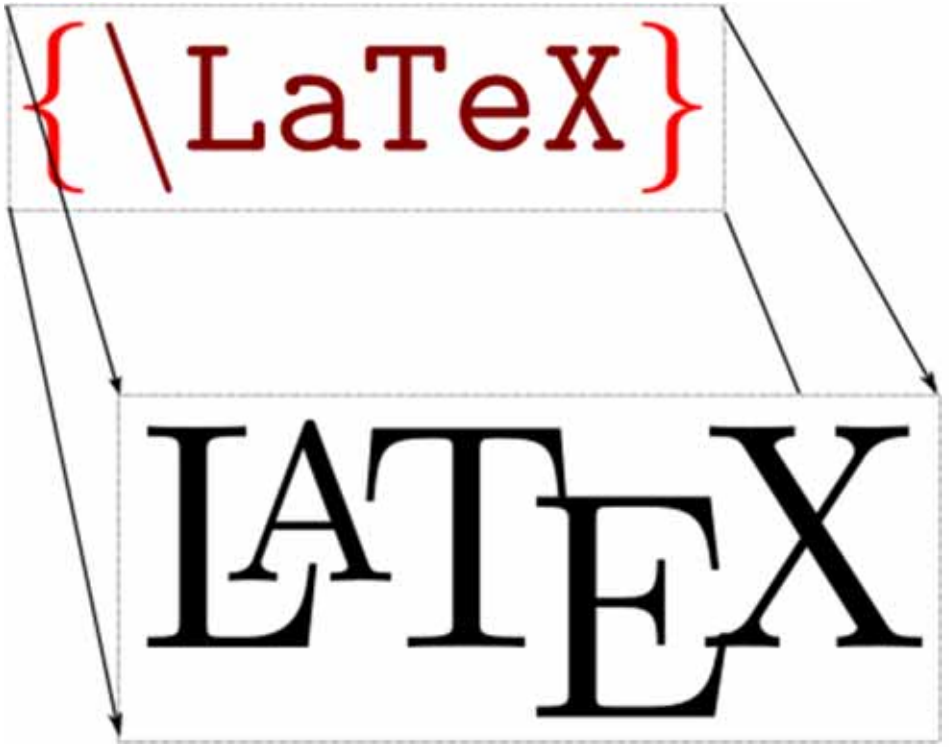


Lecture 11 – COMPSCI111/111G SS 2018

Today's lecture

- What is LaTeX?
- A brief history of LaTeX
- Basic LaTeX commands:
  - Document structure
  - Environments
  - Special characters; quotes, ellipsis, dashes

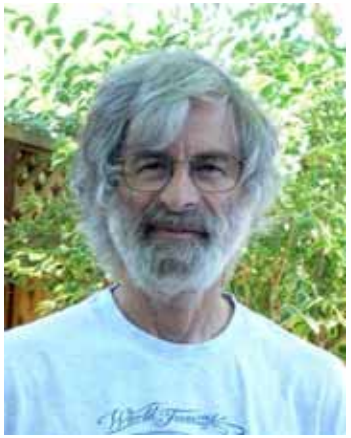
What is LaTeX?

- LaTeX is a document preparation system for typesetting
- LaTeX encourages authors to focus on their document's content and leave the formatting for later
- LaTeX can be used for a range of documents:
  - Essays and theses
  - Journal articles
  - Technical documents
  - Presentations

