Authoring Documents in RStudio

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Basics

- ▶ R Markdown
  - ▶ R version of Markdown, a markup language
- ▶ YAML
  - ▶ Header (RStudio builds this for you)
  - ▶ Tells computer what kind of doc your building
- ▶ knitr
  - ▶ Package that integrates the above (along with other components like LaTeX) to actually build the document
- ▶ RStudio has a couple of documents that flesh out most of the material in this presentation
  - ▶ cheatsheet
  - ▶ reference document
  - ▶ Available in RStudio (Help -> Cheetsheets)
  - ▶ Even more resources at http://rmarkdown.rstudio.com/

Requirements

- Rstudio
- Packages
  - markdown
  - yaml
- Additonal Programs
  - TeX for PDF documents
  - MS Word or Open/Libre Office for Word documents

Creating a Document

- ▶ File -> New File -> R Markdown
- ▶ Select document type you want to build
    - ▶ this presentation was knit as a Slidy presentation
- ▶ RStudio automatically creates the apporopriate YAML header and some sample code
- ▶ When you want to create the document, click "Knit"

R Markdown Basics

- Starting line with #s followed by space for headers (more #s = sub-headers)
- Format is done by surrounding text with symbols (* or _ for italics, ** or ___ for bold, for ^ for superscripts)
    - Equations are similar, surrounded by $
- These bullets were created with *
    - The + symbol was used for this line (preceded by four spaces)
    - For ordered lists, use [number].
- For .pdf/.doc files page breaks can be created by \newpage or \pagebreak (on their own line)
- for slides, breaks by either (sub)headers or *** on one line

Math Syntax Basics

R Code in documents

- For inline code, start code with 'r and end with '.
    - e.g. to get 1.7320508, use 'r sqrt(3)'.
- For code chunks, first line is "'{r nameofchunk}
    - code chunks don't need names, but can be useful
- Last line of chunk is "'.
- Both should be their own line

Code Chunk Parameters

- A variety of parameters can be included within {}
- Some common ones (and their default values)
    - eval (TRUE): Should the code be run
    - echo (TRUE): should the code be displayed in doc
- Can use knitr::opts_chunk$set(Parameter = TRUE/FALSE) to change defaults

Caching

- By default, data from chunks not stored
- Can set cache = TRUE to store output
- This lasts until you change the chunk (however, doesn't check if earlier chunk changed)

Quick Demo

R Notebooks

- Introduced in RStudio v1.0
- Allows chunks to be run as you work, instead of having to re-knit the whole documents
- Also allows chunks written in other languages
- More resources at `http://rmarkdown.rstudio.com/r_notebooks.html` and `https://blog.rstudio.org/2016/10/05/r-notebooks/`

bookdown

- r package for authoring books w/R Markdown
- In addition to HTML and PDF, can have EPUB outputs.
- More resources at `https://bookdown.org/` and `https://bookdown.org/yihui/bookdown/`

flexdashboards

- Package to allow you to build a dashboard of visualizations using R Markdown
- Incorporates htmlwidgets
- Designed to work well on mobile devices as well
- Can integrate with shiny for reactivity
- More resources at
  http://rmarkdown.rstudio.com/flexdashboard/

ReporteRs

- Package for producing Word and PowerPoint documents
- Also contains functions for inserting code output into existing documents
- Package homepage:
  `https://davidgohel.github.io/ReporteRs/index.html`