ANT 6973

DATA VISUALIZATION AND EXPLORATION

PLAN FOR TODAY

1. Introductions

2. Orientation
    - Syllabus and course website
    - R and RStudio

3. Complete your first in-class activity!

WHO AM I?

Dr. Fernando Campos

- Department of Anthropology
- Email: fernando.campos@utsa.edu
- Office Hours:
  - Tuesdays and Thursdays, 10:00 to 11:00
  - By appointment

WHO AM I?

Dr. Fernando Campos

Born and raised in San Antonio.

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Graduate school in Calgary, Canada.

Taught at Tulane University, New Orleans.

Postdoc at Duke University, NC.

Started at UTSA in 2018!

WHAT DO I DO?

Dr. Fernando Campos

I’m a biological anthropologist, studying the behavioral ecology of wild primates.

“Blue Marble” imagery by Reto Stöckli, NASA Earth Observatory

Nicaragua

Área de Conservación Guanacaste

Costa Rica

Panama

"Blue Marble" imagery by Reto Stöckli, NASA Earth Observatory

ACG boundaries from World Database on Protected Areas (WDPA)

WHITE-FACED CAPUCHIN

MANTLED HOWLER

BLACK-HANDED SPIDER MONKEY

"Blue Marble" imagery by Reto Stöckli, NASA Earth Observatory

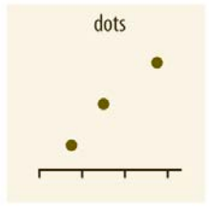
Amboseli boundaries from World Database on Protected Areas (WDPA)

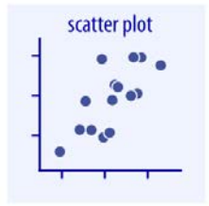
AMBOSELI BABOON RESEARCH PROJECT

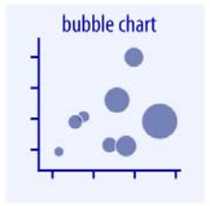
WHY AM I TEACHING THIS COURSE?

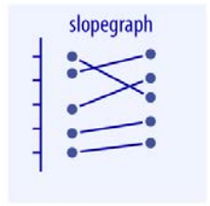
DIRECTORY OF VISUALIZATIONS

Amounts

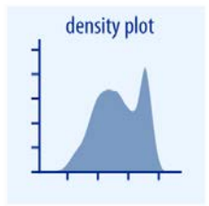


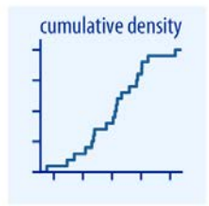


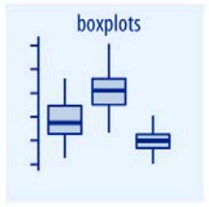


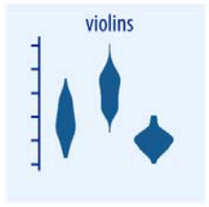


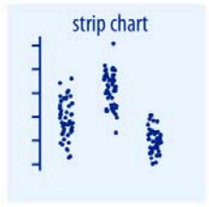
Distributions

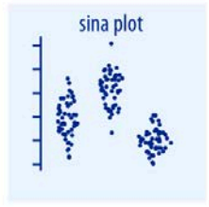


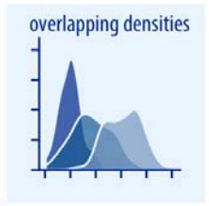


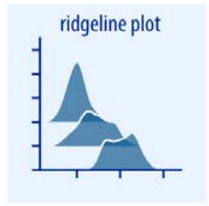




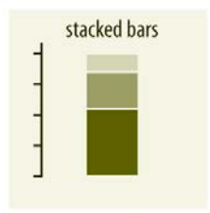


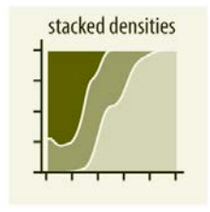




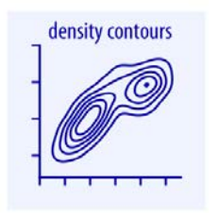


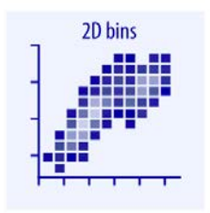
Proportions

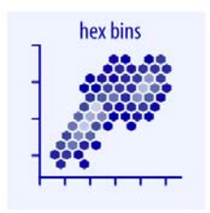


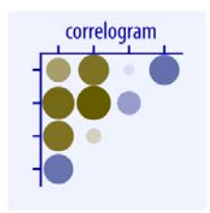


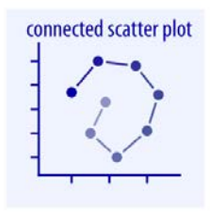
X-Y Relationships











Uncertainty

Claus Wilke, *Data Visualization*, Ch. 5: "Directory of Visualizations"

DATA LITERACY

YOUR TURN

1. Who are you?
2. What are your research interests?
3. What is your experience with data?
4. Do you have any experience using R, and if so, how much?
5. Is there anything specific that you hope to learn in this course?

ORIENTATION

ORIENTATION

- Syllabus and course website
- R and RStudio

COURSE WEBSITE

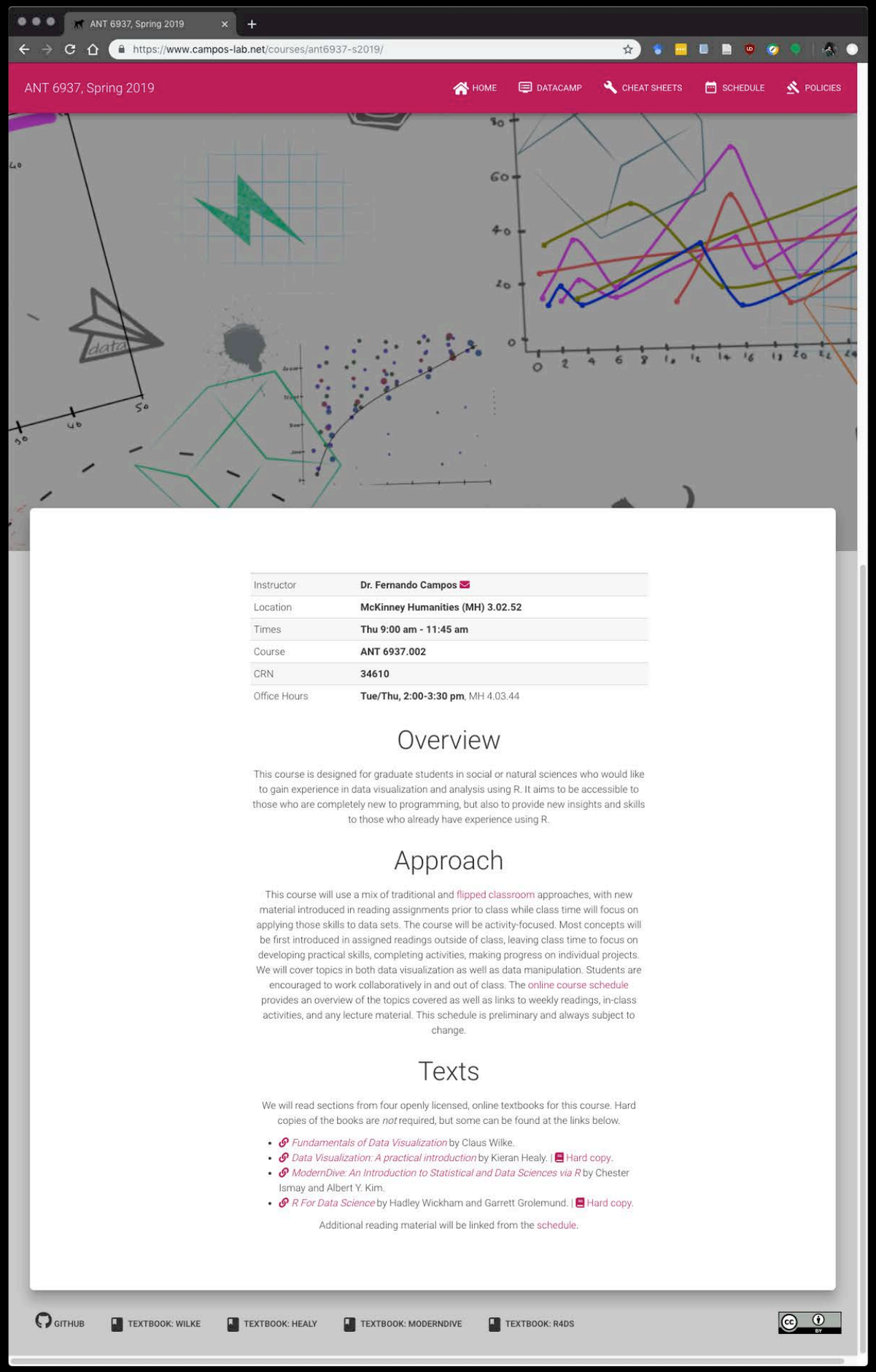
- https://www.campos-lab.net/courses/data-viz-course/

