Intro to R

RStudio

Working with R – RStudio

RStudio is an Integrated Development Environment (IDE) for R

- Helps you write code - makes suggestions
- Helps you view the output of your code
- Helps you find errors
- Is NOT a dropdown statistical tool (such as Stata)
    - See Rcmdr or Radiant

RStudio

Easier working with R

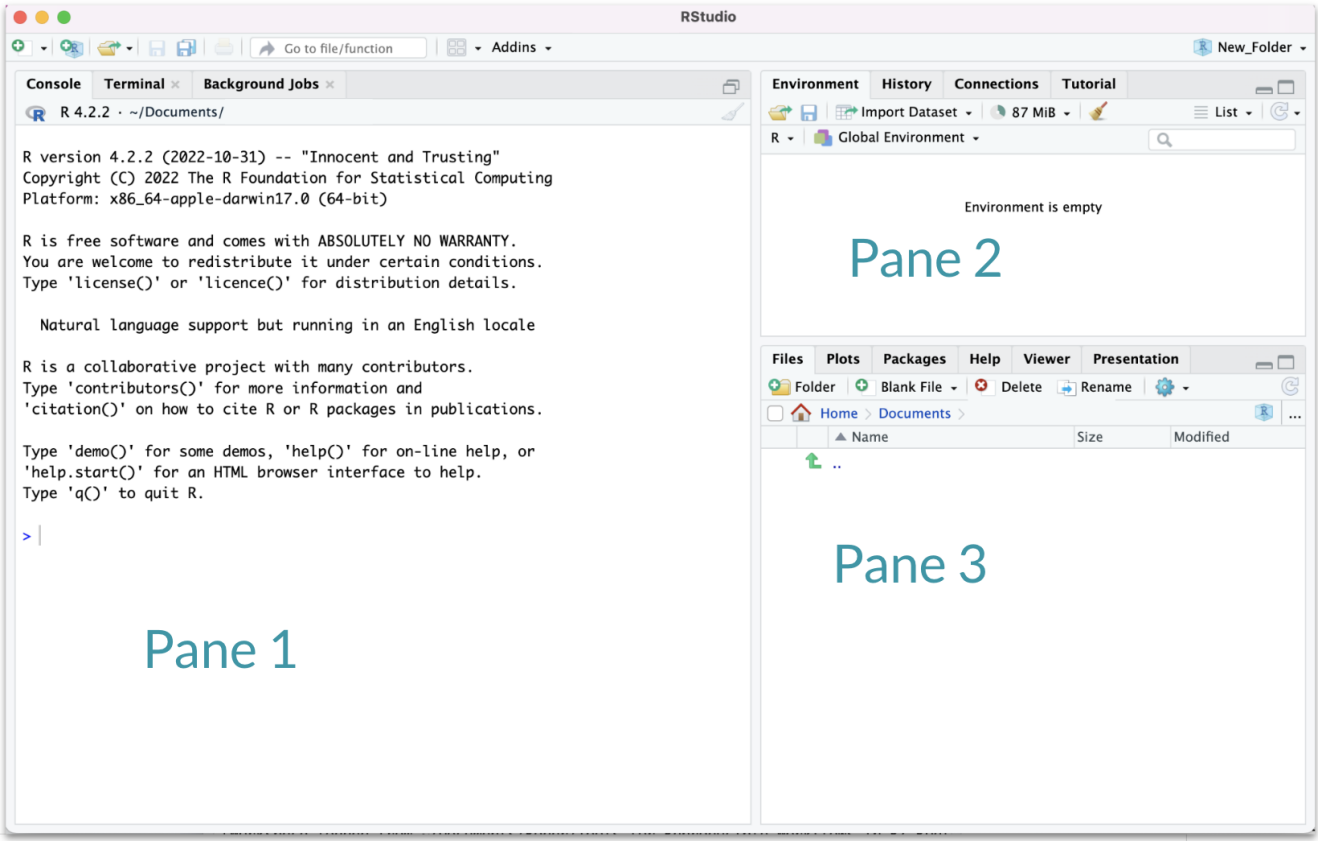
- Syntax highlighting, code completion, and smart indentation
- Easily manage multiple working directories and projects

More information

- Workspace browser and data viewer
- Plot history, zooming, and flexible image and file export
- Integrated R help and documentation

RStudio

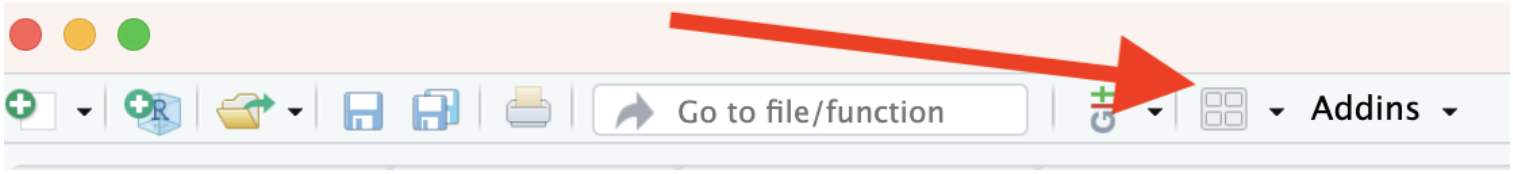
First it is important to be familiar with the layout. When you first open RStudio, you will see 3 panes.



