVisibleMain}
  {\NumChar StopVisibleMain}
  {\NumChar StartVisiblePreamble}
  {\NumChar StopVisiblePreamble}

```

\NumChar is the comment character #, which needs a special handling. This version of hvextern supports the following programming languages (option compiler): mpost, tex, latex, luatex, python3, perl, lua, xetex, pdflatex, lualatex, xelatex, and context. The default is pdflatex. The option docType selects the config file, which must be one of context, lua, pl, tex, latex, mp, and py. For Lua it is

```

\hv@extern@exampleType{lua}
  {--StartVisibleMain}
  {--StopVisibleMain}
  {--StartVisiblePreamble}
  {--StopVisiblePreamble}

```

It defines the marker strings for the listed code sequences. In some cases you have to use multiple times the same value for different optional arguments, e.g.

```
ext=lua, compiler=lua, docType=lua, ...
```

5 Optional arguments

The default setting is always shown in brackets.

5.1 Programs and runs

The progpath should only in some rare cases needed. In general all used compilers will be found by the system. A given progpath must be end with a slash, e.g. ./bin/

```
\define@key{hv}{progpath}[]{\def\hv@extern@progpath{#1}}
\define@key{hv}{compiler}{pdflatex}{\def\hv@extern@compiler{#1}}
\define@key{hv}{runsequence}[]{\def\hv@extern@runsequence{#1}}
\define@key{hv}{runs}[1]{\setcounter{hv@extern@runs}{#1}}
```

Instead of the optional arguments compiler, biber, and xindex one can define an individual command sequence by using the optional argument runsequence. It must be comma separated list:

```
runsequence={lualatex,biber,xindex -l de -c AU,lualatex,lualatex}
```

```
\usepackage[ngerman]{babel}
\usepackage{libertinus,hvindex}
\usepackage{makeidx}\makeindex
\usepackage{biblatex}\addbibresource{biblatex-examples.bib}
```

```
Sort with xindex \verb|-l DE --config AU|
\blindtext
\Index{Österreich} \Index{Öresund}
\Index{Ostern} \Index{Ober} \Index{Oberin}
\Index{Österreich} \Index{Öresund}
\Index{Ödem} \Index{Oligarch} \Index{Oder}
\Index{Goldmann}
\printindex
\nocite{*}\printbibliography
\blindtext
\blindeddocument
```

Sort with xindex -l DE --config AU Dies hier ist ein Blindtext zum Testen von Textausgaben. Wer diesen Text liest, ist selbst schuld. Der Text gibt lediglich den Grauwert der Schrift an. Ist das wirklich so? Ist es gleichgültig, ob ich schreibe. „Dies ist ein Blindtext“ oder „Huaardest gelburt“? Kjift – mitnichten! Ein Blindtext bietet mir wichtige Informationen. An ihm messe ich die Lesbarkeit einer Schrift, ihre Anmutung, wie harmonisch die Figuren zueinander stehen und prüfe, wie breit oder schmal sie läuft. Ein Blindtext sollte möglichst viele verschiedene Buchstaben enthalten und in der Originalsprache gesetzt sein. Er muss keinen Sinn ergeben, sollte aber lesbar sein. Fremdsprachige Texte wie „Lorem ipsum“ dienen nicht dem eigentlichen Zweck, da sie eine falsche Annäherung vermitteln. Österreich Öresund Ostern Ober Oberin Österreich Öresund Ödem Oligarch Oder Goldmann

Index

G
Goldmann, 1
O
Ober, 1
Oberin, 1
Oder, 1
Oligarch, 1
Ostern, 1
Ö
Ödem, 1
Öresund, 1
Österreich, 1

Literatur

- [1] José L. Almedro u. a. "Elektromagnetisches Signalhorn". EU-29702195U (FR, GB, DE). 1998.
- [2] Arnold Angenendt. "In Honore Salvatoris – Vom Sinn und Unsinn der Patrozinienkunde". In: *Revue d'Histoire Ecclesiastique* 97 (2002), S. 431–456, 791–823.
- [3] Aristotile. *De Anima*. Hrsg. von Robert Drew Hicks. Cambridge: Cambridge University Press, 1907.
- [4] Aristotile. *Physics*. Übers. von P. H. Wicksteed und F. M. Cornford. New York: G. P. Putnam, 1929.
- [5] Aristotile. *Poetics*. Hrsg. von D. W. Lucas. Clarendon Aristotile. Oxford: Clarendon Press, 1968.
- [6] Aristotile. *The Rhetoric of Aristotle with a commentary by the late Edward Meredith Cope*. Hrsg. und komm. von Edward Meredith Cope. 3 Bde. Cambridge University Press, 1877.
- [7] Robert L. Augustine. *Heterogeneous catalysis for the synthetic chemist*. New York: Marcel Dekker, 1995.
- [8] Averroes. *Drei Abhandlungen über die Conjunction des separaten Intellekts mit dem Menschen*. Von Averroes (Vater und Sohn), aus dem Arabischen übersetzt von Samuel Ibn Tibbon. Hrsg. und übers. von J. Herx. Berlin: S. Hermann, 1869.

The following Java-program creates the Mandelbrot set as png image. The valid setting for the environment externalDocument is:

```
compiler=java,ext=java,docType=java,
```

java-6.java

```

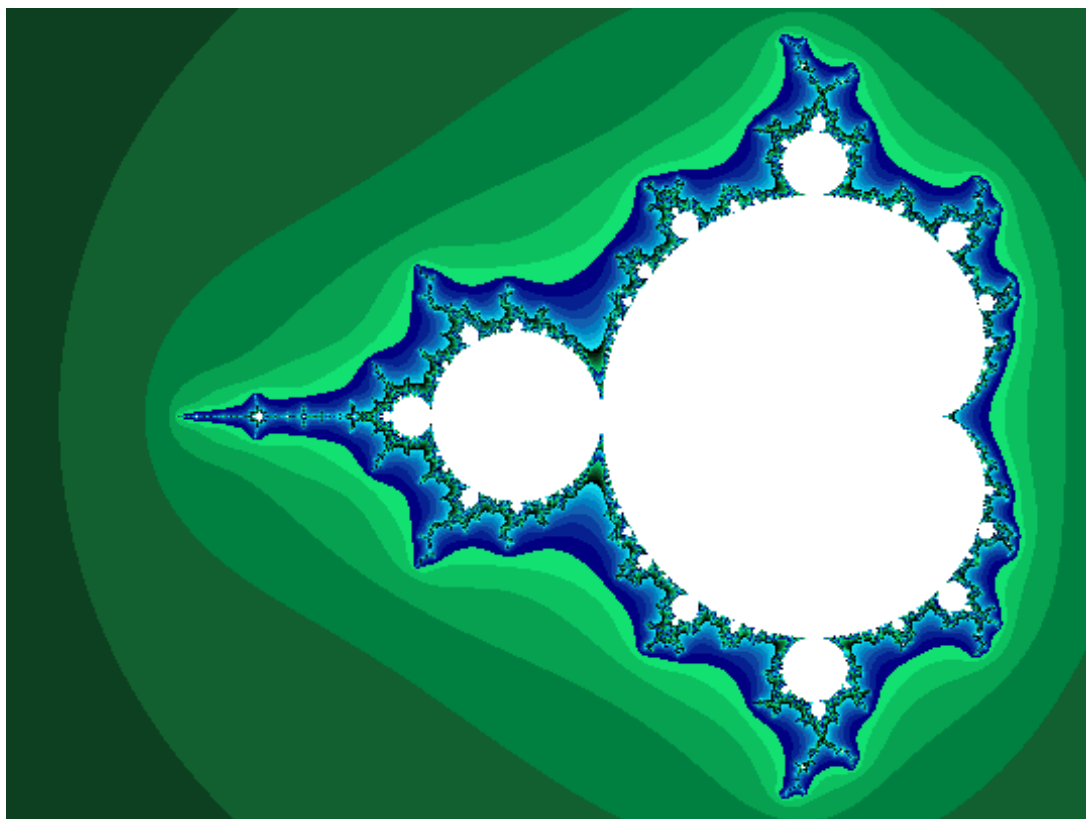
public static int iterZahl(final double cx, final double cy, int maxIt,
                          final double radius) {
// bestimmt Anzahl der Iterationen
    int zaehler = 0;
    double zx = 0.0, zy = 0.0, tmp;
    do {
        tmp = zx*zx - zy*zy + cx;
        zy = 2*zx*zy + cy; zx = tmp;
        zaehler++;
    } while (zx*zx + zy*zy <= radius && zaehler < maxIt);
    return zaehler;
}

```

```

double xa = -2.5, xe = 0.7, ya = -1.2, ye = 1.2; // Ratio 20:15
double dx = (xe-xa)/(imageBreite-1), dy = (ye-ya)/(imageHoehe-1);
double cx, cy; int R, G, B;
double radius = 10.0; int maxIt = 1024;
cx = xa;
for (int sp = 0; sp < imageBreite; sp++) {
    cy = ye; // von oben nach unten
    for (int ze = 0; ze < imageHoehe; ze++) {
        int zIter = iterZahl(cx, cy, maxIt, radius);
        if (zIter == maxIt) {
            g.setColor(Color.WHITE);
            g.drawLine(sp, ze, sp, ze);
        } else {
            R = zIter % 4 * 6 ; G = zIter % 8 * 32; B = zIter % 16 * 16;
            g.setColor(new Color(R,G,B));
            g.drawLine(sp, ze, sp, ze);
        }
        cy = cy - dy;
    } // for ze
    cx = cx + dx;
} // for sp

```

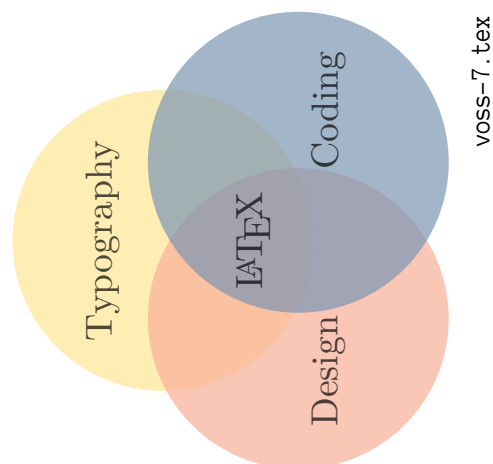
5.2 Grafik options

```
\define@key{hv}{grfOptions}[]{\def\hv@extern@grfOptions{#1}}
```

The option is passed to `\includegraphics`, e.g. `angle=90,width=\linewidth` for the following example.

