1. Introduction

Who are we?

- General intro
- R/statistics experience
- Substantive interests

Outline

- Logistics of Statistics II
- Assignments
- RStudio
- RMarkdown

Logistics of Statistics II

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Lectures	**8-10** (lab 1) **10-12** (lab 2)					
Exam-style question submission on Moodle (18h)	Assignment submission deadline via Moodle (noon)			Do readings for next week, think about lit question		
Assignments go online						

Syllabus

Week	Topic / Lecture	Assignment / Lab
1	Counterfactual Causality	Intro / Logistics
2	Potential Outcomes Framework	Data manipulation
3	Causal Graphs	Causal Graphs **assignment**
4	Regression	Regression
5	Matching	Matching **assignment**
6	Instrumental Variables	Instrumental Variables

Week	Topic / Lecture	Assignment / Lab
7	Regression Discontinuity Design	RDD **assignment**
8	Difference-in-Difference	DiD & synthetic controls
9	Panel data	Panel data **assignment**
10	Moderation & Mechanisms	Moderation & Mechanisms
11	Validity & Generalizability	Statistical power **assignment**
12	Planning & Evaluating	Final exam revision

Grading

- 40% take-home assignments, submitted via Moodle
  - Deadline: Tuesdays at noon on the week after publication
- 35% in-class or online final exam
  - Final exam week
- 25% final replication project
  - Deadline: TBA
- Exam-style questions via Moodle
  - Deadline: Mondays at 18h