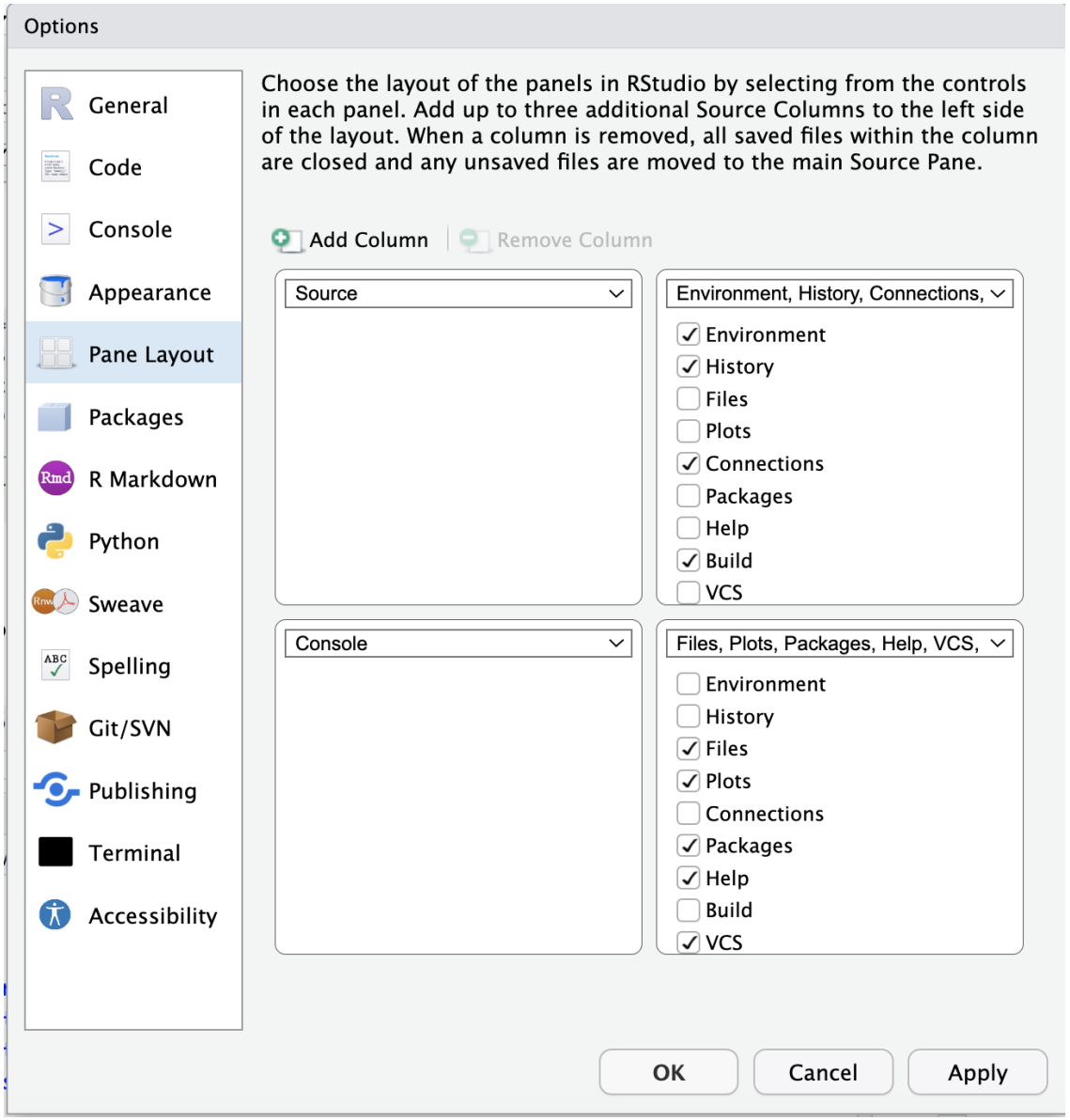
RStudio Layout

If RStudio doesn't look the way you want (or like our RStudio), then:

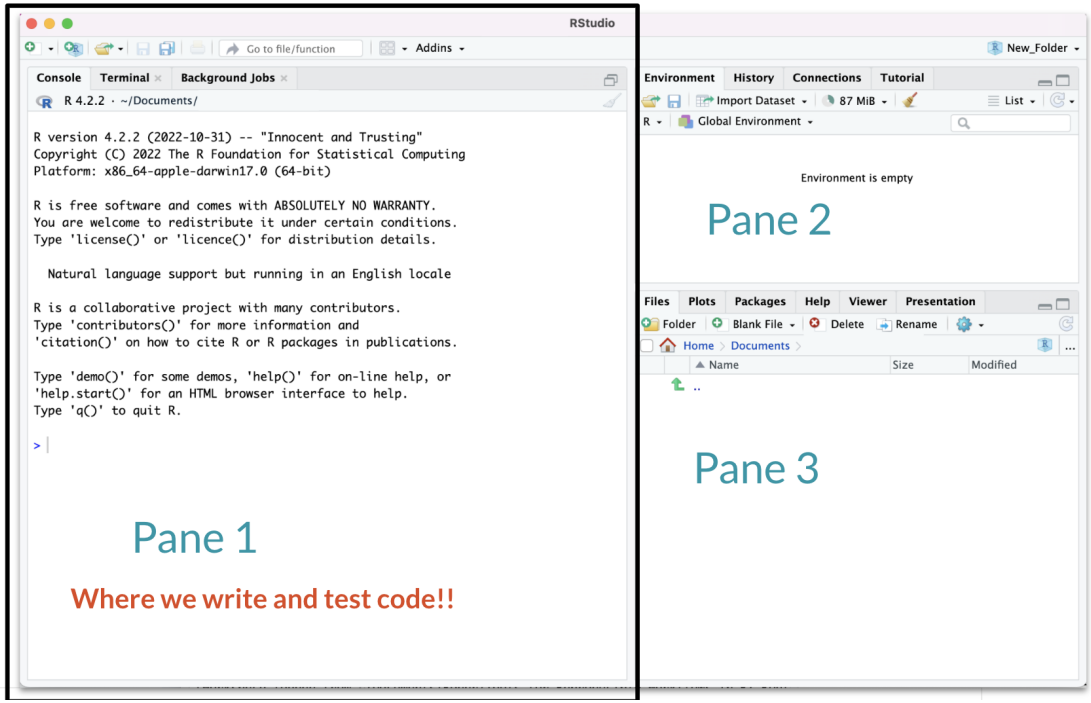
Click on the pane button, which looks like a waffle with 4 indentations. Scroll down to "Pane Layout".



