Day 5: LaTeX, Markdown, and Formatting Documents for Social Science

Theodore Landsman

Ph.D. student, Department of Government, Georgetown University

August 20, 2021

LaTex

- Instructions for how to download LaTex are here: http://blogs.commons.georgetown.edu/government-math-camp/r-bootcamp/
  - LaTex takes a long time to download distributions run in the 4-6GB range, make sure you have the storage on your computer to install it and enough time on a strong internet connection.
  - Note that you do not need LaTex installed on your computer to use online LaTex tools, such as Overleaf.
  - However, a variety of R Studio tools for document formatting, including Markdown and Sweave, rely on or have the option to use LaTex as a pdf conversion tool, so it is useful to have even if you do not plan on working in it directly.

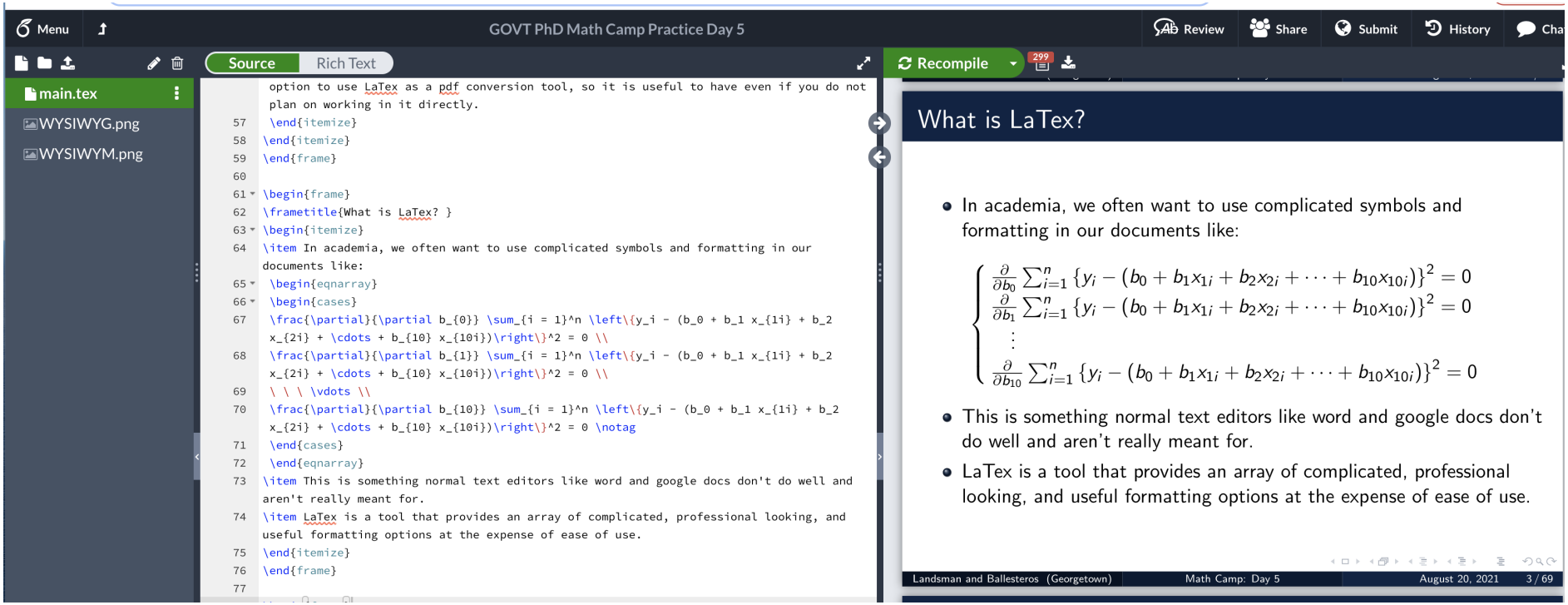
What is LaTex?

