

LaTeX I

Adapted from materials produced by UK-TUG Volunteers

Dr. Clea F. Rees

ReesC21@cardiff.ac.uk

Doctoral Academy
Prifysgol Caerdydd Cardiff University

Tachwedd 25 November 2016

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

LaTeX is a powerful system

- LaTeX can be used for everything from a one page letter to a 1000 page textbook.
- Most of *our* examples will be simple.
- Complex documents, for example interactive books and these slides, use the same ideas as we're exploring today.
- By separating input from output, reusing material becomes much easier.

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 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: TeX Live (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?

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

Usually, we use a specialist editor which has

- coloured syntax;
- buttons or menus to run LaTeX, *etc.*;
- an integrated spell checker.

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

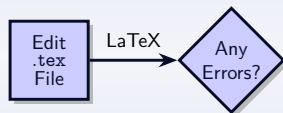
LaTeX is not a word processor

- LaTeX input is stored as plain text files, usually with the extension `.tex`.
- LaTeX input files contain both the text of the document and *commands*.
- Commands start with a backslash, so look like this:
`\example`.
- Writing in LaTeX is therefore a bit like *programming* it to produce the document you want.
- *Logical* mark up is important in LaTeX: we'll use some almost straight away!

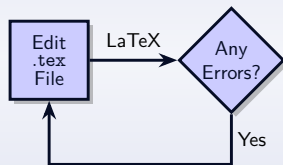
Workflow



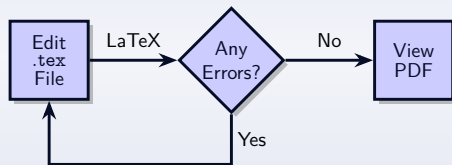
Workflow



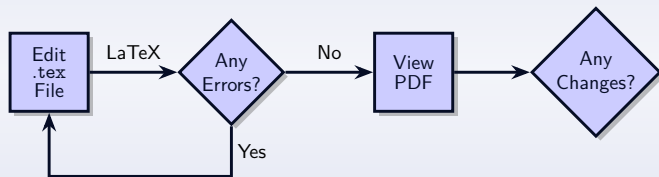
Workflow



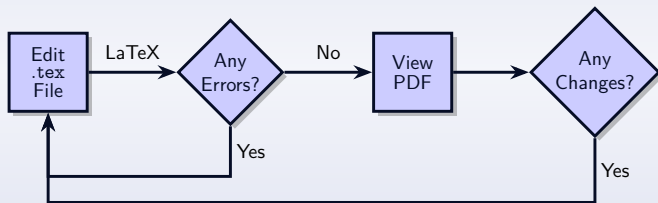
Workflow



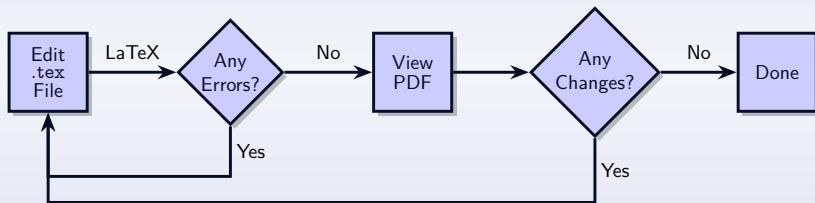
Workflow



Workflow



Workflow



Spacing

- LaTeX treats multiple spaces as a single space.
- By default, the space between sentences is slightly larger than the space between words — can be switched off using `\frenchspacing`.
- The tilde (`~`) is used to create a non-breaking space.
- 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 another sentence in the same paragraph which should
make the paragraph more than one line long.

This is a new paragraph.
\end{document}
```

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 another sentence in the same paragraph which should
make the paragraph more than one line long.

This is a new paragraph.
\end{document}
```

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 another sentence in the same paragraph which should
make the paragraph more than one line long.

This is a new paragraph.
\end{document}
```

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 another sentence in the same paragraph which should
make the paragraph more than one line long.

This is a new paragraph.
\end{document}
```

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 another sentence in the same paragraph which should
make the paragraph more than one line long.

This is a new paragraph.
\end{document}
```

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 another sentence in the same paragraph which should
make the paragraph more than one line long.

This is a new paragraph.
\end{document}
```


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 another sentence in the same paragraph which should
make the paragraph more than one line long.

