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# An Introduction to $\LaTeX$

Nicola L. C. Talbot

University of East Anglia

24th February & 3rd March 2010

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# 1 Introduction

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## 1 Introduction

## 2 Classes and Packages

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- 1 Introduction
- 2 Classes and Packages
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- 6 Help



# What are T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X?

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  - ...
- Think of L<sup>A</sup>T<sub>E</sub>X as an interpreter between you and T<sub>E</sub>X.



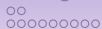


## What Else is There?

**XeTeX/XeLaTeX:** based on a merger of T<sub>E</sub>X and modern font technologies.

- Supports Unicode character sets.
- Supports bidirectional typesetting.

**LuaTeX:** T<sub>E</sub>X-like engine with a lua interpreter built in.



# What do we need to use $\text{\LaTeX}$ ?

- A text editor (e.g. notepad).



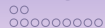
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- A PDF viewer (e.g. Adobe Reader).
- A  $\TeX$  distribution (e.g. MiKTeX or TeX Live).

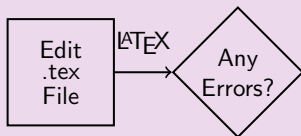


# Workflow

Edit  
.tex  
File

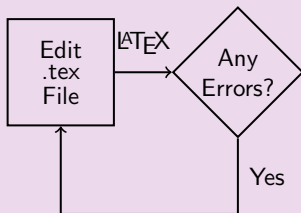


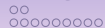
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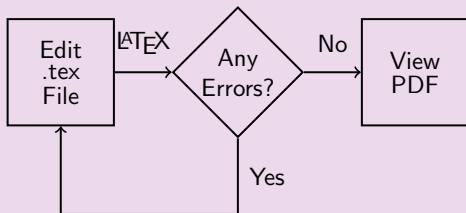


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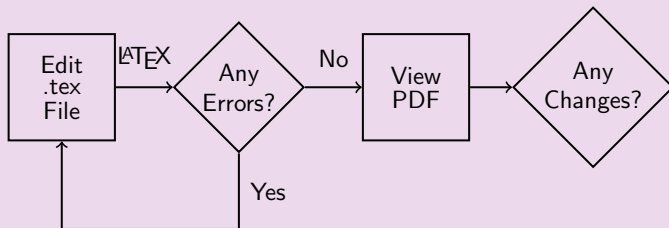
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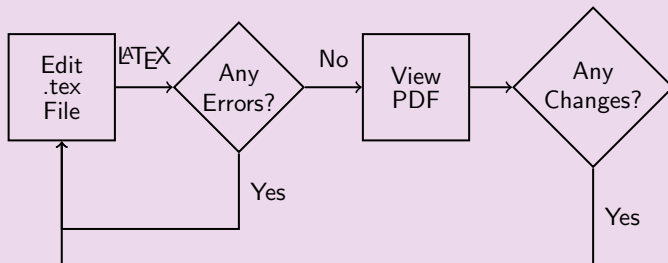


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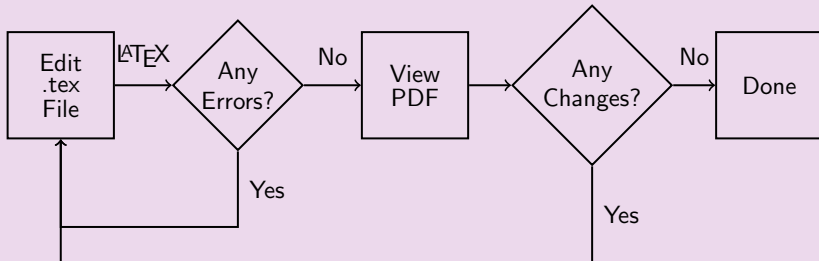


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- Download it from the Internet: <http://www.tug.org/>



## Text Editors Available for Windows

TeXMaker	Free	<a href="http://www.xmlmath.net/texmaker/">http://www.xmlmath.net/texmaker/</a>
TeXnicCenter	Free	<a href="http://www.texniccenter.org/">http://www.texniccenter.org/</a>
WinEdt	Shareware	<a href="http://www.winedt.com/">http://www.winedt.com/</a>
WinShell	Free	<a href="http://www.winshell.org/">http://www.winshell.org/</a>

We will be using TeXMaker.





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- $\text{\TeX}$  follows many typesetting rules.
- People changing from word processors to  $\text{\TeX}$  often get frustrated because  $\text{\TeX}$  makes it difficult (but not impossible) to implement these bad habits.



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\ { } % ~ & # \$ ^ \_

- If you actually want to produce one of those symbols, you need to use a command:

```
\textbackslash \{ \} \% \textasciitilde \& \# \$
\textasciicircum \_
```





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- $\text{\LaTeX}$  automatically indents paragraphs, except for the first paragraph after a section heading.



# A Simple Document

## Example

```
\documentclass[a4paper,12pt]{article}

\begin{document}
% This is a comment
This is a simple
document\footnote{with a footnote}.

This is a new paragraph.
\end{document}
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### Example

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Preamble

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## Exercise

Create the above document.

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  - the format of the headings;
  - if the document should have chapters;
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- The class is specified using

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  - `slides` for presentations.
- The basic classes aren't very flexible.



# Modern Classes

- The KOMA-Script classes:
  - `scrartcl` replaces `article`
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- Presentations (replacing `slides`):
  - `beamer` (used to create this document)
  - `prospert`
  - `foils`



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- The KOMA-Script classes:
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  - `scrreprt` replaces report
  - `scrbook` replaces book
  - `scrlttr2` replaces letter
- `memoir` replaces book and report
- `octavo` replaces book
- Presentations (replacing slides):
  - `beamer` (used to create this document)
  - `prospcr`
  - `foils`
- We will be using `scrartcl` for the rest of the exercises.



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Needs hieroglf  
package  
to work

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- A package can change the fonts. Examples:
  - The `mathptmx` package will change the serif font to Times.



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  - The `graphicx` package provides a command to include images.
  - The `parallel` package provides commands to typeset text in parallel (for example, one language in one column and the translation in the next column.)
- A package can change the fonts. Examples:
  - The `mathptmx` package will change the serif font to Times.
  - The `helvet` package will change the sans-serif font to Helvetica. (Needs to be scaled to work with Times.)

## What Are Packages For?

- A package can provide additional commands. Examples:
  - The `graphicx` package provides a command to include images.
  - The `parallel` package provides commands to typeset text in parallel (for example, one language in one column and the translation in the next column.)
- A package can change the fonts. Examples:
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- A package can redefine existing commands. Examples:

## What Are Packages For?

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  - The `datetime` package redefines `\today` to change the format of the current date.

## What Are Packages For?

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- A package can change the fonts. Examples:
  - The `mathptmx` package will change the serif font to Times.
  - The `helvet` package will change the sans-serif font to Helvetica. (Needs to be scaled to work with Times.)
- A package can redefine existing commands. Examples:
  - The `datetime` package redefines `\today` to change the format of the current date.
  - The `babel` package redefines the commands that provide textual labels (e.g. “Contents”, “Chapter”, “Appendix”).



## Exercise

To practice loading packages, amend your document so that it uses Times, Helvetica and Courier. Also change the document class to `scrartcl`. For example:

```
\documentclass[12pt]{scrartcl}
\usepackage{mathptmx}
\usepackage[scaled=.92]{helvet}
\usepackage{courier}

\begin{document}
This is a \emph{simple} document. \textsf{Some
sans-serif text.} \texttt{Some typewriter text.}
\end{document}
```

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## Title Page and In-Page Titles

- The *title page* is on a page of its own.

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## Title Page and In-Page Titles

- The *title page* is on a page of its own.
- The *in-page title* is at the top of the first page of the document.



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## Title Page and In-Page Titles

- The *title page* is on a page of its own.
- The *in-page title* is at the top of the first page of the document.
- Both types are produced by the same command.

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## Title Page and In-Page Titles

- The *title page* is on a page of its own.
- The *in-page title* is at the top of the first page of the document.
- Both types are produced by the same command.
- The document class and the class options determine whether to use a title page or in-page title.

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## Title Page and In-Page Titles

- The *title page* is on a page of its own.
- The *in-page title* is at the top of the first page of the document.
- Both types are produced by the same command.
- The document class and the class options determine whether to use a title page or in-page title.
- Usually, article-like classes have an in-page title whereas book- and report-like classes have a title page.

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## Specifying the Title Information

- Before you can display the title page or in-page title, you must specify the title information.

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## Specifying the Title Information

- Before you can display the title page or in-page title, you must specify the title information.
- Available commands depend on the class file. For `scrartcl` the following commands are available:

```
\title{Title}
```

```
\author{Author(s)}
```

```
\date{Date}
```

```
\titlehead{Titlehead}
```

```
\subject{Subject}
```

```
\subtitle{Subtitle}
```

```
\publishers{Publisher}
```

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## Specifying and Displaying the Title Information

- Separate multiple authors with `\and`, for example:  
`\author{Smith \and Jones \and Brown}`

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## Specifying and Displaying the Title Information

- Separate multiple authors with `\and`, for example:  
`\author{Smith \and Jones \and Brown}`
- Use `\thanks{Text}` to provide an attribute, for example:  
`\author{Jo Bloggs\thanks{Funded by the Creative Arts Council}}`

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## Specifying and Displaying the Title Information

- Separate multiple authors with `\and`, for example:  
`\author{Smith \and Jones \and Brown}`
- Use `\thanks{Text}` to provide an attribute, for example:  
`\author{Jo Bloggs\thanks{Funded by the Creative Arts Council}}`
- If `\date` is omitted, the current date is used. To suppress the date use `\date{}`



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## Specifying and Displaying the Title Information

- Separate multiple authors with `\and`, for example:  
`\author{Smith \and Jones \and Brown}`
- Use `\thanks{Text}` to provide an attribute, for example:  
`\author{Jo Blogs\thanks{Funded by the Creative Arts Council}}`
- If `\date` is omitted, the current date is used. To suppress the date use `\date{}`
- Once the information has been specified, display the title using `\maketitle`.

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## Displaying the Title Page or In-Page Title

### Example

```
\documentclass{scrartcl}

\title{An Example Document}
\subtitle{With a Subtitle}
\author{Me\\University of East Anglia
\and My Shadow\\University of No Where}
\subject{\LaTeX\ Exercise}

\begin{document}
\maketitle
This is a simple document\footnote{with a footnote}.
\end{document}
```





## Displaying the Title Page or In-Page Title

### Example

```
\documentclass{scrartcl}
```

Specify information

```
\title{An Example Document}
```

```
\subtitle{With a Subtitle}
```

```
\author{Me\\University of East Anglia  
and My Shadow\\University of No Where}  
\subject{\LaTeX\ Exercise}
```

```
\begin{document}
```

```
\maketitle
```

```
This is a simple document\footnote{with a footnote}.
```

```
\end{document}
```

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## Displaying the Title Page or In-Page Title

### Example

```
\documentclass{scrartcl}
```

Specify information

```
\title{An Example Document}
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\subtitle{With a Subtitle}
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\author{Me\\University of East Anglia
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```
\and My Shadow\\University of No Where }
```

```
\subject{\LaTeX\ Exercise}
```

```
\begin{document}
```

```
\maketitle
```

```
This is a simple document\footnote{with a footnote}.
```

```
\end{document}
```

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## Displaying the Title Page or In-Page Title

### Example

```
\documentclass{scrartcl}
```

Specify information

```
\title{An Example Document}
\subtitle{With a Subtitle}
\author{Me\\University of East Anglia
\and My Shadow\\University of No Where}
\subject{\LaTeX\ Exercise}
```

```
\begin{document}
```

```
\maketitle
```

Display title information

```
This is a simple document\footnote{with a footnote}.
```

```
\end{document}
```



## Notes

- `\LaTeX` produces the  $\text{\LaTeX}$  logo.
- Spaces are ignored after command names, so `\LaTeX Exercise` will produce  $\text{\LaTeXExercise}$ .
- Force a space using `\`  (backslash space) for example: `\LaTeX\ Exercise`.



## Notes

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- Spaces are ignored after command names, so `\LaTeX Exercise` will produce  $\text{\LaTeXExercise}$ .
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`\LaTeX \ Exercise.`





## Notes

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- Force a space using `\`  (backslash space) for example:  
`\LaTeX \ Exercise`.



## Notes

- `\LaTeX` produces the  $\text{\LaTeX}$  logo.
- Spaces are ignored after command names, so `\LaTeX Exercise` will produce  $\text{\LaTeXExercise}$ .
- Force a space using `\`  (backslash space) for example: `\LaTeX\ Exercise`.

## Exercise

- Edit your document from the previous exercise so that it has an in-page title.
- Once it's working, use the `datetime` package to practice loading packages. What difference does it make?

```
\usepackage{datetime}
```

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## Paragraph Breaks

A paragraph break is indicated by a completely blank line or using `\par`

### Example

This is the first paragraph. A blank line is used to indicate a paragraph break, but that doesn't mean that a blank line will appear in the PDF file.

This is the second paragraph.`\par` This is the third paragraph.



## Exercise

The `lipsum` package provides dummy text. We'll use this in the exercises from now on to pad out the document we're creating. Edit your document so that it contains some paragraphs. You will need to add:

```
\usepackage{lipsum}
```

Add each paragraph using `\lipsum`. For example:

```
\lipsum[1]
```

```
\par
```

```
\lipsum[2]
```

```
\lipsum[3]
```

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## Changing the Paragraph Indentation and Separation

- To change the width of the paragraph indentation use:

```
\setlength{\parindent}{length}
```

For example:

```
\setlength{\parindent}{0.5in}
```

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## Changing the Paragraph Indentation and Separation

- To change the width of the paragraph indentation use:

```
\setlength{\parindent}{length}
```

For example:

```
\setlength{\parindent}{0.5in}
```

- With the KOMA-Script classes, you can suppress the paragraph indentation and add blank lines between paragraphs using the `parskip` class option:

```
\documentclass[parskip]{scrartcl}
```

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## Sectioning Commands

- Article-like classes provide the commands:

```
\part[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

- Article-like classes provide the commands:

```
\part[short title]{title}
\section[short title]{title}
\subsection[short title]{title}
\subsubsection[short title]{title}
\paragraph[short title]{title}
\subparagraph[short title]{title}
```

- If the short title is present, it's used for the table of contents or the page header.



