



COMPSCI 111/111G SS 2020

L^AT_EX

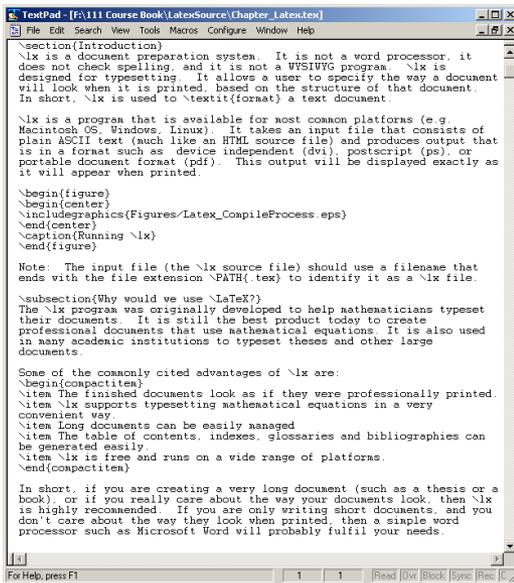
Today's lecture

- **What is LaTeX?**
- **Basic LaTeX commands:**
 - Document structure
 - Environments
 - Special characters; quotes, ellipsis, dashes

LaTeX

- **A document preparation system**

- Used to typeset a document
- Focus on the document's content and leave the formatting for later
- Essays, theses, articles, technical reports, presentations



```
section(Introduction)
\lx is a document preparation system. It is not a word processor, it
does not check spelling, and it is not a WYSIWYG program. \lx 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, \lx is used to \textit(format) a text document.

\lx 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 (such 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.

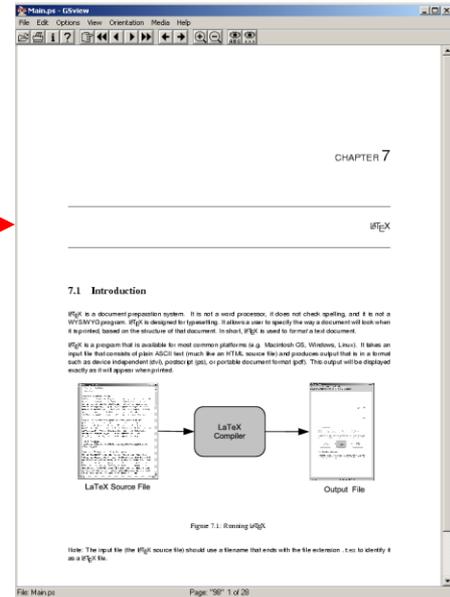
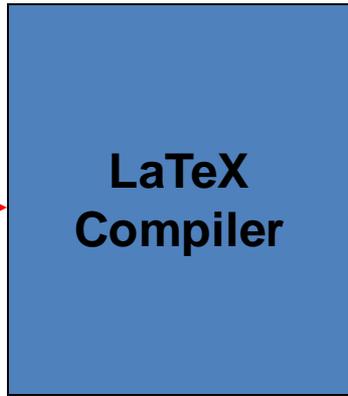
\begin{figure}
\begin{center}
\includegraphics{Figures/Latex_CompilProcess.eps}
\end{center}
\caption(Running \lx)
\end{figure}

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

\subsection{Why would we use LaTeX?}
The \lx 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 \lx are:
\begin{compactitem}
\item The finished documents look as if they were professionally printed.
\item \lx 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 \lx 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 \lx
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.
```



Why?

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

Development

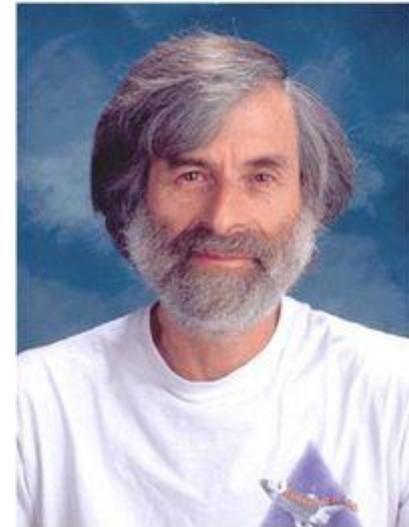
- **Donald Knuth**

- Stanford University
- The Art of Computer Programming
- Created TeX and METAFONT
- 1978 - 1989 Development of TeX



- **Leslie Lamport**

- LaTeX 1984
- Extensions to TeX
- Easier than TeX
- Focus on the structure of the document
- Standard way to use TeX



