The very short guide to typesetting with LaTeX

What's this all about? What's LaTeX?

LaTeX is a document preparation system which uses the TeX typesetting program. It enables you to produce publication-quality documents with great accuracy and consistency. LaTeX works on any computer and produces industry-standard PDF. It is available both in free (open-source) and commercial implementations. LaTeX can be used for any kind of document, but it is especially suited to those with complex structures, repetitive formatting, or notations like mathematics[1]; or where technical stability, dimensional accuracy, or a persistent and non-proprietary file format are needed. Install the software from www.tug.org/texlive/ or buy a commercially-supported version from one of the vendors (see the list on p. 3).

Creating and typesetting your document

1. Create your document using any suitable plain-text editor with LaTeX controls, eg *TeXshop* (Mac), *TeXMaker* (Win), *Kile* (Linux), *Emacs* (all), even *vi*!
2. Save the file with a name ending in `.tex` (*never* use spaces in filenames!);
3. Use the Build or Compile toolbar button or menu item in your editor to typeset and display the document;
4. Make any changes needed in your original document and repeat step 3.

Syntax (how to type LaTeX commands — these are the rules)

- **All LaTeX commands begin with a backslash**.
  Example: `\tableofcontents`
- **If a command needs text to work with, it goes in curly braces**.
  Example: `\title{Irisches Tagebuch}\author{Heinrich Böll}`
- **If options are used, they go in square brackets before the curly braces**.
  Example: `\documentclass[a4paper,11pt]{book}`
- **Spaces after commands *without* braces get suppressed**.
  Example: `Copyright \copyright␣2016` ➡ Copyright © 2016 ✗
  To prevent this, put empty curly braces after the command:
  Example: `Copyright \copyright{}␣2016` ➡ Copyright © 2016 ✓
- **Curly braces are also used to restrict the scope of effects inside them**.
  Example: `Some {\tiny little} word` ➡ Some little word

Note. This guide shows only a tiny fraction of LaTeX's power. For more information, visit the TeX Users Group site (www.tug.org). For help, see the FAQ (www.tex.ac.uk/faq), StackExchange (tex.stackexchange.com), or the Usenet newsgroup comp.text.tex. For packages (plugins), use CTAN, the Comprehensive TeX Archive Network (www.ctan.org). For further details, see *Formatting Information* (Flynn, 2016) and other online resources.

---

[1]For reasons of space this guide does not cover details of mathematics typesetting.

Writing a LaTeX document

1 Basic document structure

Here's the skeleton of a LaTeX document. These three lines are COMPULSORY: your document will not work without them:

```
\documentclass[11pt]{article}
  your Preamble goes here (extra setups, if any)
\begin{document}
  your document text goes here
\end{document}
```

New material in each example is shown in blue; material from previous examples is in black. Comments and mnemonics are in red.

- 🖝 The document class name MUST be one of the standard book, article, or report, or one of the many others preinstalled or downloadable (eg thesis, memoir, etc);
- 🖝 There are body type size options 10pt (the default), 11pt, and 12pt;
- 🖝 There are paper size options including a4paper (210 mm×297 mm) and letterpaper (8½″×11″) [see below].

2 Front matter

The **Preamble** [see above] is where you specify any **packages** (LaTeX plugins like typefaces or special formatting), and where you put any changes to standard features.

```
\documentclass[a4paper,11pt]{book}
\usepackage{charter,graphicx}
\setlength{\parindent}{1em}
\begin{document}
\title{your document title}
\author{your name}
\date{date of publication}
\maketitle
\begin{abstract}
  the paragraphs of your abstract go here
\end{abstract}
\tableofcontents
  the text of your document goes here
\end{document}
```

The title, author, and date MUST be followed by the \maketitle command to be formatted correctly.

3 Body matter

Leave a blank line between paragraphs as you type: this signals a new paragraph. Spacing is controlled by the document class and packages you use. For an unindented, line-spaced style, use the parskip package.