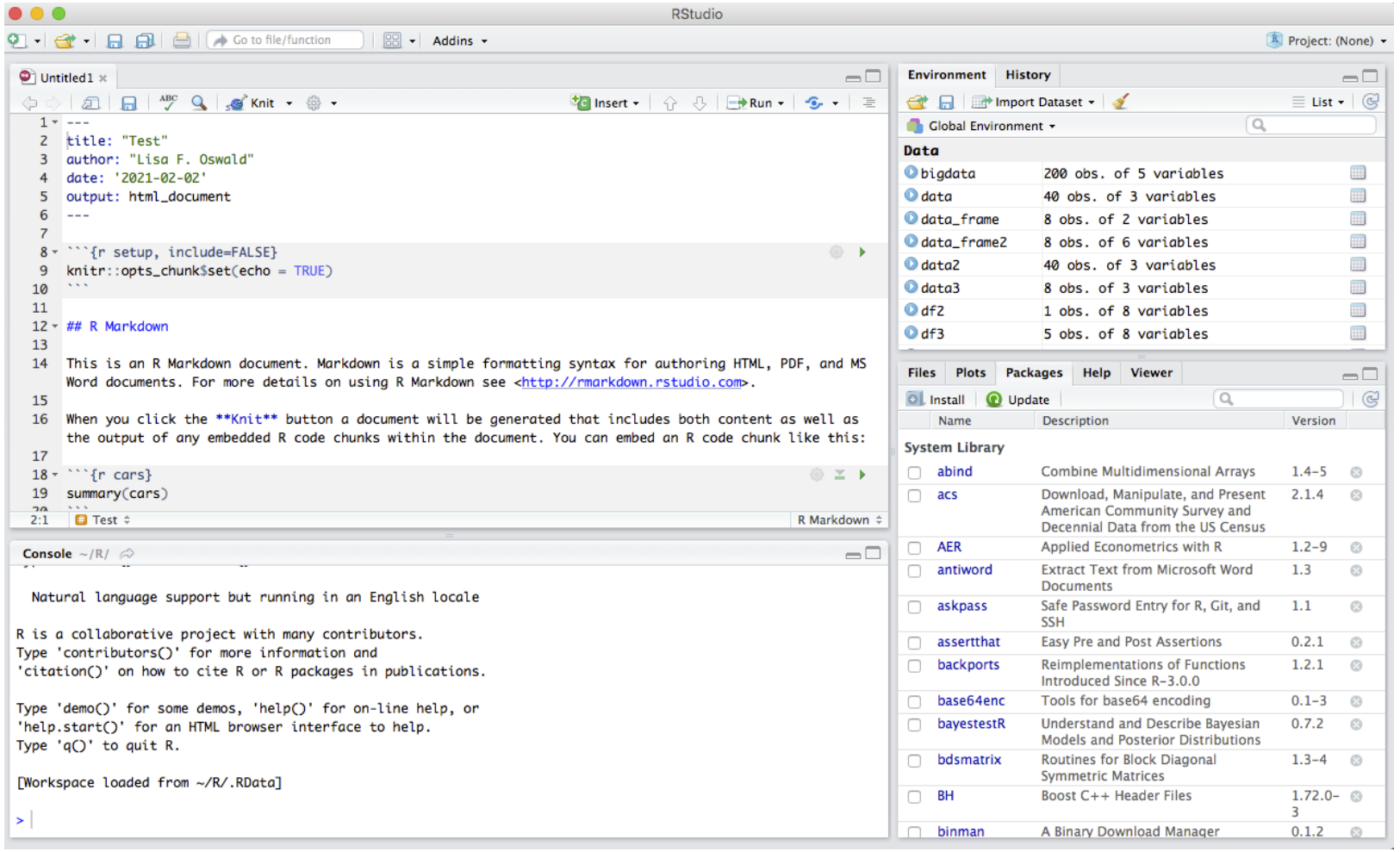
Weekly assignments

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

RStudio

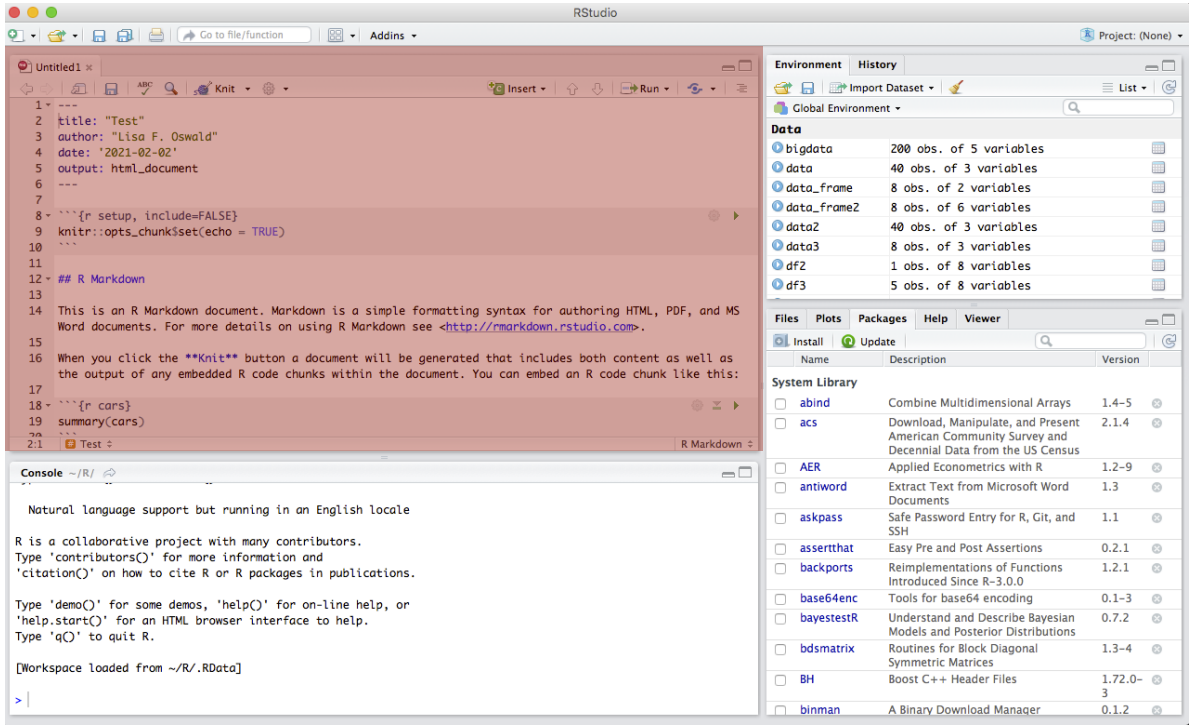
- Download latest version of R
- Download RStudio

