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Introduction to LaTeX

Extra

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- New commands
- Dimensions / counters
- More Packages
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Creating commands

- For sequences of commands frequently used, use it is a good idea to write your own command.
- This saves time and prevents errors
- Define (in the preamble or separate file) your new commands:
- `\newcommand{\nameOfCommand}[numberOfInputs]{sequences}`
  Once you defined your command, you can use it as any other command:
  - `\newcommand{\water}{H$_2$O}`
    The formula for water is \water.

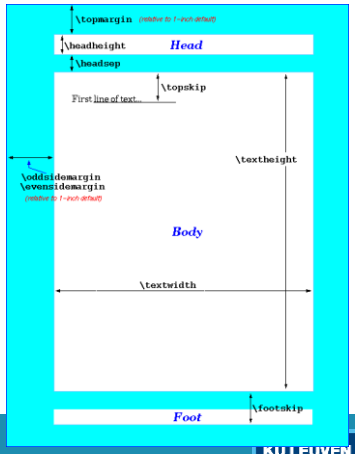
Creating commands

- New commands may be defined or redefined under LaTeX with:
- `\newcommand{\NewName}{def}`
- `\renewcommand{\Name}{def}`
- The first version is used to define a command that does not yet exist, the second version is used to redefine a command that already exists.
- Passing parameters is possible
- *File: demo_newcommand_01.tex*
- *File: demo_newcommand_02.tex*

Use of lengths

- Many predefined lengths. These definitions can be overriden with \setlength:
- `\setlength{\lengthname}{value_in_specified_unit}`

Length	Description
\baselineskip	Vertical distance between lines in a paragraph
\columnsep	Distance between columns
\columnwidth	The width of a column
\evensidemargin	Margin of even pages, commonly used in two-sided documents such as books
\linewidth	Width of the line in the current environment.
\oddsidemargin	Margin of odd pages, commonly used in two-sided documents such as books
\paperwidth	Width of the page
\paperheight	Height of the page
\parindent	Paragraph indentation
\parskip	Vertical space between paragraphs
\tabcolsep	Separation between columns in a table (tabular environment)
\textheight	Height of the text area in the page
\textwidth	Width of the text area in the page
\topmargin	Length of the top margin



Length units

Abbreviation	Value
pt	a point is approximately 1/72.27 inch, that means about 0.0138 inch or 0.3515 mm (exactly point is defined as 1/864 of American printer's foot that is 249/250 of English foot)
mm	a millimeter
cm	a centimeter
in	inch
ex	roughly the height of an 'x' (lowercase) in the current font (it depends on the font used)
em	roughly the width of an 'M' (uppercase) in the current font (it depends on the font used)
mu	math unit equal to 1/18 em, where em is taken from the math symbols family

https://www.sharelatex.com/learn/Lengths_in_LaTeX

Lengths

- lengths can not only be set to any desired value, they can also be used as units to set the dimensions of other LaTeX elements.
- `\includegraphics[width=0.2\textwidth]{fiets.jpg}`
- Other possible setting method
  `\addtolength{\textwidth}{2in}`

- http://www.eng.cam.ac.uk/help/tpl/textprocessing/squeeze.html
- http://en.wikibooks.org/wiki/LaTeX/Lengths

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Hands-on

- Use demo_margin_01
- Change \textwidth to 7 cm
- Make the text width negative via \setlength{\textwidth}{-14cm}
- What happens if a very large textwidth is used via \setlength{\textwidth}{100cm}?

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Counter

- Counters are used to keep the right number attached to equations, pages, theorems, etc.
- Increase the value of the counter by number

```
\addtocounter{CounterName}{number}
```

- Set the counter value explicitly

```
\setcounter{CounterName}{number}
```

- Display the value of the counter

```
\theCounterName
```

- *File: demo_counter.tex*

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counters

Usage	Name
For document structure	part chapter section subsection subsubsection paragraph subparagraph page
For floats	equation figure table
For footnotes	footnote mpfootnote
For the enumerate environment	enumi enumii enumiii enumiv

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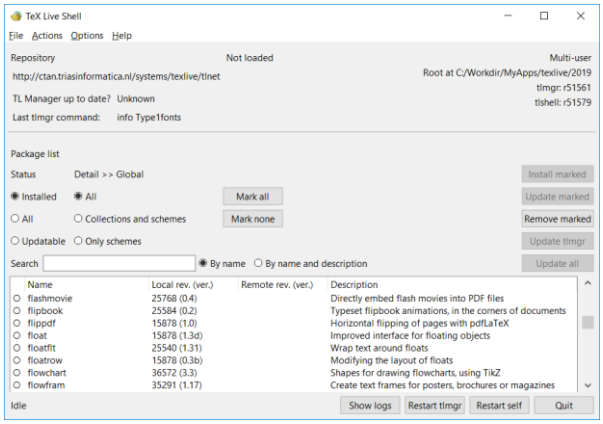