This is a new paragraph.
\end{document}
```

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 another sentence in the same paragraph which should
make the paragraph more than one line long.

This is a new paragraph.
\end{document}
```

Overleaf

Although you will probably want to try out various editors, viewers etc. to find the combination which suits you best, we are going to practise today using the online service, Overleaf.

You will need to start by signing up for an account.

Please do this now by opening the site in the browser of your choice and using the 'Sign Up' button.

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

Logical mark up

LaTeX provides us with logical mark up, as well as the ability to directly set the appearance.

Logical mark up

```
\emph{⟨text⟩}
```

```
{\large ⟨text⟩}
```

Appearance mark up

```
\textit{⟨text⟩}
```

```
{\fontsize{12 pt}{14 pt}\selectfont ⟨text⟩}
```

Usually, logical mark up is best when it is available.

Logical mark up

LaTeX provides us with logical mark up, as well as the ability to directly set the appearance.

Logical mark up

```
\emph{<text>}  
{\large <text>}
```

Appearance mark up

```
\textit{<text>}  
{\fontsize{12 pt}{14 pt}\selectfont <text>}
```

Usually, logical mark up is best when it is available.

Logical mark up

LaTeX provides us with logical mark up, as well as the ability to directly set the appearance.

Logical mark up

```
\emph{⟨text⟩}
```

```
{\large ⟨text⟩}
```

Appearance mark up

```
\textit{⟨text⟩}
```

```
{\fontsize{12 pt}{14 pt}\selectfont ⟨text⟩}
```

Usually, logical mark up is best when it is available.

Title Page

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

- `\title{\langle title \rangle}`
- `\author{\langle author(s) \rangle}`
- `\date{\langle date \rangle}` (optional)

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

Sectioning commands

- `\chapter[<short title>]{<title>}`
- `\section[<short title>]{<title>}`
- `\subsection[<short title>]{<title>}`
- `\subsubsection[<short title>]{<title>}`
- `\paragraph[<short title>]{<title>}`
- `\subparagraph[<short title>]{<title>}`

Sectioning commands

- `\chapter[<short title>]{<title>}`
- `\section[<short title>]{<title>}`
- `\subsection[<short title>]{<title>}`
- `\subsubsection[<short title>]{<title>}`
- `\paragraph[<short title>]{<title>}`
- `\subparagraph[<short title>]{<title>}`

Sectioning commands

- `\chapter[<short title>]{<title>}`
- `\section[<short title>]{<title>}`
- `\subsection[<short title>]{<title>}`
- `\subsubsection[<short title>]{<title>}`
- `\paragraph[<short title>]{<title>}`
- `\subparagraph[<short title>]{<title>}`

Sectioning commands

- `\chapter[<short title>]{<title>}`
- `\section[<short title>]{<title>}`
- `\subsection[<short title>]{<title>}`
- `\subsubsection[<short title>]{<title>}`
- `\paragraph[<short title>]{<title>}`
- `\subparagraph[<short title>]{<title>}`

Sectioning commands

- `\chapter[<short title>]{<title>}`
- `\section[<short title>]{<title>}`
- `\subsection[<short title>]{<title>}`
- `\subsubsection[<short title>]{<title>}`
- `\paragraph[<short title>]{<title>}`
- `\subparagraph[<short title>]{<title>}`

Lists

Order not important

```
\begin{itemize}
  \item This is an unordered list
\end{itemize}
```

Order important

```
\begin{enumerate}
  \item This one is ordered
  \item So this will have number 2!
\end{enumerate}
```

Quoting things

- Single quotes: ``short quote'`.
- Double quotes: ```short quote''`.
- Block quotes: `\begin{quotation}... \end{quotation}`.

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

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.

They can also add new control sequences.

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.

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 for slides (used to create the material for this workshop).

KOMA-Script Example

```
\documentclass{scrreprt}
```

```
\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}.