History of LaTeX

- 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

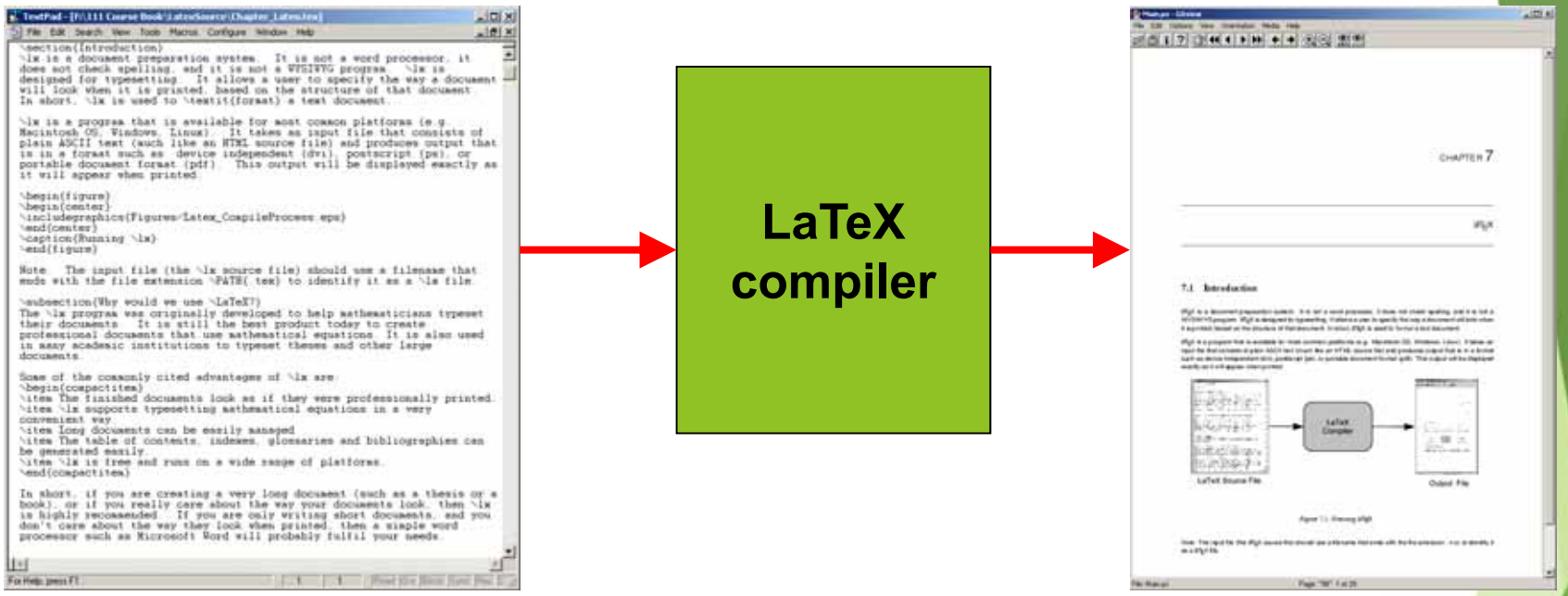
- Leslie Lamport created LaTeX in 1985
  - LaTeX = Lamport TeX
  - Introduced a number of extensions to TeX which made it faster and easier to use
  - Soon, LaTeX became the standard way to use TeX



Why use LaTeX?

- Very efficient when working with **large** documents
- Versatile **mathematical** tools
- LaTeX can automatically generates:
  - Table of contents
  - List of figures
  - Index
  - Bibliographies
- LaTeX distributions are open source

Using LaTeX



LaTeX commands

- Use to provide the LaTeX compiler with instructions
- General structure of LaTeX commands:

```
\commandname[options]{argument}
```

- Example of a LaTeX command:

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

  - Command name: documentclass
  - Options: a4paper
  - Argument: article

- Not all commands have options and/or arguments

Comments

- Used to annotate the document
- They are ignored by the LaTeX compiler

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

Whitespace characters

- Includes spaces, tabs and line breaks
- Two or more consecutive whitespace characters are reduced down to a single space character

```
A     sentence
```

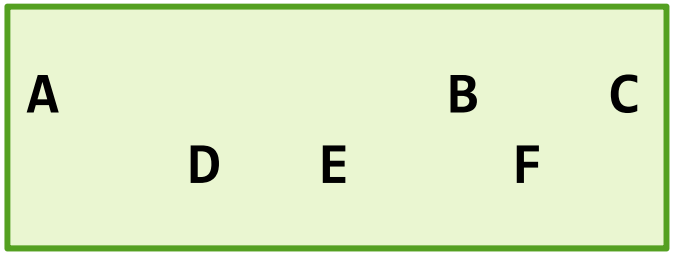
A sentence.