## Sectioning Commands

- Article-like classes provide the commands:

```
\part[short title]{title}
\section[short title]{title}
\subsection[short title]{title}
\subsubsection[short title]{title}
\paragraph[short title]{title}
\subparagraph[short title]{title}
```

- If the short title is present, it's used for the table of contents or the page header.
- Book and report-like classes also provide the command:

```
\chapter[short title]{title}
```

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## Suppressing the Section Numbering

- Sections/chapters etc are automatically numbered by default.

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## Suppressing the Section Numbering

- Sections/chapters etc are automatically numbered by default.
- Use the starred version to suppress the numbering for an individual unit. For example:

```
\section*{Acknowledgements}
```

## Suppressing the Section Numbering

- Sections/chapters etc are automatically numbered by default.
- Use the starred version to suppress the numbering for an individual unit. For example:

```
\section*{Acknowledgements}
```

- To suppress all section numbering use:

```
\setcounter{secnumdepth}{1}
```

(Use -1 for parts, 0 for chapters, 2 for subsections, 3 for subsubsections etc.)

# Sectioning

## Example

```
\section{Introduction}
\lipsum[1-2]

\subsection{Sample Subsection}
\lipsum[3]
```

## Exercise

- Add some sections and sub-sections to your document.
- Try changing the paragraph indentation or try the `parskip` class option (but don't do both at the same time).
- Try the following class options and see what effect they have: `smallheadings`, `normalheadings` and `pointednumbers`.

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## Cross-Referencing

- Most things in  $\text{\LaTeX}$  that automatically generate a number can be cross-referenced.

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## Cross-Referencing

- Most things in  $\text{\LaTeX}$  that automatically generate a number can be cross-referenced.
- Put `\label{label}` after the command that generates the number. Example:

```
\section{Introduction}\label{intro}
```

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## Cross-Referencing

- Most things in  $\text{\LaTeX}$  that automatically generate a number can be cross-referenced.
- Put `\label{label}` after the command that generates the number. Example:

```
\section{Introduction}\label{intro}
```

- Put `\ref{label}` where you want to reference it. For example:

```
See section \ref{intro} for a brief introduction.
```



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## Cross-Referencing

- Most things in  $\text{\LaTeX}$  that automatically generate a number can be cross-referenced.
- Put `\label{label}` after the command that generates the number. Example:

```
\section{Introduction}\label{intro}
```

- Put `\ref{label}` where you want to reference it. For example:

```
See section \ref{intro} for a brief introduction.
```

- Better to use an *unbreakable* space:

```
See section~\ref{intro} for a brief introduction.
```

## Cross-Referencing

- Most things in  $\text{\LaTeX}$  that automatically generate a number can be cross-referenced.
- Put `\label{label}` after the command that generates the number. Example:

```
\section{Introduction}\label{intro}
```

- Put `\ref{label}` where you want to reference it. For example:

```
See section \ref{intro} for a brief introduction.
```

- Better to use an *unbreakable* space:

```
See section~\ref{intro} for a brief introduction.
```

- Run  $\text{\LaTeX}$  **twice** to get the references up-to-date.

## Labels

- Occasionally you need to put the label in the argument of the number-generating command.

### Example

```
\footnote{\label{footnote}Another footnote}
```

Somewhere else in the document:

See footnote~\ref{footnote} on  
page~\pageref{footnote}.

- If the label is undefined,  $\text{\LaTeX}$  will insert ?? in place of the reference number and will issue a warning. Check the messages box for any warnings.

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## Exercise

- Add some cross-references to your document. (You can use TeXMaker's **LaTeX** menu to insert the `\label` command.)
- Add the `hyperref` package (after all other packages):

```
\usepackage[colorlinks]{hyperref}
```

The cross-references should now be hyperlinks.

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## Abstract

- Abstracts are put in the abstract *environment*. Example:

```
\begin{abstract}
```

```
This is the abstract.
```

```
Its style depends on the  
document class.
```

```
\end{abstract}
```

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## Abstract

- Abstracts are put in the abstract *environment*. Example:

`\begin{abstract}` ← Start of environment

This is the abstract.

Its style depends on the  
document class.

`\end{abstract}` ← End of environment

## Abstract

- Abstracts are put in the abstract *environment*. Example:

`\begin{abstract}` ← Start of environment

This is the abstract.

Its style depends on the document class. ← The contents of the abstract

`\end{abstract}` ← End of environment

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## Abstract

- Abstracts are put in the abstract *environment*. Example:

```
\begin{abstract}
```

This is the abstract.

Its style depends on the  
document class.

```
\end{abstract}
```

- The word “Abstract” will be placed at the start of the abstract if you use the abstracton class option:

```
\documentclass[abstracton]{scrartcl}
```



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## Table of Contents

- Use `\tableofcontents` where you want the table of contents to appear.

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## Table of Contents

- Use `\tableofcontents` where you want the table of contents to appear.
- Typically after `\maketitle`.

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## Table of Contents

- Use `\tableofcontents` where you want the table of contents to appear.
- Typically after `\maketitle`.
- Run  $\text{\LaTeX}$  **twice** (occasionally a third run is needed).

## Table of Contents

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- Run  $\text{\LaTeX}$  **twice** (occasionally a third run is needed).
- By default, different sectional units have different indentations. To display all section numbering flush-left use the `tocleft` class option.

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## Table of Contents

- Use `\tableofcontents` where you want the table of contents to appear.
- Typically after `\maketitle`.
- Run  $\text{\LaTeX}$  **twice** (occasionally a third run is needed).
- By default, different sectional units have different indentations. To display all section numbering flush-left use the `tocleft` class option.

### Example

```
\begin{document}
\maketitle
\tableofcontents
```

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## Exercise

- Add an abstract and a table of contents to your document. (Remember to use  $\LaTeX$  twice.)
- Try the class option `abstracton` and see what happens.
- Try the class option `tocleft` and see what happens.

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## The scrpage2 Package

- Page headers and footers can be changed with the scrpage2 package, which comes with the KOMA-Script classes.

