

Summary

L^AT_EX

Most useful L^AT_EX syntax and features summarized in one document

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Source code is available at <https://github.com/Martchus/latex-summary>

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1 Document-wide commands

Command	Effect
<code>\documentclass[options]{class}</code>	sets document class (article/report/book/letter/scrartcl...) and related options (10pt...12pt, fleqn/leqno, titlepage/notitlepage, twocolumn/twoside, a4paper/a5paper, draft, landscape)
<code>\usepackage[options]{pkgname}</code>	imports commands from the specified package
<code>\input{file}</code>	includes the specified file
<code>\include{file}</code>	includes the specified file (new page)
<code>\author{val}, \title{val}, \date{val}</code>	sets metadata (used by <code>\maketitle</code>)
<code>\begin{document}, \end{document}</code>	defines boundaries of the actual text

1.1 Important packages

Command	Effect
<code>\usepackage[lng]{babel}</code>	provides <code>\selectlanguage{lng}</code> , <code>\foreignlanguage{lng}{text}</code> which affect commands like <code>\today</code>
<code>\usepackage[latin1/utf8/...] {inputenc}</code>	sets the specified input encoding
<code>\usepackage[T1/...] {fontenc}</code>	sets the specified font encoding
<code>\usepackage{nameref}</code>	provides named references via <code>\nameref{}</code> , see 3.1: Labels/anchors and references
<code>\usepackage{amsmath}</code>	provides 9: Mathematical stuff
<code>\usepackage{caption}</code>	provides <code>\captionof{ }</code> , see 7: Floating environments
<code>\usepackage{xcolor}</code>	provides colors, see 8.2: Colors
<code>\usepackage{hyperref}</code>	provides bookmarks, hyperlinks and PDF specific settings, see also 22: PDF tweaks .
<code>\usepackage{geometry}</code>	allows to set page geometry, see 1.2: Geometry
<code>\usepackage{microtype}</code>	tunes line breaks

1.2 Geometry

With the `geometry` package page geometry can be set using `\geometry{a4paper, left=45mm, ...}`.

Option	Effect
left, right, bottom, top	specify borders
bindingoffset	specifies the binding offset
includehead, includefoot	whether head and foot notes include borders

2 Escaping

The following characters have special meaning and must be escaped: `& % $ # _ { } ~ ^ \`

Character(s)	Escape with
& % \$ # _ { }	backslash, eg. <code>\&</code>
~	<code>\textasciitilde</code>
^	<code>\textasciicircum</code>
\	<code>\textbackslash</code>

Notes

- Defining shortcuts might be useful, eg.: `\newcommand{\bs}{\textbackslash}`
- For including source code, see section 16. For special characters, see section 11.4.
- The following characters mustn't be escaped: `[] () / ! ? * :`
- The following special characters can be used in label/color IDs (*without* escaping): `_ :`
- The character sequences `" " " "` are special [Quotation marks](#) and must be escaped using eg. `"{}"`.

3 Document structure

Command	Effect
<code>\part{title}</code>	level -1 in book and report, level 0 in article
<code>\chapter{title}</code>	level 0 in book and report
<code>\section{title}</code>	level 1
<code>\subsection{title}</code>	level 2
<code>\subsubsection{title}</code>	level 3
<code>\paragraph{title}</code>	level 4
<code>\subparagraph{title}</code>	level 5
<code>\appendix</code>	starts the appendix
<code>\maketitle</code>	generates the cover sheet
<code>\tableofcontents</code>	generates the table of contents (see also 3.2: Manipulate the table of contents)

3.1 Labels/anchors and references

Command	Effect
<code>\label{anchor_id}</code>	defines an anchor
<code>\ref{anchor_id}</code>	prints the index of the specified anchor
<code>\nameref{anchor_id}</code>	prints the name of the specified anchor
<code>\pageref{anchor_id}</code>	prints the page of the specified anchor

It might be useful to combine `\ref` and `\nameref`:

```
\newcommand{\fullref}[1]{\ref{#1}:\~\nameref{#1}}
```

3.2 Manipulate the table of contents

Command	Effect
<code>\section[toc_title]{title}</code>	sets a toc-specific title
<code>\section*{title}</code>	disables index and appearance in toc
<code>\addcontentsline{toc}{section_level}{text_entry}</code>	adds an additional entry

3.3 Manual breaks

- Manual line breaks can be inserted using `\\` or `\newline`. For a line break in a table cell a `\minibox` from the `minibox` package can be used.
- A new paragraph is achieved by inserting an empty line or using the `\par` command.
- A page break can be inserted using `\newpage`.
- A page break can be inserted using `\clearpage` which also forces \LaTeX to print all remaining [7: Floating environments](#).

