

# **LaTeX Training Course**

## **'Using LaTeX to write a thesis'**

UK-TUG Volunteers

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# Acknowledgements

- ▶ Volunteers:
  - ▶ Jay Hammond
  - ▶ Phil Molyneux
  - ▶ John Trapp
  - ▶ Joseph Wright
- ▶ UK TeX Users' Group
- ▶ University of Cambridge
- ▶ Nicola Talbot

## What is LaTeX, and what is TeX?

- ▶ TeX is a typesetting application;
- ▶ TeX uses *primitives* to determine how to put text on a page;
- ▶ For most practical purposes, we need a *format* built on top of TeX, for example:
  - ▶ Plain TeX;
  - ▶ LaTeX;
  - ▶ ConTeXt;
- ▶ You can think of LaTeX as an interpreter between you and TeX.

# TeX 'engines'

## pdfTeX

The standard binary program: we'll be using this today.

## XeTeX

A merger of TeX with modern font technology with support for native Unicode input and bidirectional typesetting.

## LuaTeX

Also a modern engine: integrates the Lua scripting into TeX.

## What do we need to use LaTeX?

- ▶ A TeX distribution: TeXLive (Windows, Mac, Linux) or MiKTeX (Windows only);
- ▶ A text editor, e.g. Notepad, TextEdit, Emacs;
- ▶ A PDF viewer, for example Adobe Reader.

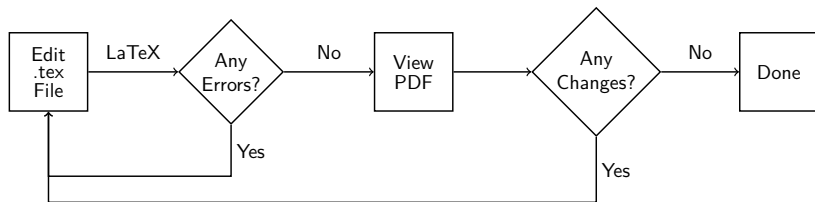
## What do we need to use LaTeX?

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Usually, we use a specialist editor

- ▶ Coloured syntax;
- ▶ Buttons or menus to run LaTeX, *etc.*;
- ▶ Most include an integrated spell checker.

# Workflow



## LaTeX is not a word processor

- ▶ LaTeX input is stored as plain text files, usually with the extension `.tex`;
- ▶ LaTeX input files contain both the text of the document and *control sequences*;
- ▶ Control sequences start with a slash, so look like this:  
`\example`
- ▶ Writing in LaTeX is therefore about *programming* it to produce the document you want.

## Special characters

Character	Use	Result
\	<code>\textbackslash</code>	\
{	<code>\{</code>	{
}	<code>\}</code>	}
%	<code>\%</code>	%
~	<code>\textasciitilde</code>	~
&	<code>\&amp;</code>	&
#	<code>\#</code>	#
\$	<code>\\$</code>	\$
^	<code>\textasciicircum</code>	^
-	<code>\_</code>	-

## Spacing

- ▶ LaTeX treats multiple spaces as a single space;
- ▶ By default, the space between sentences is slightly larger than the space between words;
- ▶ This can be switched off using `\frenchspacing`;
- ▶ New line characters are treated as a space;
- ▶ Paragraph breaks should be indicated by a blank line;
- ▶ LaTeX automatically indents paragraphs, except for the first paragraph after a section heading.

# A simple document

## Example

```
\documentclass[a4paper,12pt]{article}
% A comment in the preamble
\begin{document}
% This is a comment
This is a simple
document\footnote{with a footnote}.

This is a new paragraph.
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# Document Classes

The *document class* sets up the general layout of the document, for example:

- ▶ the format of the headings;
- ▶ if the document should have chapters;
- ▶ if the title should be on a separate page or above the text on the first page.

## Usage

```
\documentclass[<options>]{<class-name>}
```

## Base classes

**article** for short documents without chapters;

**report** for longer documents with chapters, typically single-sided with an abstract;

**book** for books, typically double-sided with front matter and back matter;

**letter** for correspondence;

**slides** for presentations.

## Modern classes

**KOMA-Script** `scrartcl`, `scrreprt` and `scrbook` to replace article, report and book, respectively;

**memoir** replaces book and report;

**beamer** or slides (used to create the course material).

# Documentation

## On your computer

The `texdoc` application will show documentation for material you have installed. From the Command Prompt/Terminal

