

Introduction to Making Documents with \LaTeX

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Introduction

What \LaTeX is

- A cross-platform typesetting environment
- Best way to produce aesthetically pleasing, logically coherent documents, especially when dealing with mathematical equations
- Free and customizable

What \LaTeX isn't

- WYSIWYG (What You See is What You Get)
 - MS Word, LibreOffice
- Bloated memory hog

How it Works

- 1 The $\text{T}_{\text{E}}\text{X}$ typesetting engine reads a plain text file, usually written using \LaTeX (a set of $\text{T}_{\text{E}}\text{X}$ macros)

```
\documentclass{article}  
\begin{document}  
Hello world  
\end{document}
```

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- 2 Produces a readable, formatted document image (.dvi)

```
craig@sonicboom ~/Documents/presentations/latex_intro $ latex hello.tex
This is pdfTeX, Version 3.1415926-2.4-1.40.13 (TeX Live 2012/Debian)
 restricted \write18 enabled.
entering extended mode
(./hello.tex
LaTeX2e <2011/06/27>
Babel <v3.8m> and hyphenation patterns for english, dumylang, nohyphenation, lo
aded.
(/usr/share/texlive/texmf-dist/tex/latex/base/article.cls
Document Class: article 2007/10/19 v1.4h Standard LaTeX document class
(/usr/share/texlive/texmf-dist/tex/latex/base/sizel0.clo)) (./hello.aux)
[1] (./hello.aux)
Output written on hello.dvi (1 page, 232 bytes).
Transcript written on hello.log.
craig@sonicboom ~/Documents/presentations/latex_intro $ ls
hello.aux  hello.dvi  hello.log  hello.pdf  hello.tex  jupiter.pdf  jupiter.tex
```

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- 3 Convert to pdf (or straight to pdf using pdf \LaTeX)

Hello world

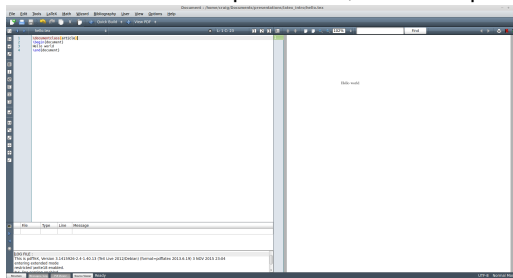
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Separates design from content \rightarrow enhanced logical structure

What you Need

- ① Text editor or IDE
 - Texmaker, Vim/Emacs/gedit with plugins, Notepad++, Sublime
 - Look for built-in output viewer, code completion



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- ② Sane \LaTeX installation
 - Windows - MikTeX
 - Mac - MacTeX
 - Linux - texlive

Special Characters, commands, and comments

- Special characters
 - tells \LaTeX to do something, won't print like you intend
 - `# $ % ^ & - { } ~ \`
- \LaTeX commands
 - Start with a `\`, i.e. `\backslash`, `\alpha` $\rightarrow \alpha$
- Comment lines with `%`

Input file structure and layout

- Preamble
 - Contains all formatting directions and information not directly related to content
 - Authors, date, institutions, title, external packages

Packages and external files

<http://www.howtotex.com/packages/9-essential-latex-packages-everyone-should-use/>

Typesetting

paragraphs, line and page breaks, hyphenation, sections, chapters, alignment, itemize, enumerate, font sizes (table 6.3, 6.4)

Some useful commands and characters

emph, bold, under, degree, tilde, quotation, ö, A^n , α_i

Some useful environments

verbatim, tabular

Mathematical Formulae

AMS math, inline, single line display (numbered/unnumbered),
multiple line display

Some useful commands

Greek, super and sub script, sum (substack), integral, product operators, dots, frac, predefined functions, partial

Arrays and matrices

uses array environment for arrays, amsmath uses matrix environments

Graphics

use graphicx package (options), no real standard find what works,
figure env. center, caption, includegraphics, remove extensions to
avoid conflict b/w latex pdflatex

Bibliographies

Use BibTeX, keep main bib file w/ consistent naming convention,
bibliography command at end, bibliographystyle at beginning

Cross referencing and citation

Cleveref package, cite, ref, naming labels

Custom commands

newcommand-name, num of args, definition, hashtag w/ number
for arguments, bra, ket, bracket, 2x2 matrix
newenvironment, renewenvironment to override existing commands

Chemistry specific packages

<https://www.ctan.org/topic/chemistry>, chemfig-rings, rxn, achemso

Putting it all together

Keep a universal header, bib, and main document template. Copy and edit as needed. Example file with header, equations, cross reference, citations, and sections

Resources

lshort, ctan, <http://www.xm1math.net/texmaker/>