Commands

- **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}`

- **Example**

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

Comments

- **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.
```


Special characters

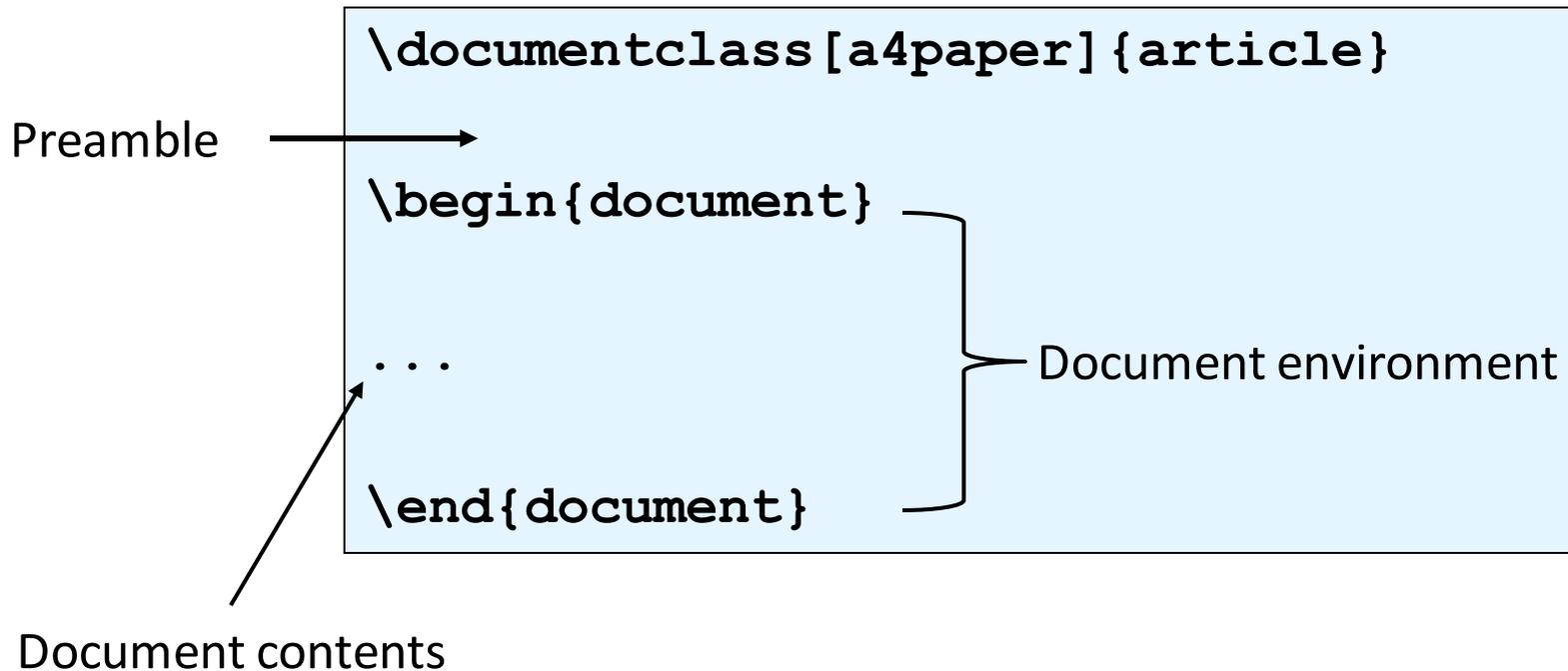
- **Characters that are used in the syntax of the language**
 - Can't type these characters directly
 - Need a special way to print them
 - 10 characters

\ \$ % ^ & _ ~ # { }

Creating a LaTeX document

- **`\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

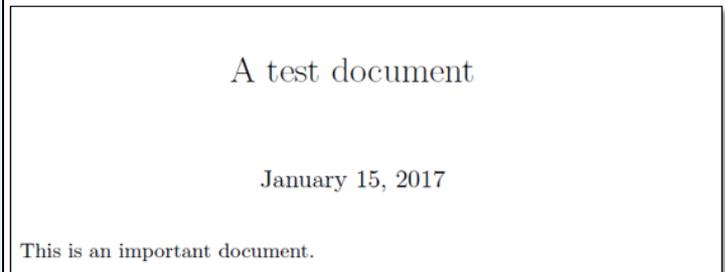


Adding a title

- **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`

```
\documentclass[a4paper]{article}

\begin{document}
\title{A test document}
\date{January 15, 2017}
\maketitle
This is an important document.
\end{document}
```



Environments

- **Apply a change to the content within the environment**

- New environments start new paragraphs

```
\begin{environmentname}
```

```
...
```

```
\end{environmentname}
```

- **Example**

```
\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

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 }`
- `\paragraph{ paragraph name goes here }`

Table of contents

- **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[Who was Pythagoras?]{Biography of the  
ancient Greek mathematician Pythagoras}
```

Contents		
1	Who was Pythagoras?	1
2	What is the Pythagorean theorem?	1
3	How is the Pythagorean theorem useful?	2

Footnotes

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

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

```
\begin{document}
```

```
\title{A very short report}
```

```
\author{Andrew Luxton-Reilly}
```

```
\date{2006}
```

```
\maketitle
```

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

```
\end{document}
```

Footnotes

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

```
\documentclass[a4paper]{report}

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

Pythagoras was born in Greece¹ around 2,500 years ago.

¹Wikipedia

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 `\\`

```
A short paragraph.  
  
Another short paragraph.  
  
And\\  
some lines\\  
that appear sequentially.
```

Quote marks

- **Unidirectional quotes (") are inadequate**
 - Use the symbols ` and ' for single quotes
 - Use the symbols `` and '' for double quotes

```
He said, ``As they say, `you win some, you  
lose some' ''.
```



He said, “As they say, ‘you win some, you lose some’ ”.

Dashes

- **Hyphen (-)**
 - Short dash to join different words together
 - merry-go-round
- **En dash (--)**
 - Longer dash used to indicate a range of values
 - pages 45–50
- **Em dash (---)**
 - Very long dash between words or phrases
 - There are many commands—some more complex than others—that are used in LaTeX.

Ellipsis

- **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

`\ldots or so he said.`

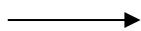


... or so he said

Spaces

- **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
```

Emphasis

- **Emphasis**

- `\emph{ text to be emphasized here }`

It is `\emph{very}` important to practice the typesetting commands so that you don't `\emph{forget}` them.

Exercise:

Write the Latex code that will produce the output bellow

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 ...

Summary

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

References

- **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>
 - <https://latexbase.com/>
- **Tutorial documents**
 - The (not so) short guide to LaTeX
- **Online course reference manual**