```
texdoc <package>
```

## From CTAN

Try the web address

```
http://ctan.org/pkg/<name>
```

## KOMA-Script Example

```
\documentclass{scrreprt}

\usepackage{lipsum}% Provides \lipsum for dummy text

\title{A Sample Document}
\author{Ann Author}

\begin{document}
\maketitle
\tableofcontents

\chapter{Introduction}

This is a sample document with some dummy
text\footnote{and a footnote}.
\lipsum
\end{document}
```

# Title Page

First, you need to give the 'meta-data':

- ▶ `\title{\textit{title}}`
- ▶ `\author{\textit{author(s)}}`
- ▶ `\date{\textit{date}}` (optional)

Then use `\maketitle` to display the title page.

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Classes such as KOMA-Script add more items, for example `\publisher`.

## Sectioning commands

Article-like classes provide the commands:

- ▶ `\part[<short title>]{<title>}`
- ▶ `\section[<short title>]{<title>}`
- ▶ `\subsection[<short title>]{<title>}`
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## On packages

The LaTeX kernel is rather limited: to get around that we load *packages*:

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\usepackage [options] {package}
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or

```
\usepackage{\langle package1 \rangle, \langle package2 \rangle, \dots}
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We have already seen the lipsum package!

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We have already seen the lipsum package!

Documentation for packages is available in exactly the same way as for classes.

## Including external images

- ▶ Load the `graphicx` package to include graphics;
- ▶ Use `\includegraphics` to actually place the image;
- ▶ Image formats: `pdf`, `png`, `jpg`;
- ▶ File extension should be omitted.

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Graphics can also be 'drawn' in LaTeX using the `Tikz` package: a course in itself!

## Floating figures

### A basic figure

```
\begin{figure}[htbp]
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## Creating a bibliography

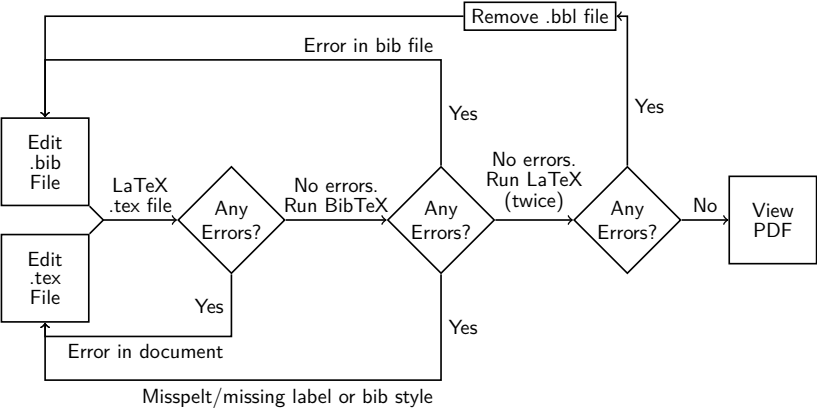
- ▶ Entries are stored in a *BibTeX database*;
- ▶ Inform LaTeX about it using `\bibliography` command;
- ▶ These are cited using `\cite` in the LaTeX file;
- ▶ Choose a style using `\bibliographystyle`.

# Creating a bibliography

## The LaTeX basics

```
\documentclass{article}
\usepackage{natbib}
\bibliographystyle{plainnat}
\begin{document}
Some text \cite{key}.
\bibliography{example}
\end{document}
```

# BibTeX workflow



# The BibTeX file

A basic article

## Example

```
@article{lampport94,  
  author    = "Leslie Lamport",  
  title     =  
    "{\LaTeX}: a document preparation system",  
  edition   = "2nd",  
  publisher = "Addison--Wesley",  
  year      = 1994,  
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Multiple authors

## Example

```
@inproceedings{smith05,  
  author      = "Smith, Jr, John and Jane Lucy Doe  
    and and Other, Andrew N. and de Vere, Jo",  
  title       = "An example article",  
  booktitle   = "Proceedings of the Imaginary Society",  
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```

## Citations in LaTeX

- ▶ The LaTeX kernel is limited for citations;
- ▶ The natbib package is much more powerful;
- ▶ A new approach is provided by biblatex.

# Citations using natbib

## Textual citations

`\citet[<note>]{<key>}`

`\citet{lampport1994}` ⇒ Lampport (1994)

`\citet[p.~34]{lampport1994}` ⇒ Lampport (1994, p. 34)

## Parenthetical citations

`\citep[<prenote>][<postnote>]{<key>}`

`\citep{lampport94}` ⇒ (Lampport, 1994)

`\citep[p.~34]{lampport94}` ⇒ (Lampport, 1994, p. 34)

`\citep[see][ ]{lampport94}` ⇒ (see Lampport, 1994)

## Getting help

- ▶ `www.tex.ac.uk/faq`;
- ▶ `www.latex-community.org`;
- ▶ `tex.stackexchange.com`;
- ▶ `theoval.cmp.uea.ac.uk/~nlct/latex/`.

## Reading

- ▶ *Not So Short Introduction to LaTeX2e*, Oetiker;
- ▶ *A Guide to LaTeX*, Kopka and Daly;
- ▶ *LaTeX Beginners Guide*, Kottwitz.