1. Introduction

Who are we?

- General intro
- R/statistics experience
- Substantive interests

Outline

- Logistics of Statistics II
- Assignments
- Github
- RStudio
- RMarkdown

Logistics of Statistics II

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Submit Assignments via Github	**Lecture** Get Assignment via Github	Work on assignment…	**Labs** (drop-in)	Assignment of this week / readings for next week…		

Syllabus

Week	Topic / Lecture	Assignment / Lab
1	Counterfactual Causality	Intro / Logistics (mini mock assignment)
2	Potential Outcomes Framework	R revision / Tidyverse (mock assignment)
3	Causal Graphs	**assignment**
4	Regression	**assignment**
5	Matching	**assignment**
6	Instrumental Variables	**assignment**

Week	Topic / Lecture	Assignment / Lab
7	Regression Discontinuity Design	**assignment**
8	Difference-in-Difference	**assignment**
9	Panel data	**assignment**
10	Moderation	**assignment**
11	Validity & Generalizability	Revision / tba
12	Planning & Evaluating	Revision / tba

Grading

- 40% weekly assignments, submitted via GitHub
  - Deadline: 11:59 PM CET on the day before the lecture
- 25% in-class or online final exam
  - Final exam week
- 35% final replication task, submitted via GitHub
  - Deadline: 22.12.2020, 11:59 PM

Weekly assignments

- Materials will be uploaded after the lecture
- Materials will consist of:
  - RMarkdown template with questions
  - Dataset
- Your task:
  - Get the assignment via GitHub
  - Work on the assignment in an RMarkdown document (in RStudio)
  - Knit the document to an HTML file
  - Upload both the R Markdown and the HTML file via GitHub

GitHub

- Version control platform
- Industry standard in any field where people code
- Allows collaboration
- Use through terminal, RStudio or **desktop client**

To Do:

- Create free account
- Download GitHub Desktop
- Send your GitHub username to Moodle survey!

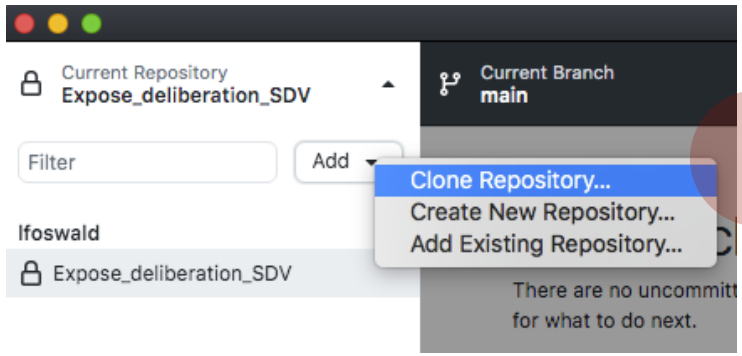
Basic Concepts GitHub

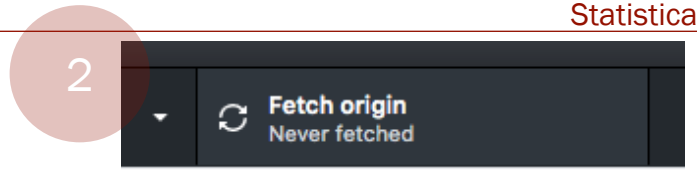
- Repository: Project folder where your files are stored. Git will track changes to anything in this folder.
- Clone: make a copy of a repository so you can access it on your local machine.
- Commit: When you make changes, you commit them to “save” them.
- Push: After you make a commit, you have to push them to the repo. Otherwise, they are just saved on your local machine.
- Pull: You can pull from the repo to access any changes made by other collaborators. This will give you the most recent version.
- README: File with information about the project.
- .gitignore: Files that you do not want Git to track (like data you don’t want to upload)
- Branch: A copy of the repo you can make changes on without affecting others.
- Merge: If there are conflicts between your local copy and the copy in the repo, sometimes you may need to open the file and choose which version of the code to keep in order to merge the two versions.