```
\usepackage{tikz}
\usepackage[hks,pantone,xcolor]{xespotcolor}

\SetPageColorSpace{HKS}
\definecolor{HYellow}{spotcolor}{HKS05N,0.5}
\definecolor{HRed}{spotcolor}{HKS14N,0.5}
\definecolor{HBlue}{spotcolor}{HKS38N,0.5}
\begin{tikzpicture}[scale=0.7,fill opacity=0.7]
  \fill[HYellow] (90:1.2) circle (2);
  \fill[HRed] (210:1.2) circle (2);
  \fill[HBlue] (330:1.2) circle (2);
  \node at (90:2) {Typography};
  \node at (210:2) {Design};
  \node at (330:2) {Coding};
  \node {\LaTeX};
\end{tikzpicture}
```



5.3 Listings options

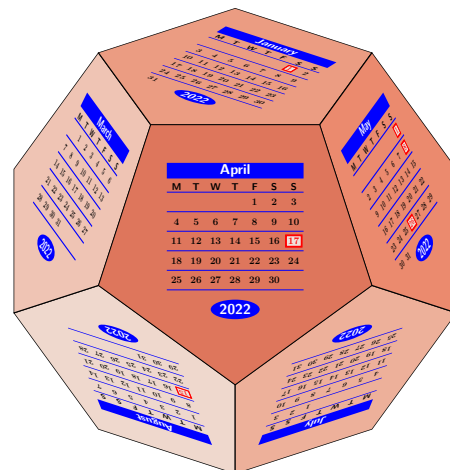
```
\define@key{hv}{lstOptions}[]{\def\hv@extern@lstOptions{#1}}
```

The option is passed either to `\lstinputlisting`, or, if `usefancyvrb` is active, to `\VerbatimInput`. The following example uses

```
lstOptions={basicstyle=\sffamily\itshape\scriptsize},
```

voss-8.tex

```
\usepackage{pst-calendar}
\psscalebox{0.3}{%
  \psCalDodecaeder[Year=2022,style=april]%
}
```



5.4 Background color

There are different colors for the preamble and body listing: the background and frame color.

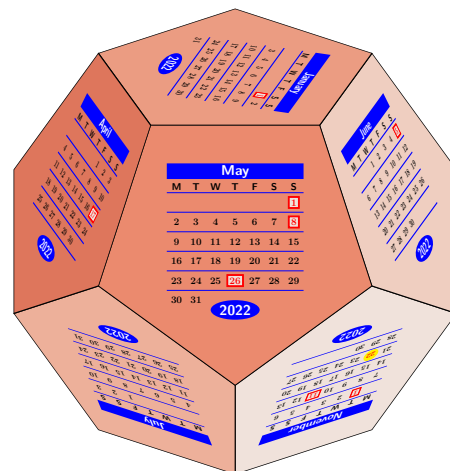
```
\define@key{hv}{BGpreamble}[black!12]{\def\hv@extern@BGpreamble{#1}}
\define@key{hv}{BGbody}[black!8]{\def\hv@extern@BGbody{#1}}
\define@key{hv}{B0preamble}[black!12]{\def\hv@extern@B0preamble{#1}}
\define@key{hv}{B0body}[black!8]{\def\hv@extern@B0body{#1}}
```

The options are passed to `tcolorbox` and preset to `black!12` and `black!8`. The color of the frame is set to the same values, hence not seen. The following example uses

```
BGpreamble=red!10, B0preamble=red,
BGbody=blue!8, B0body=blue,
```

voss-9.tex

```
\usepackage{pst-calendar}
\psscalebox{0.3}{%
  \psCalDodecaeder[Year=2022,style=may]%
}
```



5.5 Type of the source code

The current version of hvextern supports code written as METAPOST, plain T_EX, L^AT_EX, ConT_EXt, and Python. Every type has its own keywords for the linerange which should be printed for the preamble and the body. For example the latex config is:

```
\hv@extern@exampleType{latex}%                for _all_LaTeX engines
  {\string\begin\string{document\string}}%
  {\string\end\string{document\string}}%
  {\perCent StartVisiblePreamble}%
  {\perCent StopVisiblePreamble}%

% only for the sequence latex->dvi->ps2pdf
\def\hv@extern@runLATEX#1#2#3#4{% path compiler file extension
  \ifhv@extern@verbose \typeout{>>> running #1#2 #3#4}\fi
  \ShellEscape{#1#2\space #3#4}%
  \ifhv@extern@verbose \typeout{>>> running #1dvips #3}\fi
  \ShellEscape{#1dvips\space #3.dvi}%
  \ifhv@extern@verbose \typeout{>>> running ps2pdf #3.ps}\fi
  \ShellEscape{#1ps2pdf\space -dAutoRotatePages=/None\space -dALLOWPSTransparency\space #3.ps}%
}
```

If a source needs more than running the defined compiler, it must be defined by a macro

```
\def\hv@extern@run<NAME>#1#2#3#4{% path compiler file extension
...}
```

The type of the source code can be different to the compiler, e.g. source latex, but compiler lualatex.

5.6 Output more than one page

The pages which should be printed can be defined by

```
\define@key{hv}{pages}[1]{\def\hv@extern@pages{#1}}
\define@key{hv}{pagesep}[1em]{\hv@extern@pagesep=#1}
\define@boolkey{hv}[hv@extern@]{frame}[true]{}%
```

With frame the pages can be framed (internally by \fbox). It is leaved to the user to choose the correct image width for the pages. The separation between the pages is defined by the length pagesep. The following example uses:

```
pages={1,2,3},
pagesep=2pt,
grfOptions={width=0.3\linewidth},
compiler=lualatex, runs=2, % for the TOC
frame,
```

```
\usepackage[american]{babel}
\usepackage{libertinus}
\usepackage{blindtext}
```

```
\title{A multipage example}
\author{Erasmus von Rotterdam}
\maketitle
\tableofcontents
```

voss-10.tex

\blinddocument

A multipage example	
Examen van Rotterdam	
November 22, 2023	
Contents	
1 Heading on level 1 (section)	1
1.1 Heading on level 2 (subsection)	2
1.1.1 Heading on level 3 (subsubsection)	2
2 Lists	2
2.1 Example for list (enumerate)	2
2.1.1 Example for list (enumitem)	2
2.1.2 Example for list (enumitem)	2
2.1.3 Example for list (enumitem)	2
2.1.4 Example for list (enumitem)	2
2.1.5 Example for list (enumitem)	2
2.2 Example for list (description)	2
2.2.1 Example for list (description)	2
2.2.2 Example for list (description)	2
2.2.3 Example for list (description)	2
2.2.4 Example for list (description)	2
2.2.5 Example for list (description)	2
2.2.6 Example for list (description)	2
2.2.7 Example for list (description)	2
2.2.8 Example for list (description)	2
2.2.9 Example for list (description)	2
2.2.10 Example for list (description)	2
2.2.11 Example for list (description)	2
2.2.12 Example for list (description)	2
2.2.13 Example for list (description)	2
2.2.14 Example for list (description)	2
2.2.15 Example for list (description)	2
2.2.16 Example for list (description)	2
2.2.17 Example for list (description)	2
2.2.18 Example for list (description)	2
2.2.19 Example for list (description)	2
2.2.20 Example for list (description)	2
2.2.21 Example for list (description)	2
2.2.22 Example for list (description)	2
2.2.23 Example for list (description)	2
2.2.24 Example for list (description)	2
2.2.25 Example for list (description)	2
2.2.26 Example for list (description)	2
2.2.27 Example for list (description)	2
2.2.28 Example for list (description)	2
2.2.29 Example for list (description)	2
2.2.30 Example for list (description)	2
2.2.31 Example for list (description)	2
2.2.32 Example for list (description)	2
2.2.33 Example for list (description)	2
2.2.34 Example for list (description)	2
2.2.35 Example for list (description)	2
2.2.36 Example for list (description)	2
2.2.37 Example for list (description)	2
2.2.38 Example for list (description)	2
2.2.39 Example for list (description)	2
2.2.40 Example for list (description)	2
2.2.41 Example for list (description)	2
2.2.42 Example for list (description)	2
2.2.43 Example for list (description)	2
2.2.44 Example for list (description)	2
2.2.45 Example for list (description)	2
2.2.46 Example for list (description)	2
2.2.47 Example for list (description)	2
2.2.48 Example for list (description)	2
2.2.49 Example for list (description)	2
2.2.50 Example for list (description)	2
2.2.51 Example for list (description)	2
2.2.52 Example for list (description)	2
2.2.53 Example for list (description)	2
2.2.54 Example for list (description)	2
2.2.55 Example for list (description)	2
2.2.56 Example for list (description)	2
2.2.57 Example for list (description)	2
2.2.58 Example for list (description)	2
2.2.59 Example for list (description)	2
2.2.60 Example for list (description)	2
2.2.61 Example for list (description)	2
2.2.62 Example for list (description)	2
2.2.63 Example for list (description)	2
2.2.64 Example for list (description)	2
2.2.65 Example for list (description)	2
2.2.66 Example for list (description)	2
2.2.67 Example for list (description)	2
2.2.68 Example for list (description)	2
2.2.69 Example for list (description)	2
2.2.70 Example for list (description)	2
2.2.71 Example for list (description)	2
2.2.72 Example for list (description)	2
2.2.73 Example for list (description)	2
2.2.74 Example for list (description)	2
2.2.75 Example for list (description)	2
2.2.76 Example for list (description)	2
2.2.77 Example for list (description)	2
2.2.78 Example for list (description)	2
2.2.79 Example for list (description)	2
2.2.80 Example for list (description)	2
2.2.81 Example for list (description)	2
2.2.82 Example for list (description)	2
2.2.83 Example for list (description)	2
2.2.84 Example for list (description)	2
2.2.85 Example for list (description)	2
2.2.86 Example for list (description)	2
2.2.87 Example for list (description)	2
2.2.88 Example for list (description)	2
2.2.89 Example for list (description)	2
2.2.90 Example for list (description)	2
2.2.91 Example for list (description)	2
2.2.92 Example for list (description)	2
2.2.93 Example for list (description)	2
2.2.94 Example for list (description)	2
2.2.95 Example for list (description)	2
2.2.96 Example for list (description)	2
2.2.97 Example for list (description)	2
2.2.98 Example for list (description)	2
2.2.99 Example for list (description)	2
2.300 Example for list (description)	2

5.7 Output as floating object with caption and label

By default the images are not inserted as a float. This can be changed by the keyword `float`, a caption and a label are optional. The float type is always figure.