3.4 Example

```
1 % set document class
2 \documentclass[a4paper,12pt,DIV15]{scrartcl}
3
4 % meta data
5 \title{\LaTeX{} summary}
6 \author{Martchus}
7
8 % package imports
9 % page geometry
10 \usepackage{geometry}
11 \geometry{a4paper,left=20mm,right=20mm,top=20mm,bottom=20mm}
12 % language and hyphenation
13 \usepackage[english]{babel}
```

```

14 \selectlanguage{\english}
15 % text encoding
16 \usepackage[T1]{fontenc}
17 \usepackage[utf8]{inputenc}
18 % colors
19 \usepackage{xcolor}
20
21 % start actual document
22 \begin{document}
23
24 % actual content
25 \maketitle
26 \clearpage
27 \tableofcontents
28 \clearpage
29
30 \section{Section}
31     \subsection{Subsection}
32
33 % close document
34 \end{document}

```

4 Spacing and ellipsis

4.1 Spacing between lines

These commands requires the `setspace` package.

Command	Effect
<code>\singlespacing</code>	sets line spacing to 1.0
<code>\onehalfspacing</code>	sets line spacing to 1.5
<code>\doublespacing</code>	sets line spacing to 2.0
<code>\begin{singlespace},</code> <code>\begin{onehalfspace}, ...,</code> <code>\begin{spacing}{factor}</code>	begins environment with specific line spacing

4.2 Paragraphs

- Spacing can be controlled with `\setlength{\parskip}{spacing}`.
- Indention can be controlled with `\setlength{\parindent}{indent}`.

4.3 Miscellaneous

Command	Effect
<code>\dots</code>	inserts ellipsis: . . .
<code>\hspace{space}</code>	inserts horizontal space
<code>\vspace{space}</code>	inserts vertical space
<code>\hfill</code> <code>\hrulefill</code> <code>\dotfill</code>	horizontal filling
<code>\vfill</code>	vertical filling

5 Alignment

Command/environment	Alignment
<code>flushleft</code>	left
<code>flushright</code>	right
<code>center</code>	center

6 Quotes and footnotes

Command	Effect
<code>\begin{quote} ... \end{quote}</code>	wraps a quote
<code>\footnote{text}</code>	makes a footnote with the specified text

7 Floating environments

Environment	Use
<code>table</code>	to include tables (<code>tabular</code>), see 15.2: Floating tables
<code>figure</code>	to include graphics with <code>\includegraphics</code> , see 14: Graphics
<code>wrapfigure</code>	to include graphics with <code>\includegraphics</code> , allows to have text wrapped around the figure, requires the <code>wrapfig</code> package
<code>subfloat</code>	nested figure, requires the <code>subfig</code> package
<code>\lstlisting</code>	to include source code, see 16: Including source code

7.1 Preferred position

Option	Effect
<code>h</code>	here
<code>t</code>	top of page
<code>b</code>	bottom of page
<code>p</code>	separate page
<code>!</code>	increases the priority

These options can be specified as usual in square brackets and might be combined.

7.2 Useful commands in floating environments

Command	Effect
<code>\centering</code>	centers the environment
<code>\caption[<i>toc_text</i>]{text}</code>	inserts a description for the figure/table/. . .
<code>\label</code>	see 3.1: Labels/anchors and references , must be after the <code>\caption</code> command
<code>\captionof{floating_env_type}[<i>toc_text</i>]{text}</code>	same as <code>\caption</code> but allows to specify the type of the floating environment, requires the <code>caption</code> package

7.3 Parameter

Command	Meaning
<code>\topfraction</code>	fraction for floats at the beginning of a page
<code>\bottomfraction</code>	fraction for floats at the end of a page
<code>\textfraction</code>	minimum fraction for text on a page

Parameters can be changed using eg. `\renewcommand{\topfraction}{0.6}`.