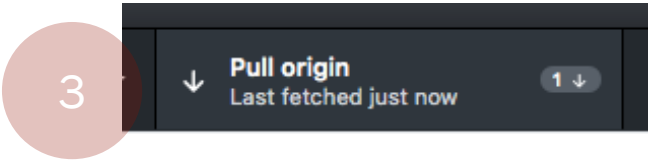
Assignments with GitHub

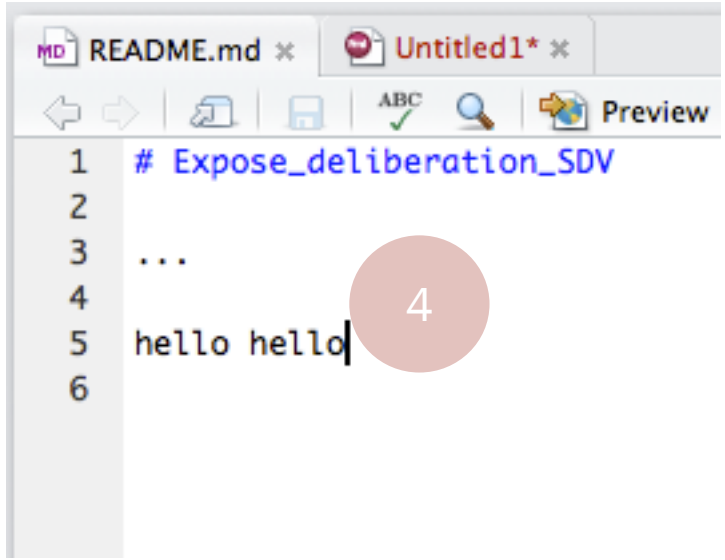
- Each week, you'll be invited to a new private repo for your assignment
- Step 1: clone the repo to access it on your desktop
- Step 2: click fetch and pull to get the newest version of the documents in the repo to your desktop
- Step 3: work on the assignment in RStudio and knit your markdown document to html
- Step 4: commit your changes and click push to submit your assignment (include both, the .html and the .Rmd file)