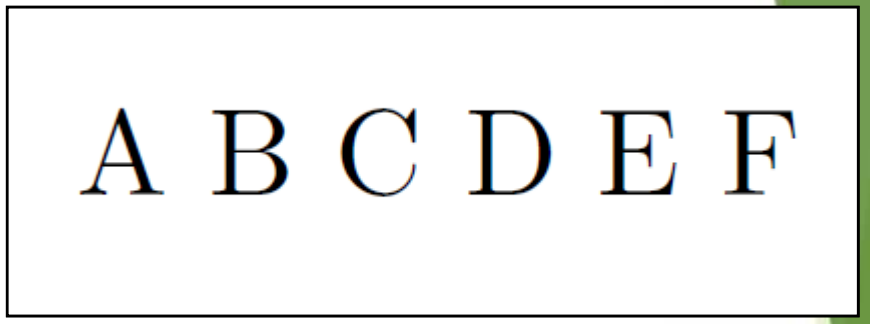
- One line break is treated as a space. However, two line breaks creates a new paragraph

```
This is
some text.

This is a sentence.
```

This is some text.
This is a sentence.

Whitespace





Special characters

- These characters have a special meaning in LaTeX
  - Need to type an escape character (‘\’) before you can type a special character
- There are 10 special characters in LaTeX

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

- Example:

```
A pie costs \$4.00.
```

A pie costs $4.00.

```
A URL contains a
$\backslash$
character.
```

A URL contains a \ character.

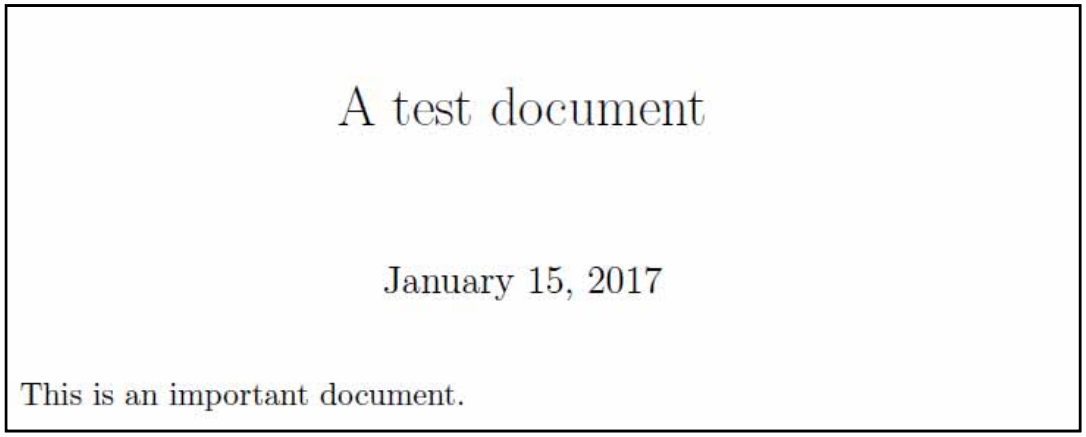
Creating a LaTeX document

```
\documentclass[a4paper]{article}


\begin{document}
\title{A test document}
\maketitle

This is an important document.
\end{document}
```