Default Layout

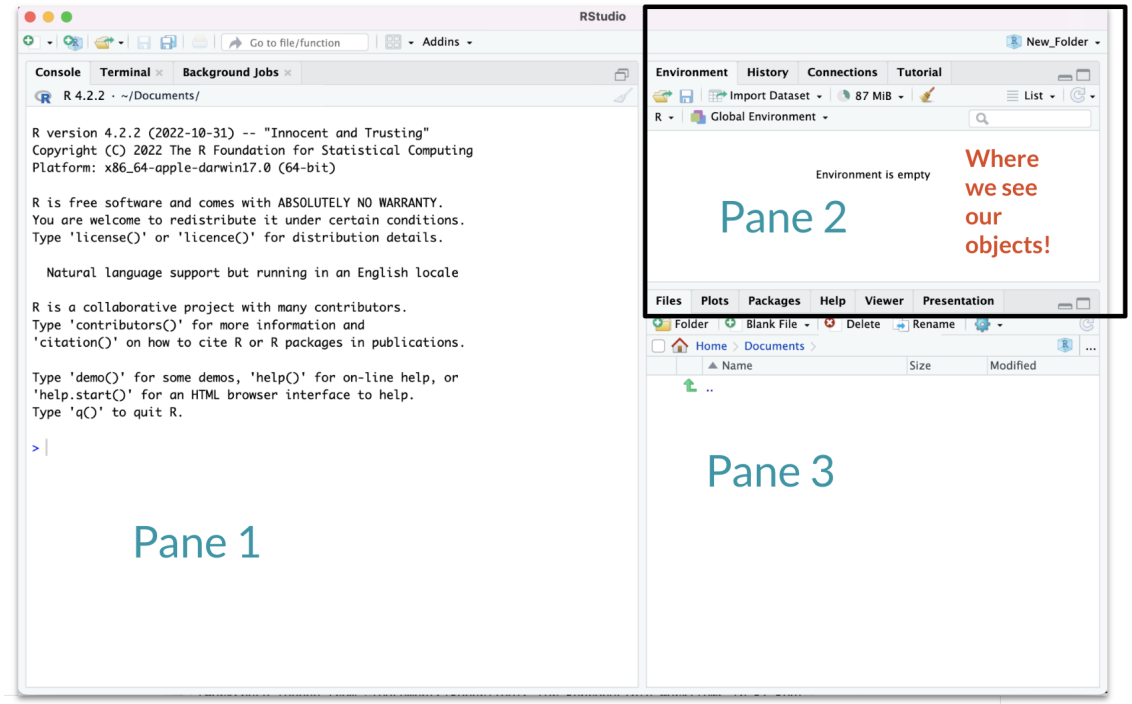


Pane 1 (Left side) for writing code

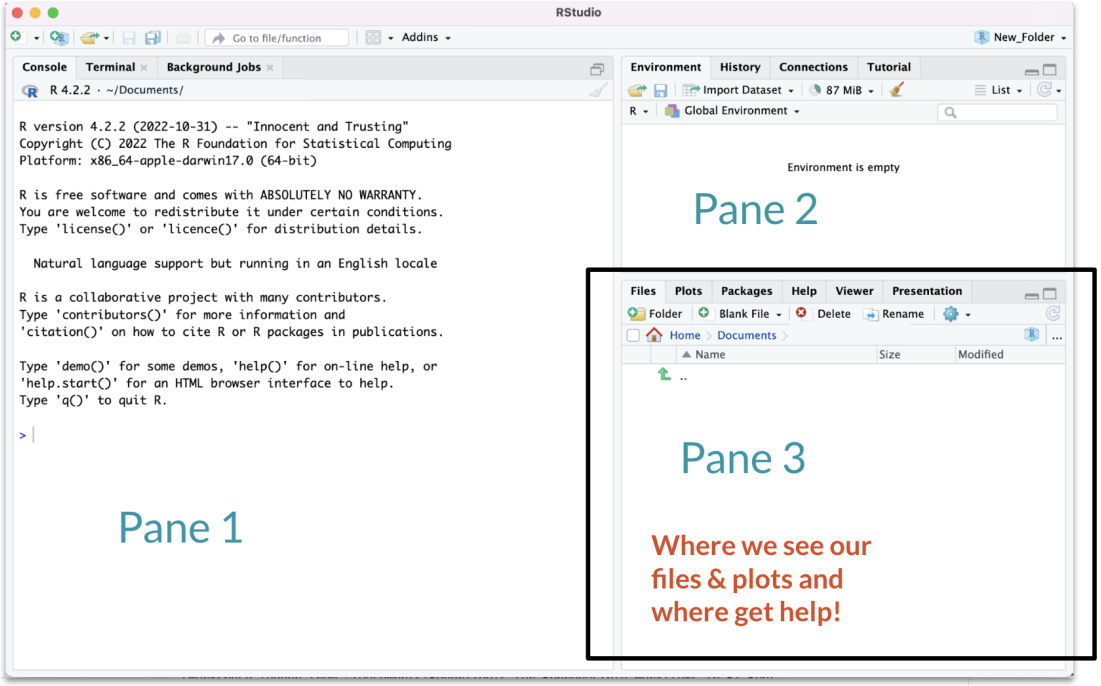


Pane 2 - where objects will be

More on this in a moment!

