

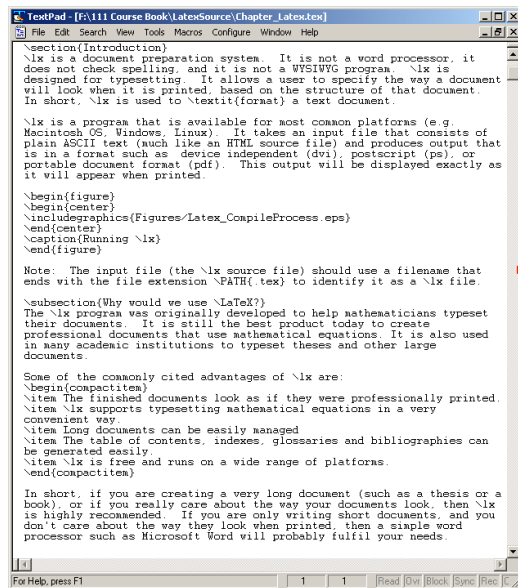
# COMPSCI 111 / 111G

*Mastering Cyberspace:  
An introduction to practical computing*

L<sup>A</sup>T<sub>E</sub>X

# What is LaTeX?

- A document preparation system
  - Used to typeset a document



```
\section{Introduction}
\ix is a document preparation system. It is not a word processor, it
does not check spelling, and it is not a WYSIWYG program. \ix is
designed for typesetting. It allows a user to specify the way a document
will look when it is printed, based on the structure of that document.
In short, \ix is used to \textit{format} a text document.

\ix is a program that is available for most common platforms (e.g.
Macintosh OS, Windows, Linux). It takes an input file that consists of
plain ASCII text (much like an HTML source file) and produces output that
is in a format such as device independent (dvi), postscript (ps), or
portable document format (pdf). This output will be displayed exactly as
it will appear when printed.

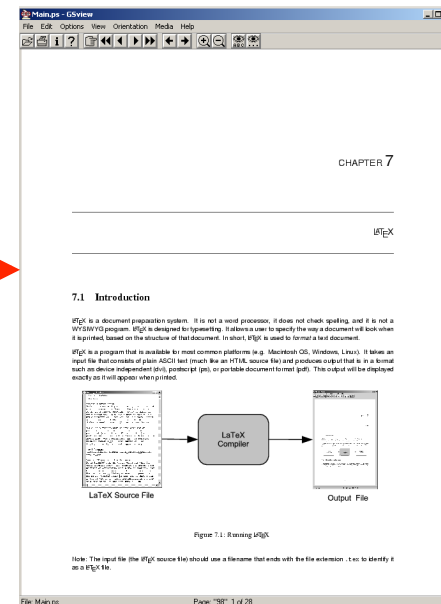
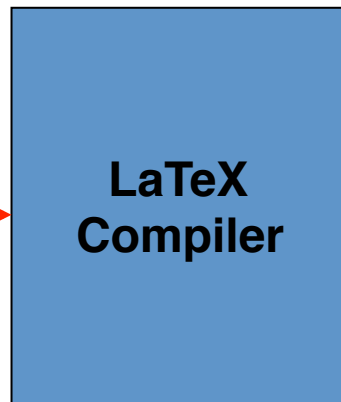
\begin{figure}
\begin{center}
\includegraphics{Figures/Latex_CompilProcess.eps}
\end{center}
\caption{Running \ix}
\end{figure}

Note: The input file (the \ix source file) should use a filename that
ends with the file extension \PATH{.tex} to identify it as a \ix file.

\subsection{Why would we use \LaTeX?}
The \ix program was originally developed to help mathematicians typeset
their documents. It is still the best product today to create
professional documents that use mathematical equations. It is also used
in many academic institutions to typeset theses and other large
documents.

Some of the commonly cited advantages of \ix are:
\begin{compactitem}
\item The finished documents look as if they were professionally printed.
\item \ix supports typesetting mathematical equations in a very
convenient way.
\item Long documents can be easily managed.
\item The table of contents, indexes, glossaries and bibliographies can
be generated easily.
\item \ix is free and runs on a wide range of platforms.
\end{compactitem}

In short, if you are creating a very long document (such as a thesis or a
book), or if you really care about the way your documents look, then \ix
is highly recommended. If you are only writing short documents, and you
don't care about the way they look when printed, then a simple word
processor such as Microsoft Word will probably fulfil your needs.
```