```
\define@boolkey{hv}[hv@extern@]{float}[true]{}
\define@key{hv}{floatsetting}[]{\def\hv@extern@floatsetting{#1}}
\define@key{hv}{caption}[]{\def\hv@extern@caption{#1}}
\define@key{hv}{label}[]{\def\hv@extern@label{#1}}
```

The image Figure 1 shows an example for a floating object, which uses the floatsetting `!htb`, which is the default. Using a caption and a label are optional.

voss-11.tex

```
\usepackage{pst-coxeterp}
\begin{pspicture}(-1,-1)(1,1)\Simplex[dimension=2]\end{pspicture}
\begin{pspicture}(-1,-1)(1,1)\Simplex[dimension=3]\end{pspicture}
\begin{pspicture}(-1,-1)(1,1)\Simplex[dimension=5]\end{pspicture}
\begin{pspicture}(-1,-1)(1,1)\Simplex[dimension=7]\end{pspicture}
```

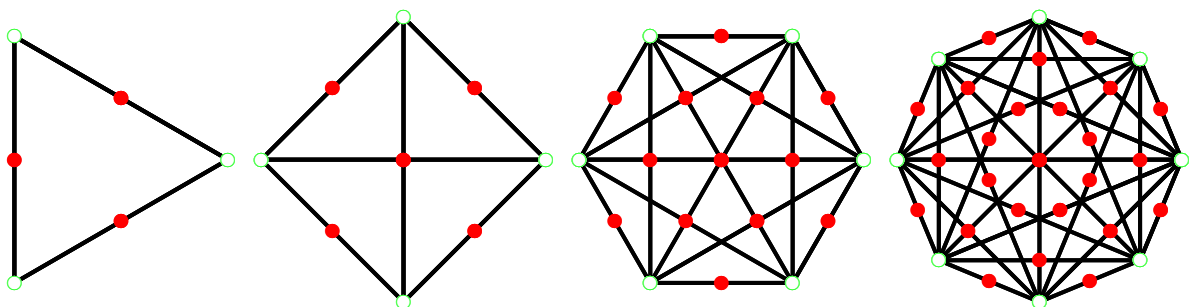


Figure 1: An example for Coxeter images

5.8 Cropping the PDF

Instead of using the documentclass `standalone`, which already crops the created PDF, one can use the optional argument `crop`.

It is also possible to crop a document with more than one page. In this case the beginning and end of the pages should be on the same height. Otherwise the pages will have different heights after cropping (see next image). The following example was created with

```
\usepackage[american]{babel}
\usepackage{libertinus}
\usepackage{blindtext}
\pagestyle{headings}

\title{A multipage example}
\author{Erasmus von Rotterdam}
\maketitle
\tableofcontents
\Blinddocument
```

	1	2	3
A multipage example			
Erasmus van Rotterdam			
November 22, 2023			
Contents			
1 Heading on level 1 (section)	1		
1.1 Heading on level 2 (subsection)	2		
1.1.1 Heading on level 3 (subsection)	3		
2 Lists	5		
2.1 Example for list (itemize)	5		
2.1.1 Example for list ("itemize")	6		
2.2 Example for list (enumerate)	9		
2.2.1 Example for list ("enumeral")	9		
2.3 Example for list (description)	11		
2.3.1 Example for list ("description")	12		
1 Heading on level 1 (section)			
Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huaerdse gefubm?" Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special contents, but the length of words should match the language.			
This is the second paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huaerdse gefubm?" Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special contents, but the length of words should match the language.			
After the second paragraph follows the third paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huaerdse gefubm?" Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special contents, but the length of words should match the language.			
1.1 Heading on level 2 (subsection)			
This is the second paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huaerdse gefubm?" Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special contents, but the length of words should match the language.			
And after the second paragraph follows the third paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huaerdse gefubm?" Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special contents, but the length of words should match the language.			
After the fourth paragraph, we start a new paragraph sequence. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huaerdse gefubm?" Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special contents, but the length of words should match the language.			
1.1 Heading on level 3 (subsection)			
And after the second paragraph follows the third paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huaerdse gefubm?" Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special contents, but the length of words should match the language.			
After the fourth paragraph, we start a new paragraph sequence. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huaerdse gefubm?" Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special contents, but the length of words should match the language.			
After the fourth paragraph, we start a new paragraph sequence. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huaerdse gefubm?" Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special contents, but the length of words should match the language.			

By default the code and the output is on top of each other. With setting the width of a minipage with `mpwidth` greater than 0 pt the output will be side by side.

`mpwidth` is the width of the code. The rest of the line, minus 1em for the space between the minipages, will be the possible width for the output and will be calculated automatically. The two minipages are aligned by defaults to its top. This can be changed by setting `mpalign` to `c` or `b`.

5.10 Horizontal alignment of the output

align=\centering, % default

```
\rule{0.5\linewidth}{5mm}
```



align=\raggedright,

```
\rule{0.5\linewidth}{5mm}
```



align=\raggedleft,

```
\rule{0.5\linewidth}{5mm}
```



align=\centering, mpwidth=0.5\linewidth, % default for side by side

```
\rule{0.25\linewidth}{5mm}
```



align=\raggedright, mpwidth=0.5\linewidth,

```
\rule{0.25\linewidth}{5mm}
```



align=\raggedleft, mpwidth=0.5\linewidth,

```
\rule{0.25\linewidth}{5mm}
```



5.11 Inline images

By default code and image are own paragraphs. With the optional argument `inline` the created image can be part of the current line. This may make sense, if you need characters which are not part of your current font.

```
\define@boolkey{hv}[hv@extern@]{inline}[true]{%
  \hv@extern@codefalse
  \hv@extern@showFilenamefalse}
```

With the setting `inline=true` the optional keyword `code` and `showFilename` is automatically set to false. The next Chinese characters 美好的一天 are inserted as inline image without showing the code. The complete code looks like:

```
\Lkeyset{inline} the optional argument \Lkeyword{code} is
automatically set to false. The next Chinese characters
\begin{externalDocument}[vshift=-1pt,
  compiler=xelatex, inline, runs=2, grfOptions={height=8pt},
  crop, cropmargin=0, cleanup, force=true, docType=latex]{voss}
```

```

\documentclass{ctexart}
\pagestyle{empty}
\begin{document}
美好的一天
\end{document}
\end{externalDocument}

```

are inserted as inline image without showing the code. The complete code looks like:

With the keyword `vshift` the inserted image can be moved in vertically direction.

5.12 Input text instead of an image

By default the created pdf which can be, of course, only text, will be inserted by `\includegraphics`. If you have only text as output and don't want to create a pdf you can insert this kind of output as verbatim text by setting `includegraphic=false`.

```
\define@boolkey{hv}[hv@extern@]{includegraphic}[true]{}

```

The textfile must have the same main filename with the extension `.txt`. As already mentioned, in every programming language you can get the current used filename from within the code itself. The following Perl example which calculates the Kaprekar constants uses

```

my $filename = $0;          # the current filename
$filename =~ s/\.pl//;      # without extension .pl
$filename = "${filename}.txt"; # for the output

```

Only for some completeness: a Kaprekar constant is a number A with $\max(A) - \min(A) = A$. \max and \min are the sorted digits of the number A : $495 = 954 - 459$.

```

my $zahl = 1;
my $anfang = 1;
my $ende = 9;

print $fh "Finding Kaprekarconstants ...\n";
while ($zahl < 8) {
    print $fh "${zahl}-stellig: ";
    foreach ($anfang...$ende) { # for every row $_
        @Zeichen = split(//,$_);
        $Min = join("",sort(@Zeichen));
        $Max = reverse($Min);
        $Dif=$Max-$Min;
        if($_ eq $Dif) {
            $found = 1;
            print $fh $_," ";
        }
    }
    if (!$found) { print $fh "---\n"; }
    else { print $fh "\n"; }
    $found = false;
    $zahl = $zahl+1;
    $anfang = $anfang*10;
    $ende = $ende*10;
}

```

```

Finding Kaprekarconstants ...
1-stellig: ---
2-stellig:
3-stellig: 495,
4-stellig: 6174,
5-stellig:
6-stellig: 549945, 631764,
7-stellig:

```

voss-20.pl

Another example with running Lua to calculate and print the Pascal's triangle. The internal filename is available with

5 Optional arguments

```
local filename = arg[0]
local shortFN = str:match("(.)%.+.") -- delete extension
outFile = io.open(shortFN..".txt","w+") -- open external file
```

voss-21.lua

```
function nextrow(t)
  local ret = {}
  t[0], t[#t+1] = 0, 0
  for i = 1, #t do ret[i] = t[i-1] + t[i] end
  return ret
end

function triangle(n)
  t = {1}
  for i = 1, n do
    m = (n - i)
    for j = 1, m do outFile:write(" ") end
    for k = 1, i do outFile:write(string.format("%8s", t[k])) end
    outFile:write("\n")
    t = nextrow(t)
  end
end
```