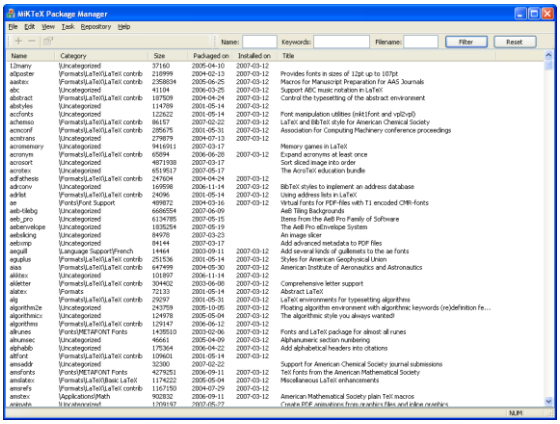

http://en.wikibooks.org/wiki/LaTeX/Packages

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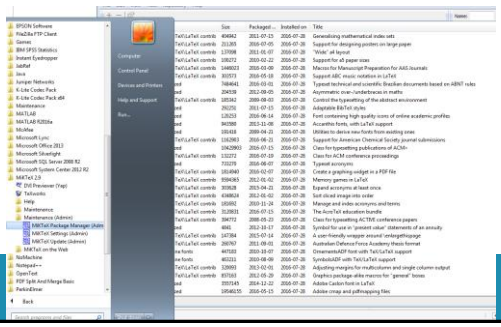
Packages

- Packages are used to alter or add features to the basic LaTeX behavior
- Finding and configuring packages usually requires some mojo (and Google)
  - Some packages will extend existing functions.
  - Some packages will add extra functions.
- Check under MikTex, TeXLive



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Packages

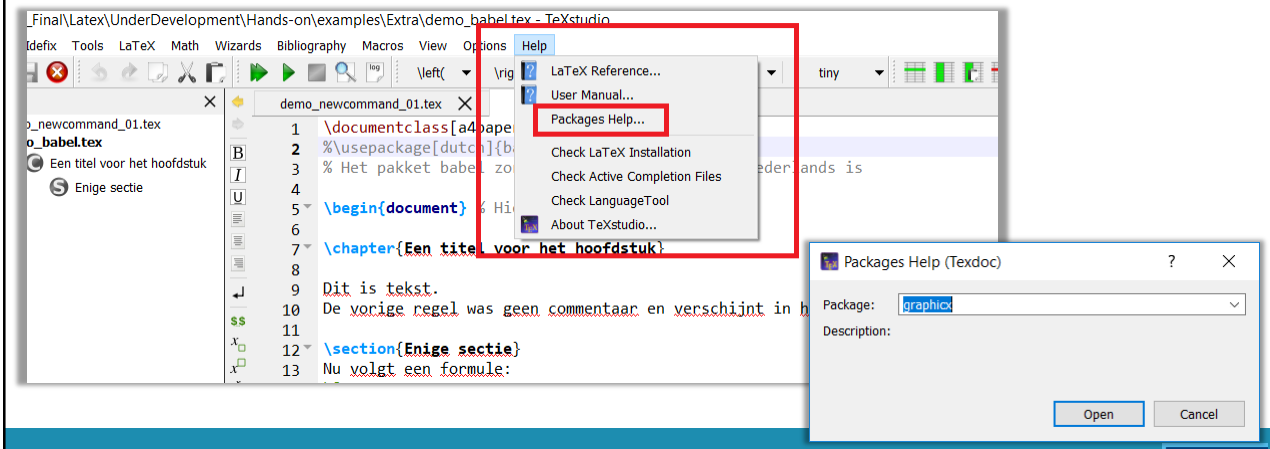
- basic LaTeX cannot solve all your problems.
  - If you want to include graphics, colored text or source code from a file into your document, you need to enhance the capabilities of LaTeX.
- Packages are activated with
  - `\usepackage[`*`options`*`]{`*`package`*`}`
  - *package* is the name of the package
  - *options* is a list of keywords that trigger special features in the package.

Package documentation

- most package documentation is provided as a PDF file
- If installed on your system, use `texdoc`
  - command prompt: `texdoc` followed by the name of the package.
  - `texdoc datetime`
  - Or via texdoc online website http://texdoc.net/
- if the documentation is not installed on your system, check CTAN. You can either navigate your way via
  - http://tug.ctan.org/ or
  - http://tug.ctan.org/pkg/*name*
    where *name* is the name of the package

Package documentation

- TeXstudio provides an entry for documentation



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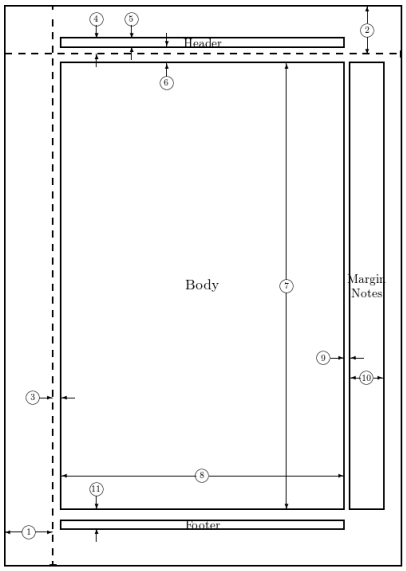
geometry