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



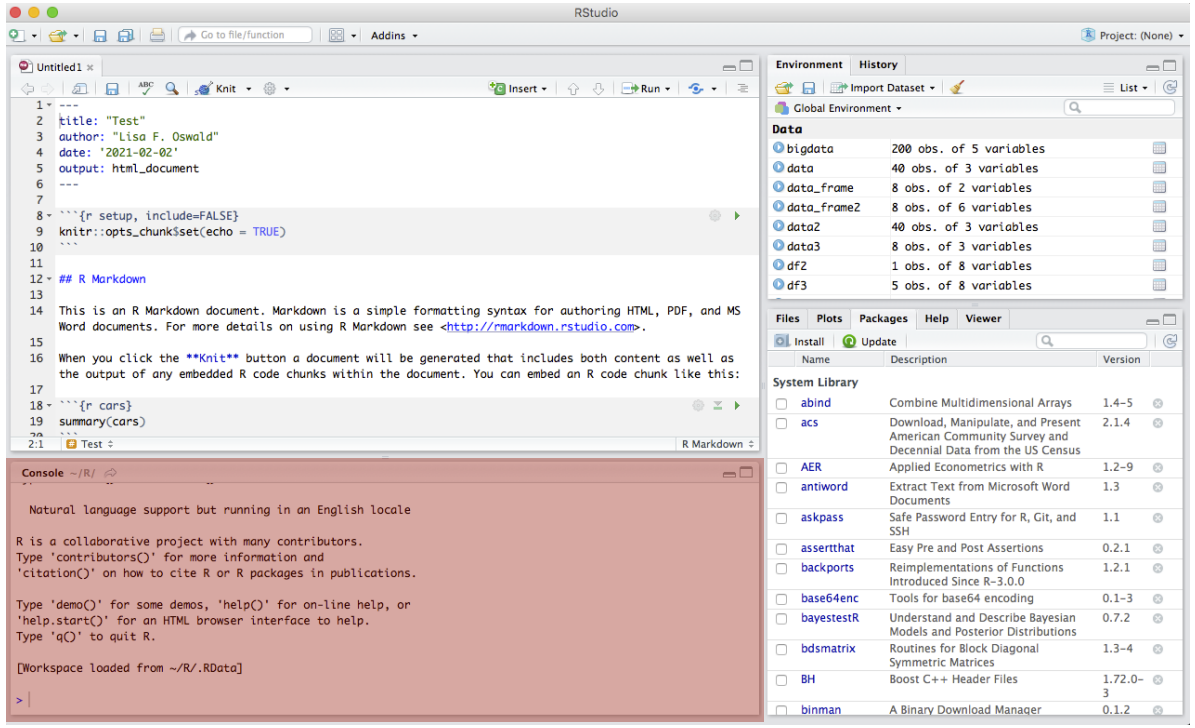
Editor in `RStudio`

- 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 #



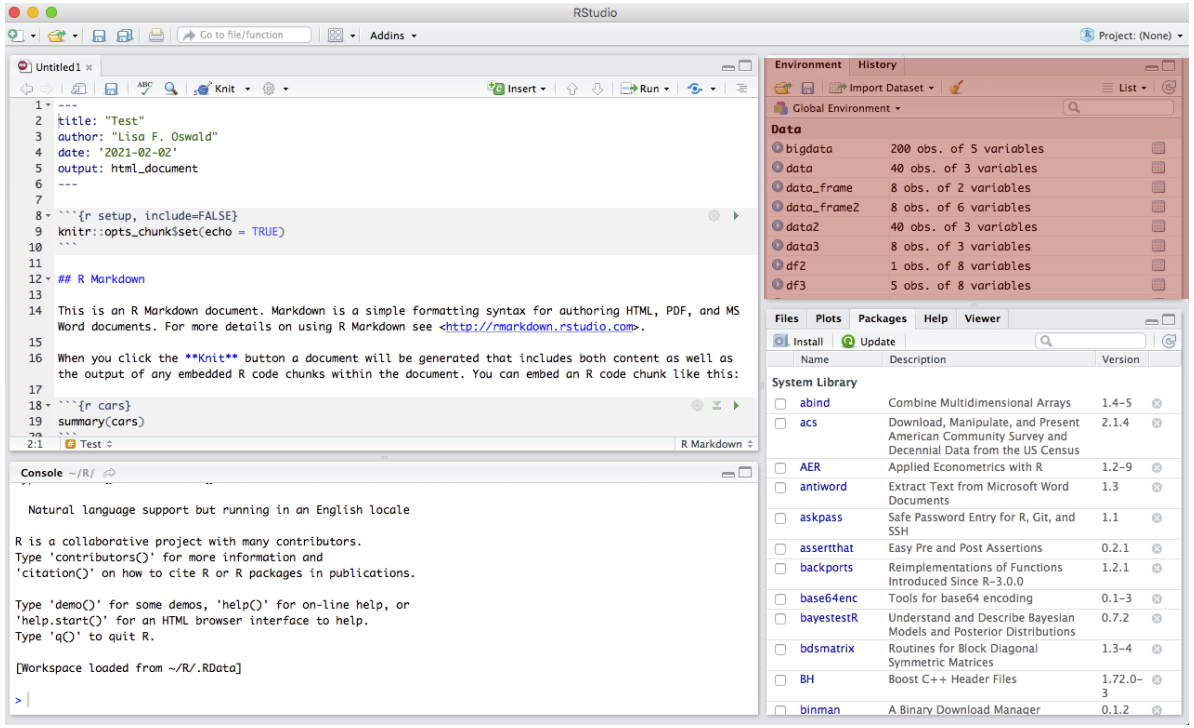