<http://en.wikipedia.org/wiki/LaTeX>

# History of LaTeX

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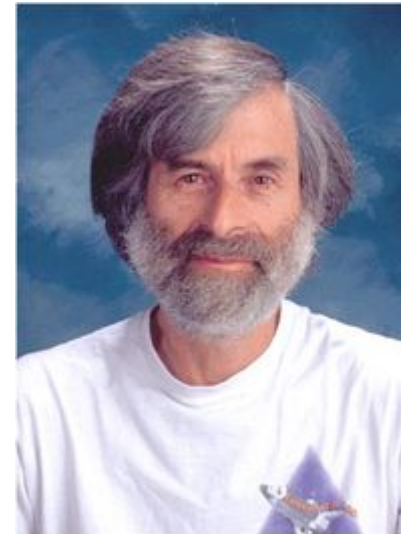
- **Donald Knuth created TeX in 1978**

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



- **Leslie Lamport created LaTeX in 1985**

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



# Why?

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

# Commands

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

`\commandname [options] {argument}`

# Comments

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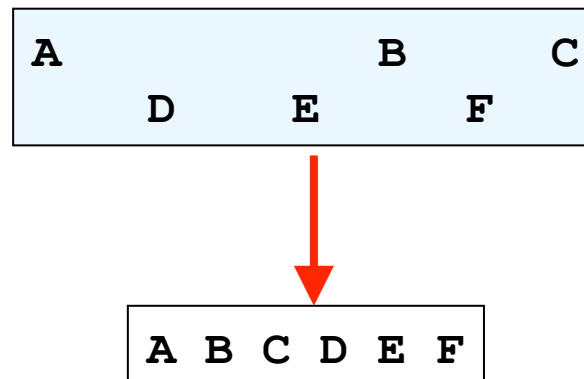
- **Used to annotate the document**
  - Ignored by the compiler
  - Aimed at other humans

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

# Whitespace

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- **Whitespace characters**
  - Space
  - Tab
  - Line break
- **White space is largely ignored apart from:**
  - Space between words.
  - Blank lines between blocks of text that are used to make paragraphs.
- **Two or more consecutive whitespace characters**
  - Reduced to a single space



# Special characters

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

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



# Environments

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

```
\begin{environmentname}
```

```
...
```

```
\end{environmentname}
```

```
\begin{center}
```

```
Content within the center  
environment, is centred on  
the page.
```

```
\end{center}
```