- Bookmark it!

- Go here for up-to-date information, schedule, assignments, readings, etc.

- I'll use Blackboard only for posting grades.

- Let's explore this a bit…



ORIENTATION

- Syllabus and course website
- R and RStudio

WHAT'S R VS. RSTUDIO?

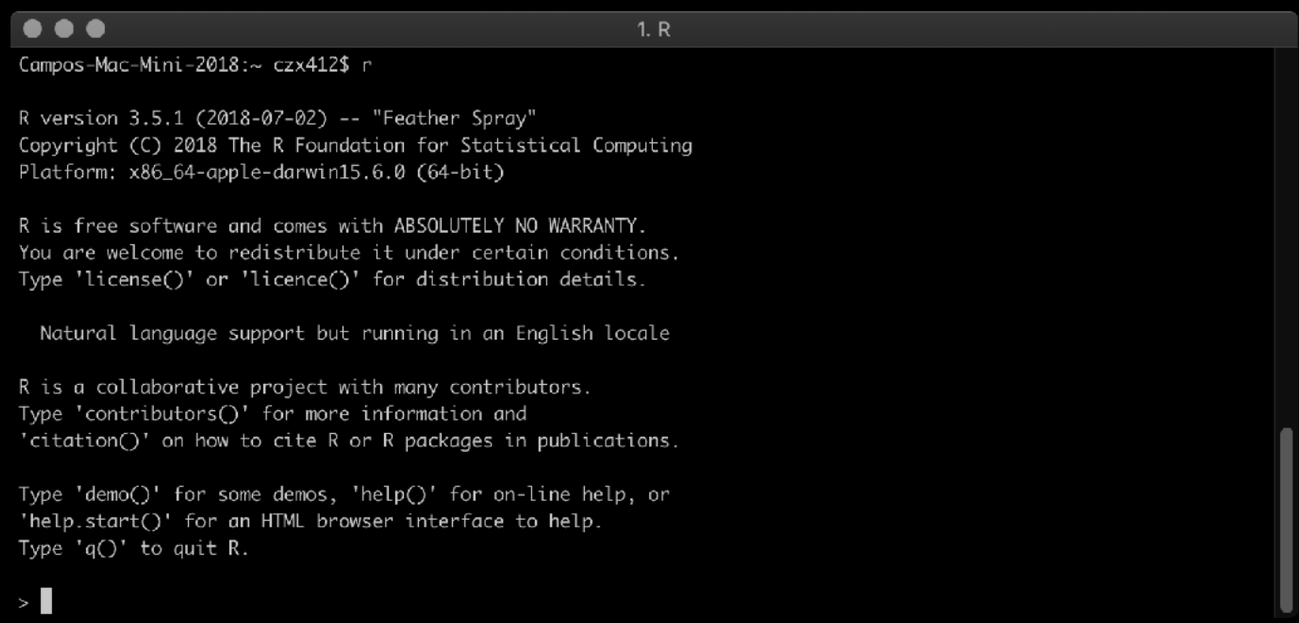
- R is a programming language.
- RStudio is a nice user interface for R (an *integrated development environment* or IDE) that provides many convenient features and tools for using R.

Engine

Dashboard

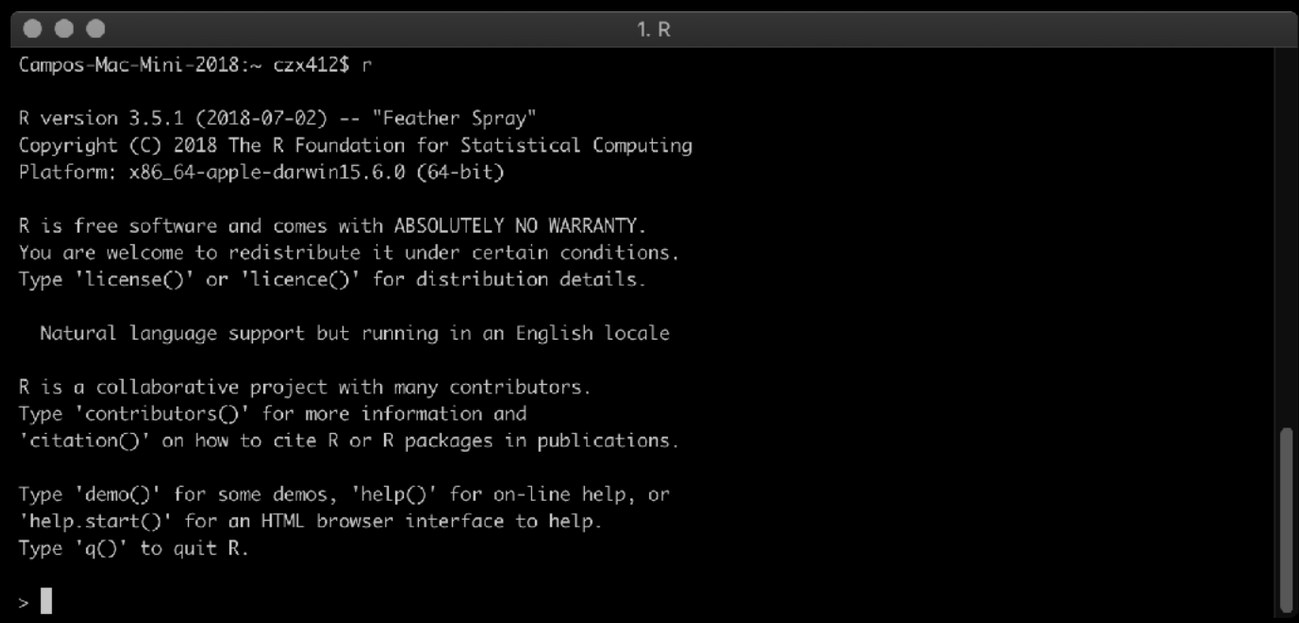
WHY R?

- R is the premier data analysis and visualization platform.