- In academia, we often want to use complicated symbols and formatting in our documents like:

$$\begin{cases} \frac{\partial}{\partial b_0} \sum_{i=1}^{n} \{y_i - (b_0 + b_1 x_{1i} + b_2 x_{2i} + \cdots + b_{10} x_{10i})\}^2 = 0 \\ \frac{\partial}{\partial b_1} \sum_{i=1}^{n} \{y_i - (b_0 + b_1 x_{1i} + b_2 x_{2i} + \cdots + b_{10} x_{10i})\}^2 = 0 \\ \quad \vdots \\ \frac{\partial}{\partial b_{10}} \sum_{i=1}^{n} \{y_i - (b_0 + b_1 x_{1i} + b_2 x_{2i} + \cdots + b_{10} x_{10i})\}^2 = 0 \end{cases}$$

- This is something normal text editors like word and google docs don't do well and aren't really meant for.
- LaTex is a tool that provides an array of complicated, professional looking, and useful formatting options at the expense of ease of use.

What is LaTex? Continued

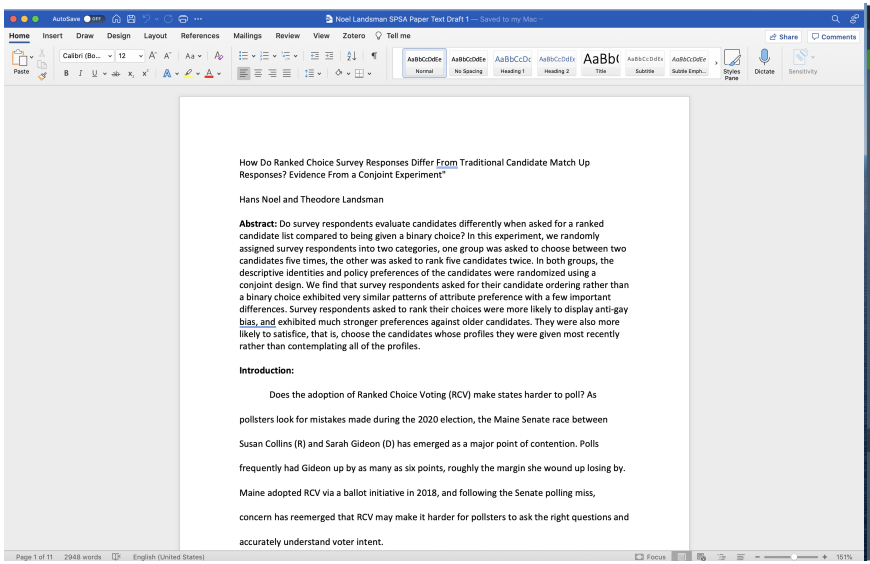


- Basically, LaTex turns document preparation into its own form of coding, this coding is less restrictive than R (E.G. Copy-pasted text will still show up as unformatted text without breaking anything), but still tricky to learn.

