

\LaTeX Engineering Grad Society Presentation

A presentation about \LaTeX to the McMaster EGS

John Fink

McMaster University

July 19th, 2022

Who am I?

What can you do with \LaTeX ?

What can you do with \LaTeX ?

- Scholarly articles
- Books and book chapters
- (bibliography support through Bib \TeX)
- Presentations (like this one!)
- Resumes/CVs

What is the difference between *word processing* and *typesetting*?

Why choose typesetting over (most) word processing?

- The source is *portable* and *versionable*. Anything that can edit text can edit \LaTeX .
- It is way easier to do things like inline formulas ($E = mc^2$), images, and tables.
- Easy to generate indices, bibliographies, cross references
- It allows you to *write* without worrying what the writing *looks like*.
- \LaTeX can produce some *beautiful* output. Even the stock PDF output is pleasant!
- The documentation for \LaTeX is **vast** (and beautiful, of course) and there's a StackExchange answer for just about anything you'd think to ask.
- You can generate many document types – PDFs, ePubs, Markdown, HTML, yes, even Word format – from \LaTeX source.

And perhaps most importantly...

Most STEM specific journals can accept submissions in \LaTeX , and some will **only** accept submissions in \LaTeX .


Worry about **content**, not (or not as much) about **form**.

Why choose word processing *over* typesetting?

- Everybody everywhere uses Word.
- \LaTeX is a *programming language*
- \LaTeX final documents have to be compiled (this presentation takes about 7 seconds)
- Word is *much better* than it used to be re: generating ToCs, using templates, etc.

1 of 234 Automatic Zoom

- ▶ 1 Introduction
- ▶ I Getting Started
- ▶ II Building a Presentation
- ▶ III Changing the Way Things Look
- ▶ IV Creating Supporting Material
- ▶ V Howtos
- Index



The BEA

User Guide for

What is \LaTeX ?

What is... T_EX?

- Invented by Donald Knuth in 1978.
- Intended as a replacement for the Unix *troff* command, which by 1978 was apparently a very patchy mess.
- So rather than make more patches, Knuth developed T_EX.

So what is \LaTeX ? It's \TeX with added sauce:

- Optimized for publishing
- Numbering, cross-referencing
- Tables and figures
- Page layout
- Bibliographies

The **structure** of a \LaTeX document.

Line 105 Column 22 INSERT


```
\documentclass{beamer}  
\usetheme{Berlin}  
\usepackage{verbatim}  
\usepackage{fancyvrb}  
%comments start with a % sign.  
.
```

```
%title page details:  
\title{\LaTeX{} Engineering Grad Society Presentation}  
\subtitle{A presentation about \LaTeX{} to the McMaster EGS}  
\author{John Fink}  
\institute{McMaster University}  
\date{July 19th, 2022}
```

So just about any \LaTeX specific markup will look like:

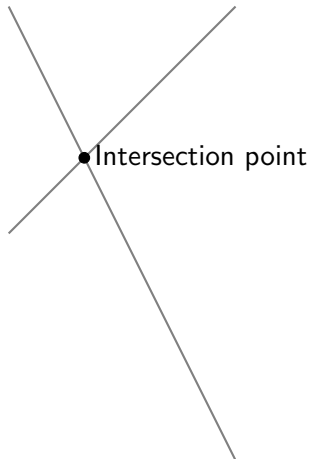
- A `\` character
- A **command**, like *includegraphics*
- **options** passed to the command, in `[]`, like `[height=8cm]`
- The information fed to the command, in `{}`, like `{imagenam}`
- So, the command `\includegraphics[height=8cm]{imagenam}` will display the image titled *imagenam*, scaled to 8cm height.