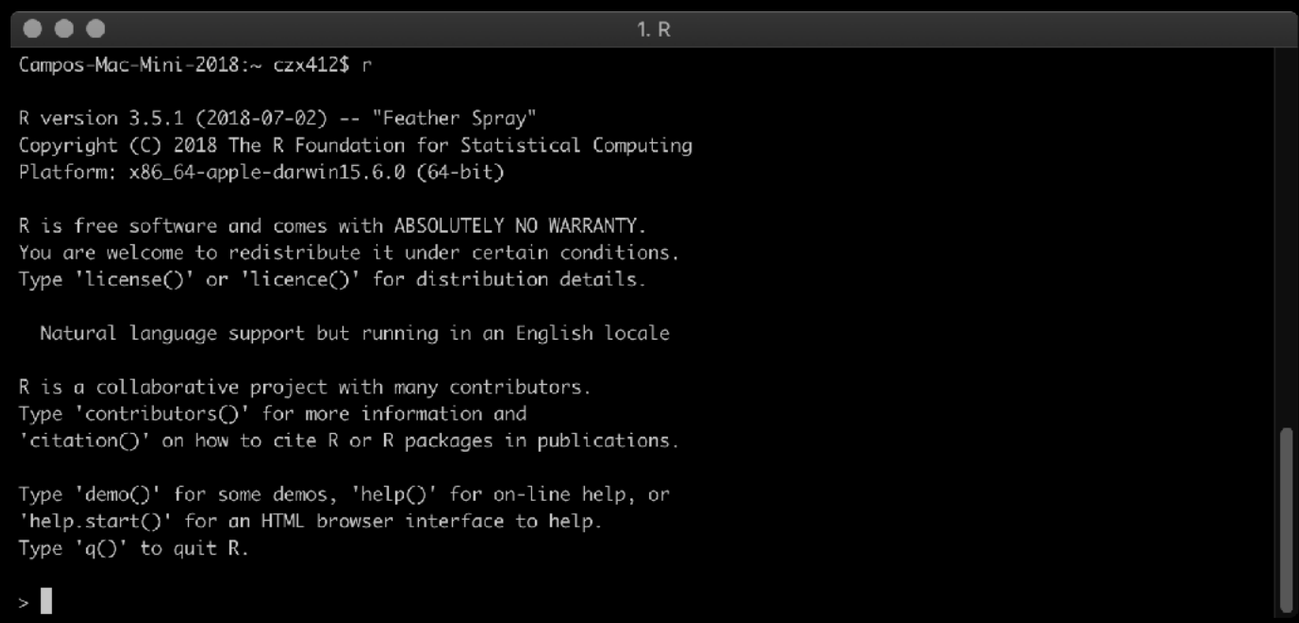
WHY LEARN R?

- **Pros (1 of 2):**
  - Powerful, state-of-the-art, and used by many researchers, R is becoming a standard for data analysis
  - Easy to extend, modify, and improve with add-on packages
    - Programmable: if R can't do a particular task right now, you (or someone) can program it
  - Freely available for Windows, Mac, Unix



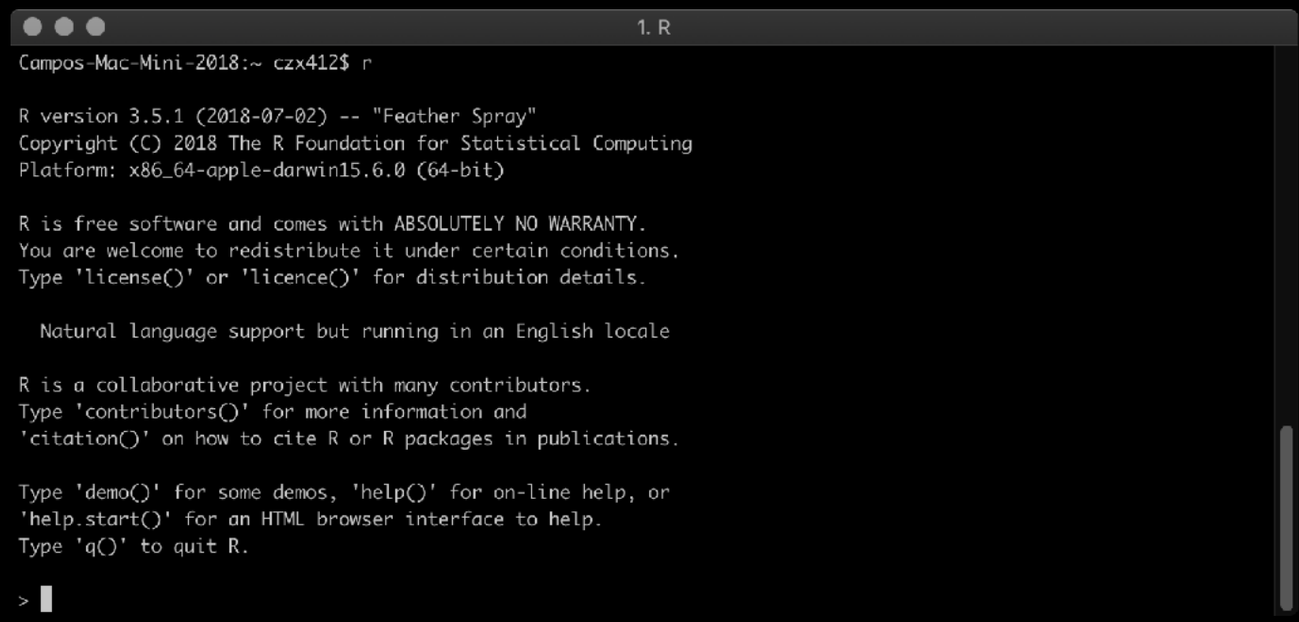
WHY LEARN R?

- **Pros (2 of 2):**
  - Reproducibility: R relies on a series of *written commands* rather than pointing and clicking (and this is a good thing!)
  - Powerful plotting packages produce publication-quality graphics.
  - R has a large and welcoming community.

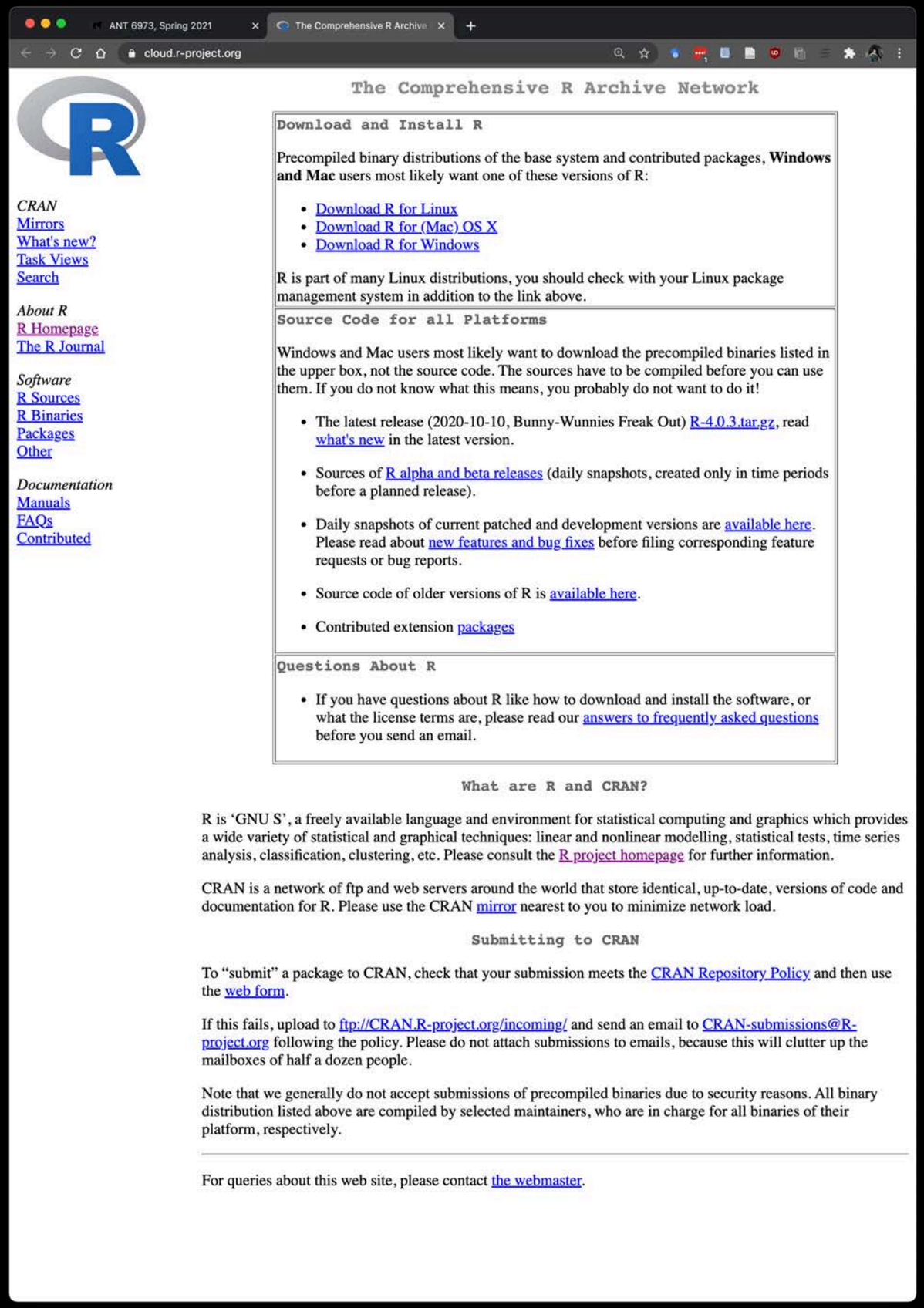


WHY LEARN R?