documentclass

Preamble

Document body



Documentclass command

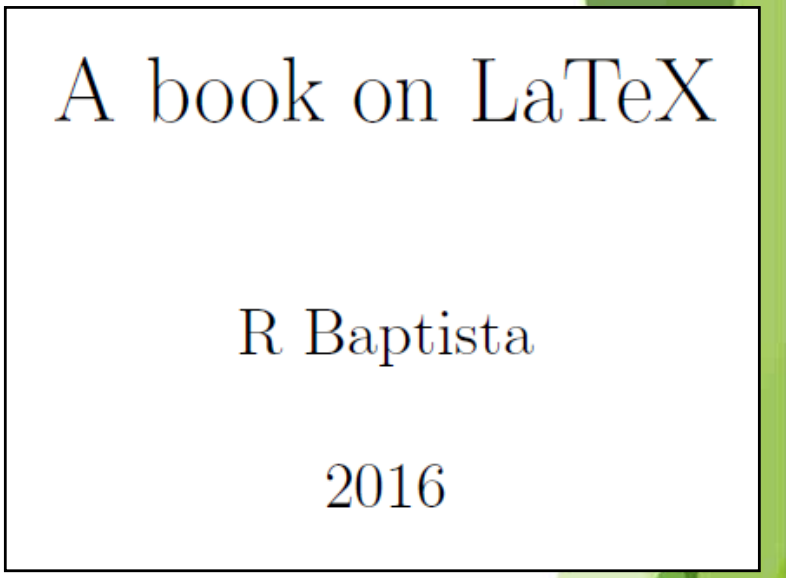
- This command defines the type of document that is being typeset
- [option] used to define paper size
  - a4paper
  - a5paper
  - letterpaper
- {argument} used to define the type of document
  - Book
  - Report
  - Article
  - Letter

Adding a title

- There are four commands that can be used to create the document's title
- \title{document title}
- \author{author's name}
- \date{date here}
  - By default, LaTeX will insert today's date
- \maketitle
  - This command inserts the title in the document and comes after the commands above

Adding a title

```
\documentclass[a4paper]{book}

\begin{document}
\title{A book on LaTeX}
\author{R Baptista}
\date{2016}
\maketitle

LaTeX typesets documents.
\end{document}
```



Environments

- Environments apply a specified change to the text within the environment
  - An environment will also start a new paragraph

```
\begin{environment name}
…
\end{environment name}
```

```
\begin{document}
This is a very long sentence.
\begin{center}
This is some centered text.
\end{center}
\end{document}
```

This is a very long sentence.

This is some centered text.

Environments

- document
  - Used to define the body of the document
- center
  - Aligns the content within the environment on the centre of the page
- displaymath, equation
  - Environments for displaying math equations
- itemize, enumerate, description
  - Three kinds of lists

Exercise 1

- In this exercise, you will prepare your first LaTeX file. You may either work on some text of your own, or work with the text given below.

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


Words are separated by one or more spaces.




\
```

Words are separated by one or more spaces.
Paragraphs are separated by one or more blank lines.

Paragraphs and line breaks

- Earlier, we saw leaving a blank line between two pieces of text creates a new paragraph
- You can create a new line by using \\

```
\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.

Footnotes

- Use \footnote{} within the text to insert a footnote

```
\begin{document}
Pythagoras was born in Greece\footnote{Wikipedia}
around 2,500 years ago.
\end{document}
```

Pythagoras was born in Greece[1] around 2,500 years ago.

[1] Wikipedia

Quote marks

- LaTeX uses directional quotes (eg. “ ”) rather than unidirectional quotes (eg. " ")
- Single quotes
  - Open using ` character and close using ' character

```
`Hello'
```

‘Hello’

- Double quotes
  - Open using `` characters and close using " character

```
``Hello''
```

“Hello”

3 Basic Commands

Dashes

- 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

3 Basic Commands

Ellipsis

- A character made of up three dots used to indicate missing text
- Must insert an ellipsis using the \ldots command, not three full stops, so that you get the correct spacing between the dots

```
There is \ldots missing
```

There is . . . missing

Avoiding line breaks

- There can be times when we don't want LaTeX to automatically insert a new line break

```
The Lord of the Rings is an epic high-fantasy
novel series written by J. R. R. Tolkien, who
was an English author.
```

The Lord of the Rings is an epic high-fantasy novel series written by J. R. R. Tolkien, who was an English author.

Avoiding line breaks

- To avoid this, we use the tilde character (~) in place of the spaces

```
The Lord of the Rings is an epic high-fantasy
novel series written by J.~R.~R.~Tolkien, who
was an English author.
```

The Lord of the Rings is an epic high-fantasy novel series written by J. R. R. Tolkien, who was an English author.

