

\LaTeX : A Programming Language for Formatting Text

- ▶ Use commands to indicate document layout
- ▶ Not WYSIWYG: Write marked-up text into a `.tex` file
- ▶ `pdflatex` converts \LaTeX to a `.pdf` file
- ▶ You can make papers and presentations with it
- ▶ It is particularly good at formatting and displaying math

A simple document: `simple.tex`

```
\documentclass{article}
```

```
\begin{document}
```

```
Hello there!
```

```
\end{document}
```

Document Classes

- ▶ Article: For writing papers, assignments, etc.
- ▶ Report: Like article, but for things that are multiple chapters long.
- ▶ Book: For formatting actual books.
- ▶ Beamer: For making presentations like this one.

Special Characters

▶ # \$ % ^ & _ { } ` ~ \ are reserved characters.

▶ You can write them using these escapes:

```
\# \$ \% \^{} \& \_ \{ \} \`{} \~{} \textbackslash{}
```

▶ % starts a comment that runs until the end of the line.

▶ \\ forces a line break.

▶ \^ and \~ by default draw above the next letter,

so \~n looks like ñ.

▶ Opening quotes are written with ` and closing quotes with

'.

▶ `single quotes' looks like 'single quotes'

▶ ``double quotes'' looks like "double quotes"

Document Structure: sections.tex

```
\documentclass{article}
\begin{document}
\section{Introduction}

\section{Methodology}
\subsection{A Perpetual Energy Source}
\subsection{A Radio Beacon for the Pyramids of Giza}
\subsection{Plans for First Contact}

\section{Results}
\subsection{Physics Dislikes Me}
\subsubsection{Physicists don't want the truth}
\subsubsection{This foil is perfectly comfortable, thanks}

\section{Conclusion: Perhaps the real aliens are
the friends we made along the way}
\end{document}
```

Titles: title.tex

```
\documentclass{article}
\title{Do Lizards Run The World?}
\author{Nathan Jarus}
\date{\today}

\begin{document}
\maketitle

\end{document}
```

Formatting Text

- ▶ **Bold:** `\textbf{your text here}`
- ▶ *Italic:* `\textit{italic text here}`
- ▶ Underline: `\underline{underlined text}`
- ▶ Monospaced: `\texttt{I am a robot}`

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- ▶ Underline: `\underline{underlined text}`
- ▶ Monospaced: `\texttt{I am a robot}`
- ▶ For URLs and hyperlinks, insert `\usepackage{hyperref}` below your document class.
- ▶ `\url{http://way-cool-website.io}` formats a URL nicely.
- ▶ `\href{http://url.com}{displayed, underlined text}` lets you put hyperlinks in your documents.

Hyperref: `hyperref.tex`

```
\documentclass{article}
\usepackage{hyperref}
% Set link colors throughout the document
\hypersetup{colorlinks=false,
             allbordercolors={0 0 0},
             pdfborderstyle={/S/U/W 1}
}

\begin{document}
\href{https://google.com}{Ask The NSA Anything!}

\url{http://www.funroll-loops.info/}

\end{document}
```

Lists: lists.tex

```
\begin{itemize}
  \item Itemize makes a bulleted list.
  \item Every item in the list starts with
        the item command.
  \item You can make multiline items\\
        by putting a linebreak in them.
\end{itemize}

\begin{enumerate}
  \item Enumerate numbers each item.
  \item Otherwise it's exactly the same as itemize.
\end{enumerate}
```

Nested Lists: `nest-list.tex`

```
\begin{enumerate}
  \item You can also nest lists!
  \item Just start a new itemize or enumerate in a list:
    \begin{enumerate}
      \item Enumerates will change numbering style.
      \item Itemizes will use a different glyph.
    \end{enumerate}
  \item Once you're done, you can keep adding new
    list items to the original list.
\end{enumerate}
```

Displaying Math

- ▶ You can write math inline by putting it between `$` signs.
`$f(x) = x^2$` renders as $f(x) = x^2$.
- ▶ Equations can be placed on their own in an `equation` environment:

$$f(x) = x^2 \tag{1}$$

`x^a x_a x^a_b`

`\forall n \in \{1,2,3,4\}`

`\sum_{i=0}^{\infty} \frac{1}{3^i}`
`= \frac{3}{2}`

`\Big(\frac{1}{3}\Big)^k`
`= \frac{1}{3^k}`

$x^a x_a x_b^a$

$\forall n \in \{1, 2, 3, 4\}$

$\sum_{i=0}^{\infty} \frac{1}{3^i} = \frac{3}{2}$

$\left(\frac{1}{3}\right)^k = \frac{1}{3^k}$

Math Symbols and Commands

Figures

- ▶ The `figure` environment is used to place images and give them captions.
- ▶ \LaTeX will place the figure on the page in a spot it thinks makes sense, usually at the top or the bottom.

Figures

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- ▶ \LaTeX will place the figure on the page in a spot it thinks makes sense, usually at the top or the bottom.
- ▶ You must put `\usepackage{graphicx}` below `\documentclass`.
- ▶ The `includegraphics` command can then be used inside a figure to include png, jpeg, pdf, and eps files.
- ▶ The `caption` command sets a caption for the figure.

Figure: `figure.tex`

```
\documentclass{article}
\usepackage{graphicx}

\begin{document}

\begin{figure}[h] % Place `here'
  \caption{4-corner simultaneous 4-day time cube}
  \centering % Center the image

  % width=\textwidth makes the image the width of the text
  \includegraphics[width=\textwidth]{timecube}
\end{figure}

\end{document}
```

Tables

- ▶ As with figure, there is a table environment that lets you make tables with captions.
- ▶ Inside the table environment, you put a tabular environment that actually draws the table.
- ▶ I have never found a markup language with a decent table syntax.
- ▶ <http://truben.no/table/> is a website that will generate tables for you!

Displaying code and algorithms

- ▶ The `verbatim` environment shows text in a plain, monospaced font.
- ▶ If you want syntax highlighting, Pygments works well.
- ▶ The `algorithm` environment works like the `figure` environment, but for algorithms.
- ▶ There are a few algorithm typesetting packages with different appearances.

Verbatim: `verbatim.tex`

```
\documentclass{article}
```

```
\begin{document}
```

```
\begin{verbatim}
```

You can write all sorts of stuff here

```
\command, $$$ cash money, etc.!
```

```
\end{verbatim}
```

```
\end{document}
```

Where to go from here

- ▶ You can manage citations with Bibtex.
- ▶ \LaTeX wikibook.
- ▶ CTAN has documentation on zillions of neat packages.
- ▶ MiKTeX is a Windows version of \LaTeX .
- ▶ TeXworks is a nice editor.
- ▶ Pandoc can convert other document formats to and from \LaTeX .