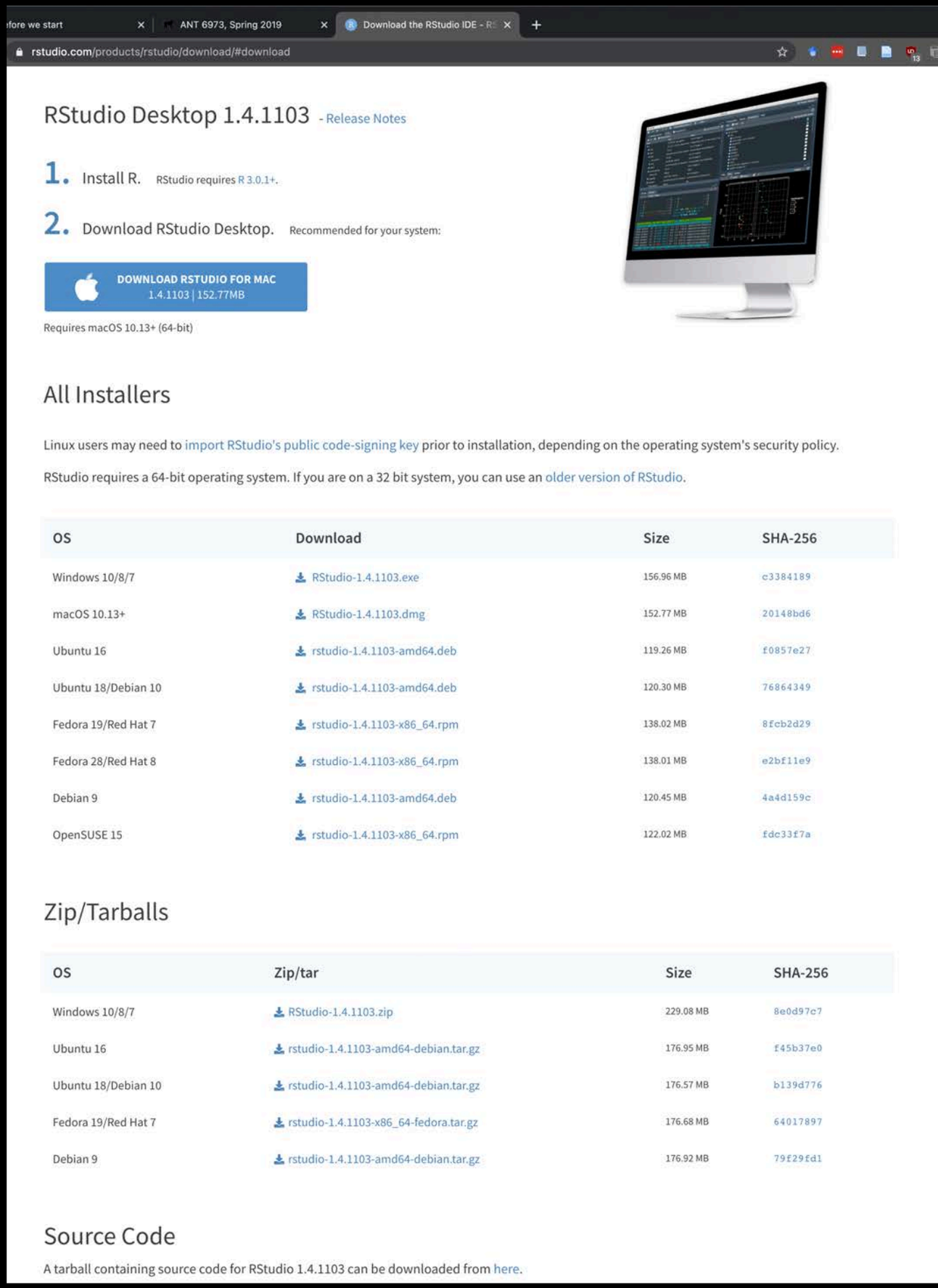
- **Cons:**
  - Command-based rather than interactive in the point-and-click sense (like SPSS & Excel)
    - Can be significant learning hurdle
    - Specific commands easy to forget
  - Documentation sometimes poor
  - Still evolving: backward-compatibility has been an issue



- Let’s make sure we all have a current installation of R.
- https://cloud.r-project.org/
- If you already have R installed, it's still a good idea to update.

