CSSS 569 Visualizing Data and Models

Lab 2: Intro to LaTeX with `Overleaf`

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Agenda

1. Logistics
2. `R Markdown` and HW1
3. LaTeX and `Overleaf`

Homework Submission

Use Canvas not email.

RMarkdown

- If any of you is looking for an general introduction for RMarkdown, I suggest you to check Chapter 27 from Wickham and Grolemund (2017) - **R for Data Science**.
- If you want a more comprehensive guid, then check Xie et al. (2021) - **R Markdown: The Definitive Guide**.
- Another, more applied, resource is Xie et al. (2022) - **R Markdown Cookbook**.

HW1

- Problem 1: Attach file (PDF/picture) and make comments with 2-5 paragraphs
- Problem 2: Read data and display the plot
  - *Do not spend more than two hours*

Intro to TEX and LATEX

- TEX is a *typesetting engine*[1] designed by Donald Knuth, a computer scientist and mathematician at Stanford
  - For typesetting scientific and mathematical documents.
  - But also other documents, from letters to complete books.
- TEX is pronounced *"Tech"*.

[1] Modern extensions of the TEX engines include pdfTeX, XeTeX, LuaTeX, etc.

Intro to TEX and LATEX

- LATEX is a *document preparation system, or a macro package*, built on top of the TEX engine, with features:
  - Typesetting journal articles, technical reports, books, and slides
  - Control over large documents containing sectioning, cross-references, tables and figures
  - Typesetting of complex mathematical formulas
  - Advanced typesetting of mathematics with AMS-LaTeX
  - Automatic generation of bibliographies and indexes
  - Multi-lingual typesetting
  - See more here

Intro to TEX and LATEX

- Popular *implementations, or distributions*, of TEX/LATEX
  - MacTeX for Mac OS: http://www.tug.org/mactex/
  - MiKTeX for Windows: https://miktex.org
    - Check out this recent revision of MiKTeX.
- Once you installed a distribution, you will need to install a LATEX editor. Texmaker is a free cross-platform solid option.

Intro to TEX and LATEX

- LATEX vs. other word processors (e.g. Microsoft Word)
  - Microsoft Word/Power Point
    - WYSIWYG: What You See Is What You Get
    - You interact with a user interface to control the document layout while typing text (although Texmaker provides a basic interface too).
    - What is displayed on the screen resembles what will be printed
  - LATEX
    - You provide "LATEX commands" to specify the layout, structure, and details of the document:
    - `\command[optional parameter]{parameter}`
    - And *typeset* the document using the TEX engine and compile the output

Intro to TEX and LATEX

- The input for LATEX is a plain text file (.tex)
  - You need a text editor!
- Numerous popular text editors
  - Specific: Texmaker, TeXShop, TeXstudio, TeXworks...
  - Generic: Emacs (Aquamacs), Vim, Sublime, Atom...

Intro to LaTeX with Overleaf

- All the above sound pretty complicated...
- Overleaf: https://www.overleaf.com/
  - An online LaTeX editor
    - Integrated PDF preview pane
    - Quality of life features: auto-complete commands, auto-close brackets, keyboard shortcuts, etc.
    - Numerous templates: journal articles, books, CVs, slides, posters, etc.
    - Easy collaboration (But not free)
    - Integrated with Zotero and Mendeley for bibliography management
    - Integrated with Git for version control

Intro to LaTeX with Overleaf

- Before we dive in, useful resources
  - The Not So Short Introduction to LaTeX 2_ε (Oetiker et al., 2021)
    - Learn LaTeX in 139 pages / minutes
  - 'Overleaf' documentation
    - Contains intro to basic LaTeX, Overleaf, and many practical guides
  - TeX at StackExchange
  - General: Mathematics and Tables and TikZ
  - Beamer Theme: here
  - Bibliography: natbib, doi2bib, text2bib
  - Other: here

Intro to LaTeX with Overleaf

- Some useful templates:
  - Thesis: here
  - Working paper: Kenya's sample, and Chris's sample
  - Academic journal: here
  - Presentation slides (Beamer): here and here
  - Poster: here
  - CV: here and here
  - Graphs, trees, diagrams (TikZ): here and here