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## The scrpage2 Package

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- There are three basic page styles: empty, scrplain and scrheadings



## The scrpage2 Package

- Page headers and footers can be changed with the scrpage2 package, which comes with the KOMA-Script classes.
- There are three basic page styles: empty, scrplain and scrheadings
- Page styles can be set using

```
\pagestyle{style}
```

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## The scrpage2 Package

- Page headers and footers can be changed with the `scrpage2` package, which comes with the KOMA-Script classes.
- There are three basic page styles: `empty`, `scrplain` and `scrheadings`
- Page styles can be set using

```
\pagestyle{style}
```

- To set the style for the current page only:

```
\thispagestyle{style}
```

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## Changing the Header

- The inner, centre and outer parts of the header can be set using:

```
\ihead[plain inner head]{inner head}
```

```
\chead[plain centre head]{centre head}
```

```
\ohead[plain outer head]{outer head}
```

- The optional argument is used with `\pagestyle{scrplain}`
- The other argument is used with `\pagestyle{scrheadings}`

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## Changing the Footer

- The inner, centre and outer parts of the footer can be set using:

```
\ifoot[plain inner foot]{inner foot}
```

```
\cfoot[plain centre foot]{centre foot}
```

```
\ofoot[plain outer foot]{outer foot}
```

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## Example

In the handout I used:

```
\usepackage{scrpage2}

\ihead[] {An Introduction to \LaTeX}
\chead[] {}
\ohead[] {24/2/2010 \& 3/3/2010}
\ifoot[] {\url{http://theoval.cmp.uea.ac.uk/~nlct/latex/csed/}}
\cfoot[\pagemark] {}
\ofoot[] {\pagemark}
\pagestyle{scrheadings}
```

Note that the first page has a different page style. This is because `\maketitle` uses the `scrplain` style with the `scrartcl` class.

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## Two Columns

- So far, our example document is a one column document. To change this, use the `twocolumn` class option. For example:

```
\documentclass[twocolumn]{scrartcl}
```

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## Two Columns

- So far, our example document is a one column document. To change this, use the `twocolumn` class option. For example:

```
\documentclass[twocolumn]{scrartcl}
```

- You can also switch to two column mode using `\twocolumn` but this will cause a page break.

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## Two Columns

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```
\documentclass[twocolumn]{scrartcl}
```

- You can also switch to two column mode using `\twocolumn` but this will cause a page break.
- For a short block of two (or more) column text within a one column page use the `multicol` package.



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## Two Columns

- So far, our example document is a one column document. To change this, use the `twocolumn` class option. For example:

```
\documentclass[twocolumn]{scrartcl}
```

- You can also switch to two column mode using `\twocolumn` but this will cause a page break.
- For a short block of two (or more) column text within a one column page use the `multicol` package.
- For a more elaborate layout, you can use the `flowfram` package.

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## Parallel Text

- To typeset two languages in parallel use the `parallel` package.

## Parallel Text

- To typeset two languages in parallel use the `parallel` package.
- Use the `Parallel` environment to switch to parallel formatting.

```
\begin{Parallel}{left width}{right width}
```

*left width* and *right width* are the widths of the left and right columns. These can be absolute values, e.g. `2.5in`, or relative values, e.g. `0.45\textwidth`

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# The Parallel Environment

- Within the Parallel environment use:

```
\ParallelLText{left text}
```

```
\ParallelRText{right text}
```

```
\ParallelPar
```

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## The Parallel Environment

- Within the Parallel environment use:

```
\ParallelLText{left text}
```

```
\ParallelRText{right text}
```

```
\ParallelPar
```

- *left text* and *right text* should be single paragraphs.

## The Parallel Environment

- Within the Parallel environment use:

```
\ParallelLText{left text}
```

```
\ParallelRText{right text}
```

```
\ParallelPar
```

- *left text* and *right text* should be single paragraphs.
- Each set of `\ParallelLText` and `\ParallelRText` must be separated by `\ParallelPar`

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## Example

```
\begin{Parallel}{0.42\textwidth}{0.42\textwidth}
\ParallelLText{Gallia est omnis divisa in partes tres,
quarum unam incolunt Belgae, aliam Aquitani, tertiam qui
ipsorum lingua Celtae, nostra Galli appellantur. Hi omnes
lingua, institutis, legibus inter se differunt.}
\ParallelRText{All Gaul is divided into three parts, one of
which the Belgae inhabit, the Aquitani another, those who are
in their own language are called Celts, in our Gauls, the
third. All these differ from each other in language, customs
and laws.}
\ParallelPar
\ParallelLText{Gallos ab Aquitanis Garumna
flumen, a Belgis Matrona et Sequana dividit.}
\ParallelRText{The river Garonne separates the Gauls from the
Aquitani, the Marne and the Seine separate them from the Belgae.}
\end{Parallel}
```

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## Example

Left column

```

\begin{Parallel}{0.42\textwidth}{0.42\textwidth}
\ParallelLText{Gallia est omnis divisa in partes tres,
quarum unam incolunt Belgae, aliam Aquitani, tertiam qui
ipsorum lingua Celtae, nostra Galli appellantur. Hi omnes
lingua, institutis, legibus inter se differunt.}
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and laws.}
\ParallelPar
\ParallelLText{Gallos ab Aquitanis Garumna
flumen, a Belgis Matrona et Sequana dividit.}
\ParallelRText{The river Garonne separates the Gauls from the
Aquitani, the Marne and the Seine separate them from the Belgae.}
\end{Parallel}

```

Left  
column



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## Example

```

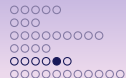
\begin{Parallel}{0.42\textwidth}{0.42\textwidth}
\ParallelLText{Gallia est omnis divisa in partes tres,
quarum unam incolunt Belgae, aliam Aquitani, tertiam qui
ipsorum lingua Celtae, nostra Galli appellantur. Hi omnes
lingua, institutis, legibus inter se differunt.}
\ParallelRText{All Gaul is divided into three parts, one of
which the Belgae inhabit, the Aquitani another, those who are
in their own language are called Celts, in our Gauls, the
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and laws.}
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flumen, a Belgis Matrona et Sequana dividit.}
\ParallelRText{The river Garonne separates the Gauls from the
Aquitani, the Marne and the Seine separate them from the Belgae.}
\end{Parallel}

```

Left column

Right  
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column

Right column



## Example

Gallia est omnis divisa  
in partes tres, quarum  
unam incolunt Belgae,  
aliam Aquitani, tertiam  
qui ipsorum lingua Celtae,  
nostra Galli appellantur.  
Hi omnes lingua, institutis,  
legibus inter se differunt.

Gallos ab Aquitanis  
Garumna flumen, a Belgis  
Matrona et Sequana  
dividit.

All Gaul is divided into  
three parts, one of which  
the Belgae inhabit, the  
Aquitani another, those  
who are in their own  
language are called Celts,  
in our Gauls, the third.  
All these differ from each  
other in language, customs  
and laws.

The river Garonne  
separates the Gauls from  
the Aquitani, the Marne  
and the Seine separate  
them from the Belgae.

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## Exercise

- Change your document so that it has two columns.
- If you want (and have time) try experimenting with the `multicol` or `parallel` packages.