8 Notations

8.1 Units

- `mm`, `cm`, `in` . . . : millimeter, centimeter, inch
- `pt` : Punkt 0.3515 mm
- `pc` : Pica 12 pt
- `cc` : Cicero \approx 4.53 mm
- `ex`, `em` : height of small x, width of capital M
- `\baselineskip` : height of a line

8.2 Colors

- require the package `xcolor`.
- pre-defined colors: `blue` `violet` `green` `red` . . .
- custom colors: `\definecolor{custom_name}{scheme}{values}`
 - schemes: `rgb` `cmyk` `HTML` . . .
 - examples: `\definecolor{red1}{HTML}{AA0000}` `\definecolor{blue1}{rgb}{0.1,0.1,1.0}`
- mixing colors: `red!50` `blue!70!green!50`

9 Mathematical stuff

The `amsmath` package must be included for most commands and environments.

9.1 Environments

Command	Effect
<code>\$ some formula \$</code>	defines an inline formula
<code>\begin{equation} ... \end{equation}</code>	defines a <i>single</i> -line formula block
<code>\begin{align} ... \end{align}</code>	defines an aligned <i>multi</i> -line formula block (one equation tag for each line)
<code>\begin{align} ... \end{align}</code>	defines a non-aligned <i>multi</i> -line formula block (one equation tag for each line)
<code>\begin{multline} ... \end{multline}</code>	defines a non-aligned <i>multi</i> -line formula block (one equation tag for all lines)

9.2 Mathematical notations

Command	Effect
<code>\frac{numerator}{denominator}</code>	fraction: $\frac{\text{numerator}}{\text{denominator}}$
<code>\sqrt[n]{a}</code>	root: $\sqrt[n]{a}$
<code>\cos(45{\circ}) = \cos(\pi/4)</code>	$\cos(45^\circ) = \cos(\pi/4)$
<code>\hat{up} _{down}</code>	$\overset{up}{\downarrow}$
<code>\sum_{n=1}^{12}{f(x_n)}</code>	sum: $\sum_{n=1}^{12} f(x_n)$
<code>\prod ...</code>	product: $\prod ...$
<code>\int ...</code>	integral: $\int ...$
<code>\iint ...</code>	integral of integral: $\iint ...$
<code>\lim ...</code>	limes: $\lim ...$
<code>\left(\right)</code>	scaled brackets (can also be used with <code>{}</code> <code>[]</code> <code>\langle \rangle</code>)
<code>\bs begin{cases} p & p \neq 0 \\ \infty & p = 0 \end{cases}</code>	cases: $\begin{cases} p & p \neq 0 \\ \infty & p = 0 \end{cases}$

9.3 Letters and symbols

Command	Effect
<code>\alpha \beta</code>	greek letters: $\alpha \beta$
<code>\neq \leq \geq</code>	equation signs: $\neq \leq \geq$
<code>\in \notin</code>	(not) in set: $\in \notin$
<code>\infty</code>	infinity: ∞
<code></code>	spacing in size of argument
<code>\mathrm{ }</code>	roman font in formula
<code>\text{ }</code>	regular text in formula
<code>\mathbf{ }</code>	bold text in formula
<code>\mathit{ }</code>	italic text in formula
<code>\mathbb{N C R}</code>	math bold: \mathbb{NCR} , requires <code>asmfonts</code> package
<code>\leftarrow \rightarrow</code>	
<code>\longleftarrow \leftrightarrows</code>	arrows: $\leftarrow \rightarrow \longleftrightarrow \overleftrightarrow{x}$
<code>\overrightarrow{x}</code>	