```
triangle(10)
```

```

              1
            1 1
          1 2 1
        1 3 3 1
      1 4 6 4 1
    1 5 10 10 5 1
  1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
  1 8 28 56 70 56 28 8 1
    1 9 36 84 126 126 84 36 9 1
      1 10 45 105 162 196 196 162 105 45 1
        1 11 55 165 330 462 546 546 462 330 165 55 1
          1 12 66 220 495 858 1287 1716 1924 1716 1287 858 495 220 66 1
            1 13 78 286 715 1365 2431 3770 4862 5005 4862 3770 2431 1365 715 286 78 1
              1 14 91 357 987 2002 3542 5610 7429 8190 7429 5610 3542 2002 987 357 91 1
                1 15 105 435 1287 2730 4862 7429 9697 10864 10864 9697 7429 4862 2730 1287 435 105 1
                  1 16 120 510 1547 3439 6435 10400 14560 17160 17160 14560 10400 6435 3439 1547 510 120 1
                    1 17 136 595 1828 4089 8008 12870 18434 22799 22799 18434 12870 8008 4089 1828 595 136 1
                      1 18 153 680 2187 4862 9528 16215 25425 34410 37700 37700 34410 25425 16215 9528 4862 2187 680 153 1
                        1 19 171 771 2556 5814 11628 21420 35271 50520 58140 58140 50520 35271 21420 11628 5814 2556 771 171 1
                          1 20 190 870 2967 7054 14112 26632 45420 68880 81528 81528 68880 45420 26632 14112 7054 2967 870 190 1
                            1 21 210 975 3364 8121 16242 30030 50520 73521 87510 93525 93525 87510 73521 50520 30030 16242 8121 3364 975 210 1
                              1 22 231 1080 3771 9240 18480 34390 58140 85980 108640 118800 118800 108640 85980 58140 34390 18480 9240 3771 1080 231 1
                                1 23 253 1190 4290 10648 21296 40890 70521 104000 136430 154740 154740 136430 104000 70521 40890 21296 10648 4290 1190 253 1
                                  1 24 276 1305 4914 12366 24732 48620 81528 128700 184340 214200 214200 184340 128700 81528 48620 24732 12366 4914 1305 276 1
                                    1 25 300 1425 5610 13800 27600 55200 95280 145600 200200 227990 227990 200200 145600 95280 55200 13800 27600 5610 1425 300 1
                                      1 26 325 1550 6380 16008 32016 64032 112056 171600 243100 286950 286950 243100 171600 112056 64032 32016 16008 6380 1550 325 1
                                        1 27 351 1680 7233 18480 36960 73920 131040 214200 273000 315285 315285 273000 214200 131040 73920 36960 18480 7233 1680 351 1
                                          1 28 378 1815 8166 21240 42480 84960 154740 254250 320340 377000 377000 320340 254250 154740 84960 42480 21240 8166 1815 378 1
                                            1 29 406 1956 9180 24300 48600 97200 184340 296370 377000 435285 435285 377000 296370 184340 97200 48600 24300 9180 1956 406 1
                                              1 30 435 2100 10287 27600 55200 110400 214200 343900 435285 505200 505200 435285 343900 214200 110400 55200 27600 10287 2100 435 1
                                                1 31 465 2250 11484 30030 60060 120120 240240 408900 505200 581400 581400 505200 408900 240240 120120 60060 30030 11484 2250 465 1
                                                  1 32 496 2400 12771 33648 67296 134592 273000 454200 561000 643500 643500 561000 454200 273000 134592 67296 33648 12771 2400 496 1
                                                    1 33 528 2550 14154 37710 75420 150840 301680 505200 616200 705210 705210 616200 505200 301680 150840 75420 37710 14154 2550 528 1
                                                      1 34 561 2700 15639 42480 84960 169920 339840 581400 705210 815280 815280 705210 581400 339840 169920 84960 42480 15639 2700 561 1
                                                        1 35 595 2850 17220 48620 97200 194400 398800 643500 779850 875100 875100 779850 643500 398800 194400 97200 48620 17220 2850 595 1
                                                          1 36 630 3000 18900 55200 110400 220800 441600 739200 935280 1086400 1188000 1188000 1086400 935280 739200 110400 55200 18900 3000 630 1
                                                            1 37 666 3150 20670 62400 124800 249600 499200 815280 1040000 1216500 1315200 1315200 1216500 1040000 815280 499200 249600 124800 62400 20670 3150 666 1
                                                              1 38 703 3300 22530 70540 141120 282240 564480 935280 1188000 1364300 1456000 1456000 1364300 1188000 935280 564480 282240 141120 70540 22530 3300 703 1
                                                                1 39 741 3450 24480 78660 158400 316800 633600 1040000 1287000 1486800 1584000 1584000 1486800 1287000 1040000 633600 316800 158400 78660 24480 3450 741 1
                                                                  1 40 780 3600 26520 87000 176400 352800 705600 1188000 1456000 1699200 1716000 1716000 1699200 1456000 1188000 705600 352800 176400 87000 26520 3600 780 1
                                                                    1 41 820 3750 28650 96600 195300 390600 781200 1310400 1716000 2002000 2142000 2142000 2002000 1716000 1310400 781200 390600 195300 96600 28650 3750 820 1
                                                                      1 42 861 3900 30870 106440 214800 429600 859200 1456000 1843400 2142000 2279900 2279900 2142000 1843400 1456000 859200 429600 214800 106440 30870 3900 861 1
                                                                                   1 43 903 4050 33180 117600 247320 494640 989280 1716000 2142000 2431000 2542500 2542500 2431000 2142000 1716000 989280 494640 989280 117600 33180 4050 903 1
                                                                                     1 44 946 4200 35580 129120 276000 552000 1104000 2002000 2431000 2730000 2869500 2869500 2730000 2431000 2002000 1104000 552000 129120 35580 4200 946 1
                                                                                       1 45 990 4350 38070 141000 306000 612000 1224000 2142000 2542500 2869500 3016800 3016800 2869500 2542500 2142000 1224000 612000 306000 141000 38070 4350 990 1
                                                                                         1 46 1035 4500 40650 153300 336600 673200 1346400 2431000 2869500 3152850 3203400 3203400 3152850 2869500 2431000 1346400 673200 336600 153300 40650 4500 1035 1
                                                                                           1 47 1081 4650 43320 166080 368400 736800 1473600 2730000 3203400 3439000 3439000 3439000 3203400 2730000 1473600 736800 368400 166080 43320 4650 1081 1
                                                                                             1 48 1128 4800 46080 179280 401760 803520 1607040 3016800 3439000 3770000 3770000 3770000 3439000 3016800 1607040 803520 401760 179280 46080 4800 1128 1
                                                                                               1 49 1176 4950 48930 192960 436800 873600 1747200 3203400 3770000 4089000 4089000 4089000 3770000 3203400 1747200 873600 436800 192960 48930 4950 1176 1
                                                                                                 1 50 1225 5100 51870 207000 473400 946800 1893600 3439000 4089000 4352850 4352850 4352850 4089000 3439000 1893600 946800 473400 207000 51870 5100 1225 1
                                                                                                   1 51 1275 5250 54900 221400 511500 1023000 2046000 3770000 4352850 4542000 4542000 4542000 4352850 3770000 2046000 1023000 511500 221400 54900 5250 1275 1
                                                                                                     1 52 1326 5400 58020 236160 551760 1104000 2142000 4089000 4542000 4862000 4862000 4862000 4089000 2142000 1104000 1104000 551760 236160 58020 5400 1326 1
                                                                                                       1 53 1378 5550 61230 251340 594000 1188000 2279900 4352850 4862000 5052000 5052000 5052000 4862000 4352850 2279900 1188000 1188000 594000 251340 61230 5550 1378 1
                                                                                                         1 54 1431 5700 64530 266940 638400 1276800 2431000 4542000 5052000 5241000 5241000 5241000 4542000 2431000 1276800 1276800 638400 266940 64530 5700 1431 1
                                                                                                           1 55 1485 5850 67920 282960 684600 1369200 2542500 4862000 5241000 5438000 5438000 5438000 5241000 4862000 2542500 1369200 1369200 684600 282960 67920 5850 1485 1
                                                                                                             1 56 1540 6000 71400 299400 732600 1465200 2730000 5052000 5438000 5634000 5634000 5634000 5438000 2730000 1465200 1465200 732600 299400 71400 6000 1540 1
                                                                                                               1 57 1596 6150 74970 316320 782400 1564800 2963700 5241000 5634000 5838000 5838000 5838000 5634000 2963700 1564800 1564800 782400 316320 74970 6150 1596 1
                                                                                                                 1 58 1653 6300 78600 333660 833760 1668000 3016800 5438000 5838000 6042000 6042000 6042000 5838000 3016800 1668000 1668000 833760 333660 78600 6300 1653 1
                                                                                                                 1 59 1711 6450 82310 351480 886680 1774400 3203400 5634000 6042000 6254000 6254000 6254000 5634000 3203400 1774400 1774400 886680 351480 82310 6450 1711 1
                                                                                                                 1 60 1770 6600 86100 369780 941160 1882800 3398400 5838000 6254000 6466000 6466000 6466000 5838000 3398400 1882800 1882800 941160 369780 86100 6600 1770 1
                                                                                                                 1 61 1830 6750 89970 388560 997200 2004000 3597600 6042000 6466000 6688000 6688000 6688000 6042000 3597600 2004000 2004000 997200 388560 89970 6750 1830 1
                                                                                                                 1 62 1891 6900 93900 407820 1054800 2128800 3799200 6254000 6688000 6910000 6910000 6910000 6254000 3799200 2128800 2128800 1054800 407820 93900 6900 1891 1
                                                                                                                 1 63 1953 7050 97890 427560 1113900 2256000 3999600 6466000 6910000 7140000 7140000 7140000 6466000 3999600 2256000 2256000 1113900 427560 97890 7050 1953 1
                                                                                                                 1 64 2016 7200 101940 447780 1174440 2386400 4198800 6688000 7140000 7370000 7370000 7370000 6688000 4198800 2386400 2386400 1174440 447780 101940 7200 2016 1
                                                                                                                 1 65 2080 7350 106050 468480 1236480 2518800 4396800 6910000 7370000 7600000 7600000 7600000 6910000 4396800 2518800 2518800 1236480 468480 106050 7350 2080 1
                                                                                                                 1 66 2145 7500 110220 489660 1299960 2653200 4593600 7140000 7600000 7830000 7830000 7830000 7140000 4593600 2653200 2653200 1299960 489660 110220 7500 2145 1
                                                                                                                 1 67 2211 7650 114450 511260 1364940 2790600 4788000 7370000 7830000 8060000 8060000 8060000 7370000 4788000 2790600 2790600 1364940 511260 114450 7650 2211 1
                                                                                                                 1 68 2278 7800 118740 533280 1431480 2929200 4980000 7600000 8060000 8290000 8290000 8290000 7600000 4980000 2929200 2929200 1431480 533280 118740 7800 2278 1
                                                                                                                 1 69 2346 7950 123090 555720 1499580 3069000 5169600 7830000 8290000 8520000 8520000 8520000 7830000 5169600 3069000 3069000 1499580 555720 123090 7950 2346 1
                                                                                                                 1 70 2415 8100 127500 578580 1569240 3210000 5356800 8060000 8520000 8750000 8750000 8750000 8060000 5356800 3210000 3210000 1569240 578580 127500 8100 2415 1
                                                                                                                 1 71 2485 8250 131970 601860 1640460 3352200 5541600 8290000 8750000 8980000 8980000 8980000 8290000 5541600 3352200 3352200 1640460 601860 131970 8250 2485 1
                                                                                                                 1 72 2556 8400 136500 625560 1713180 3495600 5733600 8520000 8980000 9210000 9210000 9210000 8520000 5733600 3495600 3495600 1713180 625560 136500 8400 2556 1
                                                                                                                 1 73 2628 8550 141090 649680 1787400 3640200 5928000 8750000 9210000 9440000 9440000 9440000 8750000 5928000 3640200 3640200 1787400 649680 141090 8550 2628 1
                                                                                                                 1 74 2701 8700 145740 674220 1863120 3786000 6124800 8980000 9440000 9670000 9670000 9670000 8980000 6124800 3786000 3786000 1863120 674220 145740 8700 2701 1
                                                                                                                 1 75 2775 8850 150450 699180 1940340 3933000 6321600 9210000 9670000 9900000 9900000 9900000 9210000 6321600 3933000 3933000 1940340 699180 150450 8850 2775 1
                                                                                                                 1 76 2850 9000 155220 724560 2019060 4081200 6518400 9440000 9900000 10130000 10130000 10130000 9440000 6518400 4081200 4081200 2019060 724560 155220 9000 2850 1
                                                                                                                 1 77 2926 9150 160050 750360 2100300 4230600 6715200 9670000 10130000 10360000 10360000 10360000 9670000 6715200 4230600 4230600 2100300 750360 160050 9150 2926 1
                                                                                                                 1 78 2993 9300 164920 776580 2183040 4380000 6910000 9900000 10360000 10590000 10590000 10590000 9900000 6910000 4380000 4380000 2183040 776580 164920 9300 2993 1
                                                                                                                 1 79 3061 9450 169830 803160 2267280 4530400 7106400 10130000 10590000 10820000 10820000 10820000 10130000 7106400 4530400 4530400 2267280 803160 169830 9450 3061 1
                                                                                                                 1 80 3130 9600 174780 830100 2353020 4681800 7308000 10360000 10820000 11050000 11050000 11050000 10130000 7308000 4681800 4681800 2353020 830100 174780 9600 3130 1
                                                                                                                 1 81 3200 9750 179760 857400 2440260 4834200 7510800 10590000 11050000 11280000 11280000 11280000 10360000 7510800 4834200 4834200 2440260 857400 179760 9750 3200 1
                                                                                                                 1 82 3271 9900 184770 885000 2528940 4987600 7713600 10820000 11280000 11510000 11510000 11510000 10590000 7713600 4987600 4987600 2528940 885000 184770 9900 3271 1
                                                                                                                 1 83 3343 10050 189810 912900 2619060 5141000 7916400 11050000 11510000 11740000 11740000 11740000 10820000 7916400 5141000 5141000 2619060 912900 189810 10050 3343 1
                                                                                                                 1 84 3416 10200 194880 941160 2710640 5294400 8119200 11280000 11740000 11970000 11970000 11970000 11050000 8119200 5294400 5294400 2710640 941160 194880 10200 3416 1
                                                                                                                 1 85 3490 10350 199980 969780 2803680 5448000 8322000 11510000 11970000 12200000 12200000 12200000 11280000 8322000 5448000 5448000 2803680 969780 199980 10350 3490 1
                                                                                                                 1 86 3565 10500 205110 998700 2898180 5602200 8524800 11740000 12200000 12430000 12430000 12430000 11510000 8524800 5602200 5602200 2898180 998700 205110 10500 3565 1
                                                                                                                 1 87 3641 10650 210270 1027920 2994240 5757000 8727600 11970000 12430000 12660000 12660000 12660000 11740000 8727600 5757000 5757000 2994240 1027920 210270 10650 3641 1
                                                                                                                 1 88 3718 10800 215460 1057380 3090840 5911200 8930400 12200000 12660000 12890000 12890000 12890000 11970000 8930400 5911200 5911200 3090840 1057380 215460 10800 3718 1
                                                                                                                 1 89 3796 10950 220680 1087080 3188940 6065400 9133200 12430000 12890000 13120000 13120000 13120000 12200000 9133200 6065400 6065400 3188940 1087080 220680 10950 3796 1
                                                                                                                 1 90 3875 11100 225930 1117020 3288540 6220200 9336000 12660000 13120000 13350000 13350000 13350000 12430000 9336000 6220200 6220200 3288540 1117020 225930 11100 3875 1
                                                                                                                 1 91 3955 11250 231210 1147200 3389640 6375600 9538800 12890000 13350000 13580000 13580000 13
```