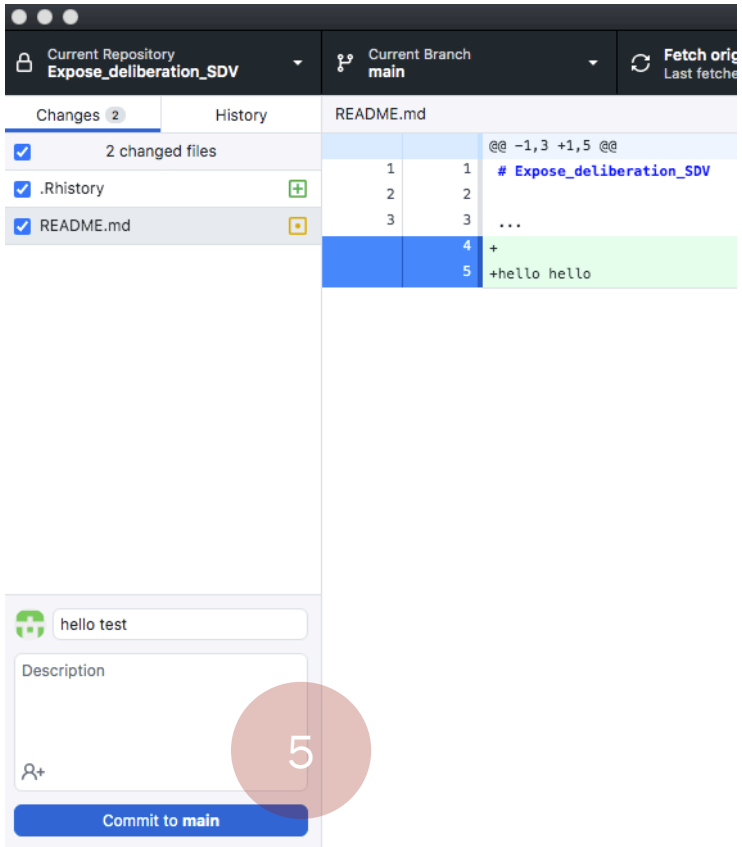
Example GitHub

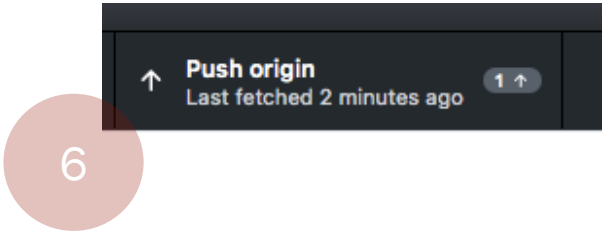