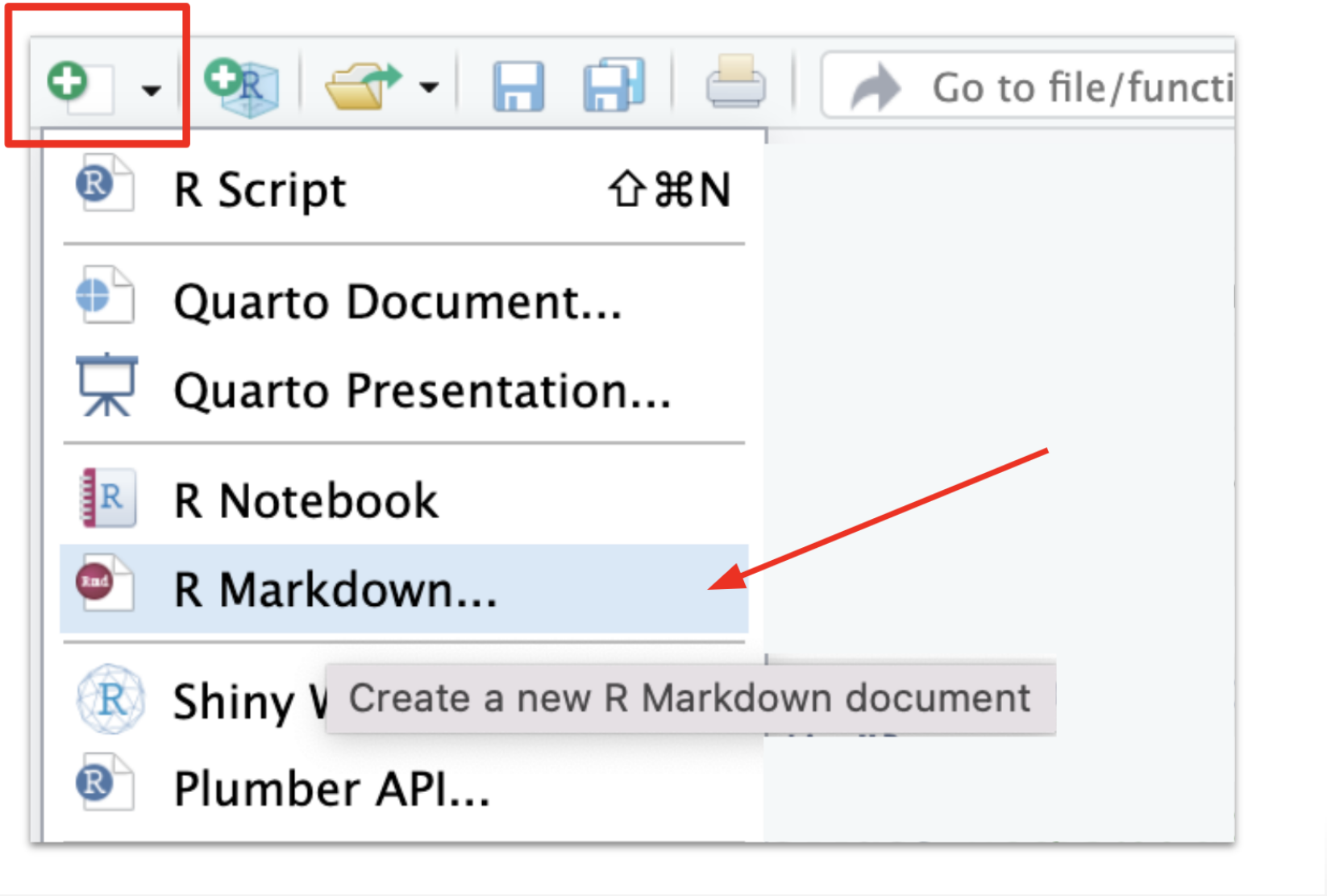


Pane 3 - where we get help and see plots



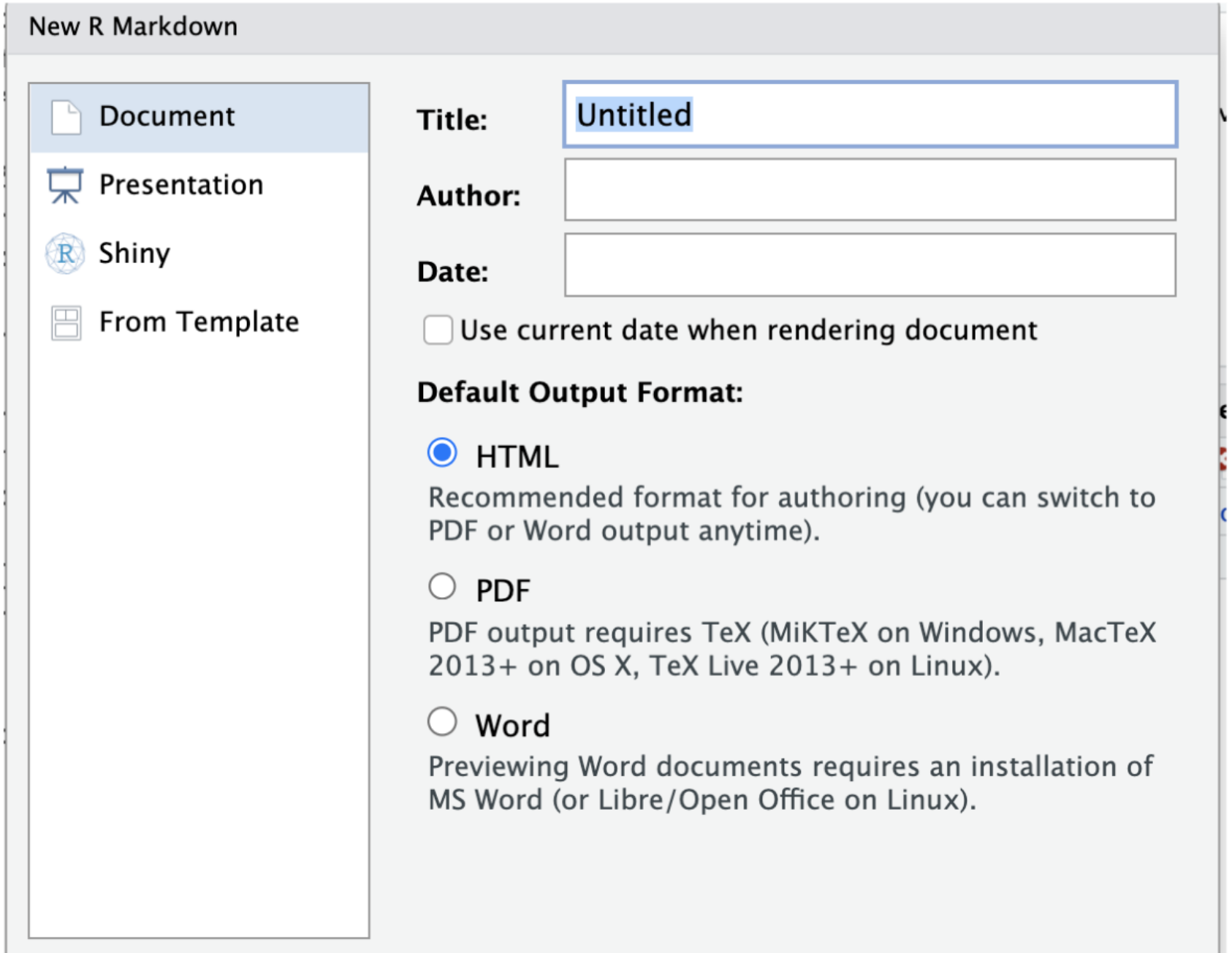
Hidden Pane

To save a copy of your code. You must open a file first - this will open a 4th pane. These files include Scripts