```
\begin{multicols}{2}
\lipsum[1]
\end{multicols}
```

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# Creating a Bibliography

## Manual Method

Use the `thebibliography` environment:

```
\begin{thebibliography}{1}
  \bibitem{lamport94} Leslie Lamport.
  \emph{\LaTeX\ : a document preparation system}.
  Addison-Wesley, 2nd edition (updated for \LaTeXe),
  1994.
\end{thebibliography}
```

Disadvantages:

- You have to remember to format the entries consistently.
- You need to sort the entries.

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# Creating a Bibliography

## Using BibTeX

- Entries are stored in one or more databases. You specify the database(s) using `\bibliography{database list}` where you want the bibliography to appear.

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# Creating a Bibliography

## Using BibTeX

- Entries are stored in one or more databases. You specify the database(s) using `\bibliography{database list}` where you want the bibliography to appear.
- You specify the bibliography style using `\bibliographystyle{style}` (This governs the sorting as well as the formatting).

# Creating a Bibliography

## Using BibTeX

- Entries are stored in one or more databases. You specify the database(s) using `\bibliography{database list}` where you want the bibliography to appear.
- You specify the bibliography style using `\bibliographystyle{style}` (This governs the sorting as well as the formatting).
- Use the `bibtex` application to select only those references you've cited in the document.

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# BibTeX

- Create a new file (with .bib extension).



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# BibTeX

- Create a new file (with `.bib` extension).
- Enter the details of the reference using a special syntax. (Use TeXMaker's **Bibliography** menu to help you with the syntax.)

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# BibTeX

- Create a new file (with .bib extension).
- Enter the details of the reference using a special syntax. (Use TeXMaker's **Bibliography** menu to help you with the syntax.)
- BibTeX converts title text to lower case (depending on the style) except for the first word. Enclose proper nouns in curly braces to prevent this.

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# BibTeX

- Create a new file (with .bib extension).
- Enter the details of the reference using a special syntax. (Use TeXMaker's **Bibliography** menu to help you with the syntax.)
- BibTeX converts title text to lower case (depending on the style) except for the first word. Enclose proper nouns in curly braces to prevent this.
- Each entry has a unique label. Choose a naming system you find easy to remember.

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# BibTeX Database

## Example

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

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# BibTeX Database

## Example

This reference is a book

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

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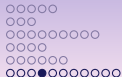
# BibTeX Database

## Example

This reference is a book

label

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



# BibTeX Database

## Example

This reference is a book

label

Don't change to lower case!

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

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# BibTeX Database

## Example

This reference is a book

label

Don't change to lower case!

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

Plain numbers don't need quotes



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## Multiple Authors

- Separate each author with and.

### Example

```
@inproceedings{smith05,
  author      = "John Smith, Jr and Jane Lucy Doe
                and Jo de Vere",
  title       = "An example article",
  booktitle   = "Proceedings of the Imaginary Society",
  month       = JAN,
  year        = 2005
}
```

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## Multiple Authors

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### Example

```
@inproceedings{smith05,
  author      = "John Smith, Jr and Jane Lucy Doe
                and Jo de Vere",
  title       = "An example article",
  booktitle   = "Proceedings of the Imaginary Society",
  month       = JAN,
  year        = 2005
}
```

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## Multiple Authors

- Separate each author with and.

### Example

```
@inproceedings{smith05,
  author      = "John Smith, Jr and Jane Lucy Doe
                and Jo de Vere",
  title       = "An example article",
  booktitle   = "Proceedings of the Imaginary Society",
  month       = JAN, — Use 3 letter abbreviation without quotes
  year        = 2005
}
```

## Multiple Authors

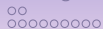
- Separate each author with and.

### Example

This reference is a conference article

```
@inproceedings{smith05,
  author      = "John Smith, Jr and Jane Lucy Doe
                and Jo de Vere",
  title       = "An example article",
  booktitle   = "Proceedings of the Imaginary Society",
  month       = JAN,
  year        = 2005
}
```

Use 3 letter abbreviation without quotes



## Citations

- By default, citations are numerical.

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## Citations

- By default, citations are numerical.
- For more flexibility use a bibliography package. Examples:
  - `natbib`
  - `newapa`
  - `biblatex`—new, very flexible.

## Citations

- By default, citations are numerical.
- For more flexibility use a bibliography package. Examples:
  - `natbib`
  - `newapa`
  - `biblatex`—new, very flexible.
- We will be using the `natbib` package with the `plainnat` bibliography style.
  - Can choose between numerical and author year formats.
  - Can have textual and parenthetical citations.

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## Example

Assume the bibliography database is called `myrefs.bib`:

```
\documentclass{scrartcl}
```

```
\usepackage{natbib}
```

```
\bibliographystyle{plainnat}
```

```
\begin{document}
```

Main matter with citations such as `\citet{lamport94}`.

```
\bibliography{myrefs}
```

```
\end{document}
```



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## Example

Assume the bibliography database is called `myrefs.bib`:

```
\documentclass{scrartcl}
```

Load bibliography package

```
\usepackage{natbib}
```

```
\bibliographystyle{plainnat}
```

```
\begin{document}
```

Main matter with citations such as `\citet{lamport94}`.

```
\bibliography{myrefs}
```

```
\end{document}
```

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## Example

Assume the bibliography database is called `myrefs.bib`:

```
\documentclass{scrartcl}
```

Load bibliography package

```
\usepackage{natbib}
```

```
\bibliographystyle{plainnat}
```

Specify bibliography style

```
\begin{document}
```

Main matter with citations such as `\citet{lamport94}`.

```
\bibliography{myrefs}
```

```
\end{document}
```

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## Example

Assume the bibliography database is called `myrefs.bib`:

```
\documentclass{scrartcl}
```

Load bibliography package

```
\usepackage{natbib}
```

```
\bibliographystyle{plainnat}
```

Specify bibliography style

```
\begin{document}
```

Citation

Main matter with citations such as `\citet{lamport94}`.

```
\bibliography{myrefs}
```

```
\end{document}
```

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## Example

Assume the bibliography database is called `myrefs.bib`:

```
\documentclass{scrartcl}
```

Load bibliography package

```
\usepackage{natbib}
```

```
\bibliographystyle{plainnat}
```

Specify bibliography style

```
\begin{document}
```

Citation

Main matter with citations such as `\citet{lamport94}`.

