Introduction to LaTeX

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11.11.2019
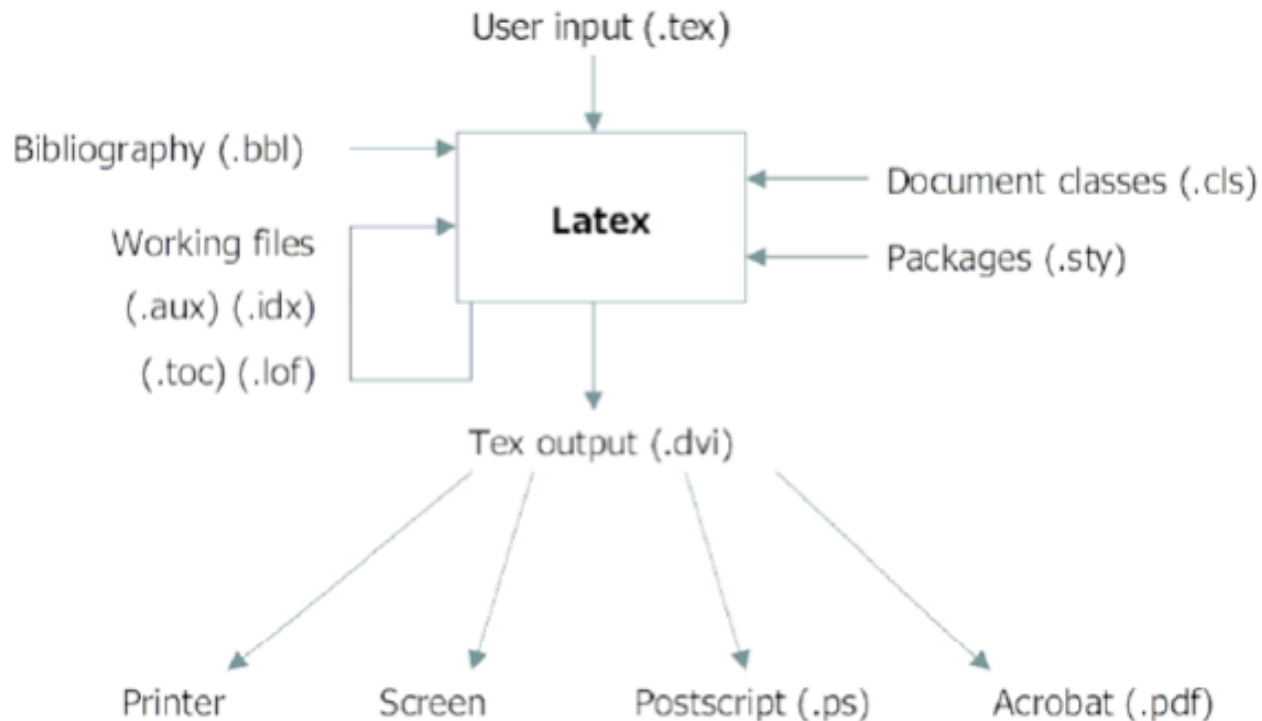
What is LaTeX?

- LaTeX is pronounced "lay-tech" or "lah-tech," not "la-teks."
- LaTeX is a document preparation system for high-quality typesetting.
- LaTeX is most often used to produce technical or scientific documents, but it can be used for almost any form of publishing.

Why Use LaTeX?

- Designed by academics and easily accommodates academic use.

- Professionally crafted predefined layouts make a document really look as if "printed."

- Mathematical symbols and equations are easily integrated.

- Even complex structures such as footnotes, references, table of contents, and bibliographies can be generated easily.

- Forces author to focus on logical instead of aesthetic structure of a document.

- Creates more beautiful documents.

- Portable, compatible, flexible, versatile, and cheap (or free)!

The Mechanisms of "TeXing"

User input (.tex)

Bibliography (.bbl) → **Latex** ← Document classes (.cls)

Working files ← **Latex** ← Packages (.sty)

(.aux) (.idx)

(.toc) (.lof)

Tex output (.dvi)

Printer   Screen   Postscript (.ps)   Acrobat (.pdf)

http://www.comp.leeds.ac.uk/andyr

Installing LaTeX

- Windows:
  - MiKTeX
    - MiKTeX is a typesetting system for the Windows.
    - Download from www.miktex.org for free
- Mac
  - MacTex (TexLive)
    - Download for free https://tug.org/mactex/mactex-download.html