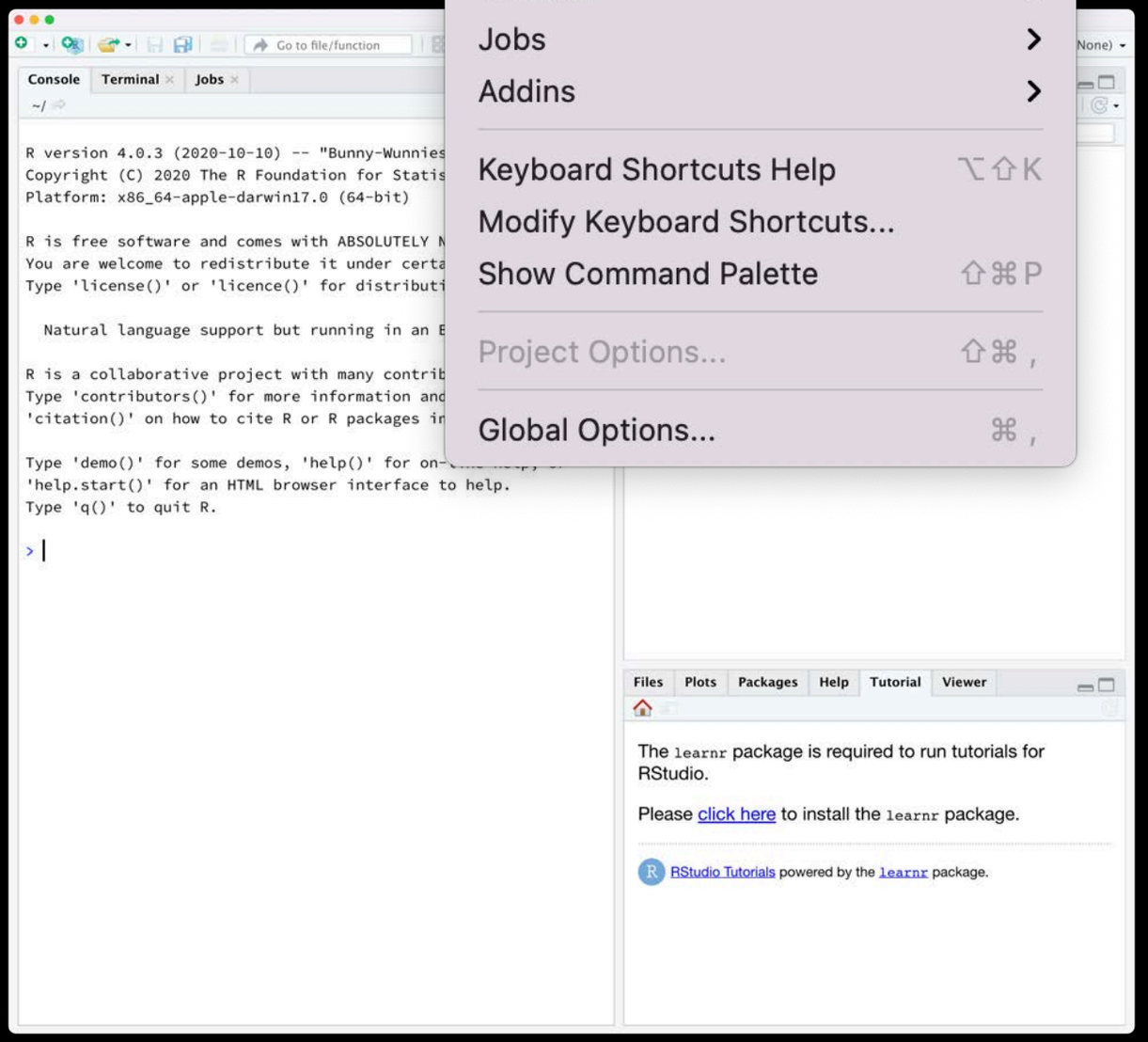


- And a current installation of RStudio.
- https://www.rstudio.com/
- If you already have RStudio installed, check for a new version using menus:
  - Help > Check for Updates



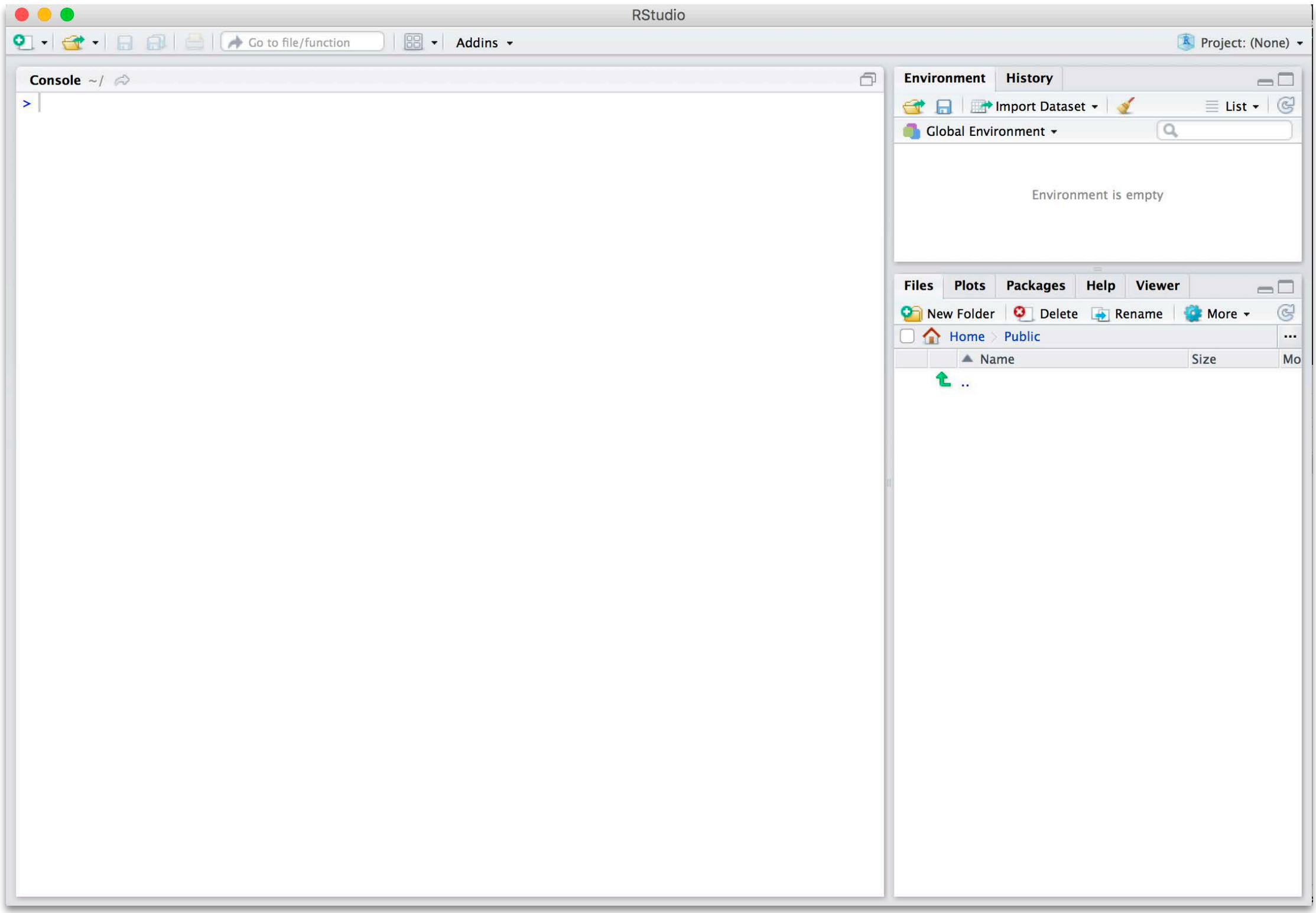
- If you already have RStudio installed, now would be a good time to update all your packages.

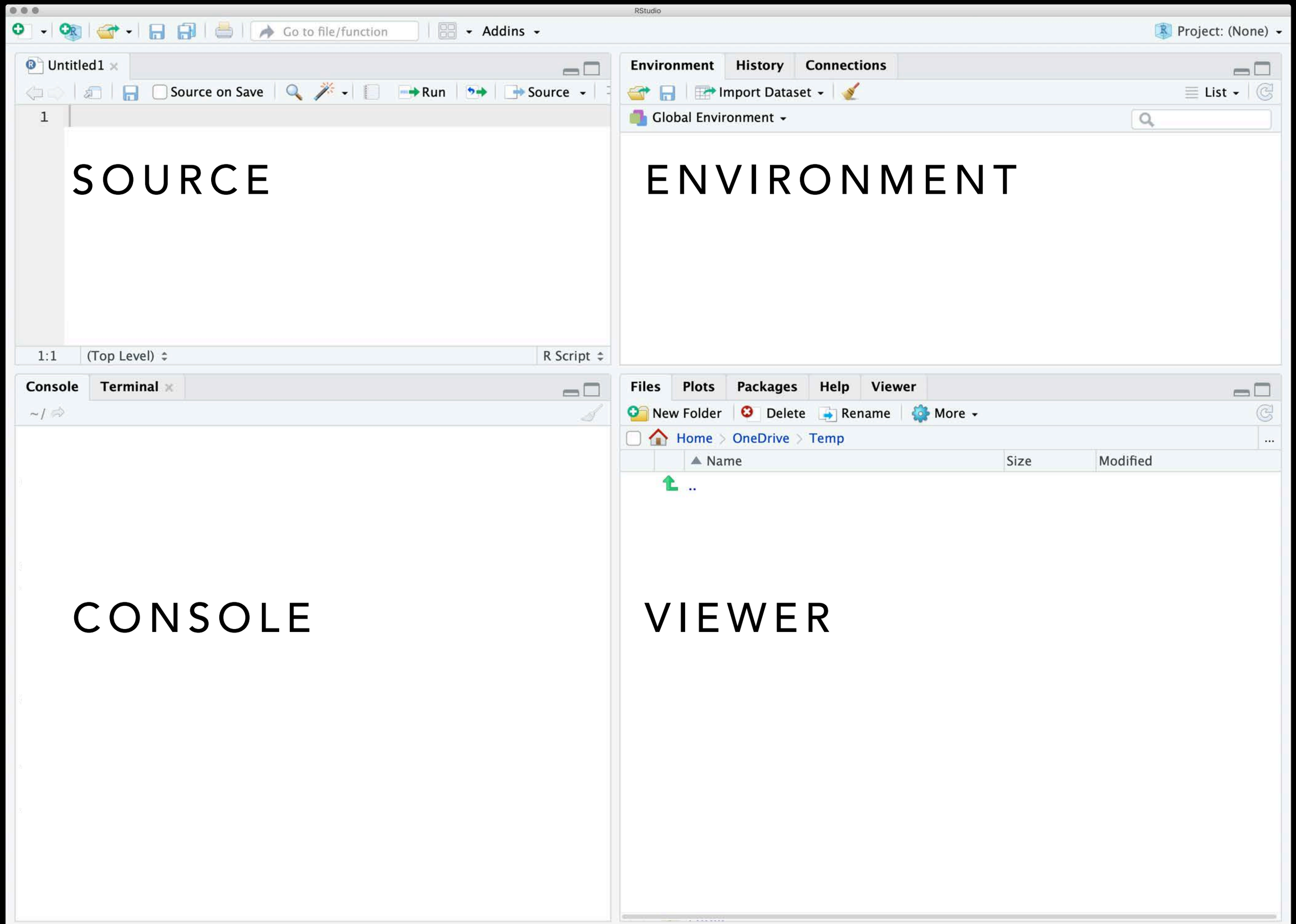
- In RStudio, Tools > Check for Package Updates…