```
\end{document}
```

Documentation

On your computer (after installing a TeX distribution!)

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

```
texdoc <name>
```

Online

Try CTAN:

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

or `texdoc` online

```
http://texdoc.net/pkg/<name>
```

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

Cross-referencing

Example input

```
\section{A section}
\label{sec:interesting}
...
\ref{sec:interesting}
```

Two LaTeX runs are needed to get cross-references right.

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

Mathematics

- Mathematical content is marked up in LaTeX in a logical way.
- You can use `$... $` or `\(... \)` to mark up in-line maths.
- For displayed mathematics, use `\[... \]`.
- A lot of spacing is automatic in math mode.
- Maths is an entire area on its own!

Example input

```
\( y = 2 \sin \theta^2 \)
```

Example output

$$y = 2 \sin \theta^2$$

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

On packages

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

```
\usepackage[\langle options \rangle]{\langle package \rangle}
```

or

```
\usepackage{\langle package1 \rangle,\langle package2 \rangle,...}
```

We have already seen the lipsum package!

On packages

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

```
\usepackage[<options>]{<package>}
```

or

```
\usepackage{<package1>,<package2>,...}
```

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`.
- Images in `eps` format 'auto-converted' to `pdf`.
- File extension should be omitted.

Including external images

- Load the `graphicx` package to include graphics.
- Use `\includegraphics` to actually place the image.
- Image formats: `pdf`, `png`, `jpg`.
- Images in `eps` format 'auto-converted' to `pdf`.
- File extension should be omitted.

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

Options for image inclusion

`\includegraphics` uses a **key-value** interface for configuration. This means that although it takes only a single optional argument, this argument can itself specify multiple options.

Options for image inclusion

`\includegraphics` uses a **key-value** interface for configuration. This means that although it takes only a single optional argument, this argument can itself specify multiple options.

```
\includegraphics[<key for option 1>=<value for option 1>, <key  
for option 2>=<value for option 2>]{myimage}
```

Options for image inclusion

`\includegraphics` uses a **key-value** interface for configuration. This means that although it takes only a single optional argument, this argument can itself specify multiple options.

```
\includegraphics[<key for option 1>=<value for option 1>, <key for option 2>=<value for option 2>]{myimage}
```

Options for image inclusion

`\includegraphics` uses a **key-value** interface for configuration. This means that although it takes only a single optional argument, this argument can itself specify multiple options.

```
\includegraphics[⟨key for option 1⟩=⟨value for option 1⟩, ⟨key  
for option 2⟩=⟨value for option 2⟩]{myimage}
```

Options for image inclusion

`\includegraphics` uses a **key-value** interface for configuration. This means that although it takes only a single optional argument, this argument can itself specify multiple options.

```
\includegraphics[<key for option 1>=<value for option 1>, <key for option 2>=<value for option 2>]{myimage}
```

Options for image inclusion

`\includegraphics` uses a **key-value** interface for configuration. This means that although it takes only a single optional argument, this argument can itself specify multiple options.

```
\includegraphics[⟨key for option 1⟩=⟨value for option 1⟩, ⟨key  
for option 2⟩=⟨value for option 2⟩]{myimage}
```

Options for image inclusion

`\includegraphics` uses a **key-value** interface for configuration. This means that although it takes only a single optional argument, this argument can itself specify multiple options.

```
\includegraphics[<key for option 1>=<value for option 1>, <key  
for option 2>=<value for option 2>]{myimage}
```

These options can be used to change the display of the image in various ways e.g. by cropping, scaling or rotating the image.

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

Floating figures

A floating figure ...

```
\begin{figure}[htbp]
\centering
\includegraphics{myimage}
\caption{A Sample Figure}
\label{fig:sample}
\end{figure}
```


Floating figures

A floating figure ...

```
\begin{figure}[htbp]  
\centering  
\includegraphics{myimage}  
\caption{A Sample Figure}  
\label{fig:sample}  
\end{figure}
```

Floating figures

A floating figure ...

```
\begin{figure}[htbp]
\centering
\includegraphics{myimage}
\caption{A Sample Figure}
\label{fig:sample}
\end{figure}
```

Floating figures

A floating figure ...

```
\begin{figure}[htbp]
\centering
\includegraphics{myimage}
\caption{A Sample Figure}
\label{fig:sample}
\end{figure}
```

Floating figures

A floating figure ...

```
\begin{figure}[htbp]
\centering
\includegraphics{myimage}
\caption{A Sample Figure}
\label{fig:sample}
\end{figure}
```

Floating figures

A floating figure ...

