Welcome to LaTeX.

The What, the Why, and the How of the Premier WYSIWYM Text Processor.

Sam Orman-Chan & Alex Elwell

University of Lincoln — School of Computer Science

27th February 2023 / Enhancement Week 2023

UNIVERSITY OF LINCOLN

Outline

What is LaTeX?

Not the Fetish Society Sort.

Pronounced as Lay-Teck

- LaTeX is a Typesetting System.
  - Meaning it is software used to define how a written document is laid out.
  - It is often used in academic writing, particularly in academic papers and reports.
  - LaTeX is also used to write Books, letters, CVs & even Presentations (Including this One).

Outline

Why?

Why use LaTeX?

- LaTeX is a “What You See is What You Mean” Document Processing & Typesetting System.
- This is opposed to the Ubiquitous “What You See is What You Get” paradigm employed by tools like Microsoft Word or LibreOffice.
- The Result of this Difference is with LaTeX, you use special ‘escape sequences’ and ‘commands’ to describe your document layout whilst you write your document.
- Allowing you to focus on your writing whilst the Compiler focuses on the Layout.

UNIVERSITY OF LINCOLN

Outline

Editors & Compilers

LaTeX is an Open Source Project with a variety of Distributions available for its usage. Examples Include:

- Overleaf — An Online LaTeXEditor & Compiler.
- MikTeX — A Native Instance for Windows, macOS & Linux. (Sam's Personal Favourite for Windows)
- MacTeX — A Native Instance for Mac[1]
- TexLive — A Native Cross-Platform Version for just about anything.[1]
- VerbTex — An Android Instance.

[1] MacTeX & TeXLive have very Large Storage Footprints (4GB+) as they locally store and maintain entire copies of the CTAN locally.

Overleaf

For the Ease of Learning & so you don't need to download any software, we will be using Overleaf, however the Syntax is the Same Across the different LaTeX Distributions.

1. Create an Account on Overleaf. You can use your University Email Here.
2. Next create a Project In Overleaf. This is a bit like a folder where you will store all files relating to the document. Here we will start with selecting "Blank Project".
3. Now you are Ready. Please shout if you have any issues.

Your First Document

When You create your Blank Project you will be presented with a split screen of LaTeX Source Code & the PDF Output. Overleaf helpfully provides a bit of code like this to get you started:

```
\documentclass{article}
\usepackage[utf8]{inputenc}
\title{Learn1}
\author{Samuel Orman-Chan}
\date{February 2023}
\begin{document}
\maketitle
\section{Introduction}
\end{document}
```

Edit the Code

You may notice that editing the code does not result in the preview updating. This is as LaTeX is a compiled Language and as such, you will need to click Recompile in Overleaf before you can see your changes.
Begin by Typing on the line below “\begin{document}” line. Try adding some newlines and some text.

Outline

Escape Sequences

You have probably noticed that no matter how many newlines you put in, the spacing on the output doesn't seem to change. This is as LaTeX treats newlines a bit differently to how Word does.
In fact there are a couple ways to add vertical space between lines. You can use a double backslash or a backslash 'par', with the difference being that the latter also indents the next line to make paragraph demarcation a little more obvious.

Accents

You may also note that typing characters with accents results in errors. This is as to type an accented character, like õ or ĥ you must escape it. This is done by:

1. Typing \ and the character that best matches the accent. Such as ˆ for a circumflex, a “ for an umlaut or a ‘c’ for cedilla.
2. Then, without a space between them, type the letter you want accenting.

Note: If you wish to type the £ sign, you must type “\pounds”. If you notice that spacing is weird between your escaped characters and your normal ones, swap the space immediately after the escape sequence with a tilde (~).

Outline

Your Preamble

When you use LaTeX you will notice that unlike a plain text or even a word doc, there are areas of the source file that are not output. The most important of these is the Preamble.
This part of your document works a bit like a configuration file, instructing the LaTeX compiler on things like page size, document class, packages in use etc.
However, if you use a template, you rarely need to touch the preamble unless you use a package.

Document Classes

In LaTeX the type of document you are writing is indicated with the Document Class. A Class determines the layout attributes of a document, such as whether it will include a postal address at the top or a page number at the bottom.
Types of Document Class Include:

- Article — The default for most. If in doubt, use this one.
- Letter — Used for writing letters and other correspondence.
- Beamer — Used for creating presentations like this.
- Book — Used for creating books.
- KOMA Letter — A variant of the Letter Class with the KOMA Macros.
- Memoir — A variant of Book Class.

Environments

In LaTeX concepts like slides, centre-aligned areas, figures, lists & tables are created within and using ‘Environments’. Environments are created using the \{begin{Environment Type}} & \{end} commands. With environments, you can use specialist commands and/or benefit from specialised formatting that is not available within the wider document environment. An example of this is the ‘itemize’ environment that lets you create a bulleted list, and adds the ‘\item’ command, which allows you to indicate that the piece of text is an item of the list.