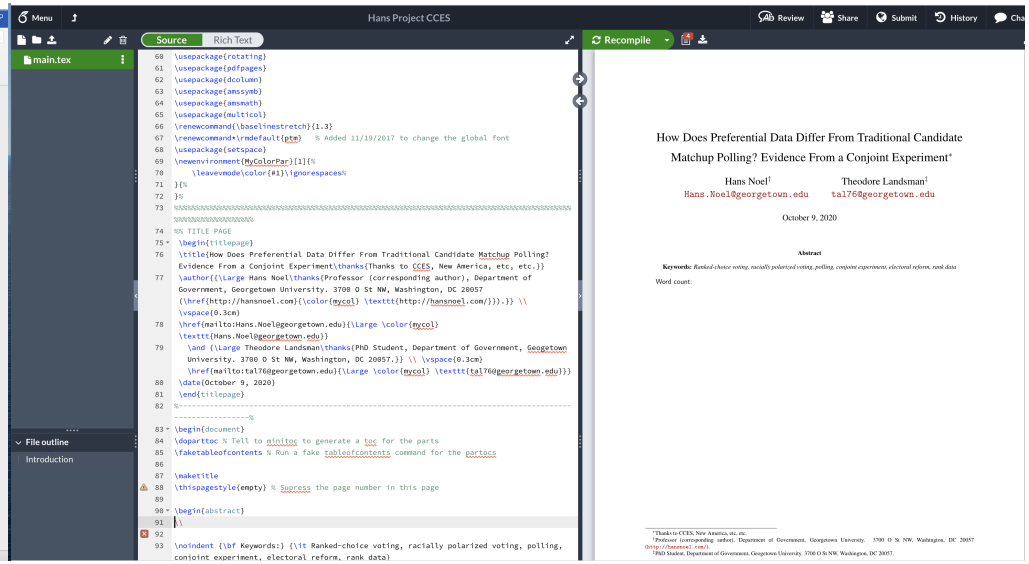
Text Editor Design and Usefulness

- In general, there are two paradigms of text editing, WYSIWYG (what you see is what you get, often referred to as wizywig), and WYSIWYM (what you see if what you mean, often referred to as wizywim).
- In WYSIWYG editors, like word and google docs, you write and format content at the same time.
- In WYSIWYM editors, formatting is done in a separate step (compiling, knitting, etc) with the aid of style commands and a stylesheet.

Text Editor Design Continued



(a) WYSIWYG



(b) WYSIWYM

- Some writers prefer tools that let them write first and format later (like a basic .txt editor) others will write directly into a more formatting oriented tool like Markdown or LaTex. Almost everyone still uses Word or Google Docs for some tasks.

Quick Aside, Sending Word Files

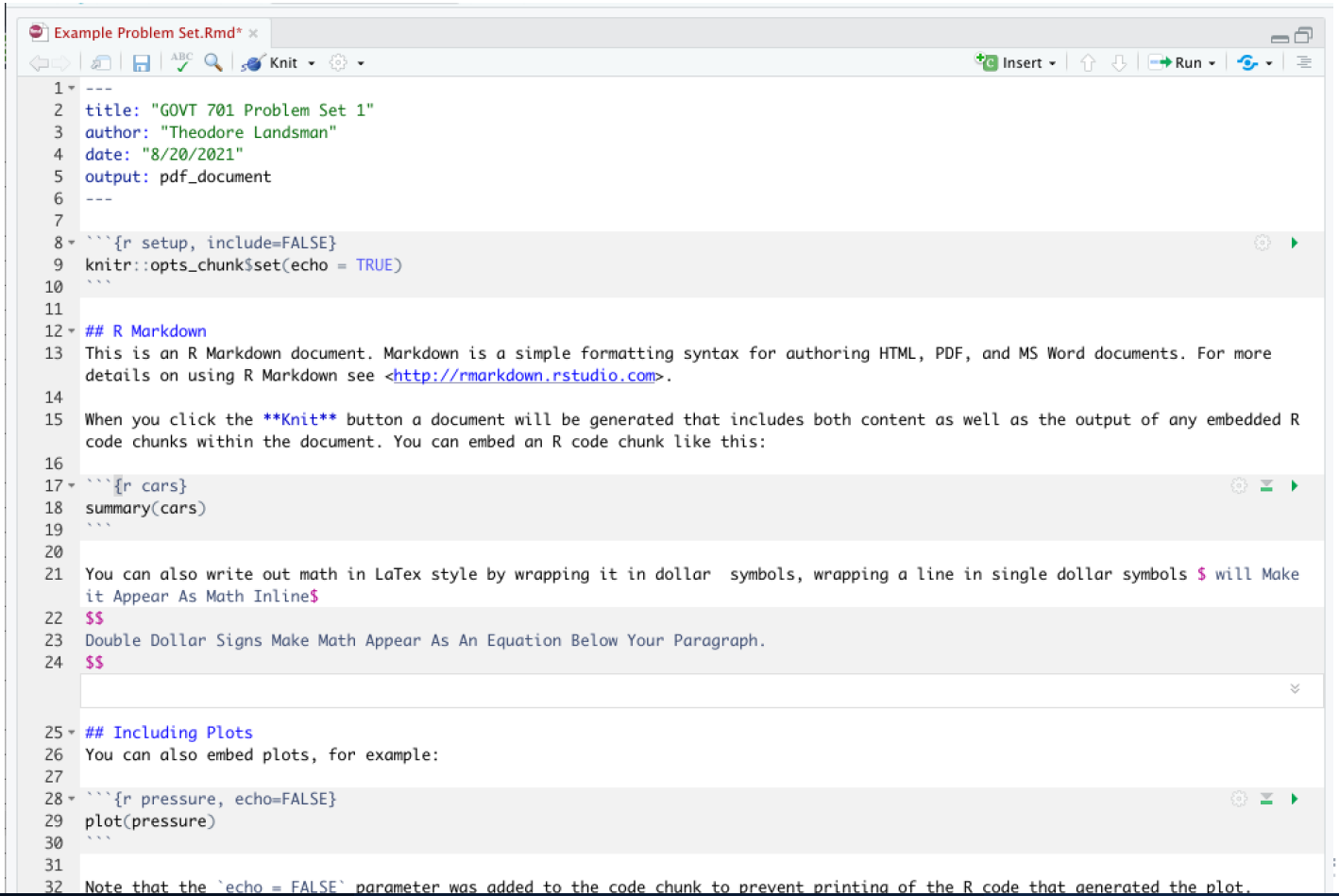
- Whether you choose to use LaTex, Markdown, or neither, the goal should be to send .pdf files for final documents unless you are strictly required to send a word document.
- This is important for two reasons:
  1. .doc/.docx/Google Docs type files save meta-data (E.G: edit history) that can be embarassing.
  2. PDFs, particularly PDFs generated by Markdown and Latex, but also PDFs exported by Word, have a cleaner more professional look that will improve your confidence in submission and signal to whoever is reading your work that you know what you're doing.
- Share document files when you are collaborating with someone, share pdfs when they are evaluating your work. Where the line between the two is unclear, ask.