```
\begin{figure}[htbp]
\centering
\includegraphics{myimage}
\caption{A Sample Figure}
\label{fig:sample}
\end{figure}
```

... needs a cross-reference

as is shown in Figure~\ref{fig:sample}

Tables

- The floating environment for a table is called `table`.
- However, the content can be anything!
- Use the `tabular` environment to make tables.
- Load the `booktabs` package for rules.

Tables

A simple table

```
\begin{table}  
  \centering  
  \caption{A caption}  
  \label{tab:example}  
  \begin{tabular}{lcr}  
    \toprule  
    Heading & Another one & A third \\  
    \midrule  
    a & b & c \\  
    d & e & f \\  
    \multicolumn{3}{c}{Wide text} \\  
    \bottomrule  
  \end{tabular}  
\end{table}
```

Tables

A simple table

```
\begin{table}  
\centering  
\caption{A caption}  
\label{tab:example}  
\begin{tabular}{lcr}  
\toprule  
Heading & Another one & A third \\  
\midrule  
a & b & c \\  
d & e & f \\  
\multicolumn{3}{c}{Wide text} \\  
\bottomrule  
\end{tabular}  
\end{table}
```


Tables

A simple table

```
\begin{table}  
  \centering  
  \caption{A caption}  
  \label{tab:example}  
  \begin{tabular}{lcr}  
    \toprule  
    Heading & Another one & A third \\  
    \midrule  
    a & b & c \\  
    d & e & f \\  
    \multicolumn{3}{c}{Wide text} \\  
    \bottomrule  
  \end{tabular}  
\end{table}
```

Tables

A simple table

```
\begin{table}  
\centering  
\caption{A caption}  
\label{tab:example}  
\begin{tabular}{lcr}  
\toprule  
Heading & Another one & A third \\  
\midrule  
a & b & c \\  
d & e & f \\  
\multicolumn{3}{c}{Wide text} \\  
\bottomrule  
\end{tabular}  
\end{table}
```

Tables

A simple table

```
\begin{table}
\centering
\caption{A caption}
\label{tab:example}
\begin{tabular}{lcr}
\toprule
Heading & Another one & A third \\
\midrule
a & b & c \\
d & e & f \\
\multicolumn{3}{c}{Wide text} \\
\bottomrule
\end{tabular}
\end{table}
```

Tables

A simple table

```
\begin{table}
\centering
\caption{A caption}
\label{tab:example}
\begin{tabular}{lcr}
\toprule
Heading & Another one & A third \\
\midrule
a & b & c \\
d & e & f \\
\multicolumn{3}{c}{Wide text} \\
\bottomrule
\end{tabular}
\end{table}
```

Tables

A simple table

```
\begin{table}
\centering
\caption{A caption}
\label{tab:example}
\begin{tabular}{lcr}
\toprule
Heading & Another one & A third \\
\midrule
a & b & c \\
d & e & f \\
\multicolumn{3}{c}{Wide text} \\
\bottomrule
\end{tabular}
\end{table}
```

Tables

A simple table

```
\begin{table}
\centering
\caption{A caption}
\label{tab:example}
\begin{tabular}{lcr}
\toprule
Heading & Another one & A third \\
\midrule
a & b & c \\
d & e & f \\
\multicolumn{3}{c}{Wide text} \\
\bottomrule
\end{tabular}
\end{table}
```

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

Beyond US English

TeX was originally designed for US English.

By default, LaTeX assumes your document uses US English.

It is important to tell LaTeX if this is not the case!

- `babel` configures your document for one or more languages.
- `inputenc` supports different *input* encodings.
 - `\usepackage[utf8]{inputenc}` enables you to input (many) accented characters directly.
- `fontenc` supports different *font* (output) encodings.
 - `\usepackage[T1]{fontenc}` supports most Western European languages.

Preamble

```
\documentclass[language options]{document class}  
\usepackage{babel}  
\usepackage[utf8]{inputenc}  
\usepackage[T1]{fontenc}% usually what you want
```

Preamble

```
\documentclass[<language options>]{<document class>}  
\usepackage{babel}  
\usepackage[utf8]{inputenc}  
\usepackage[T1]{fontenc}% usually what you want
```

Preamble