3.1 Sectioning: Sections get numbered automatically in bold type, and get included in the Table of Contents (if you use it). Numbering can be turned off selectively. Section heading layout can be modified with the sectsty, titlesec, and other packages.

```
  (Preamble, titling, and abstract as above)
\tableofcontents
\chapter{heading of a chapter}
  text for the chapter goes here
...as shown in section \ref{blah}.
\section{heading of a section}
\label{blah}   make up name for the label
  text for the section goes here
\chapter{heading of a new chapter}
  text for the new chapter goes here
\end{document}
```

3.2 Lists: There are three types of list: **itemized** (bulleted), **enumerated** (numbered or lettered), and **descriptive** (topic-and-explanation format).

Like document, these are all **environments**, using \begin{...} and \end{...}.

```
\begin{itemize}         \begin{enumerate}        \begin{description}
  \item 1lb Sugar         \item Mix ingredients     \item[Fudge] is fun...
  \item ½pt Cream         \item Boil to 112°C       \item[Broccoli] sucks...
  \item Chocolate         \item Stir and cool       \item[Exercise] is good
  \item 2oz Butter        \item Pour into dish        for you if taken daily
\end{itemize}           \end{enumerate}          \end{description}
```

• 1lb Sugar • ½pt Cream • Chocolate • 2oz Butter	1. Mix ingredients 2. Boil to 112°C 3. Stir and cool 4. Pour into dish	**Fudge** is fun but fattening if made too often. **Broccoli** sucks, period. **Exercise** is good for you if taken daily and not to extremes.

You can nest lists inside each other. Use the enumitem package to control list formatting.

3.3 Tables and figures: These environments **float** (to fit available space). They have `\caption` and `\label` commands.

```
\begin{figure} (see below)
\caption{Swiss and Dutch Mennonite
 migrations of the 1700s and 1800s}
\label{lmig}
\centering (centre the contents)
\includegraphics[width=.8\columnwidth]
 {menno-a}\\ (double backslash for linebreak)
\scriptsize Courtesy of Paul C. Adams,
Department of Geography and the
Environment, University of Texas at
Austin.
\cite{adams}\end{figure}
```

Graphics MUST be EPS files for standard LaTeX, but JPG, PNG, or PDF for pdfLaTeX.

```
\begin{table}
 \caption{Mean growth rate and intakes
  of supplement, milk, and water for 4
  diets (after Sherington, J, undated)}
 \label{dietgrowth}
 \centering
```

```
\begin{tabular}{|l|r|r|r|r|}
\hline (horizontal line between rows)
 &Growth&Supplement&Milk&Water
 \\\hline (double backslash for new row)
 Supplement&rate&intake&intake&intake
 \\\hline
 &(g/day)&(g/day)&(ml/kg$^{0.75}$)&
  (ml/kg$^{0.75}$)\\\hline
 Lucerne&145&450&10.5&144\\\hline
 Sesbania&132&476& 9.2&128\\\hline
 Leucaena&128&364& 8.9&121\\\hline
 None   & 89& 0& 9.8&108\\\hline
\end{tabular}
\end{table}
```

Table 2: *Mean growth rate and intakes of supplement, milk, and water for four diets* (after Sherington, J, undated)
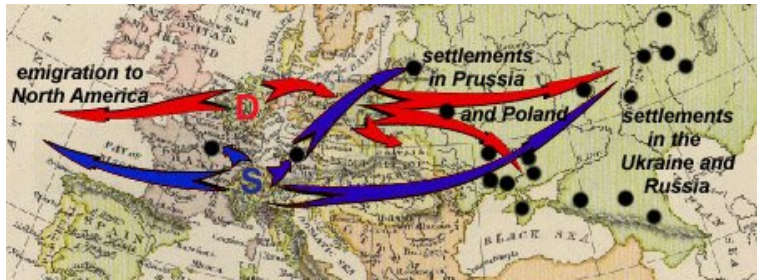
Supplement	Growth rate (g/day)	Supplement intake (g/day)	Milk intake (ml/kg$^{0.75}$)	Water intake (ml/kg$^{0.75}$)
Lucerne	145	450	10.5	144
Sesbania	132	476	9.2	128
Leucaena	128	364	8.9	121
None	89	0	9.8	108

Packages like longtable and array can help with more complex table formats.