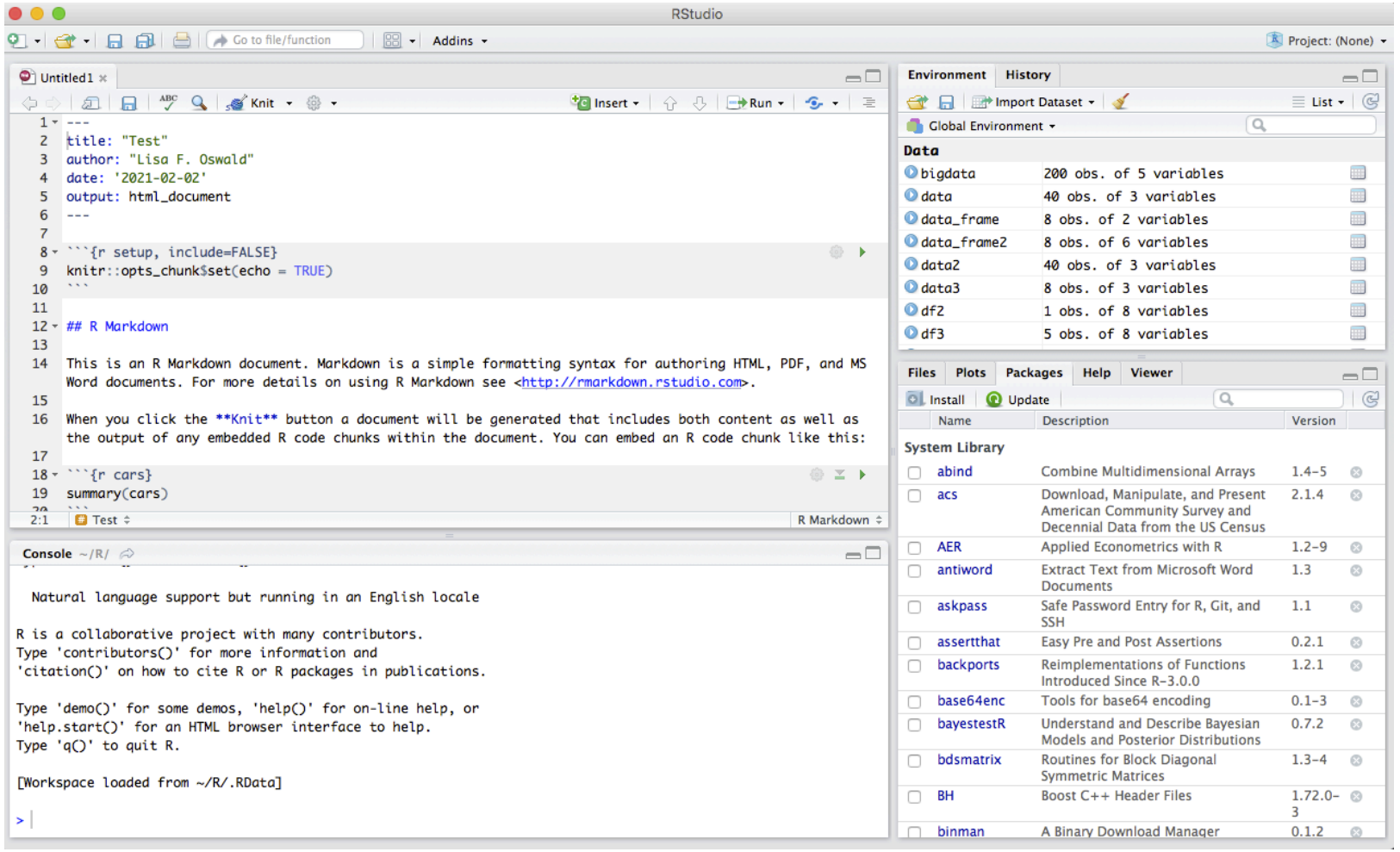




RStudio

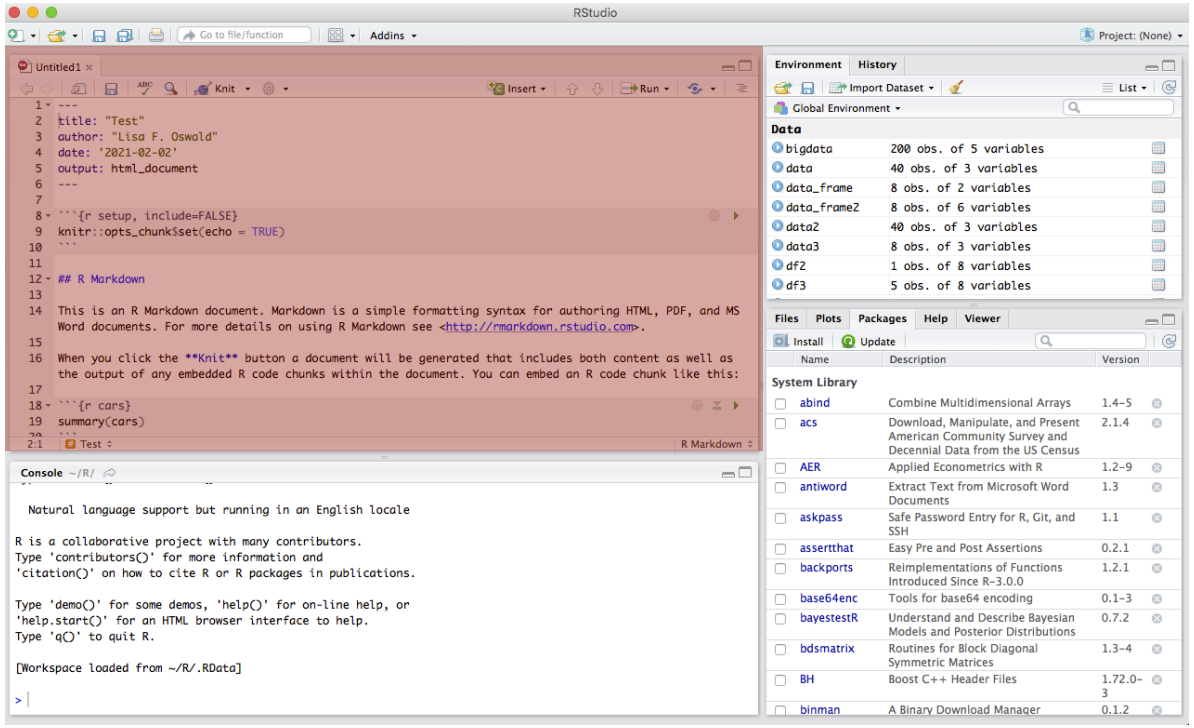
- Download latest version of R
- Download RStudio