```
\bibliography{myrefs}
```

This is where the bibliography will go

```
\end{document}
```

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## Citations (natbib)

- *Textual* citation: `\citet[note]{label}`

## Citations (natbib)

- *Textual* citation: `\citet[note]{label}`

### Example

`\citet{lampport94}` ⇒ Lampport (1994)

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

## Citations (`natbib`)

- *Textual* citation: `\citet[note]{label}`

### Example

`\citet{lampport94}` ⇒ Lampport (1994)

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

- *Parenthetical* citation: `\citep[pre][post]{label}`

## Citations (natbib)

- *Textual* citation: `\citet[note]{label}`

### Example

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

- *Parenthetical* citation: `\citep[pre][post]{label}`

### Example

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



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# KOMA-Script

With the KOMA-Script classes you can:

- Add a preamble to the bibliography using

```
\setbibpreamble{preamble}
```

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# KOMA-Script

With the KOMA-Script classes you can:

- Add a preamble to the bibliography using

```
\setbibpreamble{preamble}
```

- Add the bibliography to the table of contents using the class option `bibtotoc`

# KOMA-Script

With the KOMA-Script classes you can:

- Add a preamble to the bibliography using

```
\setbibpreamble{preamble}
```

- Add the bibliography to the table of contents using the class option `bibtotoc`
- Make the bibliography a numbered section/chapter using the class option `bibtotocnumbered`

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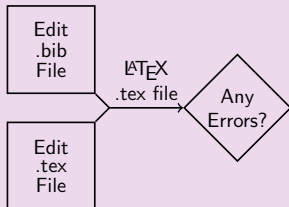
# Workflow

Edit  
.bib  
File

Edit  
.tex  
File

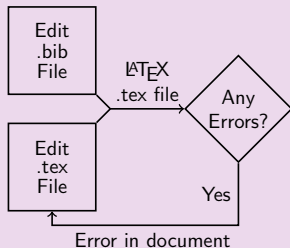
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# Workflow



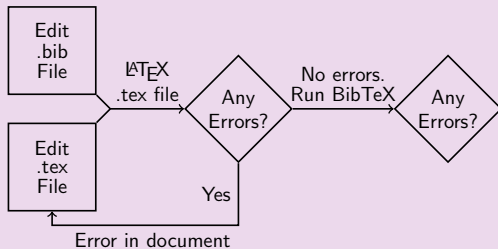
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# Workflow



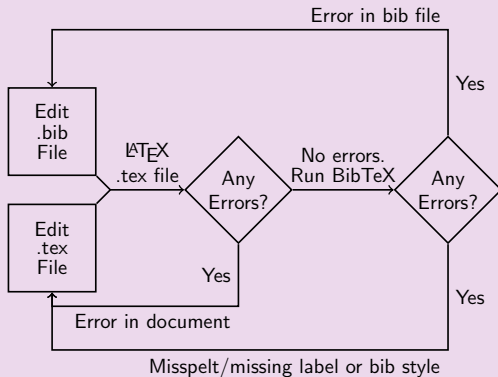
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# Workflow



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# Workflow





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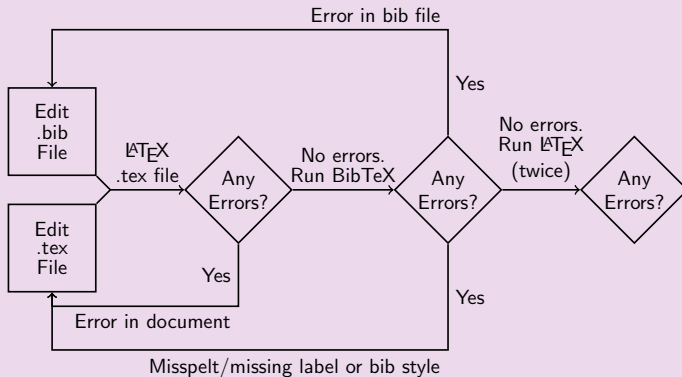
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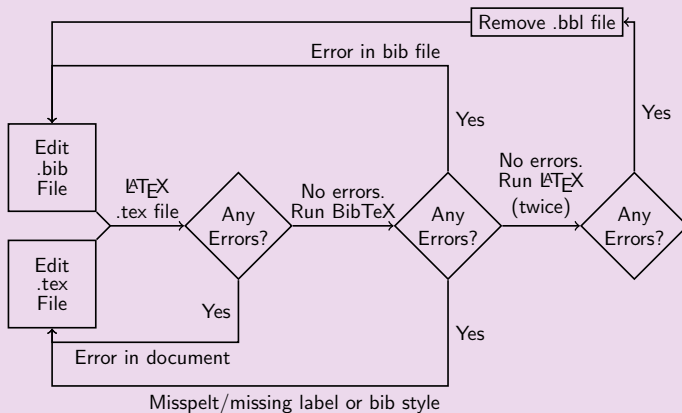
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## Workflow



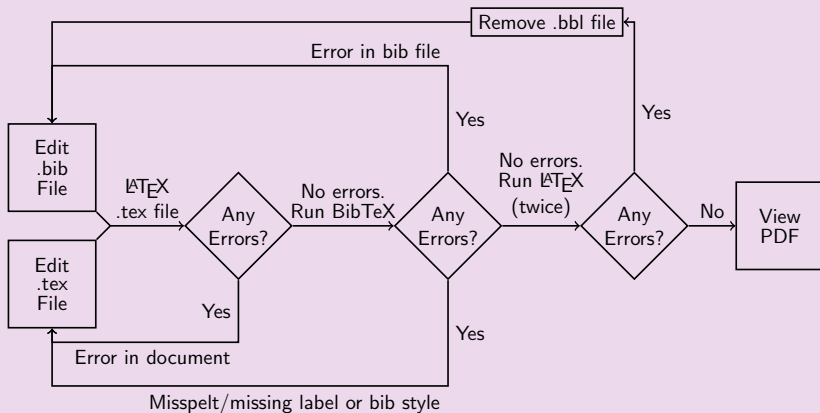


## Workflow





## Workflow



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## Exercise

Create a bibliography for your document:

- Make a new file.
- Use the **Bibliography** menu to help create some references.
- Save the file.
- Use `\citet` or `\citep` in your document.
- Run `pdflatex`, `bibtex`, `pdflatex`, `pdflatex` and view the PDF file.

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# Multilingual Support

- Different languages have different hyphenation patterns.

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## Multilingual Support

- Different languages have different hyphenation patterns.
- Predefined text, such as “Chapter” and “Contents”, should change if you are not writing in English.

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## Multilingual Support

- Different languages have different hyphenation patterns.
- Predefined text, such as “Chapter” and “Contents”, should change if you are not writing in English.
- Different languages use different quotation marks.

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## Multilingual Support

- Different languages have different hyphenation patterns.
- Predefined text, such as “Chapter” and “Contents”, should change if you are not writing in English.
- Different languages use different quotation marks.
- Need to tell  $\text{\LaTeX}$  what language you are using if you're not writing in English.



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# Packages

- babel (supports 41 languages)
- translator
- polyglossia (XeLaTeX)
- Other packages for specific languages (e.g. arabtex, bangtex, cjk)

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## Using babel

- Specify the languages in the class option. For example:  

```
\documentclass[french,english]{scrartcl}
```

  
The last named language is the default language.

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## Using babel

- Specify the languages in the class option. For example:

```
\documentclass[french,english]{scrartcl}
```

The last named language is the default language.

- Load babel:

```
\usepackage{babel}
```

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## Using babel

- Specify the languages in the class option. For example:  

```
\documentclass[french,english]{scrartcl}
```

The last named language is the default language.
- Load babel:  

```
\usepackage{babel}
```
- Use `\selectlanguage{language}` to switch to another language.

## Using babel

- Specify the languages in the class option. For example:  
`\documentclass[french,english]{scrartcl}`  
 The last named language is the default language.
- Load babel:  
`\usepackage{babel}`
- Use `\selectlanguage{language}` to switch to another language.
- Use `\foreignlanguage{language}{text}` to typeset a phrase in another language.

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## Example

```
\documentclass[latin,english]{scrartcl}
```

```
\usepackage{babel}
```

```
\begin{document}
```

According to Horace, we should

```
\foreignlanguage{latin}{carpe diem}
```

or seize the day.

