What is LaTeX?

- A document preparation system
  - Used to typeset a document

History of LaTeX

- Donald Knuth created TeX in 1978
  - Aim was to make it easy to create books and to ensure that documents looked the same on any computer
  - TeX files can be typeset into PDF files

- Leslie Lamport created LaTeX in 1985
  - LaTeX = Lamport TeX
  - Introduced a number of extensions to TeX which made it faster and easier to use
  - Soon, LaTeX became the standard way to use TeX

Why?

- Why use LaTeX when we have word processors?
  - Results look better
  - Focus on structure helps document development
  - Works well for large documents
  - Automatically generates:
    - Table of contents
    - Lists of figures
    - Lists of tables
    - Index
    - Glossaries
    - Bibliographies
  - Free and runs on many platforms

http://en.wikipedia.org/wiki/LaTeX
Commands

- Used to tell LaTeX how to typeset something
  - Commands are case sensitive
  - Optional parts are in square brackets
  - Compulsory parts are in curly braces

  \commandname[options]{argument}

  \documentclass[a4paper]{article}
  \documentclass[a4paper,twocolumn]{article}

Comments

- Used to annotate the document
  - Ignored by the compiler
  - Aimed at other humans

  \% Comments starts with a percentage sign
  \% All text is ignored until the end of the \%
  \% line is reached.

Whitespace

- Whitespace characters
  - Space
  - Tab
  - Line break

- White space is largely ignored apart from:
  - Space between words.
  - Blank lines between blocks of text that are used to make paragraphs.

- Two or more consecutive whitespace characters
  - Reduced to a single space

\begin{center}
\begin{tabular}{cccc}
A & B & C \\
D & E & F \\
\end{tabular}
\end{center}

Special characters

- Characters that are used in the syntax of the language
  - Can't type these characters directly
  - Need a special way to print them
  - 10 characters

\begin{center}
\begin{tabular}{cccc}
\$ & \& & ^ & _ & ~ & \# & \{ & \}
\end{tabular}
\end{center}
Environments

- Apply a change to the content within the environment
  - New environments start new paragraphs

\begin{environmentname}
  Content within the center
  Environment, is centered on
  The page.
\end{environmentname}

Creating a LaTeX document

- \documentclass
  - Defines the type of document
    - Book
    - Report
    - Article
    - Letter

- The document environment encloses the contents of the document

- The space between the document class command and the start of the document environment is called the preamble.
  - Contains commands that affect the entire document.

Creating a LaTeX document

- \documentclass[a4paper]{article}

- \begin{document}
  \title{A very short document}
  \author{Damir Azhar}
  \date{2017}
  \maketitle
  This is the document.
  \end{document}

Adding a title

- Require four commands to create a title
  - \title{ put the title here }
  - \author{ author goes here }
  - \date{ date goes here }
    - will put today’s date if date not specified

- Once the information has been defined, insert the title
  - \maketitle
Structuring a document

- \part{part name goes here}
- \chapter{chapter name goes here}
  - Only books and reports
- \section{section name goes here}
  - Bold, larger, numbered automatically
- \subsection{subsection name goes here}
- \subsubsection{subsubsection name goes here}

Table of contents

- Table of contents is automatically generated using the \tableofcontents command.
  - place after \maketitle – sometimes need to recompile
  - Parts
  - Chapters
  - Sections
  - Subsections
- Each command has a table of contents option
  - Displays a different name in the table of contents
    \section[Introduction]{An introduction to typesetting using the LaTeX language}

Footnotes

- Footnotes are created in the text as you type them
  - \footnote{footnote text goes here}

```
\documentclass[a4paper]{article}
\begin{document}
\title{A very short article}
\author{Damir Azhar}
\date{2017}
\maketitle
This is the document
\footnote{Note that the document is an article} that I am using as an example.
\end{document}
```

Paragraphs and line breaks

- LaTeX will remove excess whitespace
  - Need to explicitly include paragraphs and line breaks
- Paragraph
  - Leave a blank line in the input
- Line break
  - Use the command `\`

```
\begin{document}
A gap between two lines.
\end{document}
```

```
\begin{document}
A gap between two lines.
 Creates a new paragraph. Two backslashes creates\ \ \\
 a new line.
\end{document}
```
**Quote marks**

- **Unidirectional quotes (" ") are inadequate**
  - Use the symbols ' and ' for single quotes
  - Use the symbols " and " for double quotes
- **Single quotes**
  - Open using ' character and close using ' character
    - `Hello`
    - 'Hello'
- **Double quotes**
  - Open using " characters and close using " character
    - `"Hello"
    - “Hello”

**Dashes**

- **Hyphen (-)**
  - Short dash to join different words together
    - `merry-go-round`
    - merry-go-round
- **En dash (–)**
  - Longer dash used to indicate a range of values
    - pages 45--50
    - pages 45–50
- **Em dash (—)**
  - Very long dash between words or phrases
    - the start --- the finish
    - the start — the finish

**Ellipsis**

- **Three dots in a sequence**
  - Used to indicate text that ... has been removed
  - Or an unfinished ...
- **Can’t just use three full stops in a row**
  - LaTeX will use incorrect spacing
  - Use the \ldots command

There is \ldots missing

There is ... missing

**Spaces**

- **Lines have to be broken to wrap text**
  - Try to break at a space
  - Try to break at a syllable
- **Some spaces we don’t want to be broken**
  - E.g. between initials and surnames
    - The lecturer for this course is A.~J.~Luxton-Reilly
    - Bad layout
    - The lecturer for this course is A. J. Luxton-Reilly
- **Use a tilde ~ to signify a space that we can’t break**
  - The lecturer for this course is A.~J.~Luxton-Reilly
Basic Formatting

- \textbf{command} makes the enclosed text bold

This was a long lecture

This was a cool class

Exercise

- What is the LaTeX code that would generate the following document?

Pythagoras
A. Professor
2017

Around 530 BC, Pythagoras moved to Croton — a Greek colony in southern Italy — and set up a religious sect.

This is where Pythagoras earned his reputation as a mystic.

Pythagoras was also a skilled mathematician …

Answer

\documentclass[a4paper]{article}

\begin{document}
\title{Pythagoras}
\author{A. Professor}
\date{2017}
make\title

Around 530 BC, Pythagoras moved to \textbf{Croton} --- a Greek colony in southern Italy --- and set up a religious sect.

\begin{center}
This is where Pythagoras earned his reputation as a mystic.
\end{center}

Pythagoras was also a skilled mathematician\ldots

References

- There are many LaTeX tutorials on the Internet
  - http://www.tug.org/interest.html
  - http://www.latex-project.org/
  - http://www.ctan.org

- Web site that allows you to try it out
  - http://sciencesoft.at/index.jsp?link=latex\&size=1280\&js=1\&lang=en

- Tutorial documents
  - The (not so) short guide to LaTeX

- Online course reference manual