- Jupyter Lab extension for live editing of LaTeX documents
    - https://github.com/jupyterlab/jupyterlab-latex

Basic Document Structure

- The format of a document is pretty simple.
  - Preamble
    - Documentclass
    - Packages
  - Body
    - Title/author
    - Contents
  - Bibliography

Preamble of the latex document

\documentclass[options]{class}
- Document classes: letter, article, report, book, slides(beamer, prosper)
- Options: font size (ex. 12pt), paper size (ex. a4paper), number of columns (ex. twocolumn)
  - Ex. \documentclass[12pt]{article}

\usepackage[options]{name_of the package}
- Packages: numerous packages are available
  - \usepackage[margin=1in]{geometry}
  - \usepackage{setspace}
  - \usepackage{harvard}

Body of the latex document

- The body of the document is contained totally between two tags: **\begin{document} & \end{document}**
- Adding title and information about authors
  - **\title{}** – Title of the document
  - **\author{}** – Author
- To print the title + the author info
  - **\maketitle**
- Adding a page break
  - **\pagebreak**

Sections and font formating

- Sections

- **\section{}**
  - Similarly, \subsection{}, \subsubsection{}, \subsubsubsection{}
  - LaTeX does automatic numbering. If you don't like it, use section*{}

- Font formatting
  - **\emph{} or \textit{}** – emphasize text
  - **\textbf{}** – Bold
  - **\underline{}** – Underline

- Spacing
  - **\singlespacing, \doublespacing, \onehalfspacing**

Footnotes/Quotes/Equations

- \footnote{}

- \begin{quote} & \end{quote}

- \begin{equation} & \end{equation}
  - Numbered equation displayed in a block

- \begin{equation*} & \end{equation*}
  - Unnumbered equation displayed in a block

- $ equation $
  - Inline equation
  - ex. $ x = y+1 $

- https://www.math.ubc.ca/~pwalls/math-python/jupyter/latex/
- https://www.caam.rice.edu/~heinken/latex/symbols.pdf

Tables

- Add numbered table
  - **\begin{table}**
- Creating a table
- Simple tables can be produced by
  - **\begin{tabular}[pos]{tablespec}**
  - Within the {tablespec} section, one details the number of columns, the alignment, and the number of vertical lines of the table.
    - {lrc}, {|l|r|c}
  - Then type in from left to right, the values for each cell with & in between.
  - Put "\\" at the end of each row, then input another row of values if needed.
  - **\hline**

Figures

- Add a figure
  - **\begin{figure}[h t b !]**
- If you want to center the figure
  - **\centering**
- Include the image in the document:
  - \includegraphics[options]{figure}
  - Options: scale, width, height, angle, width=\textwidth
- Add caption
  - **\caption{A sample figure.}**

Citations

- \cite{bibtexkey}, citeyear{bibtexkey}
- It is more convenient to create a bibliography file, called bibtex file(.bib) and use it as needed.
- JabRef (http://jabref.sourceforge.net/)
- Mendeley (http://mendeley.com/)
  - https://blog.mendeley.com/2011/10/25/howto-use-mendeley-to-create-citations-using-latex-and-bibtex/

Bibliography - bibtex (.bib) file

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% This file was created with JabRef 2.4.
% Encoding: Cp1252

@ARTICLE{Beck1993,
  author = {Beck, Nathaniel},
  title = {The Methodology of Cointegration.},
  journal = {Political Analysis},
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  pages = {237-48},
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@ARTICLE{CheungLai1993,
  author = {Cheung, Yin-Wong, and Kon S. Lai},
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  journal = {Journal of Business and Economic Statistics},
  year = {1993},
  volume = {11},
  pages = {103-12},
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@ARTICLE{OstromSmith1993,
  author = {Ostrom, Charles W., Kr., and Renee M. Smith},
  title = {Error Correction, Attitude Persistence, and Executive Rewards and
    Punishments: A Behavioral Theory of Presidential Approval.},
  journal = {Political Analysis},
  year = {1993},
  volume = {4},
  pages = {127-84},
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  timestamp = {2009.06.08}
}

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Other Resources

- Books
  - Leslie Lampert. 1994. LaTeX: A Document Preparation System.
  - Helmut Kopta and Patrick W. Daly. 2004.Guide to LaTex
  - Frank Mittelbach et al. 2004. The LaTeX Companion
- Online Guides
  - http://en.wikibooks.org/wiki/LaTeX
  - http://tobi.oetiker.ch/lshort/lshort.pdf
  - CV and dissertation templates are available on line