9.4 Spacing

Command	Space
<code>\, \thinspace</code>	$\rightarrow \leftarrow$
<code>\: \medspace</code>	$\rightarrow \leftarrow$
<code>\; \thickspace</code>	$\rightarrow \leftarrow$
<code>\enskip</code>	$\rightarrow \leftarrow$
<code>\quad</code>	$\rightarrow \leftarrow$
<code>\qquad</code>	$\rightarrow \leftarrow$
<code>\! \negthinspace</code>	$\rightarrow \leftarrow$
<code>\negmedspace</code>	$\rightarrow \leftarrow$
<code>\negthickspace</code>	$\rightarrow \leftarrow$

10 Hyphenation

- Automatic hyphenation can be prevented using `\sim` or `\mbox{ }`.
- Manual hyphenation can be inserted with `\-`.
- Global hyphenation rule can be defined using `\hyphenation{ }`, eg. `\hyphenation{hyphen-ate}`.

10.1 Hypens, dashes

Notation	Dash
-	hyphen -
\textendash	dash –
\$-\$	minus sign —

11 Font

11.1 Family and style

Command	Effect
\rmfamily, \tesubsubsectionxtrm{ }	roman
\sffamily, \textsf{ }	sans-serif
\ttfamily, \texttt{ }	typewriter
\scshape, \textsc{ }	small-caps
\itshape, \textit{ }	<i>italic</i>
\bfseries, \textbf{ }	bold
\fontfamily{family}\selectfont	specifies font family of following text

11.1.1 Overriding defaults

Variable	Default	Activated by
\familydefault	\rmdefault	\normalfont, \textnormal{ }
\rmdefault	cmr	\rmfamily, \textrm{ }
\ttdefault	cmtt	\ttfamily, \texttt{ }
\scdefault	cmss	\sffamily, \textsf{ }
\seriesdefault	m	\normalfont, \textnormal{ }
\mddefault	m	\mdseries, \textmd{ }
\bfdefault	bx	\bfseries, \textbf{ }

The listed variables might be overridden with `\renewcommand{\variable}{\newvalue}`, eg.:

Command	Effect
\renewcommand{\rmdefault}{\pbk}	sets the default roman font to <i>Bookman</i> (pbk)
\renewcommand{\familydefault}{\sfdefault}	sets the general default font to the default sans-serif font

11.1.2 Setting fonts with packages

Package	Text font	Sans	Typewriter	Math
<i>none</i>	CM Roman	CM SansSerif	CM Typewriter	CM Roman
<i>mathpazo</i>	Palatino			≈Palatino
<i>mathptmx</i>	Times			≈Times
<i>helvet</i>		Helvetica		
<i>avant</i>		Avant Garde		
<i>courier</i>			Courier	
<i>chancery</i>	Zapf Chancery			
<i>bookman</i>	Bookman	Avant Garde	Courier	
<i>newcent</i>	New Century Schoolbook	Avant Garde	Courier	
<i>charter</i>	Charter			

11.1.3 Common font family names

Abbreviation	Font name
<i>cmr</i>	CM Roman
<i>ppl</i>	Palatino
<i>ptm</i>	Times Roman
<i>pzc</i>	Zapf Chancery
<i>pbk</i>	Bookman
<i>phv</i>	Helvetica

11.2 Size

Command	Effect
<code>\tiny</code>	tiny font (5 pt)
<code>\scriptsize</code>	very small font (7 pt)
<code>\footnotesize</code>	quite small font (8 pt)
<code>\small</code>	small font (9 pt)
<code>\normalsize</code>	normal font (10 pt)
<code>\large</code>	large font (12 pt)
<code>\Large</code>	larger font (14.4 pt)
<code>\LARGE</code>	very large font (17.28 pt)
<code>\huge</code>	huge font (20.74 pt)
<code>\Huge</code>	largest font (24.88 pt)

11.3 Color

Command	Effect
<code>\color{color}</code>	sets the color
<code>\normalcolor</code>	resets the color
<code>\textcolor{color}{text}</code>	sets the color of the specified text
<code>\pagecolor{color}</code>	sets the page background color

11.4 Special characters

11.4.1 Quotation marks

Notation/command	Description
<code>\glqq</code>	German left quote (double) „
<code>\grqq</code>	German right quote (double) “
<code>\glq</code>	German left quote (single) ‚
<code>\grq</code>	German right quote (single) ’
<code>\frqq</code>	French left quote (double) »
<code>\flqq</code>	German right quote (double) «
<code>\frq</code>	French left quote (single) ›
<code>\flq</code>	German right quote (single) ‹
‘‘	English left quotes (double) “
’’	English right quotes (double) ”
”“	German left quote (double) „
””	German right quote (double) “

Notes

- Short notations for German quotes require German language via `babel` package.
- For escaping quotation marks see [2: Escaping](#).

