(a Short) Introduction to LaTeX

Introduction to Cryptography

Saeed Sadeghian

What is LaTeX

- LaTeX (/ˈlɛɪtɛk/, /ˈlɛɪtɛx/, /ˈlɑːtɛx/, or /ˈlɑːtɛk/)
- Is a document markup language and document preparation system for the TeX typesetting program
- Refers only to the language, not to the editor

TeX

- TeX Created by Donald Knuth
- You may already know him for “Art of Computer Programming” book?
- Version numbers of his TeX software approach the number π, in that versions increment in the style 3, 3.1, 3.14. 3.141, and so on

LaTeX looks like?

```
\documentclass[12pt]{article}
\usepackage{amsmath}
\title{\LaTeX}
\date{}
\begin{document}
  \maketitle
  \LaTeX{} is a document preparation system for the \TeX{}
  typesetting program. It offers programmable desktop publishing
  features and extensive facilities for automating most aspects of
  typesetting and desktop publishing, including numbering and
  cross-referencing, tables and figures, page layout, bibliographies,
  and much more. \LaTeX{} was originally written in 1984 by Leslie
  Lamport and has become the dominant method for using \TeX; few
  people write in plain \TeX{} anymore. The current version  is
  \LaTeXe.

  % This is a comment; it will not be shown in the final output.
  % The following shows a little of the typesetting power of LaTeX:
  \begin{align}
    E &= mc^2                                    \\
    m &= \frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}
  \end{align}
\end{document}
```

PDF looks like?

LaTeX

LaTeX is a document preparation system for the TeX typesetting program. It offers programmable desktop publishing features and extensive facilities for automating most aspects of typesetting and desktop publishing, including numbering and cross-referencing, tables and figures, page layout, bibliographies, and much more. LaTeX was originally written in 1984 by Leslie Lamport and has become the dominant method for using TeX; few people write in plain TeX anymore. The current version is LaTeX 2_ε.

$$E = mc^2 \tag{1}$$

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}} \tag{2}$$

Ok Why LaTeX when we have Word?

- Professional and Uniform output
- Platform Independent (Windows, Mac, Linux,…)
- Pre-Set Standard formats
- Bibliography Management
- Fast, professional Math typesetting
- Portable, Compatible, flexibale, **FREE**

Not persuaded yet?

- Never crashes, you never lose your file
- Can compile big books (more than 70000 pages)
- You will need it in the future, better to learn and make the best use out of it soon
- After all it should be better enough that all scholars prefer it in their scientific works !

Where to find LaTeX?

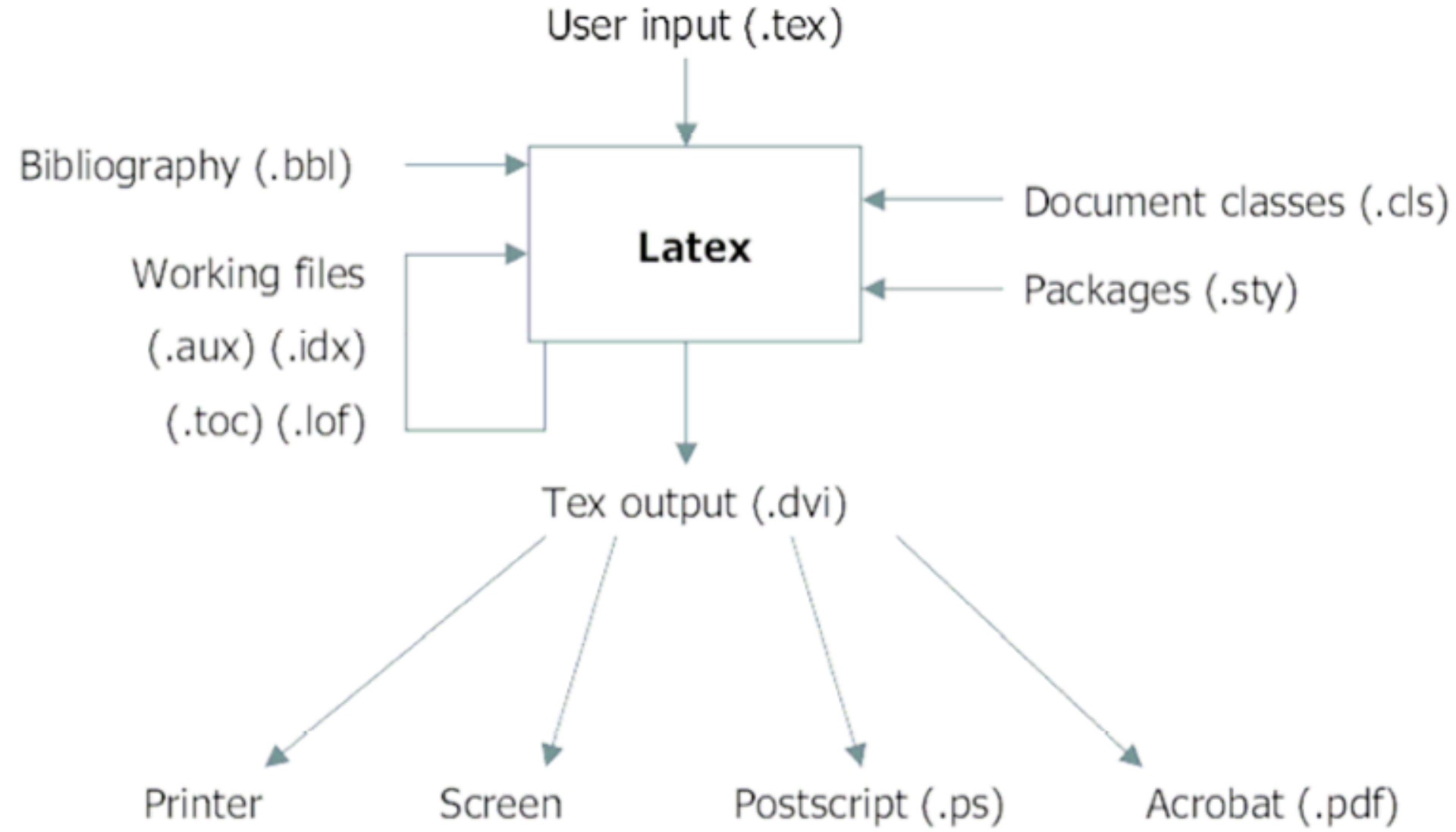
- You have to get a LaTeX distribution
- Well there are some out there:
  - Windows: MikTeX, TexLive, …
  - Linux: Texlive
  - Mac: MacTeX
- I prefer TexLive on all platforms

