

Introduction to LaTeX

By Dan Burke

What is Latex ?

- “LaTeX is a document preparation system for high-quality typesetting”
- Importance is placed on **content**, not formatting (which is left to the LaTeX designers)
- Kind of like HTML combined with C

LaTeX ?

- Can be used for:
 - Papers
 - Labs
 - Word documents
 - Assignments
 - Presentations

Why LaTeX ?

- Makes documents look very professional
- Easy to use once the syntax is learned
- Portable to any operating system

Why LaTeX ?

- Makes inclusion of other documents, working in groups very easy
- Very large files with many references are easy to handle
- Free

Some Examples...

How do I write ?

- Any text editor can be used
- Compile:
 - Command prompt
 - IDE (integrated development environment)
- Somewhere between C and HTML

File Structure

```
\documentclass{article}  
  
\title{Cartesian closed categories and  
the price of eggs}  
  
\author{Jane Doe}  
  
\date{September 1994}  
  
\begin{document}  
  
\maketitle Hello world!
```


Packages ?

- Add functionality to your documents
 - Images
 - Equations
 - Links
 - Etc.

Packages

```
\usepackage{amsmath}%  
\usepackage{amsfonts}%  
\usepackage{amssymb}%  
\usepackage{graphicx}  
\usepackage{setspace}  
\usepackage{cite}  
\usepackage{hyperref}
```


Notes on Latex

- Commands and special characters start with a ‘\’
- Comments start with ‘%’,
- New line ‘\newline’ or ‘\\’
- Special characters or inline equations must be surrounded by ‘\$’

Notes on Latex

code	result
<code>superscript\$^t\$</code>	superscript^t
<code>\$super^{script}\$</code>	<i>super</i> ^{script}
<code>subscript\$_t\$</code>	subscript_t
<code>big \$\Omega\$</code>	big Ω
<code>little \$\omega\$</code>	little ω

Graphics / Figures

- Including a figure:

```
\begin{figure}[htbp]  %[Here Top Bottom Page(of floats)]  
  
  \centering  %center the Figure  
  
  \includegraphics[width=3.0in]{HeNeSetup}  %Width and Filename  
  
  \caption{Diagram of equipment setup used for the HeNe laser test  
experiments}  %Caption for the figure  
  
  \label{fg:lasertest}  %Label name for the figure, use this to reference  
it later.  
  
\end{figure}
```

- Figures can be of type **.jpg**, **.eps** and **.png**
some others but may need extra packages...

Equations

- Including an Equation:

```
\begin{align}
```

```
  n_i \sin \theta_i = n_t \sin \theta_t \label{eq:snell}
```

```
\end{align}
```

- Gives (with a reference number)...

$$n_i \sin \theta_i = n_t \sin \theta_t$$

(3)

Tables

- The code looks complicated
- End result looks very nice
- Very customizable you know the right commands

Tables

```
\begin{table}[htbp]
\centering
\begin{tabular}{|l|l|l|}
\hline
col 1 & col 2 & col 3 \\
\hline
1 & 3 & 5 \\
2 & 4 & 6 \\
\hline
\end{tabular}
\caption{Table Caption}
\label{tab:table_label}
\end{table}
```

col 1	col 2	col 3
1	3	5
2	4	6

TABLE I
TABLE CAPTION

Citations & References

- At any point in a paper one can include a citation or reference

code	result
Snell's law <code>\cite{snell}</code> is shown in equation <code>\eqref{eq:snellslaw}</code> .	Snell's law[1] is shown in equation (2).

Bibliography and References

- Bibliography is at the end and must include everything that has a `\cite{}` in the paper
- References must point to a “`\label`” somewhere in the document
- Chapter, table, figure, equation, etc.

How to compile

- Easiest to compile to PDF, but **many** other options are available
- Can be done from a program OR command line
 >> `pdflatex filename.tex`
- Output is to “filename.pdf”

How to compile

- References and citations are found at runtime and no searching is performed.
- Needs to be compiled **TWICE**, once to see all references, second to label them appropriately

Windows labs at Carleton

- <http://www.doe.carleton.ca/~drburke/latex.zip>
- Save latex.zip to w:\ drive
- unzip the file:
 - right click 'latex.zip'
 - 'extract here'
 - **Do not** simply double click the file

Windows labs at Carleton

- Open Start Menu
- Click 'Run...'
- Type 'cmd' and press return
- Change to latex directory:
`\> cd w:\latex`
- To compile and run:
`w:\latex\> pdflatex assignment`

Your Assignment

- Recreate 'final_report.pdf' using 'assignment.tex'
- Look at 'assignment.pdf' to see what is already there
- Reuse old code, copy and paste, etc.

Some tips

- Use your old files as starting points for new reports
- Search examples and guides for added help, lots of resources available
- Many programs can output to Latex format (ex. MathType, Maple, ...)
- Ask for help

Some tips

- Use labels with useful names
 - `\label{fig:nucleus}` Good !
 - `\label{pic2}` Bad
 - `\label{fig:big_atom}` Good !
 - `\label{fig:big atom}` Bad
- When in doubt, compile again

Where can I find it ?

- Linux – check documentation for the Latex source
(suggested IDE: Kile)
- Mac OS X – use MacTeX
(suggested IDO: TeXShop)
- Windows – MikTeX or ProTeXt
(suggested IDE: Texniccenter)

More Info...

- See the `example.tex` file provided
- www.latex-project.org
- www.latex-project.org/guides/
- http://en.wikipedia.org/wiki/Help:Displaying_a_formula