LET'S PAUSE UNTIL WE ALL COMPLETE THESE STEPS


RStudio


RStudio
Go to file/function
Addins
Project: (None)
Console ~/
>
Environment
History
Import Dataset
List
Global Environment
Environment is empty
Files
Plots
Packages
Help
Viewer
New Folder
Delete
Rename
More
Home
Public
Name
Size
Mo
..


RStudio
Go to file/function
Addins
Project: (None)
Untitled1
Source on Save
Run
Source
1
SOURCE
1:1
(Top Level)
R Script
Environment
History
Connections
Import Dataset
List
Global Environment
ENVIRONMENT
Console
Terminal
~/
CONSOLE
Files
Plots
Packages
Help
Viewer
New Folder
Delete
Rename
More
Home
OneDrive
Temp
Name
Size
Modified
..
VIEWER

RStudio

Go to file/function | Addins | Project: (None)

Untitled1 | Source on Save | Run | Source

1

SOURCE

Write and run code that you intend to keep.

1:1 | (Top Level) | R Script

Environment | History | Connections

Import Dataset | List

Global Environment

ENVIRONMENT

Console | Terminal

~/

CONSOLE

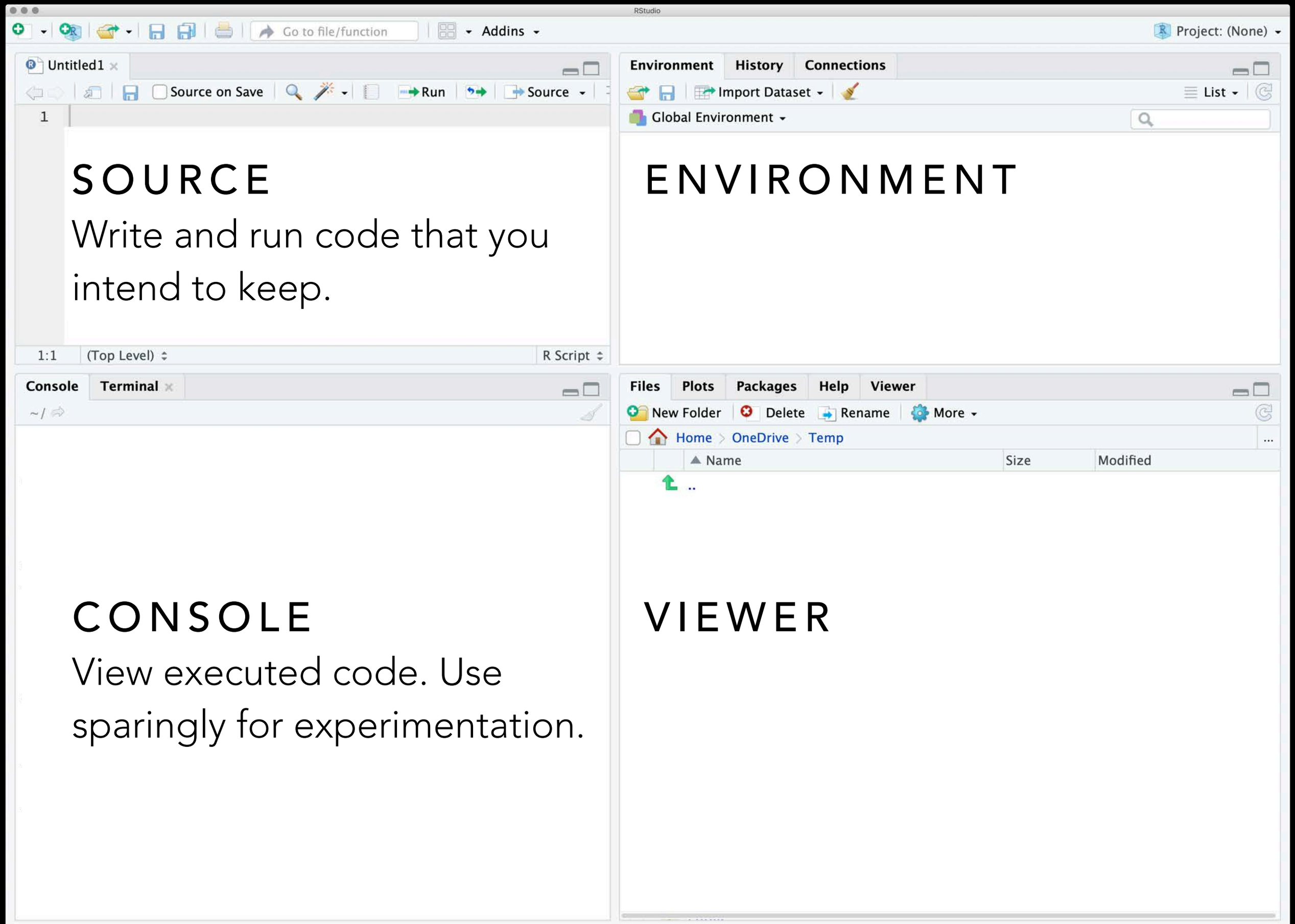
Files | Plots | Packages | Help | Viewer

New Folder | Delete | Rename | More

Home > OneDrive > Temp

Name	Size	Modified
..		