Referencing

LaTeX has both inbuilt and external Referencing Tools that are highly customisable. You can use the inbuilt referencing tool by using the cite command (obviously escaped) or a BibTex/BibLaTeX file and the appropriate post-processor. Please see the Further Reading for information on Referencing though as it can become very, very in depth.

Further Reading on Referencing in LaTeX.

The Maths “Environment”

The Maths Environment is a special area of your document that you start and end with $ signs. Between the $ you can use LaTeX Maths Notation to write even very complex maths very easily. For instance, if I wanted to write “12 plus 144 plus 20 plus 3 times the square root of 4, divided by 7, all added to 5 times 11 is equal to 9 squared plus 0” I could write:

“$ \frac{12 + 144 + 20 + 3 \sqrt {4}}{7} + 9 \times 11 = 9^2 \+ 0 $”

Which would output:

$$\frac{12+144+20+3\sqrt{4}}{7} + 9 \times 11 = 9^2 + 0$$

Images

In LaTeX Images are supported using the ‘graphicx’ package. To use this package:

1. Declare ‘graphicx’ in the preamble with the ‘usepackage’ command.
2. Optional Set the \graphicspath to the directory where images/graphics are kept.
3. At the location you want the image to appear, type \includegraphics[size either as a measurement of height and/or width, or scale]{image path, either from the graphics path, the relative path to the TeX file or the absolute path from the drive root}.
4. Compile and check it looks right.

Further Reading

https://en.wikibooks.org/wiki/LaTeX

https://www.overleaf.com/learn

https://lncn.ac/3p3t

https://lncn.ac/zk1qu

Accents Reference

LaTeX command	Sample	Description
\‘{o}	ò	grave accent
\’{o}	ó	acute accent
\^{o}	ô	circumflex
\"{o}	ö	umlaut, trema or dieresis
\H{o}	ő	long Hungarian umlaut (double acute)
\∼{o}	õ	tilde
\c{c}	ç	cedilla
\k{a}	ǫ	ogonek
\l{}	ł	barred l (l with stroke)
\={o}	ō	macron accent (a bar over the letter)
\.{o}	ȯ	dot over the letter
\d{u}	ọ	dot under the letter
\r{a}	å	ring over the letter (for å there is also the special command \aa)
\u{o}	ŏ	breve over the letter
\v{s}	š	caron/háček ("v") over the letter
\o{}	ø	slashed o (o with stroke)
{\i}	ı	dotless i (i without tittle)

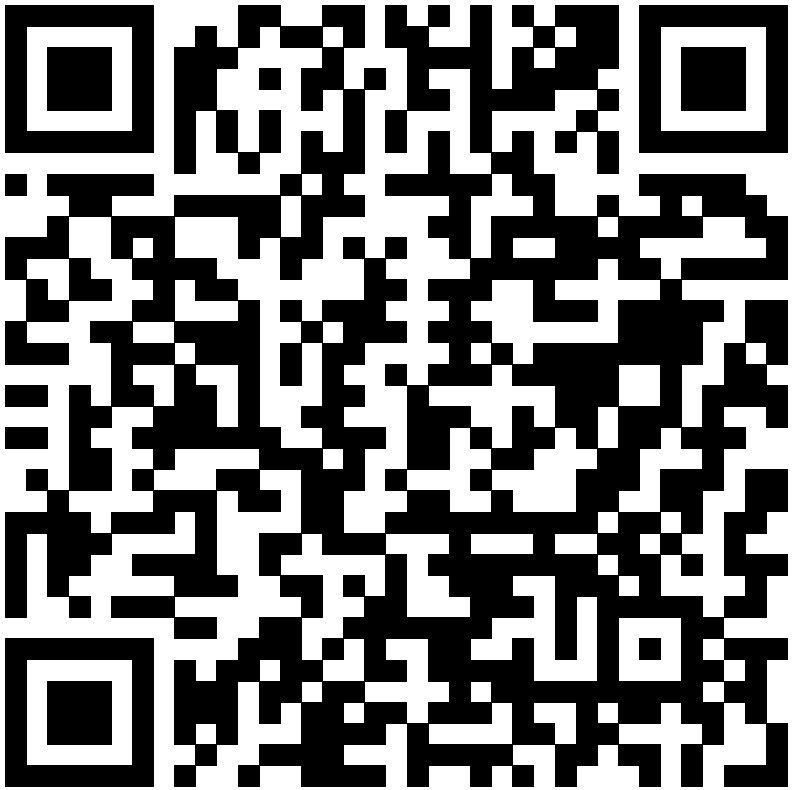
Table: Table of Accent Escapes

Thanks to:

- Wikibooks Community for the Invaluable, Straightforward & Comprehensive wiki-book on Learning LaTeX
- Overleaf for Useful, Well Organised & Detailed Support Articles on the LaTeX Language.
- TeX Stack Exchange for almost universally having answers to any questions that can arise from LaTeX Usage.

UNIVERSITY OF LINCOLN

Download this Presentation



https://github.com/SJO-C/presentLatex/raw/main/presentLaTeX.pdf