\LaTeX\ course

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Introduction to \LaTeX
Brief history of typography

- Typography is “the style and appearance of printed matter”:
  - the art or procedure of arranging type or processing data and printing from it. [Oxford Languages]

- Woodblock printing:
  - Method for printing text or images on textiles and later paper
  - Appeared around 220 AD in China

- “Movable type”:
  - The system and technology of printing that uses movable components
  - Oldest movable type printing technology was invented around 1040 AD by Bi Sheng (990-1051)
  - Movable type printing may have been brought back by European business people and missionaries from China

- The printing press:
  - Gutenberg uses movable type in 1439. He is often accredited with the invention of the “printing press”, i.e. the scalable production of printed items
Brief history of typography

- Quill pens first appeared in Seville, Spain in the 6th century:
Brief history of typography

- Gutenberg uses movable type in 1439:
Brief history of typography

- The Personal Computer, the first of which is called Progamma 101, is launched in 1965.
Brief history of typography

- In 20th century, a graphic art industry evolved.
- Before 1980s, practically all typesetting for publishers and advertisers was conducted by specialist companies.
- In 1980s, desktop publishing becomes available with the advent of the WYSIWYG (What You See Is What You Get) text editing.
- The initial platforms did not have today’s typographical quality, or flexibility. They did not have flexibility required for book layout, graphics, mathematics, hyphenation and justification rules.
Brief history of LaTeX

- Timeline of LaTeX
  
  1977   Donald Knuth, an American computer scientist, begins his work on typography
  1978   Knuth delivers an AMS Gibbs lecture entitled Mathematical Typography
  1984,1985 Leslie Lamport makes TeX macros intended for own use available for public use
  1986   Leslie Lamport writes a LaTeX manual, the earliest known manual in existence
  1985   BibTeX is released.
  1994   LaTeX 2ε is released (last updated in 2020)
  - Third edition of LaTeX cancelled.

- We distinguish between Plain TeX and LaTeX
Advantages of using **\LaTeX**:

- High typographical quality
  - Kerning by default
  - Real rather than fake small caps
  - Contextual intelligence and substitution to determine correct ligatures
- Separation of *contents* from *layout*
- Intertemporal compatibility
- Mathematical notation
- Handling of intra-document references, in particular a bibliography (Endnotes with Word versus BibTeX in **\LaTeX**)
- Tables and illustrations (although steep learning curve with **\LaTeX**).
- Line breaks, justification and hyphenation
Why use $\LaTeX$?

- Disadvantages of using $\LaTeX$:
  - Collaborative editing:
    - Especially if you have a large number of charts and tables.
  - Network externalities:
    - It is more likely your collaborators know Word (unless you work in academia).
  - Minimum barriers to entry:
    - If you just care about getting some ideas down on paper, a WYSIWYG editor may be preferred. However, it becomes tedious later when formatting the text into a formal document.
Features

- Kerning:
  - Compare AV versus AV
  - Compare Table versus Table
  - Kerning is disabled by default in Word.

- Real small caps versus fake small caps:
  - Compare ONCE UPON A TIME versus ONCE UPON A TIME

- Contextual intelligence and substitution to determine correct ligatures:
  - Compare fire and flower in Word and \LaTeX.

- Line breaks, justification and hyphenation:
  - WYSIWYG algorithms determine linebreaks line by line. \LaTeX uses an advanced algorithm based on the work by Knuth and Plass. \LaTeX considers the paragraph as a whole to determine line breaks.
# Barriers to entry

- Illustration of barriers to entry:

<table>
<thead>
<tr>
<th>Distribution</th>
<th>Basic document</th>
<th>Professional document</th>
</tr>
</thead>
<tbody>
<tr>
<td>\LaTeX{}</td>
<td>High fixed costs</td>
<td>High fixed cost</td>
</tr>
<tr>
<td>MS Word</td>
<td>No fixed cost</td>
<td>High fixed cost</td>
</tr>
</tbody>
</table>
\LaTeX{} and tables

- Works well with Stata:
  - Several packages such as estout to generate tables automatically.
- Convert Excel tables using Excel2\LaTeX{}.
- Create tables using LaTable.
Pick your editor

- Overleaf (online editor, recommended)
- Scientific Workplace (a commercial product)
  - **pros** User-friendly, nice graphical interface, almost a WYSIWYG
  - **cons** Poor compatibility with other \LaTeX{} editor. While SW extracts code from the \TeX{} distribution, it is effectively a separate piece of software.
- LyX
  - The pros are the same as for SW, but LyX is compatible with the standard \TeX{} distribution (i.e. you can share files)
- TeXWorks (very plain with not so many cool features)
- TeXStudio (recommended – good for the beginner and the advanced user). TeXStudio was formerly known as TeXMaker.
Installing \LaTeX

- You can use overleaf in your browser so no need to install it on your desktop unless you plan to work offline.
- You can sync your desktop with the online version, but this requires a \LaTeX distribution installed on your desktop.
- There is a lot of information on how to install \LaTeX online.
In this \LaTeX{} course

- Outline:
  - Lecture 1: Creating a document in \LaTeX{}.
  - Lecture 2: Typing equations, creating a bibliography and cross-referencing.
  - Lecture 3: Creating and cross-referencing figures and tables.
  - Lecture 4: Creating and exporting tables to \LaTeX{} from Stata