```
\selectlanguage{latin}
```

Carpe diem, quam minimum credula postero.

```
\end{document}
```

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## Example

Languages used in this document

```
\documentclass[latin,english]{scrartcl}
```

```
\usepackage{babel}
```

```
\begin{document}
```

According to Horace, we should

```
\foreignlanguage{latin}{carpe diem}
```

or seize the day.

```
\selectlanguage{latin}
```

Carpe diem, quam minimum credula postero.

```
\end{document}
```

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## Example

Languages used in this document

```
\documentclass[latin,english]{scrartcl}
```

```
\usepackage{babel}
```

Load babel

```
\begin{document}
```

According to Horace, we should

```
\foreignlanguage{latin}{carpe diem}
```

or seize the day.

```
\selectlanguage{latin}
```

Carpe diem, quam minimum credula postero.

```
\end{document}
```



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## Example

Languages used in this document

```
\documentclass[latin,english]{scrartcl}
```

```
\usepackage{babel}
```

Load babel

```
\begin{document}
```

According to Horace, we should

```
\foreignlanguage{latin}{carpe diem}
```

or seize the day.

Latin phrase

```
\selectlanguage{latin}
```

```
Carpe diem, quam minimum credula postero.
```

```
\end{document}
```



## Example

Languages used in this document

```
\documentclass[latin,english]{scrartcl}
```

```
\usepackage{babel}
```

Load babel

```
\begin{document}
```

According to Horace, we should

```
\foreignlanguage{latin}{carpe diem}
```

or seize the day.

Latin phrase

```
\selectlanguage{latin}
```

Switch to Latin

```
Carpe diem, quam minimum credula postero.
```

```
\end{document}
```

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# Quote Marks

- Use `csquotes` to use language dependent quotation marks.

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## Quote Marks

- Use `csquotes` to use language dependent quotation marks.
- Use the package option `babel` to ensure the quotation marks switch with the language.

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## Quote Marks

- Use `csquotes` to use language dependent quotation marks.
- Use the package option `babel` to ensure the quotation marks switch with the language.
- Use `\enquote{text}` to quote some text.

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## Quote Marks

- Use `csquotes` to use language dependent quotation marks.
- Use the package option `babel` to ensure the quotation marks switch with the language.
- Use `\enquote{text}` to quote some text.
- `\enquote` can be nested.

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## Example

```
\documentclass[french,american,british]{scrartcl}
\usepackage[T1]{fontenc}
\usepackage{babel}
\usepackage[babel]{csquotes}
\begin{document}
\enquote{Hello,} I said.

\selectlanguage{american}
\enquote{Hello,} I said.

\selectlanguage{french}
\enquote{Bonjour,} j'ai dit.
\end{document}
```

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## Example

```

\documentclass[french,american,british]{scrartcl}
\usepackage[T1]{fontenc}
\usepackage{babel}
\usepackage[babel]{csquotes}
\begin{document}
\enquote{Hello,} I said.

\selectlanguage{american}
\enquote{Hello,} I said.

\selectlanguage{french}
\enquote{Bonjour,} j'ai dit.
\end{document}

```

Single quotes



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## Example

```
\documentclass[french,american,british]{scrartcl}
\usepackage[T1]{fontenc}
\usepackage{babel}
\usepackage[babel]{csquotes}
\begin{document}
\enquote{Hello,} I said.
\selectlanguage{american}
\enquote{Hello,} I said.
\selectlanguage{french}
\enquote{Bonjour,} j'ai dit.
\end{document}
```

Single quotes

Double quotes

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## Example

```

\documentclass[french,american,british]{scrartcl}
\usepackage[T1]{fontenc}
\usepackage{babel}
\usepackage[babel]{csquotes}
\begin{document}
\enquote{Hello,} I said.
\selectlanguage{american}
\enquote{Hello,} I said.
\selectlanguage{french}
\enquote{Bonjour,} j'ai dit.
\end{document}

```

Single quotes

Double quotes

Guillemets

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## Example

```

\documentclass[french,american,british]{scrartcl}
\usepackage[T1]{fontenc} ← Need to set the encoding
\usepackage{babel}
\usepackage[babel]{csquotes}
\begin{document}
\enquote{Hello,} I said.
Single quotes
\selectlanguage{american}
\enquote{Hello,} I said.
Double quotes
\selectlanguage{french}
\enquote{Bonjour,} j'ai dit.
Guillemets
\end{document}

```

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## Diacritics

- If you use the `inputenc` package, you can directly enter the character using the relevant keyboard combination.

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## Diacritics

- If you use the `inputenc` package, you can directly enter the character using the relevant keyboard combination.
- You must set the correct encoding. In the UK, this will typically be either `latin1` or `utf8`.

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## Diacritics

- If you use the `inputenc` package, you can directly enter the character using the relevant keyboard combination.
- You must set the correct encoding. In the UK, this will typically be either `latin1` or `utf8`.
- This will cause a problem if you are sharing your code with someone who uses a different encoding.

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## Example

```
\documentclass{scrartcl}
\usepackage[T1]{fontenc}
\usepackage[utf8]{inputenc}
\begin{document}
```

It's naïve to think that eating mouldy pâté  
won't result in food poisoning.