So do we need some kind of IDE?

- No, any basic Editor can do.
- But there are some specific editors out there (free and Commercial)
- Windows: LED (very ugly, but excellent auto-complete), WinEdt, LyX,…
- Mac: TexShop, TextMate,…
- Linux: TexMaker (For all)

Try it!

- On Mac: Install MacTeX, you will have Texshop installed with it
- On Windows: Install TexLive and then install LED (short for Latex editor)


User input (.tex)
Bibliography (.bbl)
Latex
Document classes (.cls)
Working files
(.aux) (.idx)
(.toc) (.lof)
Packages (.sty)
Tex output (.dvi)
Printer
Screen
Postscript (.ps)
Acrobat (.pdf)

Basic Document Structure

```
\documentclass{article}
  your preamble goes here (extra setups, if any)
\begin{document}
  your document text goes here
\end{document}
```

Some Notes

- The document class name must be one of ***book***, ***article***, or ***report***,
- OR an extra one you have downloaded and installed (eg thesis, memoir, etc)
- There are paper size options ***a4paper*** and ***letterpaper*** and others
- **preamble** is where you specify any extra **packages**

Basic Structure

```
\documentclass[a4paper,11pt]{book}
\usepackage{charter,graphicx}
\setlength{\parindent}{1em}
\begin{document}
\title{your document title}
\author{your name}
\date{date of publication}
\maketitle
\begin{abstract}
  the paragraphs of the abstract go here
\end{abstract}
\tableofcontents
  rest of the document goes here
\end{document}
```

Commands

- Always begin with a backslash
- Case-sensitive
- Only Letters
- Some have parameters:
  - Square brackets [ ] after the command name are for optional parameters
  - Curly braces { } after the command name are for required parameters

Environments

- Many environments available in TeX
- Used to help format parts of your document
- Always need **\begin{environment name}**and **\end{environment name}**

Itemize environment

- **\begin{itemize}** and **\end{itemize}**
- Creates an outline using bullet points
- Items within the section are created by **\item**
- Can nest itemize environments within one another

Enumerate environment

- **\begin{enumerate}** and **\end{enumerate}**
- Creates an outline using numbers and letters
- Items within the section are created by **\item**
- Can nest enumerate environments within one another

Adding Cross-References

- Easy !
- Add **\label{mylabel}** after the sections or subsections or …
- Then use **\ref{mylabel}** to reference it

Adding Citations

- Add them to the bib file or at the end of tex file
- Get the bib format in google scholar or scientific portals
- Then use **\cite{citationlabel}** to cite it!

Math Equations

- Mathematical text is placed between **$A-B$**
- Math mode is normally displayed inline
- Can make some expressions look funny
- For text within math mode, use **\text{...}**
- Math mode uses italics and no spaces between words

```
Add $a$ squared and $b$ squared
to get $c$ squared. Or, using
a more mathematical approach:
$c^{2}=a^{2}+b^{2}$
```

Add a squared and b squared to get c squared. Or, using a more mathematical approach: $c^2 = a^2 + b^2$

Math Commands

- Superscript and subscript
  - x^2
  - x_2
- Use curly braces to group any more than one character
  - x_{α}
- Just Google and learn case by case !
- Typing equations without using mouse !

Equation environment

- **\begin{equation}** and **\end{equation}**
- Automatically numbers equations
- Can label equations by **\label{name}**
- Centers equation on page
- Do not need **$** within equation environment

Adding Tables

- For adding Tables, you may have to Type a lot ;)
- Want an easy way without learning it first?
- If you want to include Table from Excel:
  - **Use excel2latex**
  - http://www.ctan.org/tex-archive/support/excel2latex/
- Or you can use LyX to style it and copy the code
- And try to learn from them

References

- **The very short guide to typesetting with LATEX**
  - http://math.ucalgary.ca/~rscheidl/418/latex/veryshortguide.pdf

- **Just Google latex+"your problem"**