- IDE to use R
- Free and open source
- Interface divided into 4 panes



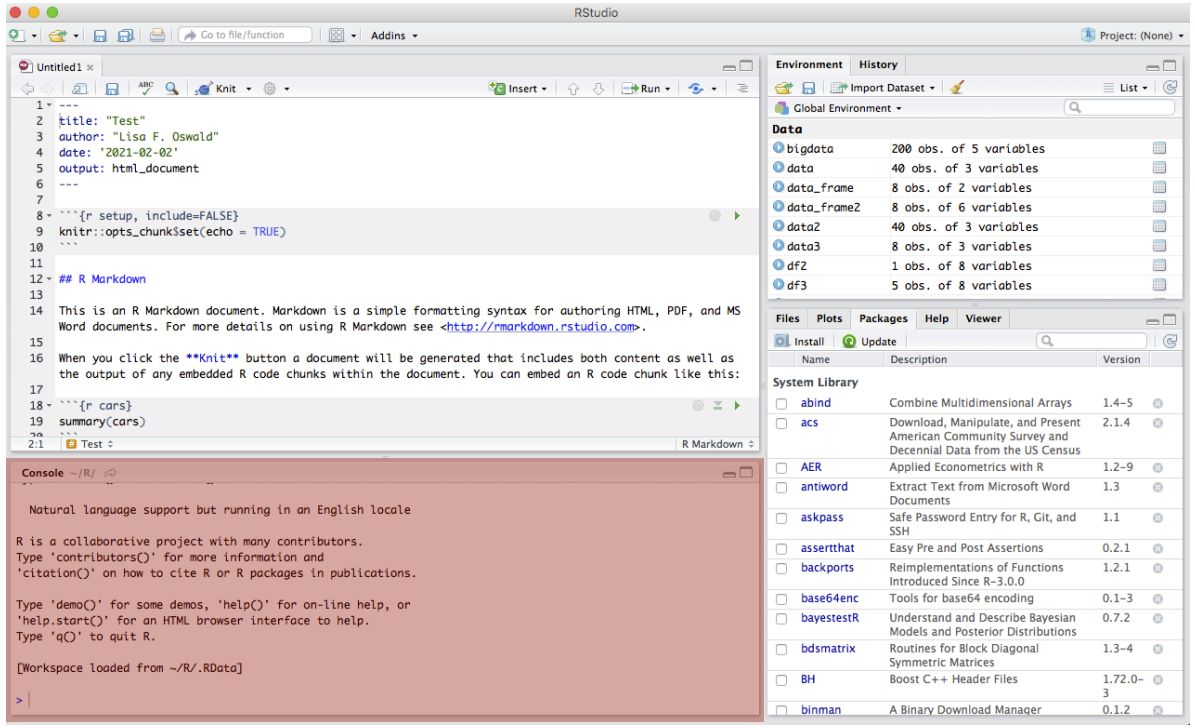
Editor in `RStudio`

- Source for your scripts and documents
- Only commands that are typed into a script can be saved
- Press `cmd + enter` to send commands to the console (to be executed)
- Comment your code using #