Combining Coding and Formatting

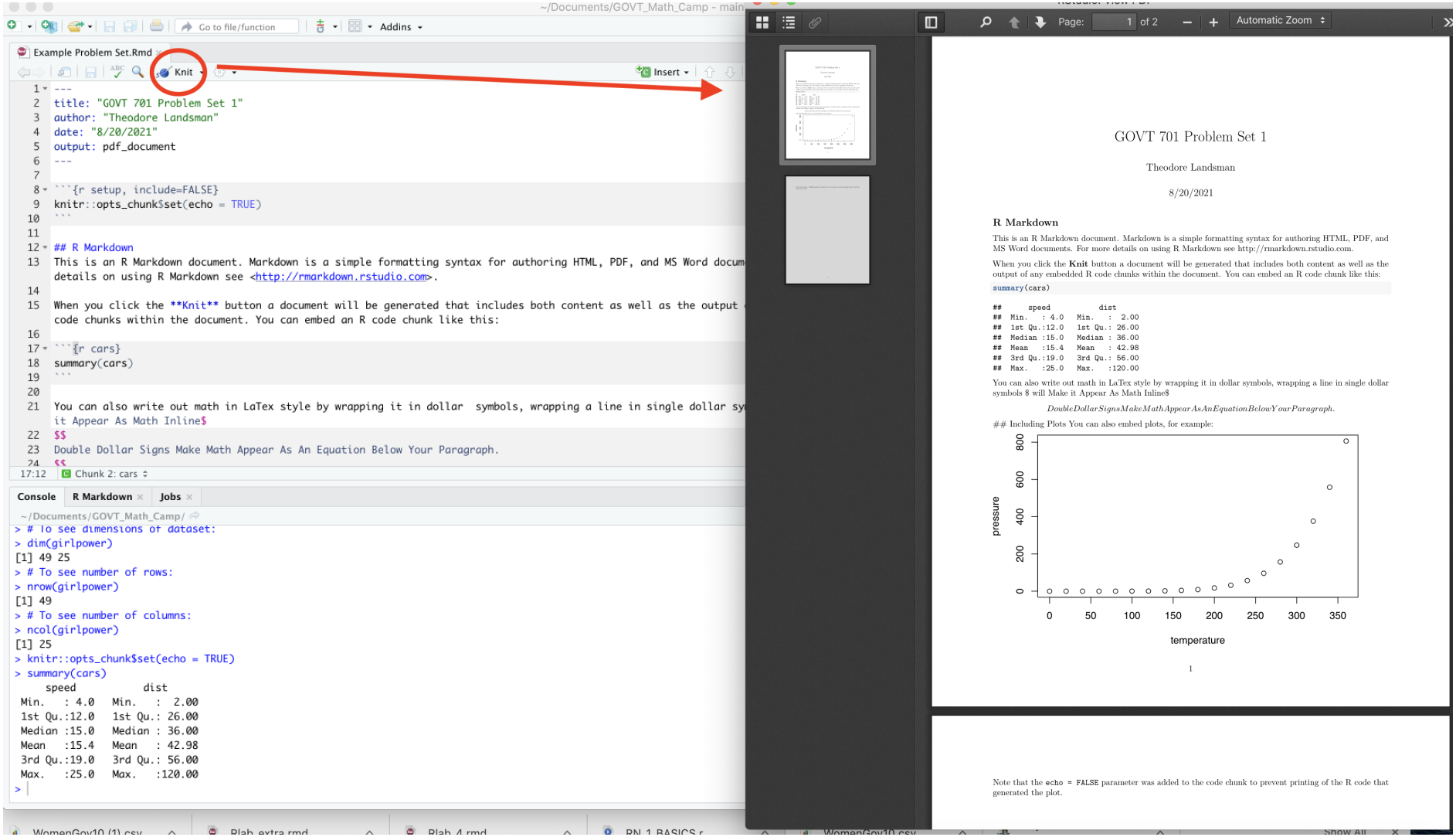
- Both coding and WYSIWYM editors require tediously explaining to the computer in painstaking detail what you want, but what if there was a way to do both at the same time?
- Enter RMarkdown, a filetype that combines the functionality of R scripting with much of the functionality of LaTex.