Drawing in \LaTeX with the tikz package

Drawing in \LaTeX with the tikz package

```
\begin{tikzpicture}  
\draw[gray, thick] (-1,2) -- (2,-4);  
\draw[gray, thick] (-1,-1) -- (2,2);  
\filldraw[black] (0,0) circle (2pt) node[anchor=west]{Intersection point};  
\end{tikzpicture}
```

Drawing in \LaTeX with the tikz package



Doing Math Stuff in L^AT_EX

- Inline formulas are done with `$..$` or `\..\` or `\begin{math}..\end{math}`
- (these are all, as far as I know, identical in use)
- e.g. the universal law of gravitation: $F = \frac{Gm_1m_2}{r^2}$.
- In code: `$F=\frac{Gm_1 m_2}{r^2}$`.

Doing Math Stuff in \LaTeX

- Display mode formulas are done with `\..\\`,
`\begin{displaymath}..\end{displaymath}`,
`\begin{equation}..\end{equation}`

$$E = m \tag{1}$$

```
\begin{equation}  
E=m  
\end{equation}
```

Tables in \LaTeX

Left	Center	Right	Paragraph
1	1	1	Lorem ipsum dolor sit amet, consectetur adipiscing elit.
12	12	12	Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.
123	123	123	Curabitur dictum gravidamauris.

```

\begin{tabular}{||l|c|r|p{6cm}||}
    Left & Center & Right & Paragraph \\
    1 & 1 & 1 & Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.
    12 & 12 & 12 & Ut purus elit, vestibulum ut, placerat in. Aenean ac diam. Suspendisse massa. Aenean euismod ornare tortor. Donec egestas diam, tristique magna a felis. Proin fermentum leo, vel nisi semper pulvinar dapibus leo.
    123 & 123 & 123 & Curabitur dictum gravidamauris. \
\end{tabular}

```

Chemical formulae in L^AT_EX

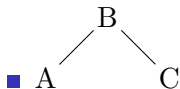
Chemical formulas are written similarly to math formulas, except support for chemical formulas is not built-in but requires a `usepackage` statement, like `\usepackage{chemfig}`

Chemical formulae in \LaTeX

- A simple example: $\text{O}=\text{H}$
- `\chemfig{O=H}`

Chemical formulae in \LaTeX

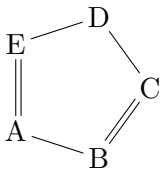
- Angled formulae:



- `\chemfig{A-[1]B-[7]C}`

Chemical formulae in L^AT_EX

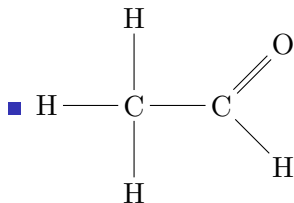
- Regular polygons



- `\chemfig{A*5(-B=C-D-E=)}`

Chemical formulae in L^AT_EX

- Branched molecules



- `\chemfig{H-C(-[2]H)(-[6]H)-C(=[1]O)-[7]H}`

Chemical formulae in L^AT_EX

For *typesetting* chemical formulae, we can use a package like *mhchem* in our preamble: `\usepackage{mhchem}`

Chemical formulae in L^AT_EX

- $3\text{H}_2\text{O}$
- `\ce{3H2O}`
- AgCl_2^-
- `\ce{AgCl2-}`
- $\text{H}_{2(\text{aq})}$
- `\ce{H2_{(aq)}}`

L^AT_EXresources: Editors

- Anything that can edit plain text (Emacs, Vim, Notepad etc)
- (but note you need a *compiler* to generate the actual output)
- Compilers: MikT_EX(Windows), MacT_EX(MacOS), T_EXLive (Linux)
- Purpose-built editors: T_EXstudio, T_EXmaker
- (These will come with built-in support for compilers)
- General IDEs: vscode, atom
- Online: Overleaf (gdocs-esque)

Signing up for Overleaf

- 1 Go to www.overleaf.com/register
- 2 Sign up for an account by whatever method you prefer
- 3 Create a new blank project.
- 4 Type "done" in the chat.

Any questions?

jfink@mcmaster.ca

<https://github.com/jbfink/latexegs>