or what are called R Markdown files.



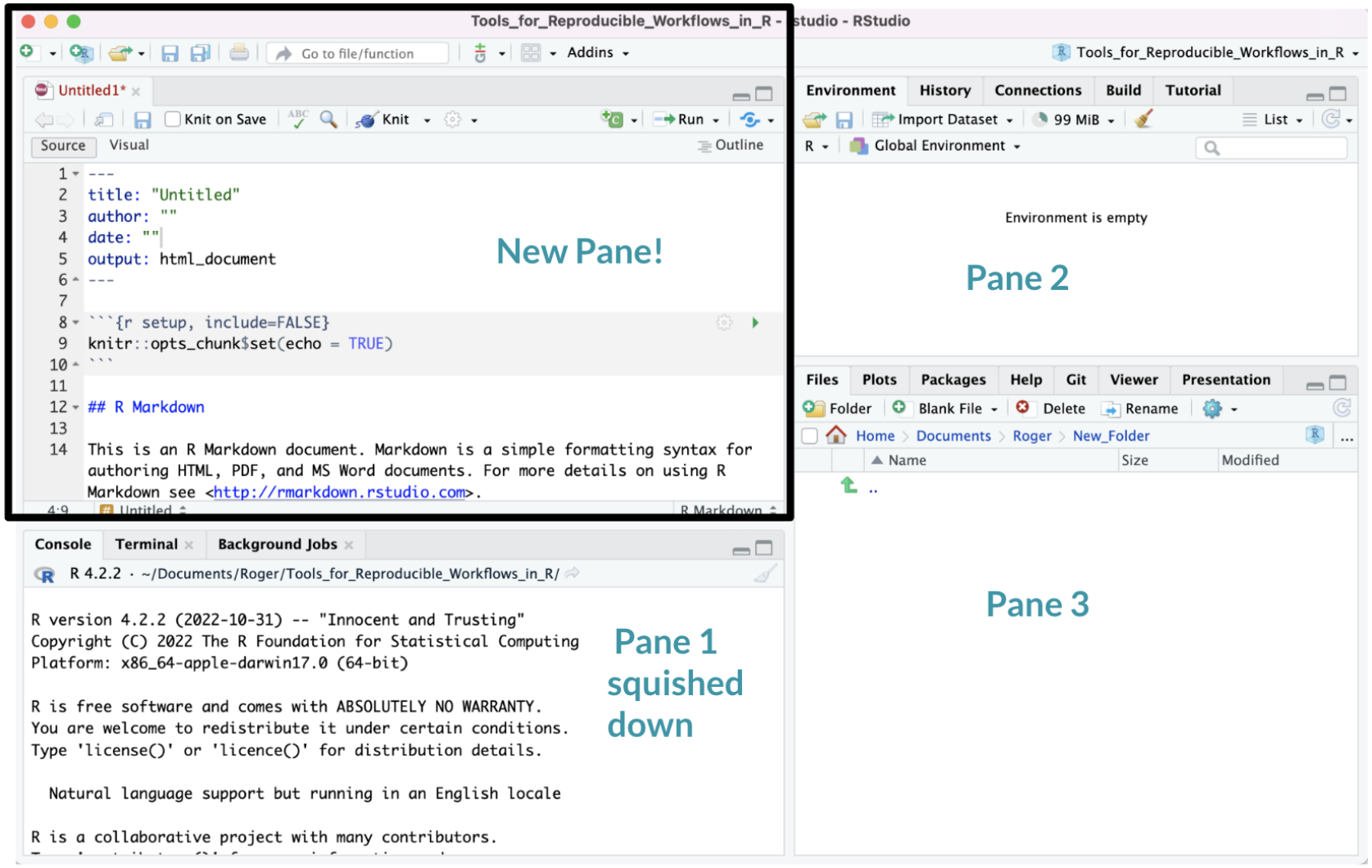
Hidden Pane

You will see a popup that you can just say “OK” to for now.



Hidden Pane

Nice! now we have a place to save code! This is where we will mostly be working.



