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Lab 13: L^AT_EX

Comp Sci 1585
Data Structures Lab:
Tools for Computer Scientists



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L^AT_EX: A Programming Language for Text

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How to
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- Use commands to indicate document layout
- Not WYSIWYG: Write marked-up text into a `.tex` file
- `$ pdflatex` converts L^AT_EX to a `.pdf` file
- You can make papers and presentations with it
- It is particularly good at formatting and displaying math
- Note: links are **in color** today

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```
\documentclass{article}
```

```
\begin{document}
```

```
Hello there!
```

```
\end{document}
```

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- **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.

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- `# $ % ^ & _ { } ` ~ \` 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"

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```
\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, th
```

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

```
\end{document}
```

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```

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

\begin{document}
\maketitle

\end{document}
  
```

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- **Bold:** `\textbf{your text here}`
- *Italic:* `\textit{italic text here}`
- 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.
- Normally, it's better to show the person the link, rather than hide it! Use `url` instead of `href`.

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```

\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}

```

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```

\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 item
\end{enumerate}

```

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```

\begin{enumerate}
  \item You can also nest lists!
  \item Just start a new itemize or enumerate in a li
    \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}

```

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- 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:

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

<code>x^a</code>	<code>x_a</code>	<code>x^a x_b^a</code>
------------------	------------------	------------------------

<code>\forall n \in \{1,2,3,4\}</code>	<code>\forall n \in \{1,2,3,4\}</code>	$\forall n \in \{1,2,3,4\}$
--	--	-----------------------------

<code>\sum_{i=0}^{\infty} \frac{1}{3^i}</code>	<code>\frac{1}{3^i}</code>	$\sum_{i=0}^{\infty} \frac{1}{3^i} = \frac{3}{2}$
<code>= \frac{1}{3^2}</code>		

<code>\Big(\frac{1}{3}\Big)^k</code>	<code>\frac{1}{3^k}</code>	$\left(\frac{1}{3}\right)^k = \frac{1}{3^k}$
<code>= \frac{1}{3^k}</code>		

<https://en.wikibooks.org/wiki/LaTeX/Mathematics>

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- 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.
- 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.
- `\begin{figure}[H]` puts the figure wherever you want, instead of letting [h] put auto-place it somewhere (see the example on the following slide); requires `\usepackage{float}` (ironically).

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```

\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
  \includegraphics[width=\textwidth]{timecube}
\end{figure}

\end{document}

```

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- 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!
- \LaTeX IDEs? Kile and TexMaker will do this too.
- TeX is the only one that will let you easily edit after creating it with a wizard.

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- 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.

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```
\documentclass{article}
```

```
\begin{document}
```

```
\begin{verbatim}
```

You can write all sorts of stuff here

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

```
\end{verbatim}
```

```
\end{document}
```

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- Is not to use it, but instead use LyX, which shows you latex source as you type.
- <https://www.lyx.org>
- Read the manual, and when making documents, select “View” and then “Source pane”
- I highly recommend LyX

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The underlined text is clickable:

- You can include citations with [Bibtex](#), and manage them with [JabRef](#)
- [\$\text{\LaTeX}\$ wikibook](#).
- [CTAN](#) has documentation on zillions of neat packages.
- [MiKTeX](#) is a Windows version of \LaTeX .
- [Kile](#) is my favorite editor
- [TexMaker](#) is my second favorite, but maybe is better for beginners
- [TeXworks](#) is a decent editor.
- [Pandoc](#) can convert other document formats to and from \LaTeX .