Markdown and RMarkdown

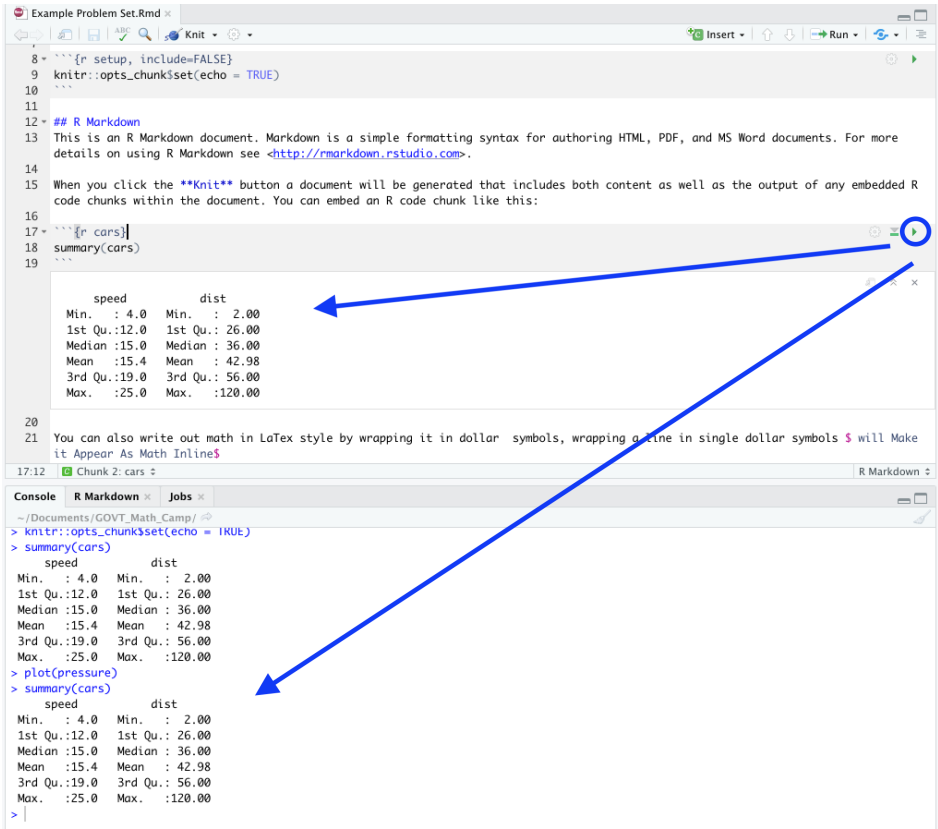
- Markdown trades some of LaTex's range of use for significant improvements in ease of use.
- RMarkdown combines Markdown with an r script editor that is almost as clear as the normal R script editor.