VIEWER



SOURCE

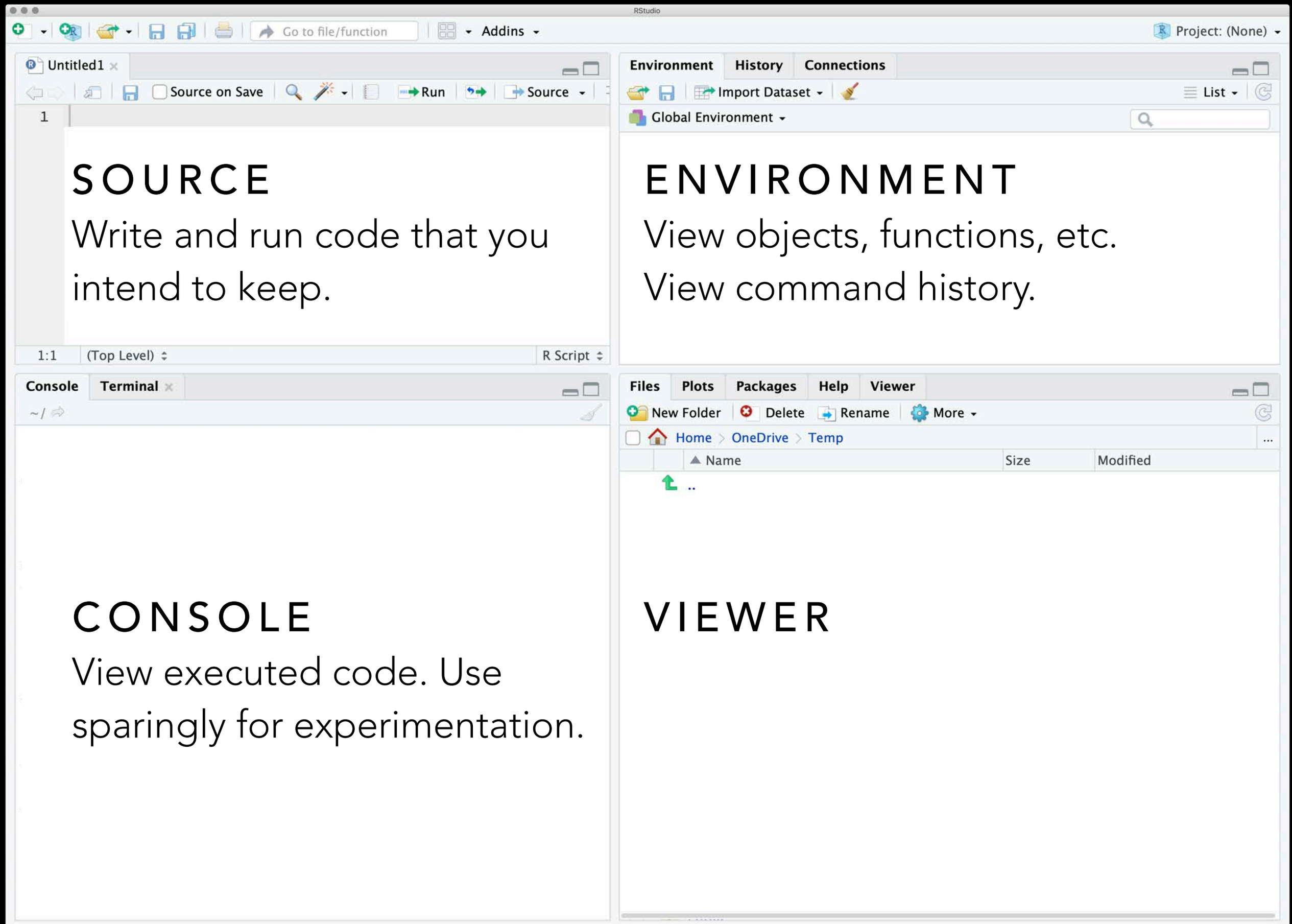
Write and run code that you intend to keep.

ENVIRONMENT

CONSOLE

View executed code. Use sparingly for experimentation.

VIEWER



SOURCE

Write and run code that you intend to keep.

ENVIRONMENT

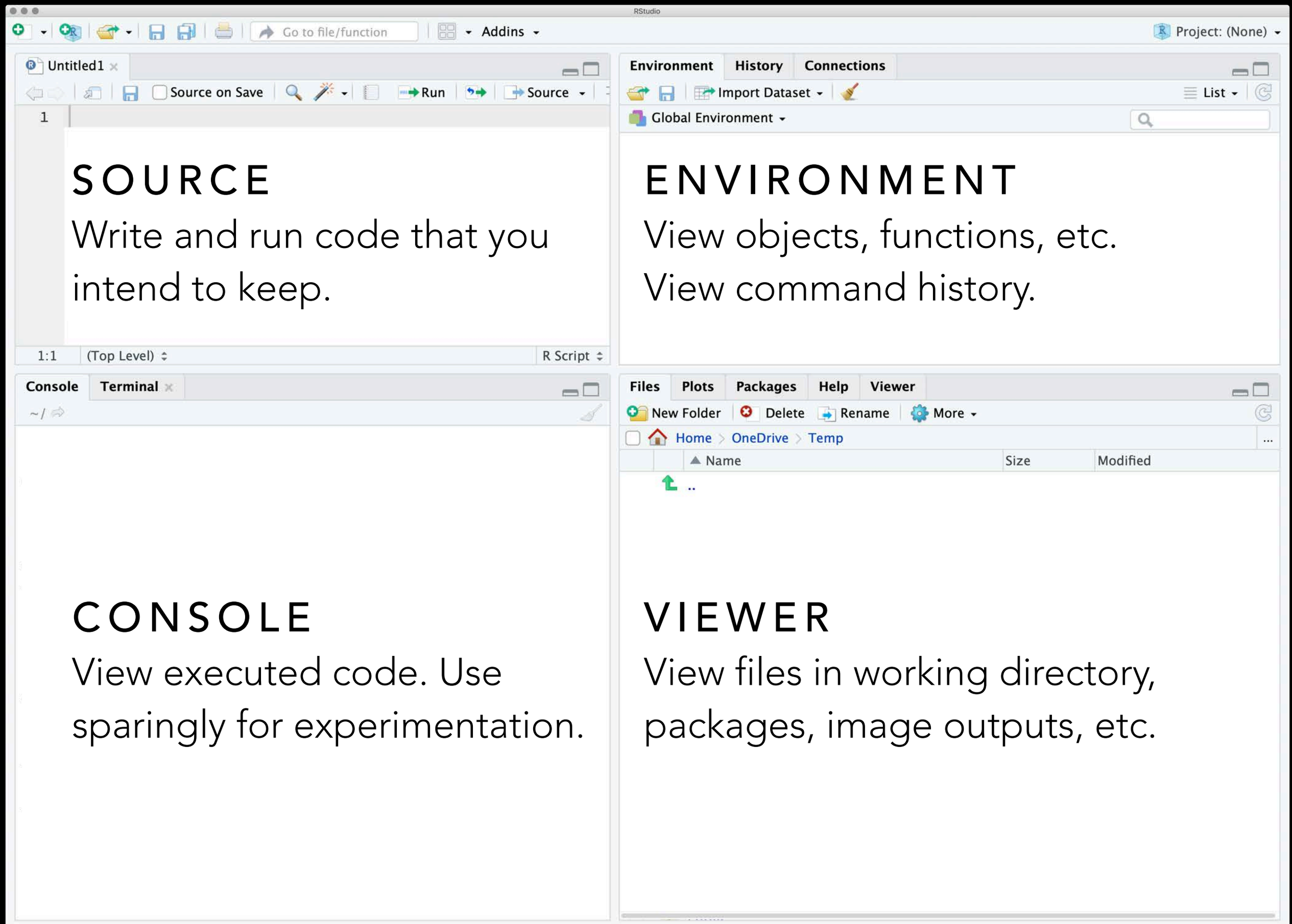
View objects, functions, etc.

View command history.

CONSOLE

View executed code. Use sparingly for experimentation.

VIEWER



SOURCE

Write and run code that you intend to keep.

ENVIRONMENT

View objects, functions, etc.

View command history.

CONSOLE

View executed code. Use sparingly for experimentation.

VIEWER

View files in working directory, packages, image outputs, etc.