```
\documentclass[language options]{document class}  
\usepackage{babel}  
\usepackage[utf8]{inputenc}  
\usepackage[T1]{fontenc}% usually what you want
```

Syntax

```
% switch to <other language> until further notice
\selectlanguage{<other language>}
% typeset short <text> in <other language>
\foreignlanguage{<other language>}{<text>}
% temporary switch to <other language>
\begin{otherlanguage}{<other language>}
  <text>
\end{otherlanguage}
```

Syntax

```
% switch to <other language> until further notice
\selectlanguage{<other language>}
% typeset short <text> in <other language>
\foreignlanguage{<other language>}{<text>}
% temporary switch to <other language>
\begin{otherlanguage}{<other language>}
  <text>
\end{otherlanguage}
```

Syntax

```
% switch to <other language> until further notice
\selectlanguage{<other language>}
% typeset short <text> in <other language>
\foreignlanguage{<other language>}{<text>}
% temporary switch to <other language>
\begin{otherlanguage}{<other language>}
  <text>
\end{otherlanguage}
```

UK English

```
\documentclass[british]{article}
\usepackage{babel}
% recommended even for English
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
```

German (Default) and US English

```
\documentclass[american,ngerman]{article}
\usepackage{babel}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
```


German (Default) and US English

```
\documentclass[american,ngerman]{article}
\usepackage{babel}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
```

US English (Default) and German

```
\documentclass[ngerman,american]{article}
\usepackage{babel}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
```

German (Default) and US English

```
\documentclass[american,ngerman]{article}  
\usepackage{babel}  
\usepackage[utf8]{inputenc}  
\usepackage[T1]{fontenc}
```

US English (Default) and German

```
\documentclass[ngerman,american]{article}  
\usepackage{babel}  
\usepackage[utf8]{inputenc}  
\usepackage[T1]{fontenc}
```

German (Default) and US English

```
\documentclass[american,ngerman]{article}
\usepackage{babel}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
```

US English (Default) and German

```
\documentclass[ngerman,american]{article}
\usepackage{babel}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
```

UK English (Default) and Welsh

```
\documentclass[welsh,british]{article}
\usepackage{babel}
\usepackage[utf8]{inputenc}
% uncomment for older LaTeX for  $\hat{W}$   $\hat{w}$   $\hat{Y}$   $\hat{y}$ 
% \input{ix-utf8enc.dfu}
\usepackage[T1]{fontenc}
\providecommand{\cymraeg}[1]{%
  \foreignlanguage{welsh}{#1}}
```

UK English (Default) and Welsh

```
\documentclass[welsh,british]{article}
\usepackage{babel}
\usepackage[utf8]{inputenc}
% uncomment for older LaTeX for  $\hat{W}$   $\hat{w}$   $\hat{Y}$   $\hat{y}$ 
% \input{ix-utf8enc.dfu}
\usepackage[T1]{fontenc}
\providecommand{\cymraeg}[1]{%
  \foreignlanguage{welsh}{#1}}
```

UK English (Default) and Welsh

```
\documentclass[welsh,british]{article}
\usepackage{babel}
\usepackage[utf8]{inputenc}
% uncomment for older LaTeX for  $\hat{W}$   $\hat{w}$   $\hat{Y}$   $\hat{y}$ 
% \input{ix-utf8enc.dfu}
\usepackage[T1]{fontenc}
\providecommand{\cymraeg}[1]{%
  \foreignlanguage{welsh}{#1}}
```

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

Creating a bibliography

There are 3 common ways to create a bibliography in LaTeX.

- Use the `thebibliography` environment.
- Use a database of bibliographical entries and BibTeX.
- Use a database of bibliographical entries, `biblatex` and `Biber`.

Creating a bibliography

The LaTeX basics

To create the bibliography, use `thebibliography`:

```
\begin{thebibliography}{\langle sample label \rangle}
```

...