- `geometry` offers a simple way to change the length and layout of different elements such as the paper size, margins, orientation, etc.
- `\usepackage[letterpaper, landscape, margin=2in]{geometry}`
- See also https://nl.sharelatex.com/learn/Page_size_and_margins



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fancyhdr

- Package `fancyhdr`
- Invoke the `\pagestyle{fancy}`
- Header
  `\lhead{`*text*`}`, `\chead{`*text*`}`, and `\rhead{`*text*`}` will place text justified on the left, center, and right
- By default, the left header will be the section number and section title of the current page.
- Footer
  `\lfoot{`*text*`}`, `\cfoot{`*text*`}`, and `\rfoot{`*text*`}` will place text justified on the left, center, and right

fancyhdr

- Arguments to be used
- `\leftmark` name of current chapter.
- `\rightmark` name of current section.
- `\markboth` name of chapter, same as appearing in toc.
- `\markright` name of section, same as appearing in toc.
- `\thepage` page number.
- `\thechapter` current chapter number.
- `\thesection` current section number.
- *File: demo_fancyhdr_01.tex*

listings

- Use the `verbatim` package

```
\begin{verbatim}
your
code
example
\end{verbatim}
```

- Use the `listings` package
  - Code formatting can be tweaked
- *File: demo_listings.tex*

color

- Easiest way: use the package `color` or `xcolor`.
  - Both packages provide a common set of commands for color manipulation. `xcolor` is more flexible and supports a larger number of color models.
  - You can create your own colors. Check the documentation.
- The background color of the entire page can be easily changed with `\pagecolor`.
- *File: demo_xcolor_1.tex*

todonotes / cooltooltips

- todonotes
  - Add all the todos, create a list
  - *File: demo_todonotes.tex*
- cooltooltips
  - `\cooltooltip[<popup color>][<linkcolor>]{<subject>}{<message>}{<url>}{<tooltip>}{<text>}`
  - prints a box of color <link color> around <text>. Additionally, a popup of color <popup color> is displayed with a title <subject> and text <message> Hovering over <text> also brings up the tooltip <tooltip> and clicking the link takes you to <url>.
  - *File: demo_cooltooltips.tex*

endfloat

- Some journals require that tables and figures be separated from the text.
- The `endfloat` package moves all the figures and tables to the end of the document.
- `\usepackage{endfloat}`
- `\usepackage[nomarkers,tablesfirst,notablist]{endfloat}`
- *File: demo_endfloat.tex*

floatrow

- Center the float objects by default
- `\usepackage{floatrow}`

- Check endfloat example: demo_endfloat.tex
  - Use / skip the `floatrow` package and check the result
  - Rem. `floatrow` and `endfloat` interact, put `floatrow` first and `endfloat` after it

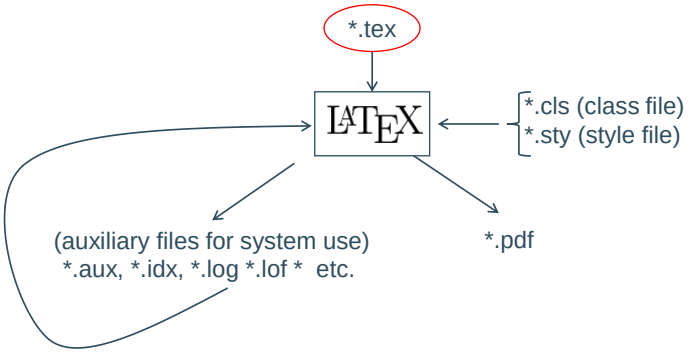
Common errors

- Preamble errors
- Missing or incorrect placement of }
- Blank lines or other spacing issues in math mode
- Forgetting about special characters, like $, %, & and quotation marks
- Misspelled environment or macro names
- Incorrect use of options or improper structure for an environment or macro
- Incorrect reference for numbering
- Mismatching braces, environments, “whatever”
- Schwartz: The art of LATEX problem solving, TUGboat, Volume 26 (2005), No. 1

Troubleshooting

- Insert ***\end{document}*** before the line with errors and move it further down the document until you identify the problem.
  Cody Chiuzan - http://people.musc.edu/~elg26/teaching/statcomputing.2013/statcomputingI.2013.htm
- Remove all auxiliary files

What do the file extensions mean?



LaTeX files

- .tex source file
- .cls class file
- .sty package/style file
- .log a log file
- .aux auxiliary file
- .toc table of contents file
- .lot a list of tables file
- .lof a list of figures file

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LaTeX files

- .bib denotes a BibTeX source file. Such files contain the database from which the .bbl bibliography file is generated.
- .bst BibTeX style file
- .bbl LaTeX bibliography file
- .blg BibTeX log file.
- .idx MakeIndex index source file
- .ind LaTeX index file
- .ilg MakeIndex log file.

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