RStudio®

1. ORGANIZE YOUR WORK INTO PROJECTS

(more on this next week)

RStudio®

2. ALWAYS START WITH A CLEAN SLATE

RStudio File Edit Code View Plots Session Build Debug Profile Tools Window Help

Install Packages...
Check for Package Updates...
Version Control
Shell...
Terminal
Jobs
Addins
Keyboard Shortcuts Help ⌥⇧K
Modify Keyboard Shortcuts...
Show Command Palette ⇧⌘P
Project Options... ⇧⌘,
Global Options... ⌘,

RStudio

Go to file/function | Addins

Console | Terminal | Jobs

~/Documents/academic-website/

```
R version 4.0.3 (2020-10-10) -- "Bunny-Wunnies Freak Out"
Copyright (C) 2020 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin17.0 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

  Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

>
```

Environment | History | Connections

Import Dataset | R | Global Environment

Files | Plots | Packages | Help | Tutorial | Viewer

New Folder | Delete | Rename | More

Home > Documents > academic-website

Name	Size	Modified
..		
.gitignore	53 B	Apr 12, 2020, 9:53 AM
.Rhistory	2 KB	Jan 14, 2021, 10:44 AM
academic.Rproj	258 B	Jan 14, 2021, 10:44 AM
assets		
config		
content		
data		
LICENSE.md	1.1 KB	Apr 12, 2020, 9:51 AM
public		
README.md	3.3 KB	Apr 12, 2020, 9:51 AM
resources		

RStudio

Go to file/function | Addins | Project: (None)

Console | Terminal | Jobs

~/Documents/academic-website/

```
R version 4.0.3 (2020-10-10) -- "Bunn
Copyright (C) 2020 The R Foundation f
Platform: x86_64-apple-darwin17.0 (64

R is free software and comes with ABS
You are welcome to redistribute it un
Type 'license()' or 'licence()' for d

  Natural language support but runnin

R is a collaborative project with man
Type 'contributors()' for more inform
'citation()' on how to cite R or R pa

Type 'demo()' for some demos, 'help()
'help.start()' for an HTML browser in
Type 'q()' to quit R.

>
```

Options

- General
- Code
- Console
- Appearance
- Pane Layout
- Packages
- R Markdown
- Sweave
- Spelling
- Git/SVN
- Publishing
- Terminal
- Accessibility
- Python

Basic | Graphics | Advanced

R Sessions

Default working directory (when not in a project):

~/Documents/academic-website | Browse...

- [x] Restore most recently opened project at startup
- [x] Restore previously open source documents at startup

Workspace

- [ ] Restore .RData into workspace at startup

Save workspace to .RData on exit: Never

History

- [x] Always save history (even when not saving .RData)
- [x] Remove duplicate entries in history

Other

- [ ] Wrap around when navigating to previous/next tab
- [x] Automatically notify me of updates to RStudio
- [ ] Send automated crash reports to RStudio

OK | Cancel | Apply

List

is empty

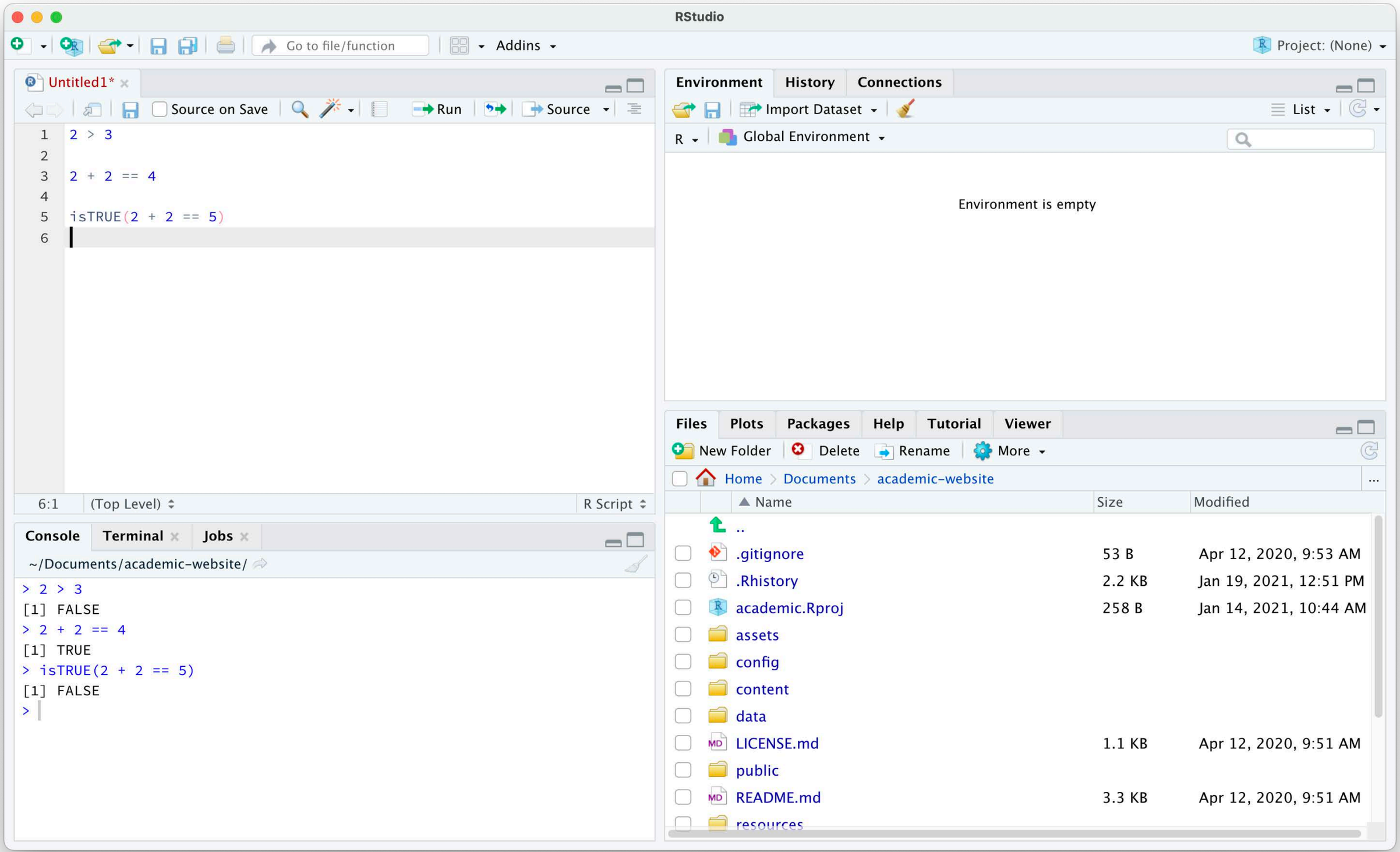
iewer

re

	Size	Modified
	53 B	Apr 12, 2020, 9:53 AM
	2 KB	Jan 14, 2021, 10:44 AM
	258 B	Jan 14, 2021, 10:44 AM
	1.1 KB	Apr 12, 2020, 9:51 AM
	3.3 KB	Apr 12, 2020, 9:51 AM
resources		

3. TWO WAYS OF INTERACTING WITH R: CONSOLE AND SCRIPTS

(most of the time, use scripts)


RStudio
Go to file/function
Addins
Project: (None)
Untitled1*
Source on Save
Run
Source
2 > 3
2 + 2 == 4
isTRUE(2 + 2 == 5)
6:1
(Top Level)
R Script
Console
Terminal
Jobs
~/Documents/academic-website/
> 2 > 3
[1] FALSE
> 2 + 2 == 4
[1] TRUE
> isTRUE(2 + 2 == 5)
[1] FALSE
>
Environment
History
Connections
Import Dataset
List
R
Global Environment
Environment is empty
Files
Plots
Packages
Help
Tutorial
Viewer
New Folder
Delete
Rename
More
Home
Documents
academic-website
Name
Size
Modified
..
.gitignore
53 B
Apr 12, 2020, 9:53 AM
.Rhistory
2.2 KB
Jan 19, 2021, 12:51 PM
academic.Rproj
258 B
Jan 14, 2021, 10:44 AM
assets
config
content
data
LICENSE.md
1.1 KB
Apr 12, 2020, 9:51 AM
public
README.md
3.3 KB
Apr 12, 2020, 9:51 AM
resources

RStudio®

4. BECOME COMFORTABLE WITH ERROR MESSAGES


```
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> my_data <- read.csv("my_data.csv")
Error in file(file, "rt") : cannot open the connection
In addition: Warning message:
In file(file, "rt") :
  cannot open file 'my_data.csv': No such file or directory
> Can you say that in plain English please?
Error: unexpected symbol in "Can you"
> :(
Error: unexpected ':' in ":"
>
```

RStudio®

5. USE RSTUDIO'S TOOLS TO MAKE LIFE EASIER

YOUR TURN

Please complete the activity for this week listed on the course website under:

Schedule > Assignments

It's short!