```
\end{thebibliography}
```

Creating a bibliography

The LaTeX basics

To create the bibliography, use `thebibliography`:

```
\begin{thebibliography}{\langle sample label \rangle}  
...  
\end{thebibliography}
```

Each entry looks like this:

```
\bibitem[\langle label \rangle]{\langle key \rangle} \langle entry text \rangle
```

Citations in the text then use the defined key:

```
Some text \cite{\langle key \rangle}.
```

thebibliography

Example

```
\begin{thebibliography}{99}
```

```
\bibitem{lamport}
```

```
  Leslie Lamport, \textit{\LaTeX{}: A Document  
  Preparation System}. Second Edition. Addison-Wesley:  
  Reading, MA. 1994.
```

```
\end{thebibliography}
```

thebibliography

Example

```
\begin{thebibliography}{99}
```

```
\bibitem{lampport}
```

```
  Leslie Lamport, \textit{\LaTeX{}: A Document  
  Preparation System}. Second Edition. Addison-Wesley:  
  Reading, MA. 1994.
```

```
\end{thebibliography}
```

thebibliography

Example

```
\begin{thebibliography}{99}
\bibitem{lamport}
  Leslie Lamport, \textit{\LaTeX{}: A Document
  Preparation System}. Second Edition. Addison-Wesley:
  Reading, MA. 1994.
\end{thebibliography}
```

thebibliography

A journal article

Example

```
\begin{thebibliography}{99}
```

```
\bibitem{smith05}
```

```
John Smith, Jr, Jane Lucy Doe, Andrew N.\ Other and  
Jo de Vere, 'An imaginary article'. In  
\textit{Journal of the Imaginary Society}  
XIV(4):45–67. 2005.
```

```
\end{thebibliography}
```

thebibliography

A journal article

Example

```
\begin{thebibliography}{99}
\bibitem{smith05}
  John Smith, Jr, Jane Lucy Doe, Andrew N.\ Other and
  Jo de Vere, 'An imaginary article'. In
  \textit{Journal of the Imaginary Society}
  XIV(4):45–67. 2005.
\end{thebibliography}
```

Citing the entries

Example

For additional information about `\LaTeX{}` and `\TeX{}` see `\cite{lamport}` and `\cite{smith05}`.

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

Working with long documents

- Long documents are best split into parts.
- `\input` places the material loaded 'here'.
- `\include` is used for separate chapters:
it always starts a new page.
- Using `\include` allows you to `\includeonly` selected chapters.
- Use `\includeonly` in the preamble.

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

Changing the page layout

By default, the standard classes use US letter sized paper.
For consistent A4 layout with standard classes:

```
\documentclass[a4paper]{article}  
\usepackage{geometry}
```

- Use `\geometry` with `article`, `report`, `book` and `letter`.
- `geometry` is usually best avoided when using classes such as `memoir` or `KOMA-Script`.
- Use `\geometry{<options>}` in the preamble to customise the layout.

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

Problem solving strategies

- Revert to the last known-good state of your document. Then reintroduce the changes one-by-one. (Only works if you keep backups, but you do that anyway, right?)
- Comment out code (using `%`) until you eliminate the problem. Then uncomment gradually.
- Take a break! Staring at non-working code blinds you to the obvious.
- Make the smallest document you can which demonstrates the problem. If that doesn't help, ask.

Describe the symptoms

Be clear about the problem.

If you are asking online, people only know what you tell them!

There are different kinds of problems.

- Compilation failure. (No PDF is produced.)
What is the error message?
What does the .log say?
- PDF compiles but with errors.
Which errors?
- No errors but the output is 'wrong'.
What exactly is wrong with it?

Solution strategies

- Delete 'generated' files e.g. `.aux`.
- Check that every `\begin{⟨environment⟩}` matches an `\end{⟨environment⟩}`.
- Check that the `{`s match the `}`s.
- Make sure you don't start writing before `\begin{document}`.

Outline

An overview of LaTeX

Getting started

Logical structure

Classes

Cross-referencing

More logical structure

Packages

Floating material

Multilingual typesetting

Bibliographies

Long documents

Page layout

Solving problems

Further information

Getting help

- www.tex.ac.uk/faq
- www.latex-community.org
- tex.stackexchange.com
- www.dickimaw-books.com/latexresources.html
- detexify.kirelabs.org/

Reading

- *Not So Short Introduction to LaTeX2e*, Oetiker
- *A Guide to LaTeX*, Kopka and Daly
- *LaTeX for Complete Novices*, Talbot
- *LaTeX and Friends*, van Dongen