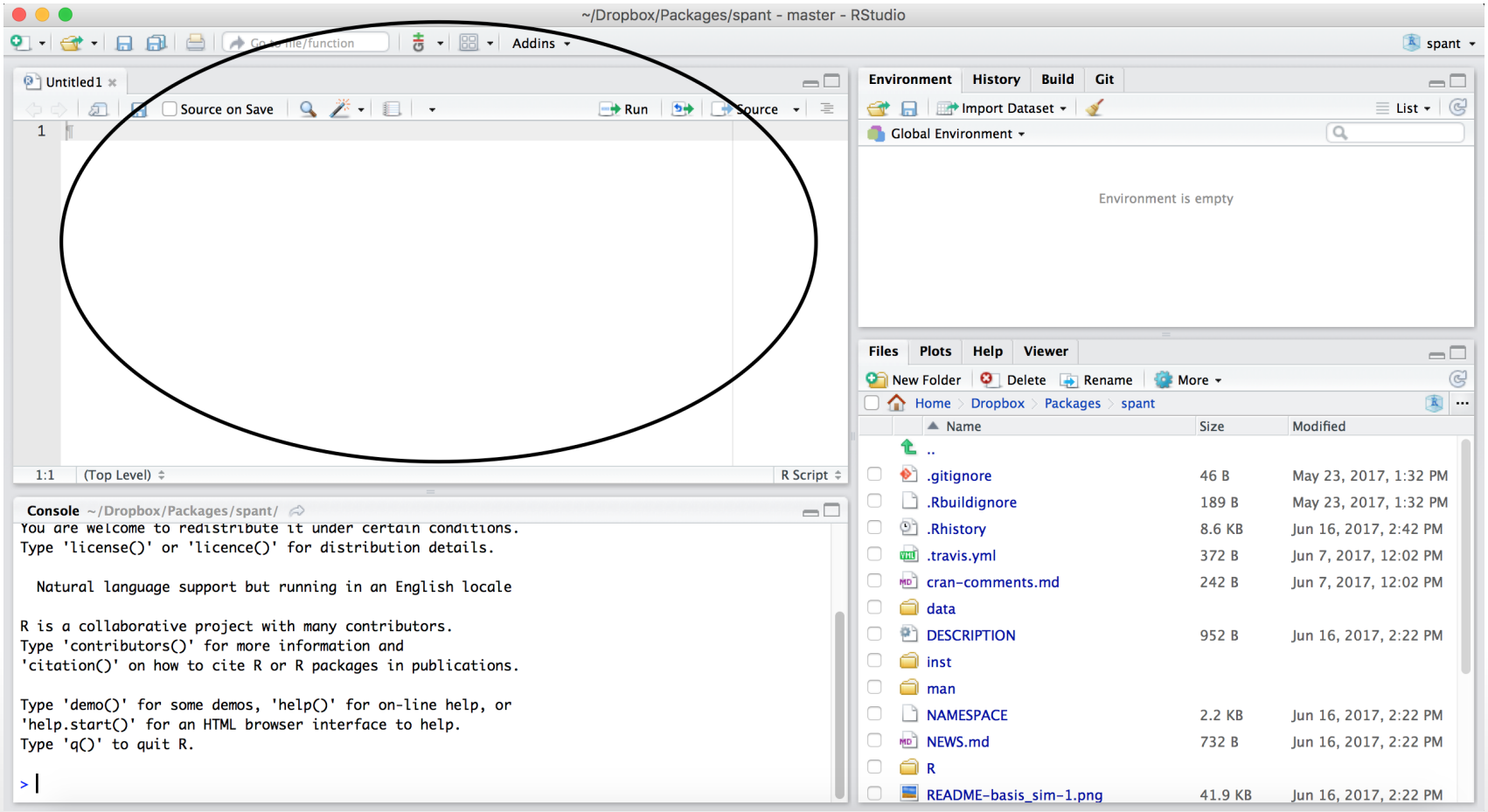
Working with R in R Studio - 2 major panes:

1. The **Source/Editor**: “Analysis” Script + Interactive Exploration
   - Static copy of what you did (reproducibility)
   - Top by default
2. The **R Console**: “interprets” whatever you type
   - Calculator
   - Try things out interactively, then add to your editor
   - Bottom by default

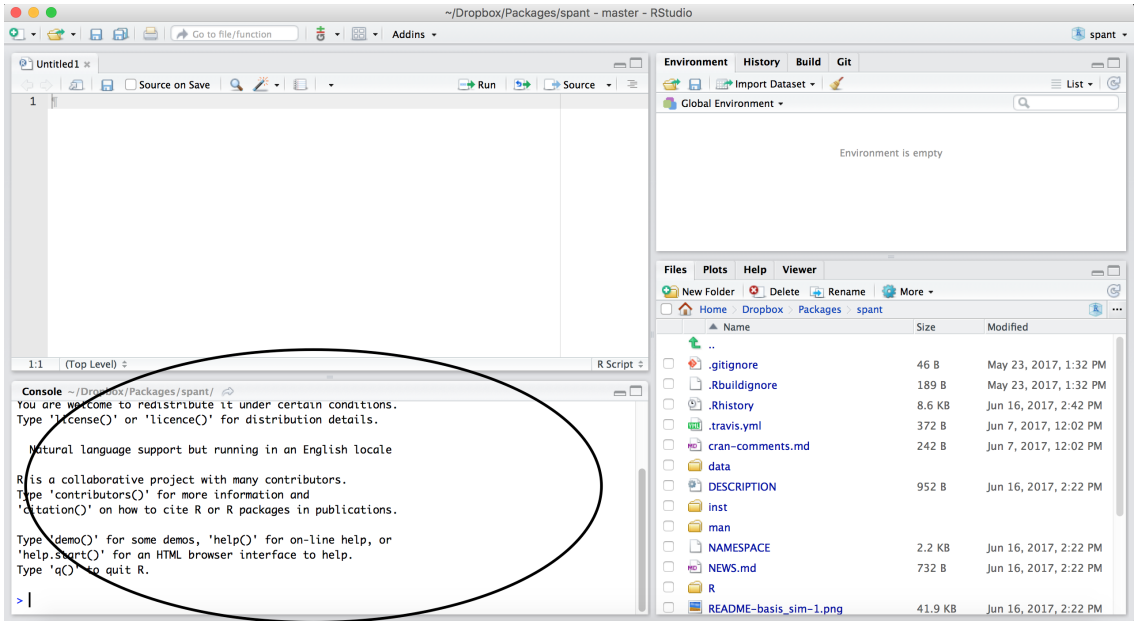
Source / Editor

- Where files open to
- Have R code and comments in them
- Can highlight and press (CMD+Enter (Mac) or Ctrl+Enter (Windows)) to run the code

