

Introduction to L^AT_EX

Maryam Kaka

IEEE Carleton Workshop

maryam.kaka@ieee.carleton.ca

October 20, 2016

What is L^AT_EX?

- high-quality typesetting system
- includes features designed for the production of technical and scientific documentation
- Long story short: makes pretty documents (Just look at this sideshow!)

How does it work?

- document is written in commands that describe the structure of the document
- the L^AT_EX compiler takes all the commands and text to produce a formatted document
- so all you have to do is say what things are and L^AT_EX will take care of the rest

How do I begin?



- <https://www.latex-project.org/>
- Works Linux, Mac OS, Windows, and even Online!
- This workshop will use Overleaf (Online platform)

Beginning With Overleaf

- <https://www.overleaf.com>
- Free online platform that allows you to create, edit and share your L^AT_EX documents
- we will be using this for this workshop so head over, create an account and open a blank document!



Hello Document!

- Every document begins with `\documentclass{}` - Allows us to tell L^AT_EX what kind of document we are writing
- Every command starts with a slash (`\`)
- your document goes between `\begin{document}` ... `\end{document}`
- notice that L^AT_EX takes care of any random whitespace
- `%` allows for comments

Example

```
\documentclass{article}  
\begin{document}  
Hello World! %Heres a comment!  
\end{document}
```

Titles and Sections

- Document titles can be created using the `\title{}` command
- Document author can be specified using the `author{}` command
- The `\maketitle` command is required to create the title page

Example

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

\author{Maryam Kaka}
\title{Getting Started with \LaTeX}
\maketitle

Hello World! %Heres a comment!

\end{document}
```

Titles and Sections

- Sections and subsections can be added using the `section{}` and `subsection{}` commands
- Notice that sections are automatically numbered (use `section*{}` if you don't want numbered sections)

Example

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

\title{Getting Started with \LaTeX}
\maketitle

\section{Introduction}
\subsection{Subsection 1}

Hello World! %Heres a comment!

\end{document}
```


Special Characters

- Some character's have special meaning in L^AT_EX- Inorder to type them you need to *escape* the character by typing a backslash (\) beforehand
 - $\backslash \$ \backslash \% \backslash \& \backslash \# \backslash \{ \backslash \} \rightarrow \$ \% \& \# \{ \}$
 - What happens when you try to escape a backslash?
- Quotation Marks:
 - ‘Single Quotes’ → ‘Single Quotes’
 - ‘‘Double Quotes’’ → “Double Quotes”

Typesetting Math

- Use the \$... \$ to write math in text

Example

```
\section{Math}
\subsection{Inline Mode}
Here's a random equations in the middle of the document $y =
  \alpha{x_1}^2 + \beta{x_2}$
```

- Some other math mode symbols:
 - `\ne` → \neq
 - `\infty` → ∞
 - `\le` `\ge` → \leq \geq
 - `\angle ABC` → $\angle ABC$
 - `90^{\circ}` → 90°
 - `\sum` → \sum

Working with Environments

- Environments are used to format blocks of text in L^AT_EX
- environments are defined in
`\begin{NameOfEnviro} ... \end{NameOfEnviro}`

Example

```
\section{Working With Environments}
\subsection{Centre Environment}
\begin{center}
This text will be centred since it is inside a special
environment. Environments provide a efficient way of
    modifying
blocks of text within your document.
\end{center}
```

Math Environments

- The `Math` environment allows you to write more complex math in own line
- The `equation` environment allows you to have numbered equations
- Other math environments exist (Eg. The `align` allows for multiline equations that are properly aligned)

Example

```
\subsection{Math Environment}
\begin{equation}
x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\end{equation}
```

Lists

- Unordered Lists: `itemize`
- Ordered Lists: `enumerate`
- each item in the list is preceded by the `\list` command
- lists can be nested to create nested points

Example

```
\subsection{Lists}
\begin{itemize}           % unordered List
\item Point 1 of unordered list
\item second point
\end{itemize}

\begin{enumerate}        %ordered List
\item point 1 of ordered list
\item \begin{enumerate}
      \item nested point
    \end{enumerate}
\end{enumerate}
```

Figures

- In order to add figures we will be using the `graphicx` package
 - packages need to be imported in the document preamble (ie before the `\begin{document}`)
- Captions can be added inside the figure environment using the `\caption{}` command

Example

```
\usepackage{graphicx}
\begin{document}
...
\subsection{Figures}
\begin{figure}
  \includegraphics{image.jpg}
  \caption{Here's a figure with a figure caption} \label{
    exapleFigure}
\end{figure}
```

- notice how L^AT_EX finds the optimal location of the figure based on the structure of the document

Tables

- The columns justification are specified using **l**(eft), **c**(entre) and **r**(ight) tags
- **&** specifies the end of the column and **** the end of the row

Example

```
\begin{table}
\centering
\caption{Heres a table caption} \label{exampleTable}
\begin{tabular} {|l | c r|}
  \hline
  Column 1 & Col. 2 & col 3 \\
  \hline
  1          & 2          & 3          \\
  \hline
\end{tabular}
\end{table}
```

- Generating tables for the lazy:
<http://www.tablesgenerator.com/>

Working with References

- Locations within the document can be linked (such as referring to a table, section or figure) - saves you from having to remember what all the figure/table/section numbers are!
- Accomplished using the `\label{}` and `\ref{}` tags
- For figures and tables the `\label{}` tag goes within the respective environment

Example

```
\section{Referencing}
\subsection{Working with references}
See Table \ref{exampleTable} for an example of a table
structure in \LaTeX
```


- All references are stored in a .bib file
- .bib files can be exported by most reference managers
- references are called using the tag (`exampleRef` is the tag in the example below)

Example

```
@book{exampleRef,  
  title={Brain-Computer Interfaces: Principles and Practice  
    },  
  author={Wolpaw, J. and Wolpaw, E.W.},  
  isbn={9780199921485},  
  year={2012},  
  publisher={Oxford University Press}  
}
```

Referencing the Bibliography

- In the main text the `\cite{}` command is used to reference to the .bib file
- The `\bibliography{}` command inserts a bibliography with all texts referenced in the document
- citation style is set using the `\bibliographystyle{}` command

Example

```
\subsection{Bibliography}  
Here I'm referencing a book \cite{exampleRef}  
  
\bibliography{biblio}  
\bibliographystyle{IEEEtran}
```

The End