Figure 1: *Swiss and Dutch Mennonite migrations of the 1700s and 1800s*

Courtesy of Paul C. Adams, Department of Geography and the Environment, University of Texas at Austin. [1]

3.4 Typefaces: The default typeface in LaTeX is Computer Modern, like this.

Times	mathptmx	Courier	courier
Palatino	mathpazo	Avant Garde	avant
Bookman	bookman	Helvetica	helvet
Charter	charter	*Zapf Chancery*	chancery
Utopia	utopia	Pandora	pandora
Century	newcent	Fraktur	oldgerm

Dozens of other font packages are available in TeX Live and the LaTeX Font Catalogue, including mathematics and decorative fonts. Any Postscript Type 1 font can be configured for LaTeX.

If you use XeLaTeX and the fontspec package, you can also use your computer's system fonts as well as those available with TeX Live.

Typefaces continued

To change font for a word or phrase, use these commands (they can be nested):

Italics	`\textit{Hello}`	➡	*Hello*
Boldface	`\textbf{Hello}`	➡	**Hello**
Smallcaps	`\textsc{Hello}`	➡	Hello
Sans-serif	`\textsf{Hello}`	➡	Hello
Monospace	`\texttt{Hello}`	➡	`Hello`

Example: `\textit{\textbf{\textsf {bold italic sans}}}` ➡ ***bold italic sans***

Sizes for titles, headings, footnotes, etc are automatic, but there are some step-sizes:

`\normalsize`	10	11	12	
`\tiny`	5	6	7	
`\scriptsize`	6	7	8	
`\footnotesize`	7	8	9	
`\small`	9	10	11	
`\large`	11	12	14	
`\Large`	12	14	17*	
`\LARGE`	14	17*	20*	
`\huge`	17*	20*	24*	
`\Huge`	20*	24*	28*	

* sizes rounded here to save space

For other sizes, add the special command `\RequirePackage{fix-cm}` *before* the `\documentclass` line and use `\fontsize{pp}{bb}\selectfont` for the point-size (*pp*) and baseline (*bb*).

Size commands are all **unscoped** commands, so enclose them *and* the applicable text in curly braces to stop them affecting the rest of the document.

For double or 1½ line-spacing (eg in theses) use the setspace package.

You can use colour palettes in the RGB, CMYK, HTML, and other colourspaces with the xcolor package and the `\color{name}` command.

For verbatim text, use the `\verb` command or the verbatim environment, or (better) the listings or fancyvrb packages.

3.5 Footnotes: You do footnotes with `\footnote(like this}`.[2] Endnotes too.

3.6 Cross-references: Use the command `\label{...}` to label the target, and

`\ref{...}` or `\pageref{...}` to refer to it. Make up the labels yourself.

Example: …section `\ref{blah}` on p. `\pageref{blah}.` ➡ …section 3.6 on p. 4.

3.7 Citation and reference: Create your bibliographic database in BIBTEX format (Patashnik, 1988) using *JabRef* or similar. Each entry MUST have a unique label (here 'fi'):

```
@book{fi,
  title = {Formatting Information},
  author = {Peter Flynn},
  publisher = {Silmaril},
  year = {2016}}
```

Use the biblatex package to specify the style, and give the filename of your database:

```
\usepackage[style=apa]{biblatex}
\addbibresource{myrefs.bib}
```

To cite, use `\cite{...}` (or `\textcite` or `\parencite`) with the relevant label:
Example: `\textcite{fi}` ➡ Flynn (2016).

4 Back matter

For an index, use the makeidx package and the `\makeindex` command with the `\index{...}` and `\printindex` commands and the makeindex program.

References

Adams, P. (2002, November). Linguistic Chaos in Montreal. In *Chaos and the City miniconference*. University of Texas School of Architecture. Retrieved from http://www.utexas.edu/depts/grg/adams/chaos.ppt

Flynn, P. (2016). *Formatting Information*. Silmaril. Retrieved from http://latex.silmaril.ie/

Patashnik, O. (1988). *BIBTEXing*. TEX Users Group. Portland, RI. Retrieved from http://ftp.heanet.ie/pub/CTAN/tex/biblio/bibtex/base/btxdoc.pdf

Sherington, J. (1998). *Informative Presentation of Graphs and Statistics*. 4.2, example table. Statistical Services Centre, University of Reading. Retrieved from http://www.reading.ac.uk/ssc/publications/guides/toptgs.htm

---

[2] Like this.