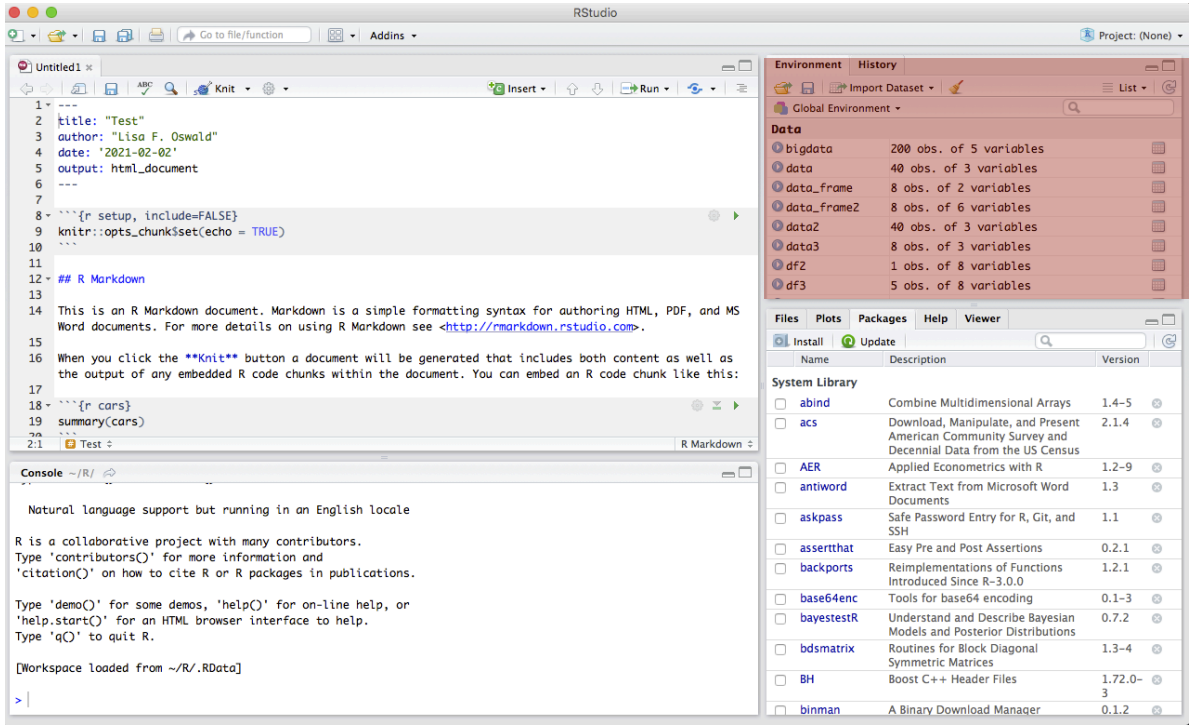
Console in RStudio

- Immediate execution of R comments by the computer
- Display of results of executed commands
- Press `enter` to execute commands
- Shows > if ready to accept commands



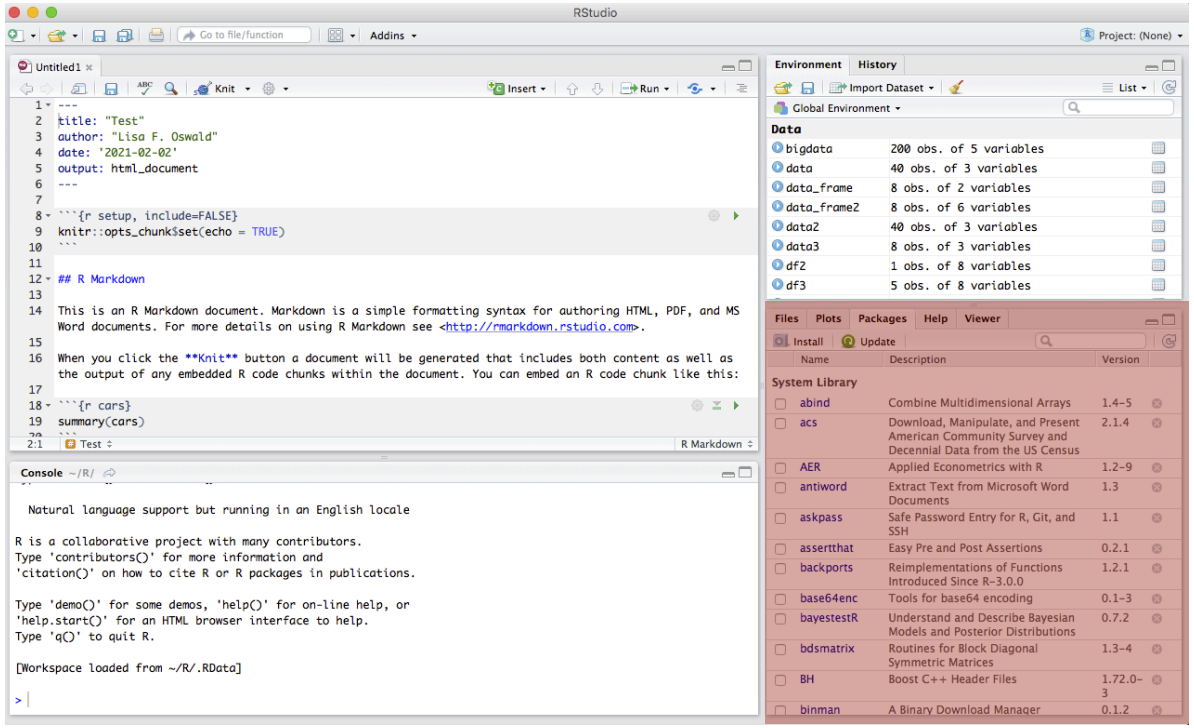
Environment in RStudio

- Environment and History
- Convenient monitor for data, variables, etc
- Helps with reading in files "manually"
- Often useful to clear environment when you run into troubles