In a .R file (we call a script), code is saved on your disk



R Console



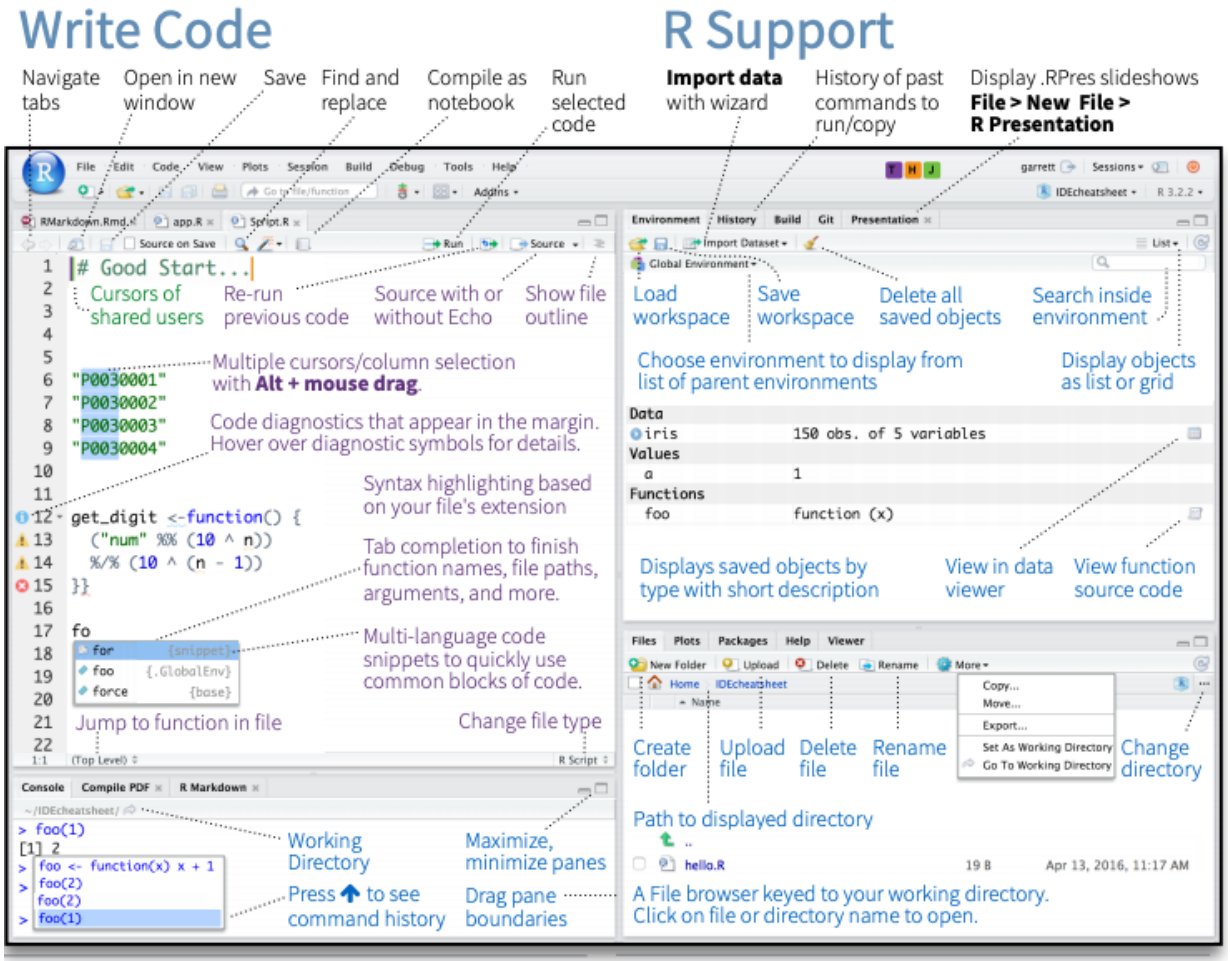
- Where code is executed (where things happen)
- You can type here for things interactively to test code
- Code is **not saved** on your disk

R Console

- Where code is executed (where things happen)
- You can type here for things interactively to test code
- Code is **not saved** on your disk