11.4.2 Miscellaneous

- with `textcomp` package: `\textcopyright` ©, `\texttrademark` ™, `\textcelsius` °C, `\texteuro`, . . .
- official €-symbol with `\usepackage[official,right]{eurosym}`: `\euro`, `\EUR{123,45}`
- with `pifont` package: `\ding{sym_num}`, `\Pisymbol{sym_font}{sym_num}`
- using inline math environment: `$ \rightarrow \leftrightharrow $` →↔, see also section [9.3](#)
- see also [2: Escaping](#)

11.5 Sections, paragraphs, ...


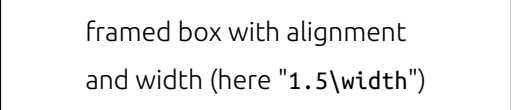

These commands require the `sectsty` package.

Command	Effect
<code>\allsectionsfont{any_latex_cmd}</code>	allows to set font family/style for all sections
<code>\subsectionfont{any_latex_cmd}</code> , <code>\paragraphfont{any_latex_cmd}</code> , ...	allows to set font family/style for subsections, paragraphs, ...

12 Enumerations


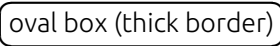

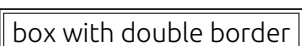
Command	Effect
<code>\begin{itemize} ... \end{itemize}</code>	defines enumeration block <i>without</i> numbering
<code>\begin{enumeration} ... \end{enumeration}</code>	defines enumeration block <i>with</i> numbering (use of <code>\label</code> is possible)
<code>\begin{description} ... \end{description}</code>	defines a descriptive enumeration block
<code>\setlength\itemsep{spacing}</code>	controls spacing between items
<code>\item[icon/description]</code>	starts an item with the specified icon/description in case of <code>itemize/description</code>

13 Boxes, frames

Command	Effect
<code>\fbox{text}</code>	
<code>\mbox{text}</code>	simple unframed box
<code>\framebox[width][alignment]{text}</code>	
<code>\makebox[width][alignment]{text}</code>	unframed box with alignment and width (here "1.5\width")
<code>\colorbox{bg_color}{text}</code>	unframed box with background color
<code>\colorbox[frame_color]{bg_color}{text}</code>	framed box with colored background and frame
<code>\minibox{text}</code>	unframed box which allows manual line breaks (requires <code>minibox</code> package)
<code>\rule[vertical_offset]{width}{height}</code>	 (invisible) padding (when either <code>width</code> or <code>height</code> is zero)

13.1 fancybox

These commands require the `fancybox` package.

Command	Effect
<code>\ovalbox{text}</code>	
<code>\Ovalbox{text}</code>	
<code>\shadowbox{text}</code>	
<code>\doublebox{text}</code>	
<code>\cornersize{corner_size}</code>	manipulates the corner size
<code>\raisebox{raise}{text}</code>	allows to raise and to lower (negative raise)
<code>\underline{text}</code>	<u>underline</u>
<code>\underbar{text}</code>	<u>underbar</u> <u>underline and underbar</u>

13.2 Minipages

Allow side by side positioning; can be used withing float environment; require the minipage package.

Command	Effect
<code>\begin{minipage}[vert_align]{width} ... \end{minipage}</code>	defines minipage

Vertical alignment either t, c or b for top, center or bottom subsection

Width use eg. `0.5 \textwidth` for 50 % of the available width

14 Graphics

With PDF_{TEX} *.pdf, *.jpg and *.png files can be included with `\includegraphics[options]{image}`. For floating graphics see [7: Floating environments](#).