```
\usepackage{makeidx}\makeindex
\usepackage{hvinindex}
```

```
Sort with xindex \verb|-l DE --config AU|
\Index{Österreich} \Index{Öresund}

\Index{Ostern} \Index{Ober} \Index{Oberin}
\Index{Österreich} \Index{Öresund}

\Index{Ödem} \Index{Oligarch} \Index{Oder}
\Index{Ostern} \Index{Ober} \Index{Oberin}

\Index{Obstler} \Index{Öl} \Index{ölen}
\Index{Oder|seealso{Fluss}} \Index{Göbel}

\Index{oder} \index{Fluss!Oder}
\Index{Goethe} \Index{Göthe} \Index{Götz}

\Index{Goldmann}
\printindex
```

Index

F
 Fluss
 - Oder, 1

G
 Goethe, 1
 Goldmann, 1
 Göbel, 1
 Göthe, 1
 Götz, 1

O
 Ober, 1
 Oberin, 1

Obstler, 1
 oder, 1
 Oder, 1, *siehe auch Fluss*
 Oligarch, 1
 Ostern, 1

Ö
 Ödem, 1
 Öl, 1
 Öresund, 1
 Österreich, 1

ö
 ölen, 1

voss-22.tex

Instad of using the options `compiler`, `biber`, and `xindex` one can also use only the optional argument `runsequence` to define an individuell sequence of commands, e.g.:

```
runsequence={lualatex,biber,{xindex -l de -c AU},lualatex,lualatex}
```

```
\usepackage[ngerman]{babel}
\usepackage{libertinus,hvinindex}
\usepackage{makeidx}\makeindex
\usepackage{biblatex}\addbibresource{biblatex-examples.bib}
```

```
\blindtext
\Index{Österreich} \Index{Öresund}
\Index{Ostern} \Index{Ober} \Index{Oberin}
\Index{Österreich} \Index{Öresund}
\Index{Ödem} \Index{Oligarch} \Index{Oder}
\Index{Goldmann}
\printindex
\nocite{*}\printbibliography
\blindtext
\blindeddocument
```

voss-23.tex

Dies hier ist ein Blindtext zum Testen von Textausgaben. Wer diesen Text liest, ist selbst schuld. Der Text gibt lediglich den Grauwert der Schrift an. Ist das wirklich so? Ist es gleichgültig, ob ich schreibe: „Dies ist ein Blindtext“ oder „Huerdest gefbun?“ Kjift – mitnichten! Ein Blindtext bietet mir wichtige Informationen. An ihm messe ich die Lesbarkeit einer Schrift, ihre Anmutung, wie harmonisch die Figuren zueinander stehen und prüfe, wie breit oder schmal sie läuft. Ein Blindtext sollte möglichst viele verschiedene Buchstaben enthalten und in der Originalsprache gesetzt sein. Er muss keinen Sinn ergeben, sollte aber lesbar sein. Fremdsprachige Texte wie „Lorem ipsum“ dienen nicht dem eigentlichen Zweck, da sie eine falsche Anmutung vermitteln. Österreich Öresund Ostern Ober Oberin Österreich Öresund Ödem Oligarch Oder Goldmann

Index

G
 Goldmann, 1

O
 Ober, 1
 Oberin, 1
 Oder, 1
 Oligarch, 1
 Ostern, 1

Ö
 Ödem, 1
 Öresund, 1
 Österreich, 1

	<p style="text-align: center;">Literatur</p> <p>[1] José L. Almedro u. a. "Elektromagnetisches Signalthorn". EU-29702195U (FR, GB, DE). 1998.</p> <p>[2] Arnold Angenendt. "In Honore Salvatoris – Vom Sinn und Unsinn der Patrozinienkunde". In: <i>Revue d'Histoire Ecclesiastique</i> 97 (2002), S. 431–456, 791–823.</p> <p>[3] Aristotle. <i>De Anima</i>. Hrsg. von Robert Drew Hicks. Cambridge: Cambridge University Press, 1907.</p> <p>[4] Aristotle. <i>Physics</i>. Übers. von P. H. Wicksteed und F. M. Cornford. New York: G. P. Putnam, 1929.</p> <p>[5] Aristotle. <i>Poetics</i>. Hrsg. von D. W. Lucas. Clarendon Aristotle. Oxford: Clarendon Press, 1968.</p> <p>[6] Aristotle. <i>The Rhetoric of Aristotle with a commentary by the late Edward Meredith Cope</i>. Hrsg. und komm. von Edward Meredith Cope. 3 Bde. Cambridge University Press, 1877.</p> <p>[7] Robert L. Augustine. <i>Heterogeneous catalysis for the synthetic chemist</i>. New York: Marcel Dekker, 1995.</p> <p>[8] Averroes. <i>Drei Abhandlungen über die Conjunction des separaten Intellekts mit dem Menschen</i>. Von Averroes (Vater und Sohn), aus dem Arabischen übersetzt von Samuel Ibn Tibbon. Hrsg. und übers. von J. Hercz. Berlin: S. Hermann, 1869.</p>	<p style="text-align: center;"><i>Literatur</i></p> <p>[9] Averroes. <i>The Epistle on the Possibility of Conjunction with the Active Intellect by Ibn Rushd with the Commentary of Moses Narhoni</i>. Hrsg. und übers. von Kalman P. Bland. Moreshet: Studies in Jewish History, Literature and Thought 7. New York: Jewish Theological Seminary of America, 1982.</p> <p>[10] Averroes. <i>Des Averroës Abhandlung: "Über die Möglichkeit der Conjunction" oder "Über den materiellen Intellekt"</i>. Hrsg., übers. und erläut. von Ludwig Hanne. Halle an der Saale: C. A. Kaemmerer, 1892.</p> <p>[11] John C. Baez und Aaron D. Lauda. <i>Higher-Dimensional Algebra V: 2-Groups</i>. Version 3. 27. Okt. 2004. arXiv: math/0307200v3.</p> <p>[12] John C. Baez und Aaron D. Lauda. "Higher-Dimensional Algebra V: 2-Groups". Version 3. In: <i>Theory and Applications of Categories</i> 12 (2004), S. 423–491. arXiv: math/0307200v3.</p> <p>[13] Aaron Bertram und Richard Wentworth. "Gromov invariants for holomorphic maps on Riemann surfaces". In: <i>J. Amer. Math. Soc.</i> 9.2 (1996), S. 529–571.</p> <p>[14] Ahasver von Brandt und Erich Hoffmann. "Die nordischen Länder von der Mitte des 11. Jahrhunderts bis 1448". In: <i>Europa im Hoch- und Spätmittelalter</i>. Hrsg. von Ferdinand Seibt. Handbuch der europäischen Geschichte 2. Stuttgart: Klett-Cotta, 1987, S. 884–917.</p> <p>[15] <i>The Chicago Manual of Style. The Essential Guide for Writers, Editors, and Publishers</i>. 15. Aufl. Chicago, Ill.: University of Chicago Press, 2003. isbn: 0-226-10403-6.</p>
--	---	--

5.14 Using listings

The default is using `\lstinputlisting` for the printed code sequences.

voss-24.tex

```

\documentclass[chapterprefix=on,parskip=half-,DIV=12,fontsize=12pt]{scrbook}
\DeclareNewSectionCommand[
  style=section,
  level=4,
  beforeskip=-3.25ex plus -1ex minus -.2ex,
  afterskip=1.5ex plus .2ex,
  font=\normalsize,
  indent=0pt,
  counterwithin=subsubsection
]{subsubsection}
\RedeclareSectionCommand[
  level=5,
  toplevel=5,
  tocindent=13em,
  tocnumwidth=5.9em,
  counterwithin=subsubsubsection
]{paragraph}
\RedeclareSectionCommand[
  level=6,
  toplevel=6,
  tocindent=15em,
  tocnumwidth=6.8em
]{subparagraph}
\setcounter{secnumdepth}{\subsubsectionnumdepth}
\setcounter{tocdepth}{\subsubsubsectionnumdepth}

