

Introduction to $\text{\LaTeX}$

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What is $\text{\LaTeX}$?

- $\text{\LaTeX}$ is a typesetting system, not an editor
- $\text{\LaTeX}$ grew out of $\text{\TeX}$
- First version released in 1982 (first version of $\text{\TeX}$ released in 1978)
- Open Source
- Cross-platform
- Can extend with packages
- Can output many formats

How does it work?

- Write in a markup language (think HTML)
- Run a processor to generate output
- Three phase production cycle
 - edit
 - process
 - preview
- Once you're happy, you produce your final version

What does L^AT_EX look like?

```
\documentclass[letter]{article}
```

```
\title{This is my thesis}
```

```
\author{A Poor Grad-student}
```

```
\begin{document}
```

```
\maketitle
```

```
\begin{section}
```

This is just a sample of some text. You would
put your actual article text here.

What $\text{\LaTeX}$ is not

- *NOT* a word processor
- Alternatively, Word is not a typesetting system
- Steeper learning curve
- Usually edit directly, but you can get graphical editors
- Debugging problems can be frustrating

Philosophy of $\text{\LaTeX}$

- $\text{\LaTeX}$ is structured around the concept of separate content and presentation
- The author only needs to focus on the text and its structure, not the layout
- Layout, fonts and presentation determined by style
- Types of markup in $\text{\LaTeX}$
 - **Typographical** - Instructions to change the appearance of outputted text
The `\textbf{brown}` fox
 - **Logical** - Instructions to indicate the purpose of the outputted text
`\title{This is my thesis}`

Output Types

$\LaTeX$ can generate lots of different file formats, for example:

- DVI: **De**Vice **I**ndependent (default output format)
- HTML: online articles and books
- PS: PostScript, for printing
- PDF: online display, presentations, sharing with others

Packages Available

- Chemistry: molecules, redox equations
- Physics: Feynmann diagrams
- Mathematics: theorems and proofs
- Arts: poetry, prose, accents
- Many, many, many more ...

Structure of a $\text{\LaTeX}$ file

Every $\text{\LaTeX}$ file has two parts, a preamble and a body.

Preamble

- This starts with `\documentclass` which sets the type of the document, along with specific class options
- Any global settings are set here, as well

Body

- Preamble ends with `\begin{document}`
- All of the actual content, along with any markup, goes here
- The body (and the file) ends with `\end{document}`

Document Structures - Articles

- Articles have a title, author information, and possibly an abstract on the first page
- The content of an article begins immediately after this
- There is usually no table of contents
- The content is divided into sections, or possibly sub-divided into sub-sections

Article Sample Code

```
\documentclass{article}

\title{My First Article}
\author{Joey Bernard \\  
        CRC - ACEnet \\  
        UNB}

\begin{document}
\maketitle
\begin{abstract}
This is an abstract of your paper.
\end{abstract}
```

Article Sample Code - 2

```
\section{Introduction}  
This is a short introduction.  
\section{First Section}  
This is the first Section.  
\subsection{First Sub-section}  
This is a sub-section of the article.  
\end{document}
```

Article Sample

Pull up the sample PDF.

Document Structures - Books

- books are like large articles
- Have chapters rather than sections
- Usually have a table of contents
- Can use `\include{file}` to break the contents into separate files

Book Sample Code

```
\documentclass{book}

\title{This is my book}
\author{Joey Bernard \\\
        ACEnet CRC}

\begin{document}
\frontmatter
\tableofcontents
\mainmatter
\chapter{First Chapter}
This is just the first chapter.
```

Book Sample Code - 2

```
\chapter{Second Chapter}
```

This is the second chapter. Hopefully we'll have more here.

```
\section{A Subsection}
```

This is a subsection.

```
\backmatter
```

```
\end{document}
```

Book Sample

Pull up the sample PDF.

Basic Text Formatting

- Most text is treated normally
- Most extra white space is ignored
- There are 13 special characters

\$ % & ~ _ ^ { } @ " |

- Need to use `\` if you want to use any of the above
- Paragraphs are marked with either a blank line, or `\par`

Basic Text Formatting - 2

- You can format text with commands
 - `\textbf{some text}` - bold the text
 - `\textit{some text}` - italics
- Formatting with environments
 - `\begin{verbatim} ... \end{verbatim}` - print out text as entered
 - `\begin{itemize} ... \end{itemize}` - create a bulleted list of items
- You can force line breaks with `\\`

Equations

- There are two ways to use a math environment
 - `$ math goes here $`
 - `\begin{math} math goes here \end{math}`
- There are tons of operators to format equations and math
- For example
$$\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$$
- There are also environments for theorems, proofs

Presentations

- There are many packages available
 - slides
 - prosper
 - beamer
- We'll look at beamer
- Use document class beamer
- Create a title slide with `\maketitle`

Presentations - 2

- Slides are defined with
`\begin{frame} ... \end{frame}`
- `frame` can take many options, the one most often to be used is `[fragile]`
- `fragile` is needed when you use the `verbatim` environment
- The title of each frame can be given with `\frametitle{Slide 1}`

Presentations - Overlays

Overlays are used to decide what output shows up on which slides.

- The most generic overlay is done with
`\onslide< overlayspec >`
- The overlay spec tells which slides should have the given text
 - 1-2,4- – means all overlays from 1 to 2, and from 4 until the end
 - -3 – means all overlays from the beginning to overlay 3
 - 2,4,6 – means overlays 2, 4, and 6

Sample Beamer

```
\documentclass{beamer}
\usetheme{Berlin}
\usecolortheme{albatross}
\title{Introduction to \LaTeX}
\author{Joey Bernard - ACEnet CRC}
\date{August 2010}
\begin{document}
\maketitle
```

Beamer Example

```
\begin{frame}  
  \frametitle{The First Slide}  
  \begin{itemize}  
    \item Point one  
    \item Point two  
  \end{itemize}  
\end{frame}  
\end{document}
```

UNB Template Package

- UNB Graduate School has an Electronic Theses & Dissertation Section
<http://www.unb.ca/etd/index.html>
- There are templates for Word, and for $\text{\LaTeX}$
- This page has a zip file with the template in it and a manual describing how to use it.
<http://www.unb.ca/etd/steps/step1.html>
- This template provides environments to properly format all of the required elements.
- There are also example $\text{\LaTeX}$ files to get you started.

UNB Template Package - 2

You set the class in the preamble. Use `unbthesis` rather than `report`, or `book`.
it would look like

```
\documentclass[12pt]{unbthesis}
```

You can include any other packages with the *usepackage* command.

UNB Template Package - Preamble

```
\title{}  
\author{}  
\predegree{}  
\degree{}  
\gau{}  
\supervisor{}  
\examboard{}  
\externalexam{}  
\date{}  
\copyright{}
```

Available GUI's

These are all cross-platform editors designed to be used with $\text{\LaTeX}$

- LyX $\text{\LaTeX}$ editor

<http://www.lyx.org>

- Texmaker

<http://www.xmlmath.net/texmaker>

- texworks

<http://code.google.com/p/texworks/>

Further Reading

- The official Tex Users Group - You can find links to lots of resources like: editors, manuals, implementations, tutorials
<http://www.tug.org>
- There is a wikibook available, provides a very good overview
<http://en.wikibooks.org/wiki/LaTeX>