The very short guide to typesetting with LaTeX

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

LaTeX is a document preparation system for the TeX typesetting program. It enables you to produce publication-quality output with great accuracy and consistency. LaTeX works on any computer and produces industry-standard PDF or PS documents. 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 a complex structure, 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 free software from `www.tug.org/texlive/` or buy a commercially-supported version from one of the vendors (see back page).

Creating and typesetting your document

1. Create your document using any suitable plain-text editor with LaTeX controls, eg *TeXshop* (Mac), *TeXnicCenter* (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 toolbar buttons or menu items in your editor to typeset and display the document (you need *Acrobat Reader* or similar to display the PDF output);
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 (an 'argument'), it goes in curly braces**.
  Example: `\title{Irisches Tagebuch}\author{Heinrich Böll}`
- **If options are used, they go in square brackets first, before the curly braces**.
  Example: `\documentclass[a4paper,11pt]{book}`
- **Spaces after commands *without* braces get suppressed**.
  Example: `Copyright \copyright⎵2013` ➠ Copyright ©2013 ☒
  To prevent this, put empty curly braces after the command.
  Example: `Copyright \copyright{}⎵2013` ➠ Copyright © 2013 ☑
- **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`) and the Usenet newsgroup `comp.text.tex`. For packages, use the Comprehensive TeX Archive Network (`www.ctan.org`). For documentation, use the sources in the *References* [2].

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

Basic document structure

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

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

- ✏ The document class name must be one of the standard `book`, `article`, or `report`, or one of the many extras preinstalled or downloadable (eg `thesis`, `memoir`, etc).
- ✏ There are paper size options `a4paper` (210 mm×297 mm) and `letterpaper` ($8^1/_2''\times11''$) and others (eg `a5paper`).
- ✏ There are body type size options `10pt` (the default), `11pt`, and `12pt`.

New material introduced in each example is shown below in `blue`; previous material in black.

Front matter

The **Preamble** is where you specify any extra **packages** (LaTeX plugins) such as typefaces or special formatting requirements, 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}
```

In a typical document, the title, author, date, abstract (summary), and table of contents (optional) all go at the start, followed by your text.

Leave a blank line between paragraphs as you type. To LaTeX, this means 'start a new paragraph', *not* 'leave a blank line'. You can control spacing and indentation by setting `\parskip` and `\parindent` with the `\setlength` command as in the previous example, or with the `parskip` package.

Sections and cross-references

Sections get numbered automatically in bold type, and get included in the Table of Contents (if any). Numbering can be turned off selectively. Section heading layout can be modified with the `sectsty`, `titlesec`, and other packages. Use the `babel` package for other languages.

```
(Preamble, titling, and abstract as above)
\setcounter{secnumdepth}{3}
\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}
```

For cross-references, use `\label{...}` to label the target and `\ref{...}` and/or `\pageref{...}` to refer to it. Make up the label values: LaTeX will use them to work out the right numbers to print.

Example: …`section \ref{blah}` on p. `\pageref{blah}`. ➠ …section 3 on p.9.

Typefaces

LaTeX's default typeface is Computer Modern. There is a selection of other typeface packages (use them in your Preamble):

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`

See each package's documentation for details.

Dozens of others are available, including mathematical and decorative fonts. To switch to a sans-serif type family (eg Helvetica, Avant Garde), use `\sffamily` in your text. To change font for a word or phrase, use these commands (they can be nested—see below):

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***

Font sizing is automatic for titles, headings, and footnotes. There are some named step-size commands (in points, relative to the base size):

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

You can specify an exact size with the fix-cm package and the command:

`\fontsize{`*pp*`}{`*bb*`}\selectfont`

for any point-size (*pp*) on any baseline (*bb*). Enclose the command *and* its applicable text in curly braces to prevent it affecting the rest of the document.

For double or 1½ line-spacing (eg in theses) use the setspace package. You can also use RGB, CMYK, HTML, and many other colourspaces with the xcolor package and the `\color{`*name*`}` command.

For verbatim text, use the listings or fancyvrb packages, or the `\verb` command.

Lists

There are three basic kinds: **itemized** lists (bulleted); **enumerated** lists (numbered or lettered);

and **descriptive** lists (topic-and-explanation format). Others are avaiable on CTAN[5].

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

- 1lb Sugar
- ½pt Cream
- Chocolate
- 2oz Butter

1. Mix together
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.

Tables and figures

Formal tables and figures will *float* (change position to fit available space). Use `\caption` and `\label` to caption and label tables and figures.