\tableofcontents
\chapter{Einführung}
\section{Ein Abschnitt}
\subsection{Ein Unterabschnitt}
\subsubsection{Ein Unter-Unterabschnitt}
\subsubsubsection{Ein Unter-Unter-Unterabschnitt}
\paragraph{Der normale Paragraph}
\blindtext
\subparagraph{Der normale Unterparagraph}
\blindtext
\blinddocument

```

Inhaltsverzeichnis	
1 Einführung	3
1.1 Ein Abschnitt	3
1.1.1 Ein Unterabschnitt	3
1.1.1.1 Ein Unter-Unterabschnitt	3
1.1.1.1.1 Ein Unter-Unter-Unterabschnitt	3
2 Überschrift auf Ebene 0 (chapter)	5
2.1 Überschrift auf Ebene 1 (section)	5
2.1.1 Überschrift auf Ebene 2 (subsection)	5
2.1.1.1 Überschrift auf Ebene 3 (subsubsection)	6
2.2 Listen	6
2.2.1 Beispiel einer Liste (itemize)	6
2.2.1.1 Beispiel einer Liste (4"itemize)	7
2.2.2 Beispiel einer Liste (enumerate)	7
2.2.2.1 Beispiel einer Liste (4"enumerate)	7
2.2.3 Beispiel einer Liste (description)	8
2.2.3.1 Beispiel einer Liste (4"description)	8

Kapitel 1

Einführung

1.1 Ein Abschnitt

1.1.1 Ein Unterabschnitt

1.1.1.1 Ein Unter-Unterabschnitt

1.1.1.1.1 Ein Unter-Unter-Unterabschnitt

Der normale Paragraph Dies hier ist ein Blindtext zum Testen von Textausgaben. Wer diesen Text liest, ist selbst schuld. Der Text gibt lediglich den Grauwert der Schrift an. Ist das wirklich so? Ist es gleichgültig, ob ich schreibe: „Dies ist ein Blindtext“ oder „Huardest gefburn“? Kjift – mitnichten! Ein Blindtext bietet mir wichtige Informationen. An ihm messe ich die Lesbarkeit einer Schrift, ihre Anmutung, wie harmonisch die Figuren zueinander stehen und prüfe, wie breit oder schmal sie läuft. Ein Blindtext sollte möglichst viele verschiedene Buchstaben enthalten und in der Originalsprache gesetzt sein. Er muss keinen Sinn ergeben, sollte aber lesbar sein. Fremdsprachige Texte wie „Lorem ipsum“ dienen nicht dem eigentlichen Zweck, da sie eine falsche Anmutung vermitteln.

Der normale Unterparagraph Dies hier ist ein Blindtext zum Testen von Textausgaben. Wer diesen Text liest, ist selbst schuld. Der Text gibt lediglich den Grauwert der Schrift an. Ist das wirklich so? Ist es gleichgültig, ob ich schreibe: „Dies ist ein Blindtext“ oder „Huardest gefburn“? Kjift – mitnichten! Ein Blindtext bietet mir wichtige Informationen. An ihm messe ich die Lesbarkeit einer Schrift, ihre Anmutung, wie harmonisch die Figuren zueinander stehen und prüfe, wie breit oder schmal sie läuft. Ein Blindtext sollte möglichst viele verschiedene Buchstaben enthalten und in der Originalsprache gesetzt sein. Er muss keinen Sinn ergeben, sollte aber lesbar sein. Fremdsprachige Texte wie „Lorem ipsum“ dienen nicht dem eigentlichen Zweck, da sie eine falsche Anmutung vermitteln.

It also possible to use `\VerbatimInput` from package `fancyvrb`. In general it makes no difference using the optional argument `usefancyvrb` or not.

```
\documentclass[chapterprefix=on,parskip=half-,DIV=12,fontsize=12pt]{scrbook}
\DeclareNewSectionCommand[
  style=section,
  level=4,
  beforekip=-3.25ex plus -1ex minus -.2ex,
  afterskip=1.5ex plus .2ex,
  font=\normalsize,
  indent=0pt,
  counterwithin=subsubsection
]{subsubsubsection}
\RedeclareSectionCommand[
  level=5,
  toplevel=5,
  tocindent=13em,
  tocnumwidth=5.9em,
  counterwithin=subsubsubsection
]{paragraph}
\RedeclareSectionCommand[
  level=6,
  toplevel=6,
  tocindent=15em,
  tocnumwidth=6.8em
]{subparagraph}
\setcounter{secnumdepth}{\subsubsubsectionnumdepth}
\setcounter{tocdepth}{\subsubsubsectionnumdepth}

\tableofcontents
\chapter{Einführung}
```

voss-25.tex

```

\section{Ein Abschnitt}
\subsection{Ein Unterabschnitt}
\subsubsection{Ein Unter-Unterabschnitt}
\subsubsubsection{Ein Unter-Unter-Unterabschnitt}
\paragraph{Der normale Paragraph}
\blindtext
\subparagraph{Der normale Unterparagraph}
\blindtext
\blindeddocument

```

Inhaltsverzeichnis		Kapitel 1	
Einführung		Einführung	
1.1 Ein Abschnitt	2	1.1 Ein Abschnitt	
1.1.1 Ein Unterabschnitt	2	1.1.1 Ein Unterabschnitt	
1.1.1.1 Ein Unter-Unterabschnitt	2	1.1.1.1 Ein Unter-Unterabschnitt	
2 Übersicht auf Thema 1 (Kapitel)	2		
2.1 Übersicht auf Thema 1 (Kapitel)	2		
2.1.1 Übersicht auf Thema 1 (Unterabschnitt)	2		
2.1.1.1 Übersicht auf Thema 1 (Unterabschnitt)	2		
2.2 Liste	2		
2.2.1 Beispiel einer Liste (Liste)	2		
2.2.2 Beispiel einer Liste (Liste)	2		
2.2.3 Beispiel einer Liste (Liste)	2		
2.2.4 Beispiel einer Liste (Liste)	2		
2.2.5 Beispiel einer Liste (Liste)	2		
2.2.6 Beispiel einer Liste (Liste)	2		
2.2.7 Beispiel einer Liste (Liste)	2		
2.2.8 Beispiel einer Liste (Liste)	2		
2.2.9 Beispiel einer Liste (Liste)	2		
2.2.10 Beispiel einer Liste (Liste)	2		
2.2.11 Beispiel einer Liste (Liste)	2		
2.2.12 Beispiel einer Liste (Liste)	2		
2.2.13 Beispiel einer Liste (Liste)	2		
2.2.14 Beispiel einer Liste (Liste)	2		
2.2.15 Beispiel einer Liste (Liste)	2		
2.2.16 Beispiel einer Liste (Liste)	2		
2.2.17 Beispiel einer Liste (Liste)	2		
2.2.18 Beispiel einer Liste (Liste)	2		
2.2.19 Beispiel einer Liste (Liste)	2		
2.2.20 Beispiel einer Liste (Liste)	2		
2.2.21 Beispiel einer Liste (Liste)	2		
2.2.22 Beispiel einer Liste (Liste)	2		
2.2.23 Beispiel einer Liste (Liste)	2		
2.2.24 Beispiel einer Liste (Liste)	2		
2.2.25 Beispiel einer Liste (Liste)	2		
2.2.26 Beispiel einer Liste (Liste)	2		
2.2.27 Beispiel einer Liste (Liste)	2		
2.2.28 Beispiel einer Liste (Liste)	2		
2.2.29 Beispiel einer Liste (Liste)	2		
2.2.30 Beispiel einer Liste (Liste)	2		
2.2.31 Beispiel einer Liste (Liste)	2		
2.2.32 Beispiel einer Liste (Liste)	2		
2.2.33 Beispiel einer Liste (Liste)	2		
2.2.34 Beispiel einer Liste (Liste)	2		
2.2.35 Beispiel einer Liste (Liste)	2		
2.2.36 Beispiel einer Liste (Liste)	2		
2.2.37 Beispiel einer Liste (Liste)	2		
2.2.38 Beispiel einer Liste (Liste)	2		
2.2.39 Beispiel einer Liste (Liste)	2		
2.2.40 Beispiel einer Liste (Liste)	2		
2.2.41 Beispiel einer Liste (Liste)	2		
2.2.42 Beispiel einer Liste (Liste)	2		
2.2.43 Beispiel einer Liste (Liste)	2		
2.2.44 Beispiel einer Liste (Liste)	2		
2.2.45 Beispiel einer Liste (Liste)	2		
2.2.46 Beispiel einer Liste (Liste)	2		
2.2.47 Beispiel einer Liste (Liste)	2		
2.2.48 Beispiel einer Liste (Liste)	2		
2.2.49 Beispiel einer Liste (Liste)	2		
2.2.50 Beispiel einer Liste (Liste)	2		
2.2.51 Beispiel einer Liste (Liste)	2		
2.2.52 Beispiel einer Liste (Liste)	2		
2.2.53 Beispiel einer Liste (Liste)	2		
2.2.54 Beispiel einer Liste (Liste)	2		
2.2.55 Beispiel einer Liste (Liste)	2		
2.2.56 Beispiel einer Liste (Liste)	2		
2.2.57 Beispiel einer Liste (Liste)	2		
2.2.58 Beispiel einer Liste (Liste)	2		
2.2.59 Beispiel einer Liste (Liste)	2		
2.2.60 Beispiel einer Liste (Liste)	2		
2.2.61 Beispiel einer Liste (Liste)	2		
2.2.62 Beispiel einer Liste (Liste)	2		
2.2.63 Beispiel einer Liste (Liste)	2		
2.2.64 Beispiel einer Liste (Liste)	2		
2.2.65 Beispiel einer Liste (Liste)	2		
2.2.66 Beispiel einer Liste (Liste)	2		
2.2.67 Beispiel einer Liste (Liste)	2		
2.2.68 Beispiel einer Liste (Liste)	2		
2.2.69 Beispiel einer Liste (Liste)	2		
2.2.70 Beispiel einer Liste (Liste)	2		
2.2.71 Beispiel einer Liste (Liste)	2		
2.2.72 Beispiel einer Liste (Liste)	2		
2.2.73 Beispiel einer Liste (Liste)	2		
2.2.74 Beispiel einer Liste (Liste)	2		
2.2.75 Beispiel einer Liste (Liste)	2		
2.2.76 Beispiel einer Liste (Liste)	2		
2.2.77 Beispiel einer Liste (Liste)	2		
2.2.78 Beispiel einer Liste (Liste)	2		
2.2.79 Beispiel einer Liste (Liste)	2		
2.2.80 Beispiel einer Liste (Liste)	2		
2.2.81 Beispiel einer Liste (Liste)	2		
2.2.82 Beispiel einer Liste (Liste)	2		
2.2.83 Beispiel einer Liste (Liste)	2		
2.2.84 Beispiel einer Liste (Liste)	2		
2.2.85 Beispiel einer Liste (Liste)	2		
2.2.86 Beispiel einer Liste (Liste)	2		
2.2.87 Beispiel einer Liste (Liste)	2		
2.2.88 Beispiel einer Liste (Liste)	2		
2.2.89 Beispiel einer Liste (Liste)	2		
2.2.90 Beispiel einer Liste (Liste)	2		
2.2.91 Beispiel einer Liste (Liste)	2		
2.2.92 Beispiel einer Liste (Liste)	2		
2.2.93 Beispiel einer Liste (Liste)	2		
2.2.94 Beispiel einer Liste (Liste)	2		
2.2.95 Beispiel einer Liste (Liste)	2		
2.2.96 Beispiel einer Liste (Liste)	2		
2.2.97 Beispiel einer Liste (Liste)	2		
2.2.98 Beispiel einer Liste (Liste)	2		
2.2.99 Beispiel einer Liste (Liste)	2		
2.300 Beispiel einer Liste (Liste)	2		

5.15 Vertical space