Option	Note
<code>viewport=x1 y2 x2 y2, clip</code>	cropping (in $\frac{1}{72}$ inch, relative to bottom left corner)
<code>scale=</code>	scales the image by the specified factor
<code>width=, height=</code>	specifies the size
<code>angle=</code>	specifies the rotation angle (counterclockwise)

14.1 Annotations

Graphics can be annotated using the `overpic` environment of the `overpic` package.

Listing 1: Annotation example

```

1 \begin{overpic}[tics=10,height=7cm]{robot}
2   \put(80 ,32){detector}
3   \put(87 ,36){\vector(-1,4){1.5}}
4   \put(50 ,18){source}
5   \put(77 ,19){\vector(1,0){7}}

```

```

6   \put(15 ,50){valve}
7   \put(30 ,50){\vector(1, -1){5}}
8   \put(19 ,13){\small A1}}
9 \end{overpic}

```

14.2 Drawings

Drawings can be created with the `picture` environment. The package `tikz` provides extended features. Functions can be drawn with GNU Plot.

15 Tables

For basic tables no packages need to be included. However the packages `tabularx`, `array` and `longtable` provide extended features.

Command

```
\begin{tabular}[position]{column_declarations}
... \end{tabular}
```

```
\begin{tabular*}{width}[position]{column_declarations}
... \end{tabular*}
```

```
\begin{array}[position]{column_declarations}
... \end{array*}
```

```
\begin{tabbing}
... \end{tabbing}
```

```
\begin{longtable}[position]{column_declarations}
... \end{longtable}
```

```
\listoftables
```

```
\multicolumn{count}{position}{content}
```

```
\cline{start_col-end_col}
```

Effect

defines a table

defines a table with the specified width

defines a table (for formulas)

defines a tabulator-based table

defines a table which is able to expand multiple pages (can not be used in a floating environment)

prints the list of tables

allows content to span multiple columns

inserts a horizontal line which spans multiple columns

15.1 Column definitions

Syntax	Description
<code>l, r, c</code>	specifies the alignment
<code>p{width}</code>	specifies width
<code> </code>	defines vertical line between columns
<code>@{col_divider}</code>	sets the column divider
<code>*{count}{definition}</code>	inserts <code>definition</code> <code>count</code> times

Listing 2: Example table

```
1 \begin{tabular}{|lcr|}
2   \hline
3   Color & Shape & Number \\
4   red & rect & 100 \\
5   blue & circle & 99 \\
6   \hline
7 \end{tabular}
```

Listing 3: Example tabulator-based table

```
1 \begin{tabbing}
2   Distributions: \ \= Column 1 \= Column 2 XX\kill \\
3   Distributions: \> Name \= Packaging system \\
4                 \> Arch Linux \= pacman \\
5                 \> Debian \= APT
6 \end{tabbing}
```

15.2 Floating tables

Command	Effect
<code>\begin{table} ... \end{table}</code>	defines a floating environment for embedding the actual table
<code>\centering</code>	sets alignment of the <code>table</code> environment to center
<code>\caption</code>	specifies the caption of the floating table
<code>\label</code>	defines an anchor referring to the floating table

Remarks The `table` environment defines only the floating element. The actual table is still defined using the `tabular` environment.

16 Including source code

The `lstlisting` environment and associated commands require the `listings` package.

Command`\begin{verbatim} ... \end{verbatim}``\begin{lstlisting}[options] ... \end{lstlisting}``\lstinputlisting[options]{file}`**Effect**ignores \LaTeX syntax, sets typewriter fontadvanced version of `verbatim`, see [16.1: `lstlisting` options](#)same as `lstlisting` environment, but allows including an external file

16.1 `lstlisting` options

Option**Example/values****Description**`caption=``{Some C++ code}`

caption (with number)

`label=``{anchor_name}`defines an anchor, see [3.1: `Labels/anchors and references`](#)`title=``{More C++ code}`

caption (without number)