```
\begin{table}
\caption{Mean growth rate and intakes
 of supplement, milk, and water for 4
 diets.}
\label{dietgrowth}\centering
\begin{tabular}{|l|r|r|r|r|}\hline
&Growth&Supplement&Milk&Water\\
 Supplement&rate&intake&intake&intake\\
&(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.

Tables and Figures, *continued*

```
\begin{figure}
\caption{Swiss and Dutch Mennonite migrations of the 1700s and 1800s}\label{lmig}
\centering   (graphics must be EPS files for standard LaTeX; but JPG, PNG, or PDF for pdfLaTeX)
\includegraphics[width=.8\columnwidth]{menno-a}\\   (double backslash for forced linebreak)
\scriptsize Courtesy of Paul C. Adams, Department of Geography and the
 Environment, University of Texas at Austin. \cite{adams}\end{figure}
```

Figure 1: *Swiss and Dutch Mennonite migrations of the 1700s and 1800s*
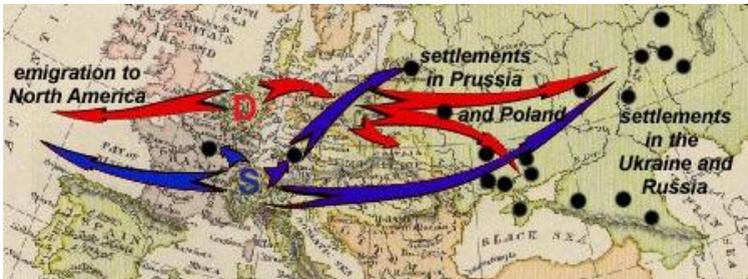
Courtesy of Paul C. Adams, Department of Geography and the Environment, University of Texas at Austin. [1]

Footnotes, citations, references, and indexes (back matter)

You do footnotes with a simple command,[2] see below. Citations using BIBTEX (Patashnik, 1988) are easy (see [2], §7.4.2), and there are packages for more complex formats for journals and publishers. You can add indexes with the \index and \printindex commands and the makeindex program.

```
You do footnotes with a simple command,\footnote{Like this.} see below. Citations
using BIB\TeX{} \citeauthoryear{oren} are easy (see \cite[§7.4.2]{flynn}), and
there are packages for more complex formats for journals and publishers. You can
add  indexes with the \verb`\index` and \verb`\printindex` commands and the
\textsf{makeindex} program.
\bibliography{myrefs} \bibliographystyle{apalike}   (see BIBTEX manual [3] for details)
```

References

1. Adams, Paul C. *Linguistic Chaos in Montreal*, www.utexas.edu/depts/grg/adams/chaos.ppt, 2/59, Oct 2006.
2. **Flynn, P.** *Formatting Information,* **2005, at** latex.silmaril.ie/formattinginformation/
3. Patashnik, O. *BIBTEXing*, TEX Users Group, 1988 (distributed with all copies of LaTeX).
4. Sherington, J. example table in 'Informative Presentation of Tables, Graphs and Statistics', 4.2, Statistical Services Centre, University of Reading, www.reading.ac.uk/ssc/publications/guides/toptgs.html
5. **TEX Users Group, for TEX Live (**www.tug.org/texlive/**) and CTAN (Comprehensive TEX Archive Network) for downloads (**www.ctan.org**).**

Note.   Commercial implementations of TEX with business support are available from Personal TEX, Inc (PCTEX); Blue Sky Research (Textures [Mac]); MacKichan Software, Inc (Scientific Word); Micropress, Inc (VTEX), TrueTEX Software (TrueTEX), and others.

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[2]Like this.