```

\define@key{hv}{aboveskip}[\medskipamount]{%
  \setlength{hv}{extern@aboveskip{#1}}
}
\define@key{hv}{belowpreambleskip}[\smallskipamount]{%
  \setlength{hv}{extern@belowpreambleskip{#1}}
}
\define@key{hv}{belowbodyskip}[\smallskipamount]{%
  \setlength{hv}{extern@belowbodyskip{#1}}
}
\define@key{hv}{belowskip}[\medskipamount]{%
  \setlength{hv}{extern@belowskip{#1}}
}

```

aboveskip Vertical space *before* the environment `externalDocument` or the command `\runExtCmd` (default `\medskipamount`)

belowpreambleskip Vertical space between preamble and body (default `\smallskipamount`)

belowbodyskip Vertical space between body and output (default `\smallskipamount`)

belowskip Vertical space *after* the environment `externalDocument` or the command `\runExtCmd` (default `\medskipamount`)

The listings environment uses its own keywords `aboveskip` and `belowskip`, also preset to `\medskipamount`. These ones can be changed by using the keyword `lstOptions`:

```
..., lstOptions = {aboveskip=..., belowskip=...}, ...
```

5.16 No output

By default there is an image or text as output of the external run. In a case, where you are only interested in the code, which should be formatted in the same style as other examples, you can set `showoutput` to `false`.

```

\documentclass[chapterprefix=on,parskip=half-,DIV=12,fontsize=12pt]{scrbook}
\DeclareNewSectionCommand[
  style=section,
  level=4,
  beforeskip=-3.25ex plus -1ex minus -.2ex,
  afterskip=1.5ex plus .2ex,
  font=\normalsize,
  indent=0pt,
  counterwithin=subsubsection
]{subsubsubsection}

\tableofcontents
\chapter{Einführung}
\section{Ein Abschnitt}
\subsection{Ein Unterabschnitt}
\subsubsection{Ein Unter-Unterabschnitt}
\subsubsubsection{Ein Unter-Unter-Unterabschnitt}
\blindtext

```

voss-26.tex

6 Defining new marker

Suppose you do not want for a L^AT_EX document the complete body part between `\begin` and `\end` printed. In this case you can define own markers, e.g.:

```

\defMarkerType{ltx}
{
  {\perCent StartVisibleBody}
  {\perCent StopVisibleBody}
  {\perCent StartVisiblePreamble}
  {\perCent StopVisiblePreamble}
}

```

Whith this definition and the setting `docType=ltx` the last example looks like:

```

\DeclareNewSectionCommand[
  style=section,
  level=4,
  beforeskip=-3.25ex plus -1ex minus -.2ex,
  afterskip=1.5ex plus .2ex,
  font=\normalsize,
  indent=0pt,
  counterwithin=subsubsection
]{subsubsubsection}

\subsubsubsection{Ein Unter-Unter-Unterabschnitt}

```

voss-27.tex

Inhaltsverzeichnis

1	Einführung	2
1.1	Ein Abschnitt	2
1.1.1	Ein Unterabschnitt	2
1.1.1.1	Ein Unter-Unterabschnitt	2
1.1.1.1.1	Ein Unter-Unter-Unterabschnitt	2

7 Supported engines

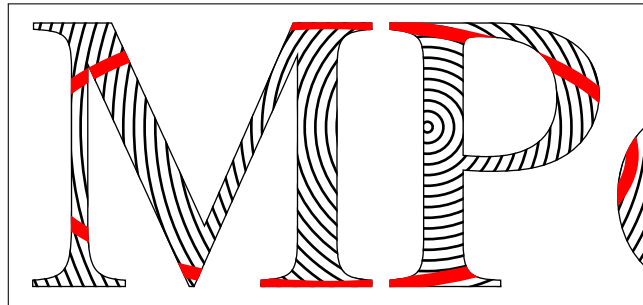
7.1 METAPOST example

Needs the run sequence setting to get a pdf from the created dvi output. It is already internally defined.

voss-28.mp

```
defaultfont:="ptmr8r";
warningcheck:=0;

draw fullcircle shifted (0.5,0.6) xscaled 8cm yscaled 3.5cm
  withpen pencircle scaled 5bp withcolor red;
special( " /Times-Roman findfont 150 scalefont setfont " &
  " 0 10 moveto (MPost) false charpath clip stroke gsave 150 70 translate " &
  " 2 4 600 {dup 0 moveto 0 exch 0 exch 0 360 arc stroke} for grestore ");
```



7.2 plainTeX example

Needs the run sequence setting to get a pdf from the created dvi output. It is already internally defined.

voss-29.tex

```
\footline={\footsc the electronic journal of combinatorics
  {\footbf 16} (2009), \#R00\hfil\footrm\folio}

\font\bigrm=cmr12 at 14pt
\centerline{\bigrm An elementary proof of the reconstruction conjecture}

\bigskip\bigskip
\centerline{D. Remifa\footnote*{Thanks to the editors of this journal!}}
\smallskip
\centerline{Department of Inconsequential Studies}
\centerline{Solatido College, North Kentucky, USA}
\centerline{\tt remifa@dis.solatido.edu}
\bigskip
\centerline{\footrm
Submitted: Jan 1, 2009; Accepted: Jan 2, 2009; Published: Jan 3, 2009}
\centerline{\footrm Mathematics Subject Classifications: 05C88, 05C89}
\bigskip\bigskip
\centerline{\bf Abstract}
\smallskip
{\narrower\noindent
The reconstruction conjecture states that the multiset of unlabeled
vertex-deleted subgraphs of a graph determines the graph, provided it
has at least 3 vertices. A version of the problem was first stated
by Stanisław Ulam. In this paper, we show that the conjecture can
be proved by elementary methods. It is only necessary to integrate
the Lenkle potential of the Broglington manifold over the quantum
supervacillatory measure in order to reduce the set of possible
counterexamples to a small number (less than a trillion). A simple
computer program that implements Pipletti's classification theorem
for torsion-free Aramaic groups with symplectic socles can then
```

```
finish the remaining cases.}
```

```
\bigskip
```

```
\beginsection 1. Introduction.
```

```
This is the start of the introduction.
```



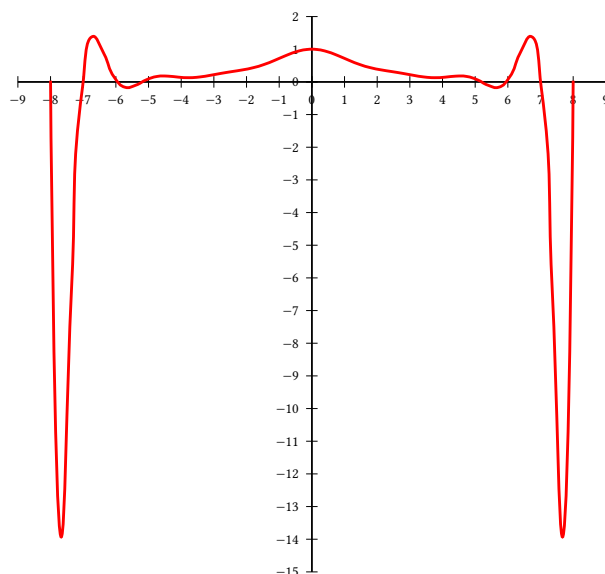
7.3 Lua \LaTeX example

With Lua \LaTeX and using PostScript code the intermediate GhostScript run is not needed. The pdf is directly created.

```
\usepackage{fontenc}\usepackage{libertinus}
\usepackage{pst-all}
```

```
\psset{unit=0.8cm}
\begin{pspicture}(-9,-15)(9,2)
\psaxes(0,0)(-9,-15)(9,2)
\psplot[algebraic,plotstyle=curve,curvature=1 1 0,
linewidth=2pt,linecolor=red]{-8}{8}{
1 - 3876218985722260225*x^2/10892114744073986176
+ 14975974793271450625*x^4/174273835905183778816
- 317095420958296875*x^6/26811359370028273664
+ 194412970920703125*x^8/214490874960226189312
- 2090988251953125*x^10/53622718740056547328
+ 99480224609375*x^12/107245437480113094656
- 7879638671875*x^14/697095343620735115264
+ 152587890625*x^16/2788381374482940461056}
\end{pspicture}
```

voss-30.tex



7.4 ConT_EXt example

voss-31.tex

```

\definehead
[myhead]
[section]
\setuphead
[myhead]
[numberstyle=bold,
textstyle =bold,
before    =\hairline\blank,
after     =\nowhitespace\hairline]