`language=``{[Visual]C++}/[LaTeX]tex}`

programming language

`breaklines=``true/false`

enables/disables line breaks

`basicstyle=``{\ttfamily\footnotesize}`

defines the basic style

`keywordstyle=``{\color{blue}}`

sets the style of keywords

`commentstyle=``{\color{green}}`

sets the style of comments

`stringstyle=``{\color{brown}}`

sets the style of string literal

`backgroundcolor=``{\color{yellow}}`

sets the background color

`frame=``none/leftline/topline/
bottomline/lines/shadowbox`

specifies the appearance of the frame

`numbers=``left/right`

enables line numbers

`inputencoding=``latin1`

specifies the input encoding

`float=`see [7.1: `Preferred position`](#)

enables floating

17 Bibliography

17.1 Manual bibliography

Command`\begin{thebibliography}{abbr_length}
... \end{thebibliography}`**Effect**

defines a manual bibliography

`\bibitem{key} title of book, author ...`

starts an item

17.2 Automatically generated bibliography

Command	Effect
<code>\bibgraphystyle{style_file}</code>	sets the bibliography layout, see 17.2.1: Styles
<code>\bibliography{bib_file1, bib_file2, ...}</code>	makes the bibliography
<code>\cite[text]{key}</code>	reference to bibliography entry with <i>text</i>
<code>\nocite{key1, key2}</code>	ensures the specified entries occur in the bibliography without producing a reference
<code>\nocite{*}</code>	ensures all entries occur in the bibliography without producing any references

17.2.1 Styles

Name	Note
<code>plain</code>	alphabetical order, numeric marks
<code>unsrt</code>	sorted by the occurrence of references, numeric marks
<code>alpha</code>	alphabetical order, marks with author and year
<code>natdin</code>	alphabetical order, marks with full author name and year according DIN 1505 part 2 (requires <code>natbib</code> package)

17.2.2 *.bib-File example

```
@book{ entry_id,
  author = {Goossens, Michel and Mittelbach, Frank},
  title = {Der LaTeX-Begleiter},
  publisher = {Pearson Studium},
  address = {M{"\{u}nchen},
  year = {2005},

  ...
}
```

```
@article{ entry_id,
  author = {Neubauer, Marion},
  title = {Mikrotypographie-Regeln, Teil 1},
  journal = {Die TeXnische Kom{o}die},
  number = {4},
  pages = {23-40},
  year = {1996},

  ...
}
```

Other entry classes `@booklet`, `@conference`, `@manual`, `@masterthesis`, `@misc`, `@string{abbreviation_id = "Text"}`, ...

17.2.3 Compilation steps

1. `pdflatex`: generates *.aux-file (for `\cite`-commands)
2. `bibtex`: generates *.bbl-file (from *.aux- and *.bib-file)
3. `pdflatex`: can now generate bibliography (from *.bbl-file)
4. `pdflatex`: can now generate references to bibliography

18 Index

These commands require the `makeidx` package and `\makeindex` in the header.

Command	Effect
<code>\printindex</code>	prints the index
<code>\index{index_entry}</code>	defines an index entry, see 18.1: Syntax

18.1 Syntax

Symbol	Effect
@	divides <i>key</i> and <i>entry</i> , eg. <code>\index{key@entry}</code> (<i>entry</i> is sorted by <i>key</i>)
!	divides main entry and secondary entry, eg. <code>\index{main_entry!sec_entry}</code>
	starts command which is applied to page number, eg. <code>\index{important textbf}</code>
(...)	starts/ends page range, eg. <code>\index{entry { }... \index{entry })</code> → key, 7-9
"	escape character, eg. <code>\index{"@}</code> → @, 5

18.2 Compilation steps

1. `pdflatex`: generates *.idx-file (for `\index`-commands)
2. `makeindex`: generates *.ind-file (from *.idx- and *.ist-file)
3. `pdflatex`: can now generate index

19 Nomenclature/symbol table

These commands require the `nomencl` package and `\makenomenclature` in the header.

