

Pragmatic L^AT_EX

Nicholas Lantz

CSM Linux User's Group

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What is L^AT_EX?

- A typesetting and document preparation system
- Looks better than Word
- Written especially for writing technical reports

- Certain character combinations look awkward together, for example...

find vs. find

fly vs. fly

efficient vs. efficcient

- We go to Mines, we all need to typeset mathematical equations for projects, lab reports, etc.
- L^AT_EX supports these very nicely, and the output looks much better than the Word equivalent.
- We will discuss how to typeset mathematics later.

$$-\int_0^{2\pi} \frac{kQd\theta}{2\pi(a^2+x^2)^{3/2}} (a \sin \theta \hat{j}) = 0$$

$$-\int_0^{2\pi} \frac{kQ d\theta}{2\pi(a^2+x^2)^{3/2}} (a \sin \theta \hat{j}) = 0$$

Structure of L^AT_EX Document

```
\documentclass[letterpaper]{article}

% Package includes here
\usepackage[margin=1in]{geometry}

% Header info here
\title{Example}
\author{Nicholas Lantz}
\date{\today} % Outputs today's date

\begin{document}
\maketitle % Creates title based on header info
% Document goes here....
\end{document}
```

- L^AT_EX considers all spaces between words equally, so adding extra spaces between words will not increase the spacing in the document.
- Two ways to create a new paragraph in L^AT_EX
 - 1 Two newlines (`\n`)
 - 2 `\\`
- Generally, use the two newlines, looks better.
- However, the two wacks can look better inside of the author declaration at the top of the document, or in tables (discussed later).

```
\section{Top-level Section}  
\subsection{Sub-section}  
\section{Yet Another Section}
```

There are other kinds of sections, like

- part
- chapter
- section
- subsection
- subsubsection
- paragraph
- subparagraph

Document Classes

Writing L^AT_EX

- Remember the `\documentclass{article}`?
- “article” is the most common document class I use. Used for short documents
- “Report” has access to the “chapter” section discussed in the last slide
- “book” has access to the “part” section
- Generally, the document class will change the basic structure of your document and the style of headings, but it will not change much.
- Generally, use “article” for short documents and “report” for long ones.

Common Packages

Writing L^AT_EX

```
\usepackage[margin=1in]{geometry}
% Used to adjust margins
\usepackage{verbatim}
% adds "comment" environment for long comments
% Allows the displaying of text "verbatim" that the LaTeX 1
% will not process
\usepackage{amsmath}
% Allows expanded math features
\usepackage{times}
% Uses Times New Roman font for LAIS classes
\usepackage{setspace}
% Easy double spacing between lines in paragraphs
\usepackage{graphicx}
% Includes images (discussed later)
```

Any other *common* packages I missed?

Text Styles/Fonts

Writing L^AT_EX

For all of the below commands, just use the control word and then place the text you want to appear inside of the {}.

Bold Face	<code>\textbf{}</code>
<i>Italics</i>	<code>\textit{}</code>
<i>Emphasized</i>	<code>\emph{}</code>
Roman Text	<code>\rmfamily{}</code>
Sans Serif Text	<code>\textsf{}</code>
Monospace Text	<code>\texttt{}</code>

Ordered `\begin{enumerate}`

Unordered `\begin{itemize}`

Description `\begin{description}`

- Use `\item` to create new item in the list
- For descriptions, add the description in `[]` after the `\item`

Example of Lists

Writing L^AT_EX

```
\begin{enumerate}
  \item Item 1
  \item Item 2
  \item Item 3
    \begin{enumerate}
      \item
        These can be nested!
    \end{enumerate}
  \item Item 4
\end{enumerate}

\begin{description}
  \item[My Description] Informative Text
\end{description}
```

Environments

Writing L^AT_EX

- Different pieces of the document are placed in different *environments*
- The lists above each began an environment which causes L^AT_EX to handle commands differently.
- Everything in the document is placed in the document environment
 - That's why it begins with `\begin{document}`
- Use `\begin{}` to open an environment and `\end{}` to close it.

- Math has its own special environment in L^AT_EX.
- For the most part, it behaves like normal
 - Except, there are different functions than normal text
 - And the typesetting system is different for math
- Two ways to write math:
 - 1 Inline: Use `\()`
 - 2 Displayed: Use `\[`

```
\begin{displaymath}  
  \int_1^{\infty} \frac{\pi}{y^2} dy  
\end{displaymath}
```

$$\int_1^{\infty} \frac{\pi}{y^2} dy$$

Nested Fractions

Writing L^AT_EX

```
\[ \frac{\frac{1}{x}}{\frac{y}{2}} \cdot \frac{(x+y)^2}{1} \]
```

$$\frac{\frac{1}{x} \cdot \frac{y}{2}}{(x+y)^2}$$

Boolean Equations and Logic

Writing L^AT_EX

`\[\neg (P \wedge Q) = (\neg P) \vee (\neg Q) \]`

`\[\neg (P \vee Q) = (\neg P) \wedge (\neg Q) \]`

$$\neg(P \wedge Q) = (\neg P) \vee (\neg Q)$$

$$\neg(P \vee Q) = (\neg P) \wedge (\neg Q)$$

You can also embed math in text...

Let `\(x=1\)` and `\(y=2\)`. As `\(t \to \infty\)`,
`\(z\)` goes to `\(0\)`.

Let $x = 1$ and $y = 2$. As $t \rightarrow \infty$, z goes to 0.

Getting L^AT_EX

Arch:	<code># pacman -S texlive-most</code>
Debian/Mint/Ubuntu:	<code># apt-get install texlive-full</code>
Fedora:	<code># yum install texlive</code>
Windows/OS X:	Follow instructions at https://tug.org