Rest in RStudio

- Files/Plots/Packages/Help/ Viewer
- Displays Plots and Tables
- Overview of installed and loaded packages
- Help to learn more about packages and functions



R Markdown

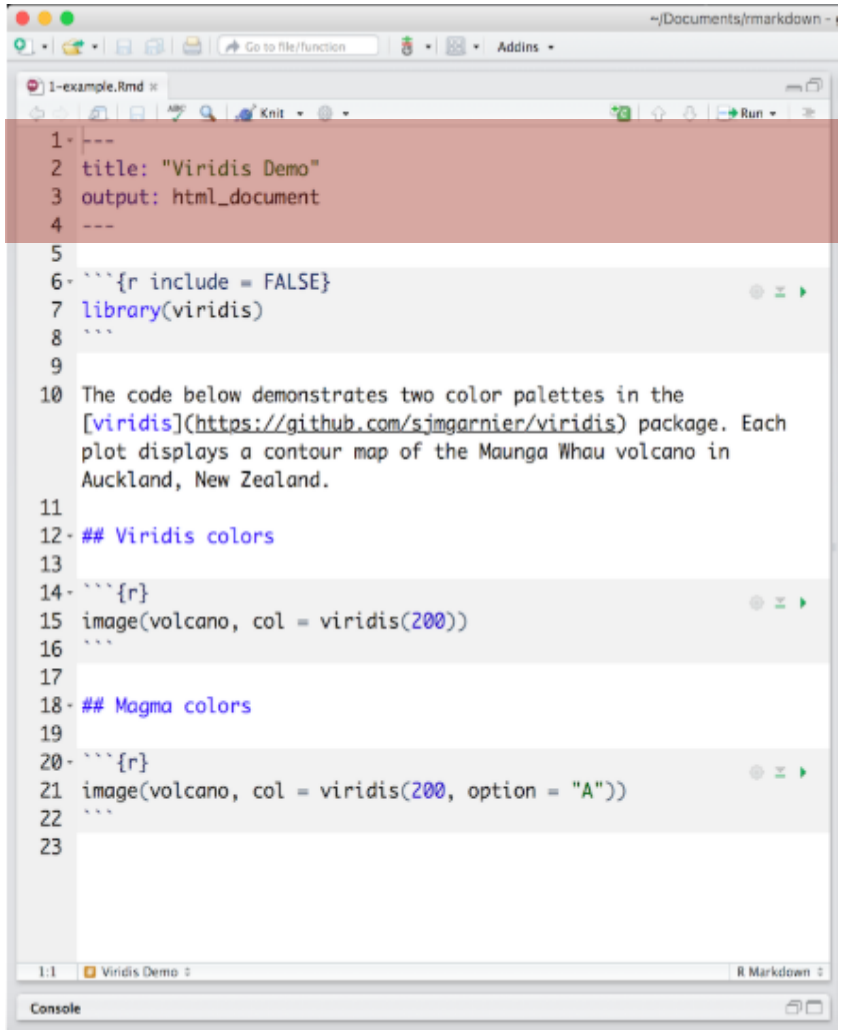
`RMarkdown` is an authoring framework for data science. A single `RMarkdown` file can be used to:

- Save and execute code
- Generate high quality reports that can be shared with an audience

We will use `RMarkdown` to submit our weekly assignments.

Headers in `Rmarkdown`

- YAML headers surrounded by "---"
  Meta-data that guides the file build-up process.