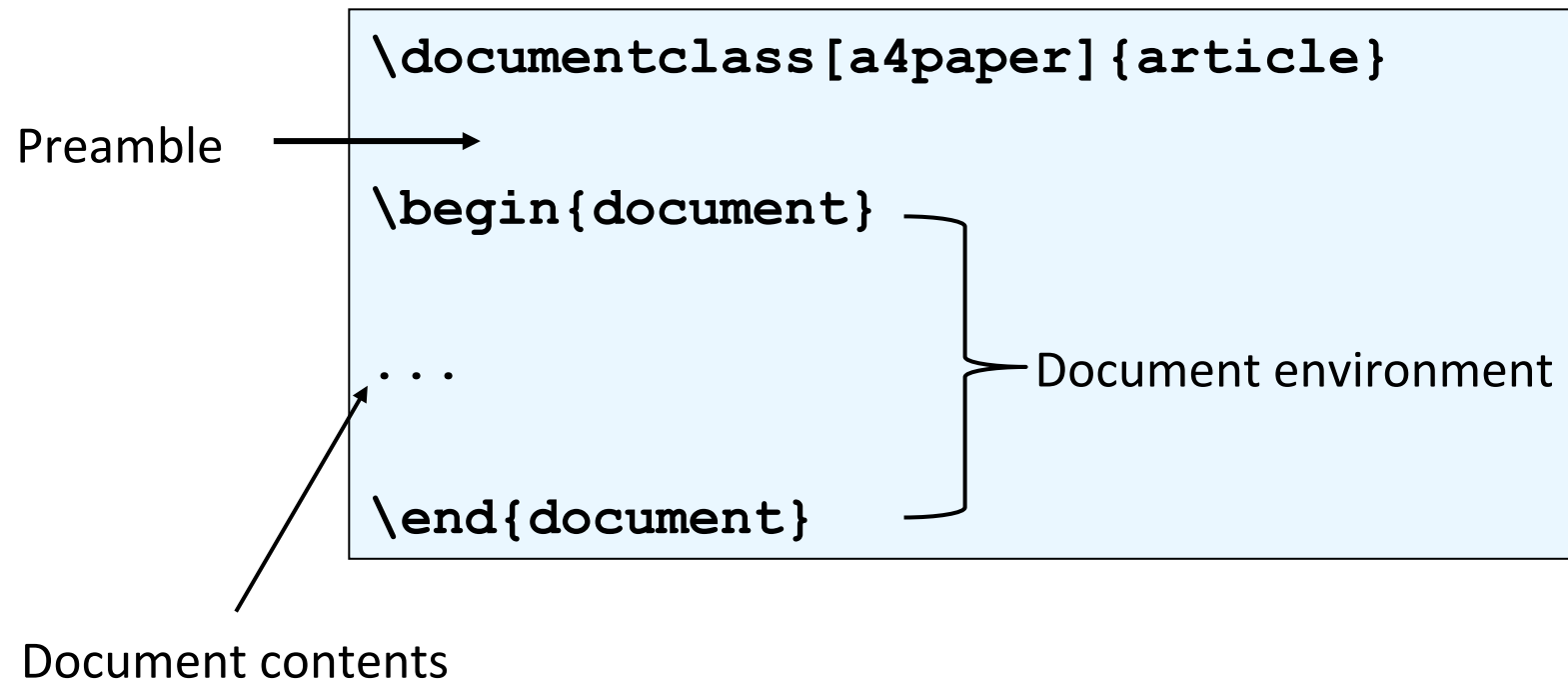
# Creating a LaTeX document

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- **`\documentclass`**
  - Defines the type of document
  - Book
  - Report
  - Article
  - Letter
- **The document environment encloses the contents of the document**
- **The space between the document class command and the start of the document environment is called the preamble.**
  - Contains commands that affect the entire document.

# Creating a LaTeX document

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# Adding a title

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- **Require four commands to create a title**
  - `\title{ put the title here }`
  - `\author{ author goes here }`
  - `\date{ date goes here }`
- **Once the information has been defined, insert the title**
  - `\maketitle`

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

\end{document}
```

# Structuring a document

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- `\part{part name goes here}`
- `\chapter{chapter name goes here}`
- `\section{section name goes here}`
- `\subsection{subsection name goes here}`
- `\subsubsection{subsubsection name goes here}`

# Table of contents

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- **Table of contents is automatically generated using the `\tableofcontents` command.**
  - Parts
  - Chapters
  - Sections
  - Subsections
  
- **Each command has an table of contents option**
  - Displays a different name in the table of contents
    - `\section[Introduction]{An introduction to typesetting using the LaTeX language}`

# Footnotes

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

```
\documentclass[a4paper]{article}

\begin{document}
\title{A very short article}
\author{Damir Azhar}
\date{2017}
\maketitle

This is the
document\footnote{Note that the
document is an article} that I
am using as an example.

\end{document}
```

A very short article

Damir Azhar

2017

This is the document<sup>1</sup> that I am using as an example.

---

<sup>1</sup>Note that the document is an article

1

# Paragraphs and line breaks

---

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

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

Creates a new paragraph. Two backslashes creates\\
a new line.
\end{document}
```

A gap between two lines.  
Creates a new paragraph. Two backslashes creates  
a new line.



# Quote marks

---

- **Unidirectional quotes (") are inadequate**

- Use the symbols ` and ' for single quotes
- Use the symbols `` and '' for double quotes

- **Single quotes**

- Open using ` character and close using ' character

``Hello'`

‘Hello’

- **Double quotes**

- Open using `` characters and close using '' character

```Hello''`

“Hello”

# Dashes

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- **Hyphen (-)**

- Short dash to join different words together

merry-go-round

merry-go-round

- **En dash (--)**

- Longer dash used to indicate a range of values

pages 45--50

pages 45–50

- **Em dash (---)**

- Very long dash between words or phrases

the start --- the finish

the start — the finish

# Ellipsis

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

There is `\ldots` missing

There is ... missing

# Spaces

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- **Lines have to be broken to wrap text**
  - Try to break at a space
  - Try to break at a syllable
- **Some spaces we don't want to be broken**
  - E.g. between initials and surnames

**Bad layout** →

```
The lecturer for this course is  
A. J. Luxton-Reilly
```

- **Use a tilde ~ to signify a space that we can't break**

```
The lecturer for this course is  
A.~J.~Luxton-Reilly
```

# Basic Formatting

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- `\emph` command emphasises the enclosed text

This was a `\emph{long}` lecture

This was a *long* lecture

- `\textbf` command makes the enclosed text bold

This was a `\textbf{cool}` lecture

This was a **cool** class

# Exercise

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

Pythagoras

A. Professor

2017

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

This is where Pythagoras earned his reputation as a mystic.

Pythagoras was also a skilled mathematician ...

# Exercise

---

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

```
\begin{document}
```

```
\title{Pythagoras}
```

```
\author{A. Professor}
```

```
\date{2017}
```

```
\maketitle
```

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

```
\begin{center}
```

This is where Pythagoras earned his reputation as a mystic.

```
\end{center}
```

Pythagoras was also a skilled mathematician `\ldots`

```
\end{document}
```

# References

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- **There are many LaTeX tutorials on the Internet**
  - <http://www.tug.org/interest.html>
  - <http://www.latex-project.org/>
  - <http://www.ctan.org>
- **Web site that allows you to try it out**
  - <http://sciencesoft.at/index.jsp?link=latex&size=1280&js=1&lang=en>
- **Tutorial documents**
  - The (not so) short guide to LaTeX
- **Online course reference manual**