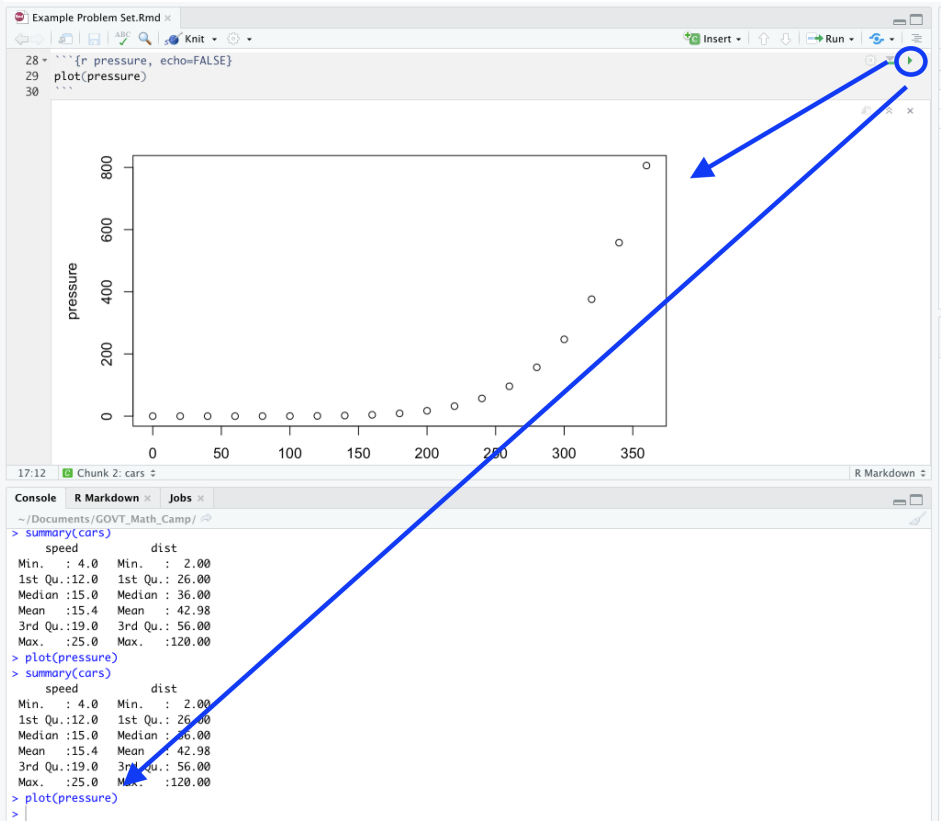
RMarkdown Output



RMarkdown Scripting



(c) Console Output with RMarkdown



(d) Plot Output with RMarkdown

Problem Sets for GOVT 701

- Because RMarkdown allows you to include code in your writeup, with ‘‘‘{r include = TRUE} it is great for projects where we are evaluating your coding skills like 701 problem sets.
- For those of you who are going on to 701 with some coding background. Writing problem sets in RMarkdown is a great way to make the class a little more challenging while preparing yourself for academic paper writing.
- If you want an even harder challenge, using Sweave or Overleaf for Data Essays is also an option, but has a lower value-add for work required relative to RMarkdown for problem sets.
- Don’t kill yourself trying to do this if you aren’t there! Submitting a word document and r script for problem sets is also fine.

Conclusion

- That's it for math camp, its been a pleasure teaching you all, and happy to answer any questions you have about Latex and Markdown.
- We will take a quick break, then have a quick session where you can ask any questions you have about PhD student life.