R Code in `Rmarkdown`

- R code chunks surrounded by ```
- Chunks take code as an input. It works just like usual R code.

  start a chunk: ```{r}
  end a chunk: ```

Text in `Rmarkdown`

- Text mixed with simple text formatting Takes text as input.

```
# H1
## H2
### H3
```

```
**bold text**
```

```
*italicized text*
```

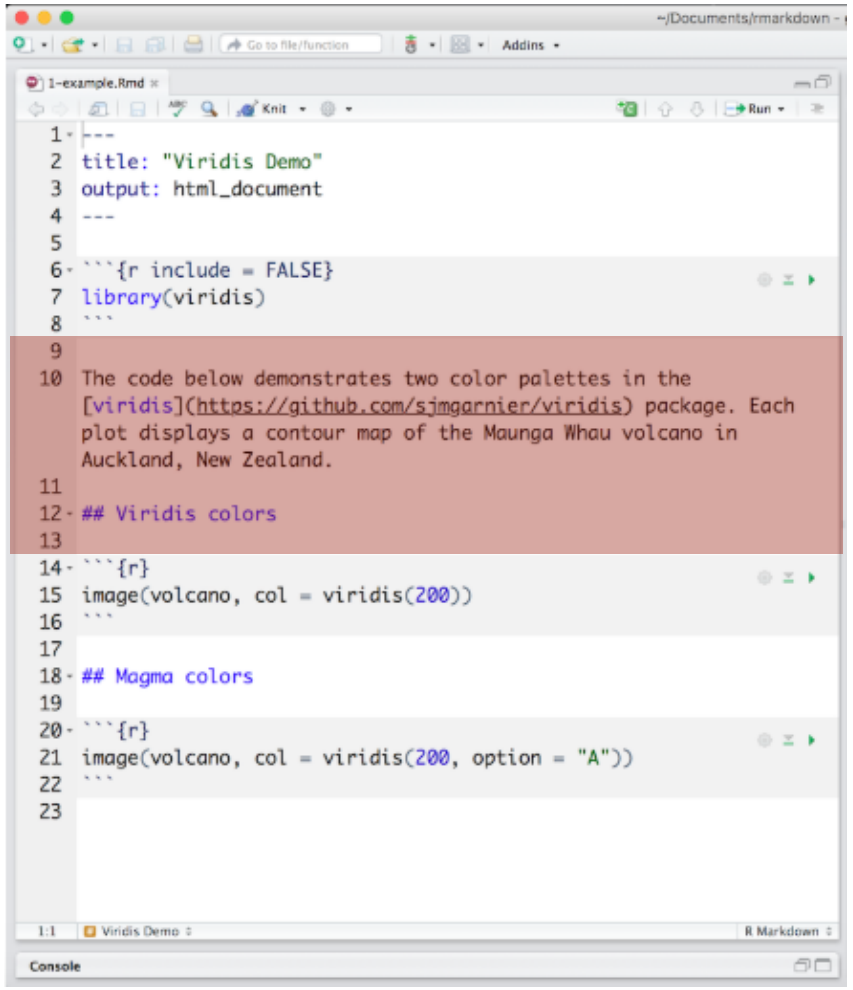
```
> blockquote
```

```
1. First item
2. Second item
3. Third item
```

```
- First item
- Second item
- Third item
```

```
`code`
```

```
---
```



Mini Mock Assignment

- Get R, RStudio and GitHub Desktop running
- Generally, revise some R basics

- If you can, try to get the assignment via GitHub
- Look at the assignment, complete the tasks, push to GitHub

- We'll download and upload the assignment again together next week ☺

Coding issues

First, don’t panic, take a step back. Then:

1. Check your code (missing parentheses, packages, stray commas, etc.)
2. Google the error message
3. Search on Stackoverflow or look on YouTube
4. Ask for help (from stackoverflow, friends, or your TA)

Further Resources

- Reminder of the basics: https://tinyurl.com/vkebh2f
- A comprehensive guide to R: http://qpolr.com/
- RMarkdown: The definitive guide https://tinyurl.com/y4tyfqmg
- For any coding issues – https://stackoverflow.com/
- Hertie's Data Science Lab – Research Consulting