Command	Effect
<code>\printnomenclature</code>	prints the nomenclature
<code>\nomenclature{symbol}{description}</code>	defines a symbol

19.1 Compilation steps

1. `pdflatex`: reads `\nomenclature`-commands
2. `nomencl`: generates *.nls and *.ilg files
3. `pdflatex`: can print nomenclature

20 Customization

20.1 Commands

Command	Effect
<code>\newcommand{\cmd_name}[arg_count]{cmd_content}</code>	defines a new command
<code>\renewcommand{\cmd_name}[arg_count]{cmd_content}</code>	redefines an existing command

20.2 Environments

Command	Effect
<code>\newenvironment{\env_name}{begin_env_code}{end_env_code}</code>	defines a new environment

20.3 Counter

Command	Effect
<code>\newcounter{counter_name}</code>	defines a new counter which is initialized with 0
<code>\arabic{counter_name}</code>	prints the counter value with Arabic digits
<code>\roman{counter_name}</code>	prints the counter value with Roman digits
<code>\value{counter_name}</code>	returns the counter value
<code>\setcounter{counter_name}{value}</code>	assigns the counter to the specified value
<code>\addtocounter{counter_name}{value}</code>	increments the counter by the specified value
<code>\stepcounter{counter_name}</code>	increments the counter by one

20.4 Lengths

Command	Effect
<code>\setlength{\length_name}{length}</code>	defines a new length
<code>\addtolength{\length_name}{length_increment}</code>	increments the specified length
<code>\settowidth{\length_name}{some_text}</code>	defines a new length with the length of the specified text

20.5 Comparison operations

Requires the `ifthen` package.

Usage `\ifthenelse{condition}{"true" branch}{"false" branch}`,
eg. `\ifthenelse{\value{c1} > \value{c2}}{$c1 > c2}{$c1 \le c2}`

Loops `\whiledo{condition}{code}`

20.6 Document classes

Create *.cls file, eg.

```
\ProvidesClass{myclass}[desc]
\LoadClassWithOptions[a4paper,ngerman,twoside]{article}
\RequiredPackage[ansinew]{inputenc}
\RequiredPackage[T1]{fontenc}
\RequiredPackage[ngerman]{babel}
\RequiredPackage{xcolor,graphics}
```

20.7 Packages

Create *.sty file, eg.

```
\ProvidesPackage{mypackage}[desc]
\newenvironment{...}{...}{...}
\newcommand{...}[...]{...}
...
```

21 Koma-Script

Bundles various classes and packages for European layout.

21.1 Classes

Default class **Koma-Script class**

article	scrartcl
report	scrreprt
book	scrbook
letter	scrlettr

21.2 Packages

Packages **Provides**

```
\scrdate    \todaysname, \nameday{name}
\scrttime    \thistime[separator]
```

22 PDF tweaks

The following commands are PDF specific and require the `hyperref` package which should be loaded as last package.

22.1 PDF specific configuration (example)

```
1 \hypersetup{%
2    pdfauthor={The author},
```



```

3 pdftitle={The title},
4 pdfsubject={The subject},
5 pdfkeywords={keyword1, keyword2, ...},
6 pdfstartview={FitV},
7 pdfview={FitH},
8 pdfpagemode={FullScreen},
9 colorlinks={true/false},
10 urlcolor={some\_color},
11 backref={true/false}
12 }

```

22.2 Links and bookmarks

Command

`\href{url}{text}`

`\url{url}`

`\pdfbookmark[level]{text}{anchor_id}`

Effect

makes a [link](#) with the specified text and url

make a link with the specified url which is also used as link text

inserts a PDF bookmark

Note [Escaping](#) of # and ~ is not necessary.

22.3 PDF inclusion

Can be done with the `\includepdf[options]{document_name}` command which requires the `pdfpages` package.

Option

Specifies

`pages` the pages to be included, eg. `pages={2-4; 10}`

`nup` the number of (included) pages on one page, eg. `nup=xyy`

`landscape` whether landscape layout is used (`true` or `false`)

23 Presentations

- document class: `beamer`
- each page is embedded in `\frame{content}` or `frame` environment
- presentation structure is defined using `\section[long_heading]{TOC_heading}`, `\subsection[]{}...`

Command

`\frame`

`\frametitle{title}`

`\titlepage`

Effect

wraps a page

sets the frame title

makes the title page

24 Further information

Full \LaTeX documentation is available at the [CTAN \(Comprehensive TeX Archive Network\) website](#).