```
\end{document}
```



## Encoding Independent

- If you don't want to use the `inputenc` package, you can use  $\text{\LaTeX}$  commands to produce diacritics.



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## Encoding Independent

- If you don't want to use the `inputenc` package, you can use  $\LaTeX$  commands to produce diacritics.
- In TeXMaker, you can use the **LaTeX** → **International Accents** menu.

## Encoding Independent

- If you don't want to use the `inputenc` package, you can use  $\LaTeX$  commands to produce diacritics.
- In TeXMaker, you can use the **LaTeX** → **International Accents** menu.
- Other diacritic commands are also available for particular symbols. Examples:

<code>\O</code>	Ø	<code>\o</code>	ø
<code>\AA</code>	Å	<code>\aa</code>	å
<code>\L</code>	Ł	<code>\l</code>	ł

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## Example

It's naïve to think that eating mouldy pâté won't result in food poisoning.

(On some older systems you'll need to use `\i` or `\j` when putting accents on an `i` or `j`, e.g. `naï{\i}ve`.)

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## Ligatures

- The f-ligatures are converted automatically (ff, fl, fi, ffl, ffi).

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## Ligatures

- The f-ligatures are converted automatically (ff, fl, fi, ffl, ffi).
- This can cause a problem searching a PDF when viewing on-line.

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## Ligatures

- The f-ligatures are converted automatically (ff, fl, fi, ffl, ffi).
- This can cause a problem searching a PDF when viewing on-line.
- Use the `cmap` package to make searching easier.

## Ligatures

- The f-ligatures are converted automatically (ff, fl, fi, ffl, ffi).
- This can cause a problem searching a PDF when viewing on-line.
- Use the `cmap` package to make searching easier.
- Other ligatures can be obtained using  $\text{\LaTeX}$  commands.

Examples:

<code>\AE</code>	Æ	<code>\ae</code>	æ
<code>\OE</code>	Œ	<code>\oe</code>	œ

## Example

His unwise man\oe uvre caused a h\ae morrhoid.

produces: His unwise manœuvre caused a hæmorrhoid.

## Notes

- Can also write `man\oe{}uvre` and `h\ae{}morrhoid` but not `man\oeuvre` or `h\aeorrhoid`.
- A space or empty braces are needed to separate the command name from the rest of the text.



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## Exercise

- Add the babel package to your document.
- Remember to specify the language(s) in the class options.
- If you've set the language to something other than English, have you noticed a difference in the document?

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## Font Commands

- We've already used some font changing commands. For example `\emph{simple}` emphasizes the word “simple”. This toggles italic and upright depending on the surrounding font.

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- In TeXMaker, you can use **LaTeX** → **Font Styles** to select the style you want (e.g. `\emph` - **Emphasis [selection]**)

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- These commands are called *text-block* commands. They change the font for the text given in the argument.

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- These commands are called *text-block* commands. They change the font for the text given in the argument.
- To **switch** the font, you can use a *declaration* or an environment.

## Font Declarations

<code>\rmfamily</code>	Serif
<code>\sffamily</code>	Sans-serif
<code>\ttfamily</code>	Typewriter
<code>\mdseries</code>	Medium weight
<code>\bfseries</code>	<b>Bold weight</b>
<code>\itshape</code>	<i>Italic</i>
<code>\slshape</code>	<i>Slanted</i>
<code>\upshape</code>	Upright
<code>\scshape</code>	SMALL CAPS
<code>\em</code>	<i>Emphasized</i>

## Size Declarations

<code>\Huge</code>	Huge
<code>\huge</code>	huge
<code>\LARGE</code>	LARGE
<code>\Large</code>	Large
<code>\large</code>	large
<code>\normalsize</code>	normalsize
<code>\small</code>	small
<code>\footnotesize</code>	footnote size
<code>\scriptsize</code>	scriptsize
<code>\tiny</code>	tiny

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## Environments

Environments have the same name as the declarations **without** the leading backslash.

### Example

```
\normalfont
Some normal text.
\begin{large}\bfseries
Some large bold text.
\end{large}
Some normal text.
```

Produces: Some normal text. **Some large bold text.** Some normal text.



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Environments have the same name as the declarations **without** the leading backslash.

### Example

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```

```
Some normal text.
```

```
\begin{large}\bfseries
```

```
Some large bold text.
```

```
\end{large}
```

```
Some normal text.
```

Only has effect  
until the end of  
the environment

Produces: Some normal text. **Some large bold text.** Some normal text.

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## Changing the Default Font

- Most classes use the serif font as the default.
- If you want the default font to be sans-serif or typewriter you need to redefine `\familydefault`:
  - For sans-serif do:
 

```
\renewcommand*{\familydefault}{\sfdefault}
```
  - For typewriter do:
 

```
\renewcommand*{\familydefault}{\ttdefault}
```
- `\normalfont` will now use sans-serif or typewriter, respectively.

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## Typesetting URLs

- Web addresses are typically typeset using a typewriter font.

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## Typesetting URLs

- Web addresses are typically typeset using a typewriter font.
- Web addresses sometimes contain T<sub>E</sub>X's special characters.

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## Typesetting URLs

- Web addresses are typically typeset using a typewriter font.
- Web addresses sometimes contain T<sub>E</sub>X's special characters.
- Web addresses are sometimes very long, but shouldn't be hyphenated across a line break.

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## Typesetting URLs

- Web addresses are typically typeset using a typewriter font.
- Web addresses sometimes contain T<sub>E</sub>X's special characters.
- Web addresses are sometimes very long, but shouldn't be hyphenated across a line break.
- Can't just use `\texttt`.

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## Typesetting URLs

- Web addresses are typically typeset using a typewriter font.
- Web addresses sometimes contain T<sub>E</sub>X's special characters.
- Web addresses are sometimes very long, but shouldn't be hyphenated across a line break.
- Can't just use `\texttt`.
- Use `hyperref` or `url` packages:

```
\url{address}
```

## Heading Fonts

- The KOMA-Script classes make it easy to change the font used in the headings.
- Use

```
\addtokomafont{type}{declarations}
```

where *type* indicates what you are changing.

### Exercise

Change the section headings in your document to serif medium weight italic:

```
\addtokomafont{section}{\rmfamily\mdseries\itshape}
```



## Package and Class Documentation

- Try using the texdoc application:
  - 1 Go to the **Start** menu and then select **Run...**
  - 2 Type texdoc followed by a space and then the name of the class or package. For example: texdoc natbib
- Try going to the web address  
<http://www.ctan.org/pkg/package-name> where *package-name* is the name of the package. For example:  
<http://www.ctan.org/pkg/natbib>
- Try searching for the package in the T<sub>E</sub>X Catalogue:  
<http://www.tex.ac.uk/tex-archive/help/Catalogue/>

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## Links

- The UK TUG FAQ: <http://www.tex.ac.uk/faq>
- The T<sub>E</sub>X Users Group: <http://www.tug.org/>
- The L<sub>A</sub>T<sub>E</sub>X Community:  
<http://www.latex-community.org/>
- comp.text.tex archives:  
<http://groups.google.com/group/comp.text.tex/>
- texhax archives: <http://tug.org/pipermail/texhax/>
- TeXMaker: <http://www.xmlmath.net/texmaker/>
- My L<sub>A</sub>T<sub>E</sub>X web page:  
<http://theoval.cmp.uea.ac.uk/~nlct/latex/>

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## Books

- Helmut Kopka and Patrick W. Daly. *A Guide to L<sup>A</sup>T<sub>E</sub>X*. Addison-Wesley.
- Michel Goossens, Frank Mittelbach and Alexander Samarin. *The L<sup>A</sup>T<sub>E</sub>X Companion*. Addison-Wesley.
- Leslie Lamport. *L<sup>A</sup>T<sub>E</sub>X: a Document Preparation System*. Addison-Wesley.