Basic formatting

- \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 2

- In this exercise, you will prepare a LaTeX file. You may either work on some text of your own, or work with the text given below.

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

In March 2006, Congress raised that ceiling an additional $0.79
trillion to $8.97 trillion, which is approximately 68% of GDP. As of
October 4, 2008, the Emergency Economic Stabilization Act of
2008 raised the current debt ceiling to 11.3 trillion.

\
```

In March 2006, Congress raised that ceiling an additional \$0.79 trillion to \$8.97 trillion, which is approximately 68% of GDP. As of October 4, 2008, the "Emergency Economic Stabilization Act of 2008" raised the current debt ceiling to \$11.3 trillion.

Exercise 3

- 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 ...

Structuring a document

- \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 }

Example

```
\documentclass{article}
\begin{document}

\section{Introduction}

The problem of \ldots

\section{Method}

We investigate \ldots

\subsection{Sample Preparation}

\subsection{Data Collection}

\section{Results}

\section{Conclusion}

\end{document}
```

1 Introduction

The problem of ...

2 Method

We investigate ...

2.1 Sample Preparation

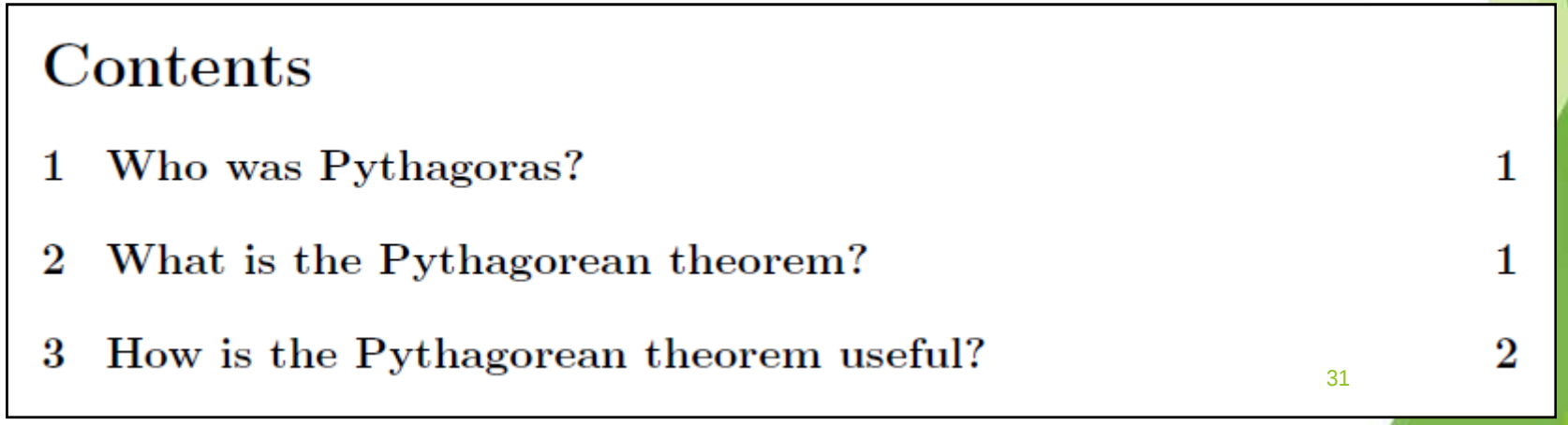
2.2 Data Collection

3 Results

4 Conclusion

Table of contents

- \tableofcontents uses the location of the structuring commands (eg. \page, \chapter, \section etc) to build a table of contents
- Insert the \tableofcontents command after the \maketitle command
  - May need to compile your document twice in order to see the complete table of contents



Summary

- History of LaTeX
- Basics of LaTeX: comments, special characters, whitespace
- Creating a LaTeX document
  - \documentclass
  - Environments
  - Structuring documents
  - Quotes, dashes, basic formatting