\startstandardmakeup
\midaligned{From Hasselt to America}
\midaligned{by}
\midaligned{J. Jonker and C. van Marle}
\stopstandardmakeup
\placecombinedlist[content]
\chapter{Introduction}
\input knuth \input knuth
\chapter[rensselaer]{The Rensselaer family}
\input knuth
\section{The first born}
\input knuth
\section{The early years}
... in those days Hasselt was ...
\input knuth
\section{Living and workin in America}
\input knuth
\chapter[lansing]{The Lansing family}
... the Lansing family was also ...
\input knuth
\chapter[cuyler]{The Cuyler family}
... much later Tydeman Cuyler ...
\input knuth
\myhead[headlines]{And the end of all}
foo

```


<p>From Hasselt to America by J. Josker and C. van Marle</p>	<div>1</div> <div>1 Introduction2 2 The Rensselaer family3 2.1 The first born3 2.2 The early years3 2.3 Living and workin in America4 3 The Lansing family5 4 The Chrysler family6</div>	<div>2</div> <div>1 Introduction Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large-scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TjX significantly. If I had not participated fully in all these activities, literally hundreds of improvements would never have been made, because I would never have thought of them or perceived why they were important. But a system cannot be successful if it is too strongly influenced by a single person. Once the initial design is complete and fairly robust, the real test begins as people with many different viewpoints undertake their own experiments.</div>
<div>3</div> <div>2 The Rensselaer family Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large-scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TjX significantly. If I had not participated fully in all these activities, literally hundreds of improvements would never have been made, because I would never have thought of them or perceived why they were important. But a system cannot be successful if it is too strongly influenced by a single person. Once the initial design is complete and fairly robust, the real test begins as people with many different viewpoints undertake their own experiments. 2.1 The first born Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large-scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TjX significantly. If I had not participated fully in all these activities, literally hundreds of improvements would never have been made, because I would never have thought of them or perceived why they were important. But a system cannot be successful if it is too strongly influenced by a single person. Once the initial design is complete and fairly robust, the real test begins as people with many different viewpoints undertake their own experiments. 2.2 The early years In those days Hasselt was ... Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large-scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TjX significantly. If I had not participated fully in all these activities, literally hundreds of improvements would never have been made, because I would never have thought of them or perceived why they were important. But a system cannot be successful if it is too strongly influenced by a single person. Once the initial design is complete and fairly robust, the real test begins as people with many different viewpoints undertake their own experiments.</div>	<div>4</div> <div>2.3 Living and workin in America Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large-scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TjX significantly. If I had not participated fully in all these activities, literally hundreds of improvements would never have been made, because I would never have thought of them or perceived why they were important. But a system cannot be successful if it is too strongly influenced by a single person. Once the initial design is complete and fairly robust, the real test begins as people with many different viewpoints undertake their own experiments.</div>	<div>5</div> <div>3 The Lansing family ... the Lansing family was also ... Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large-scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TjX significantly. If I had not participated fully in all these activities, literally hundreds of improvements would never have been made, because I would never have thought of them or perceived why they were important. But a system cannot be successful if it is too strongly influenced by a single person. Once the initial design is complete and fairly robust, the real test begins as people with many different viewpoints undertake their own experiments.</div>

8 Running external commands

Integrating the current directory of this document we can use the macro `\runExtCmd` with the optional argument `redirect`

```
\runExtCmd[redirect]{ls -la}{voss}
```

to get the directory listed:

```
total 4912
drwxr-xr-x  35 voss  staff   1120 22 Nov 13:24 .
drwxr-xr-x 195 voss  staff   6240 22 Nov 13:18 ..
drwxr-xr-x  3 voss  staff    96 24 Apr 2022 .ctan
drwxr-xr-x  4 voss  staff   128 27 Apr 2022 .test
-rw-r--r--  1 voss  staff  2268 22 Nov 13:22 Changes
drwxr-xr-x 102 voss  staff  3264 22 Nov 13:24 Exa
-rwxrwxrwx  1 voss  staff  1175 22 Nov 12:56 Makefile
-rw-r--r--  1 voss  staff   711 19 Sep 21:24 README
-rw-rw-rw-  1 voss  staff  3998 27 Mai 2022 hvdoctools.sty
-rwxr-xr-x  1 voss  staff   1040 21 Jul 2022 hvextern-checkfile.lua
-rw-r--r--  1 voss  staff  16384 22 Nov 13:24 hvextern.aux
-rw-r--r--  1 voss  staff   8192 22 Nov 13:24 hvextern.idx
-rw-r--r--  1 voss  staff 107045 22 Nov 13:24 hvextern.log
-rw-r--r--  1 voss  staff   727 20 Jun 2022 hvextern.lua
```

```

-rw-r--r--@ 1 voss staff 1288531 22 Nov 13:24 hvextern.pdf
-rw-r--r-- 1 voss staff 45481 22 Nov 13:22 hvextern.sty
-rw-r--r-- 1 voss staff 53005 22 Nov 13:16 hvextern.tex
-rw-r--r-- 1 voss staff 0 22 Nov 13:22 hvextern.toc
-rw-r--r-- 1 voss staff 62 22 Nov 13:23 voss-11-1.psaux
-rw-r--r-- 1 voss staff 62 22 Nov 13:23 voss-11-2.psaux
-rw-r--r-- 1 voss staff 62 22 Nov 13:23 voss-11-3.psaux
-rw-r--r-- 1 voss staff 62 22 Nov 13:23 voss-11-4.psaux
-rw-r--r-- 1 voss staff 62 22 Nov 13:24 voss-30-1.psaux
-rw-r--r-- 1 voss staff 61 22 Nov 13:23 voss-8-2.psaux
-rw-r--r-- 1 voss staff 61 22 Nov 13:23 voss-8-3.psaux
-rw-r--r-- 1 voss staff 61 22 Nov 13:23 voss-8-4.psaux
-rw-r--r-- 1 voss staff 61 22 Nov 13:23 voss-8-5.psaux
-rw-r--r-- 1 voss staff 61 22 Nov 13:23 voss-8-6.psaux
-rw-r--r-- 1 voss staff 58 22 Nov 13:23 voss-8-7.psaux
-rw-r--r-- 1 voss staff 61 22 Nov 13:23 voss-9-2.psaux
-rw-r--r-- 1 voss staff 61 22 Nov 13:23 voss-9-3.psaux
-rw-r--r-- 1 voss staff 61 22 Nov 13:23 voss-9-4.psaux
-rw-r--r-- 1 voss staff 61 22 Nov 13:23 voss-9-5.psaux
-rw-r--r-- 1 voss staff 61 22 Nov 13:23 voss-9-6.psaux
-rw-r--r-- 1 voss staff 62 22 Nov 13:23 voss-9-7.psaux

```

```
\runExtCmd[redirect,verbose,lstOptions={basicstyle=\ttfamily\small}]{du}{voss}% *nix
```

```

1264    ./test
6440    ./Exa
96      ./ctan/hvextern/latex
8       ./ctan/hvextern/script
4464    ./ctan/hvextern/doc
8       ./ctan/hvextern/lualatex
4592    ./ctan/hvextern
4592    ./ctan
17208   .

```

9 Other options

vshift A length for a vertical shift of the object, only valid for the inline mode. See document source of example on page 14.

force=false can speed up the comiling time for the document. If a created image/output already exists, there is no need to create it with the next run again and again. This option is not valid if the package option `checkCode` exists.

cleanup the auxiliary files of a L^AT_EX-run are deleted, preset to aux, log. It must be a comma seperated list of the extensions of the main file, s.g. `cleanup={aux,log}`.

moveToExampleDir move all examples into a directory, must be set *before* the option `ExampleDir`.

ExampleDir name of a directory for the examples, must first be created by the user himself.

tcbox=false Can be used if there are some negative interactions between package listings and package `tcolorbox`.

framesep Value for `\fbox` if keyword `frame` is used.

mpsep Distance between code and output (default 1 em).

pagesep Distance between pages for multipage output (default 1 em).

verbose Print control messages into the terminal and logfile.

eps create an eps from the pdf (historical).

Index

Symbols

-shell-escape (package option), 1
./bin/ (value), 6
#, 3
%StartVisiblePreamble, 5
%StopVisiblePreamble, 5

A

aboveskip (keyword), 19

B

b (value), 12
\begin, 20
\begin{document}, 5
belowbodyskip (keyword), 19
belowpreambleskip (keyword), 19
belowskip (keyword), 19
biber (keyword), 6, 15f
bibliography, 15
black!12 (color), 9
black!8 (color), 9

C

c (value), 12
checkCode (package option), 1, 25
cleanup (keyword), 25
code (keyword), 13
compiler (keyword), 5f, 16
context (value), 5
crop (keyword), 11
cropping, 12
current line, 13

D

docType (keyword), 5, 20
documentclass, 11

E

\end, 20
\end{document}, 5
eps (keyword), 26
ExampleDir (keyword), 25
externalDocument (environment), 2, 7, 19

F

false (value), 14, 25
fancyvrb (package), 18
\fbox, 10, 25
figure (environment), 11
float (keyword), 11
force (keyword), 1, 25
frame (keyword), 10

framesep (keyword), 25

H

\hvExternFilename, 1
hvextern (package), 5, 10

I

includegraphic (keyword), 14
\includegraphics, 8, 14
index, 15
inline (keyword), 13
inline image, 13

J

Java, 1

K

Kaprekar, 14

Keyword

- ExampleDir, 25
- aboveskip, 19
- belowbodyskip, 19
- belowpreambleskip, 19
- belowskip, 19
- biber, 6, 15f
- cleanup, 25
- code, 13
- compiler, 5f, 16
- crop, 11
- docType, 5, 20
- eps, 26
- float, 11
- force, 1, 25
- frame, 10
- framesep, 25
- includegraphic, 14
- inline, 13
- lstOptions, 19
- moveToExampleDir, 25
- mpsep, 25
- mpvalign, 12
- mpwidth, 12
- outerFN, 5
- pagesep, 10, 25
- progbath, 6
- redirect, 24
- runsequence, 6, 16
- shiftFN, 5
- showFilename, 5, 13
- showoutput, 19
- tcbox, 25

- usefancyvrb, 9, 18
- verbose, 26
- vshift, 14, 25
- xindex, 6, 15f

L

- latex (value), 5, 10
- listings (package), 25
- lstOptions (keyword), 19
- \lstinputlisting, 9, 17
- ltx (value), 20
- lua (value), 5
- Lua, 1
- lualatex (value), 5, 10
- luatex (value), 5

M

- \medskipamount, 19
- minipages, 12
- moveToExampleDir (keyword), 25
- mp (value), 5
- mpost (value), 5
- mpsep (keyword), 25
- mpvalign (keyword), 12
- mpwidth (keyword), 12

N

- \NumChar, 3, 5

O

- outerFN (keyword), 5

P

- pagesep (keyword), 10, 25
- Pascal's triangle, 14
- pdflatex (value), 5
- perl (value), 5
- Perl, 1
- pl (value), 5
- png, 2
- progpah (keyword), 6
- py (value), 5
- Python, 1, 3
- python3 (value), 5

R

- redirect (keyword), 24
- \runExtCmd, 19, 24
- runsequence (keyword), 6, 16

S

- shiftFN (keyword), 5
- showFilename (keyword), 5, 13
- showoutput (keyword), 19
- \smallskipamount, 19

- source, 2
- standalone (doc class), 11

T

- tcbox (keyword), 25
- tcolorbox (package), 9, 25
- tex (value), 5
- .txt (file extension), 14

U

- usefancyvrb (keyword), 9, 18

V

- Value
 - false, 14, 25
 - ltx, 20
- \VerbatimInput, 9, 18
- verbose (keyword), 26
- vshift (keyword), 14, 25

X

- xelatex (value), 5
- xetex (value), 5
- xindex (keyword), 6, 15f