Console in `RStudio`

- 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



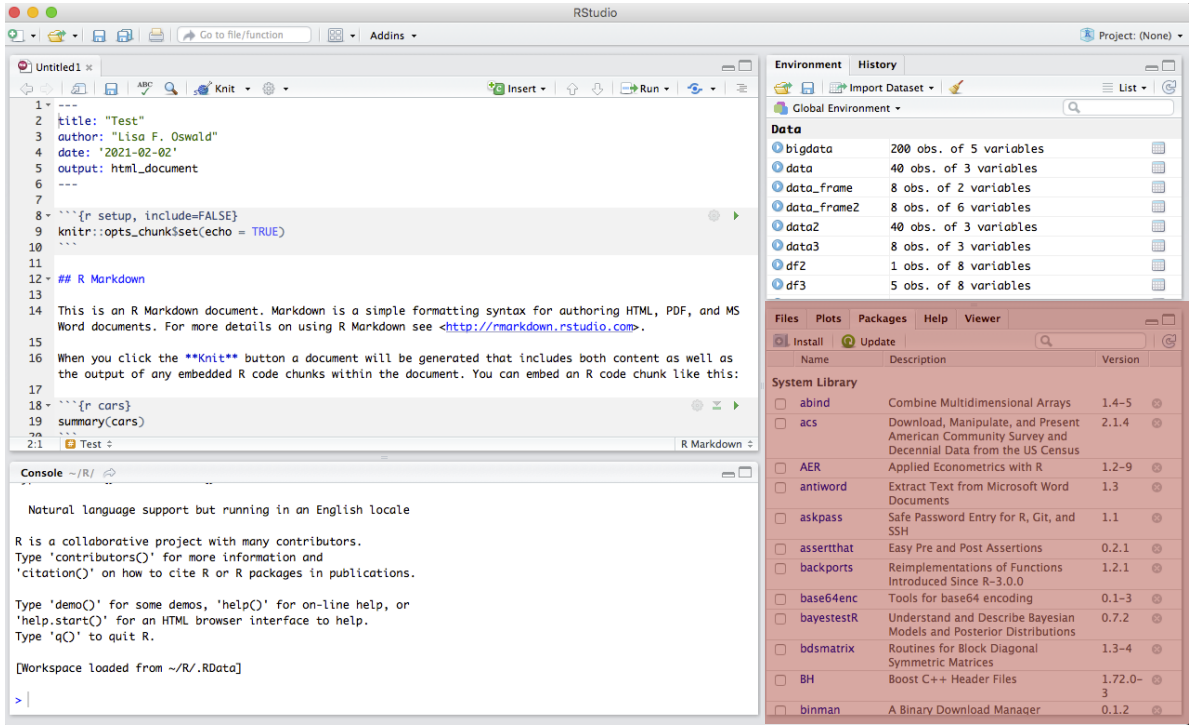
Environment in RStudio

- 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:

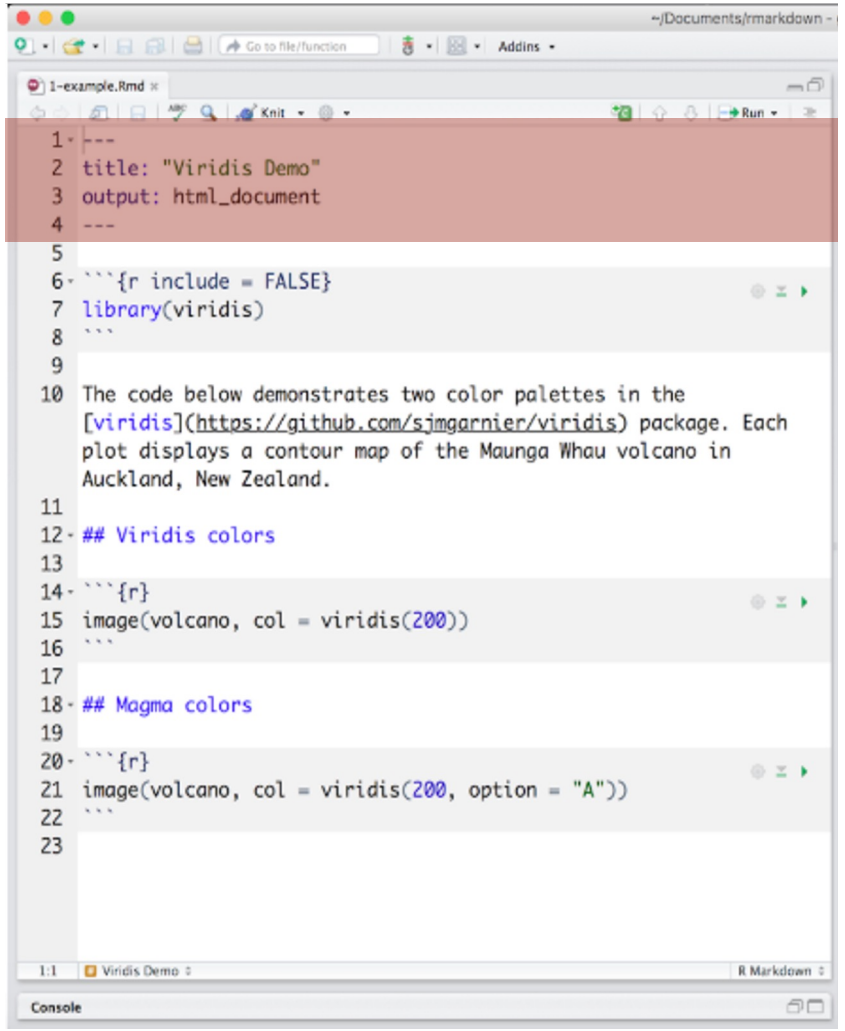
- Save and execute code
- Generate high quality reports that can be shared with an audience

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*
```

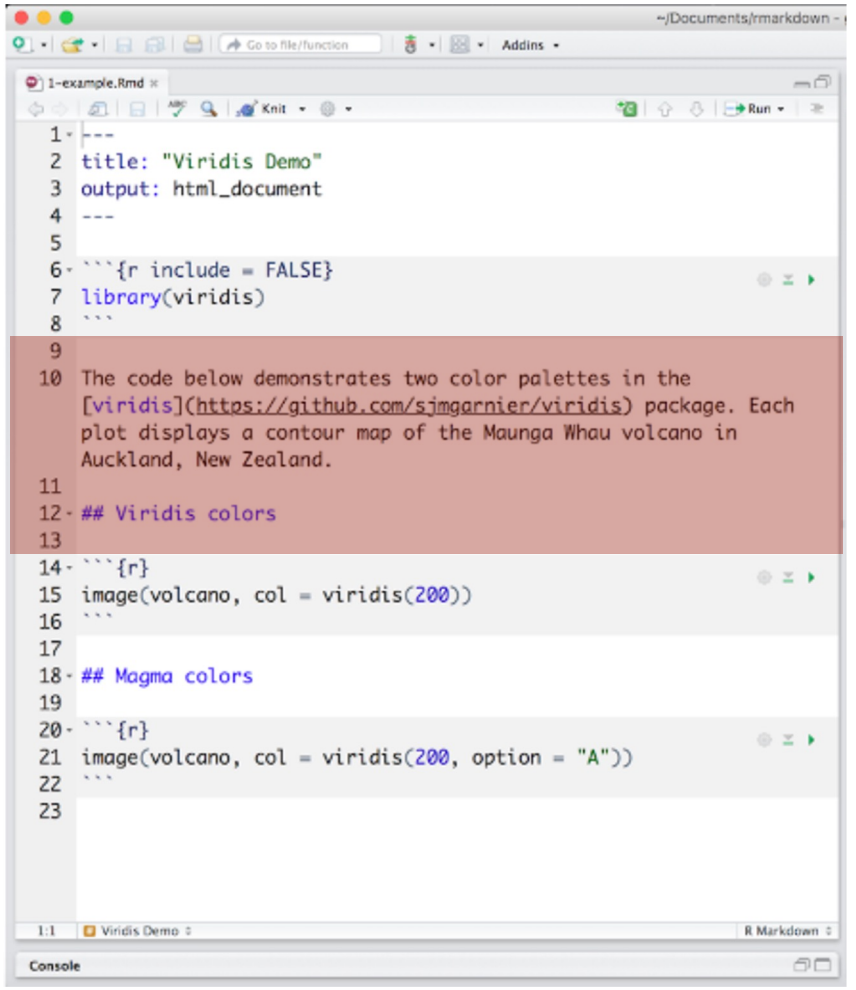
```
> blockquote
```

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

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

```
`code`
```

```
---
```



Deadly sins in `Rmarkdown`

1. install.packages()
2. View()
3. Actual errors in the code

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 – Recordings & materials of workshop
- 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