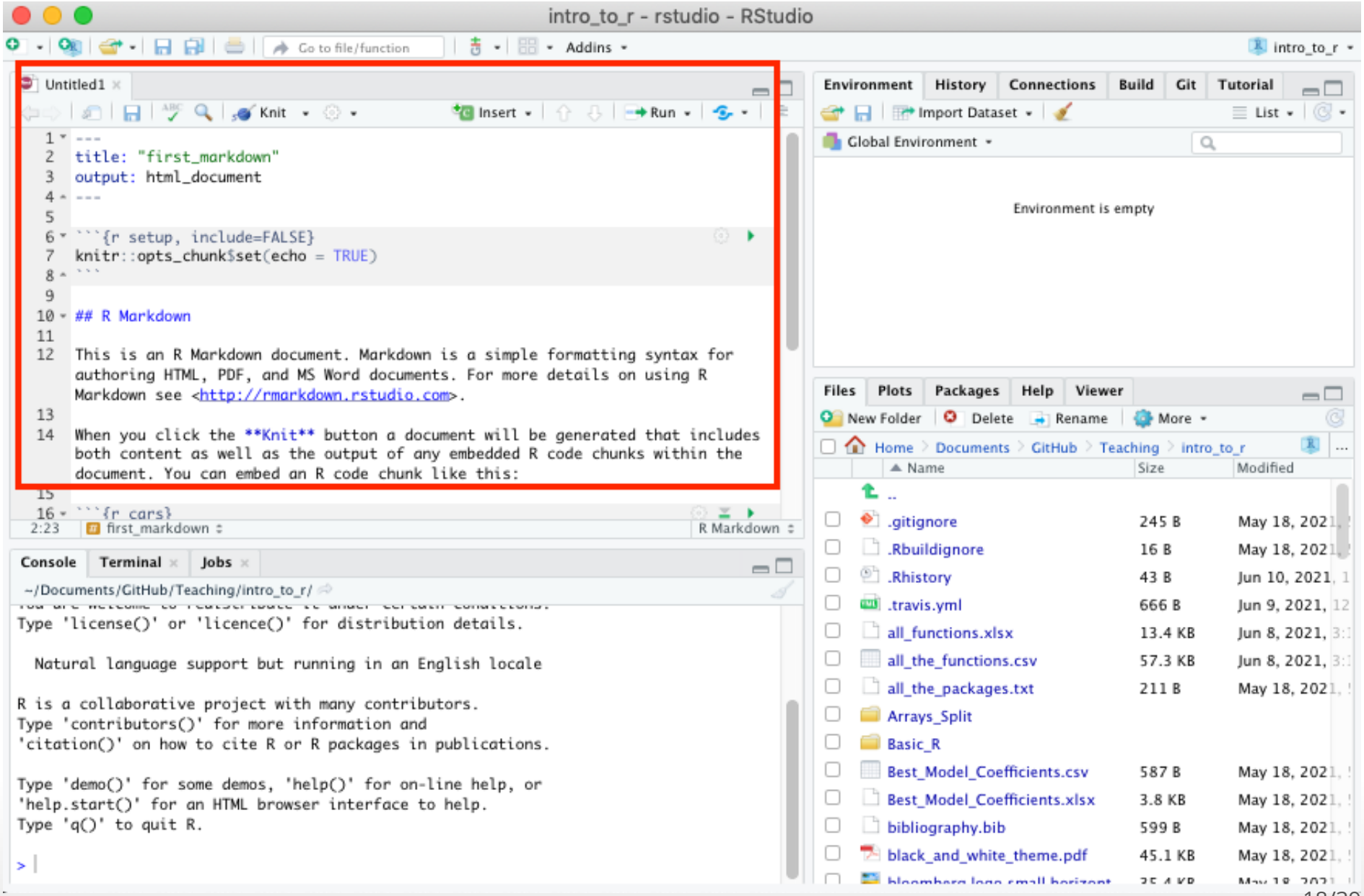
RStudio

Super useful “cheat sheet”:
https://github.com/rstudio/cheatsheets/raw/master/rstudio-ide.pdf

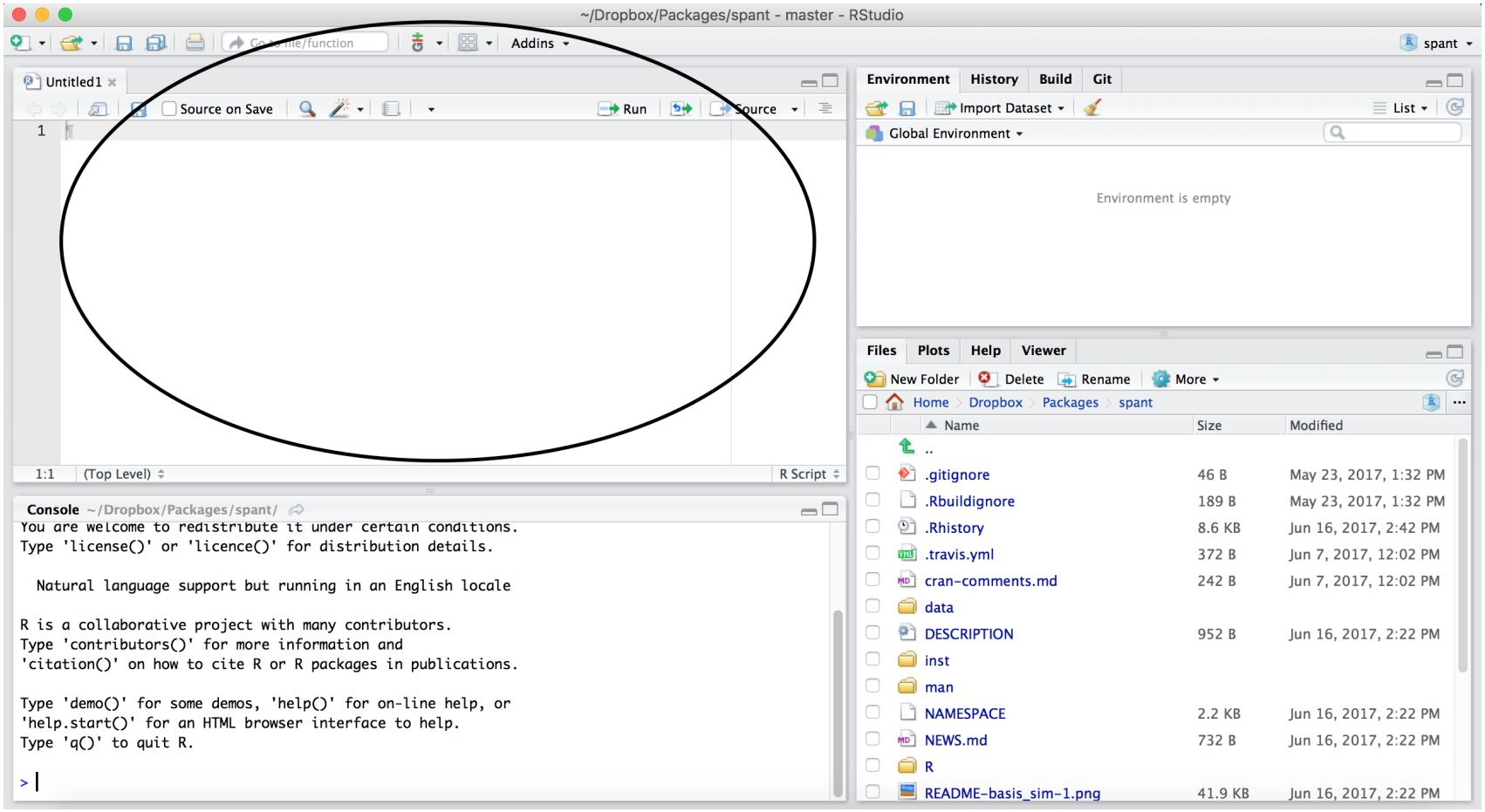


R Markdown files look different from scripts

It will look like this with text in it, unlike a script.



Recall that a script was just empty

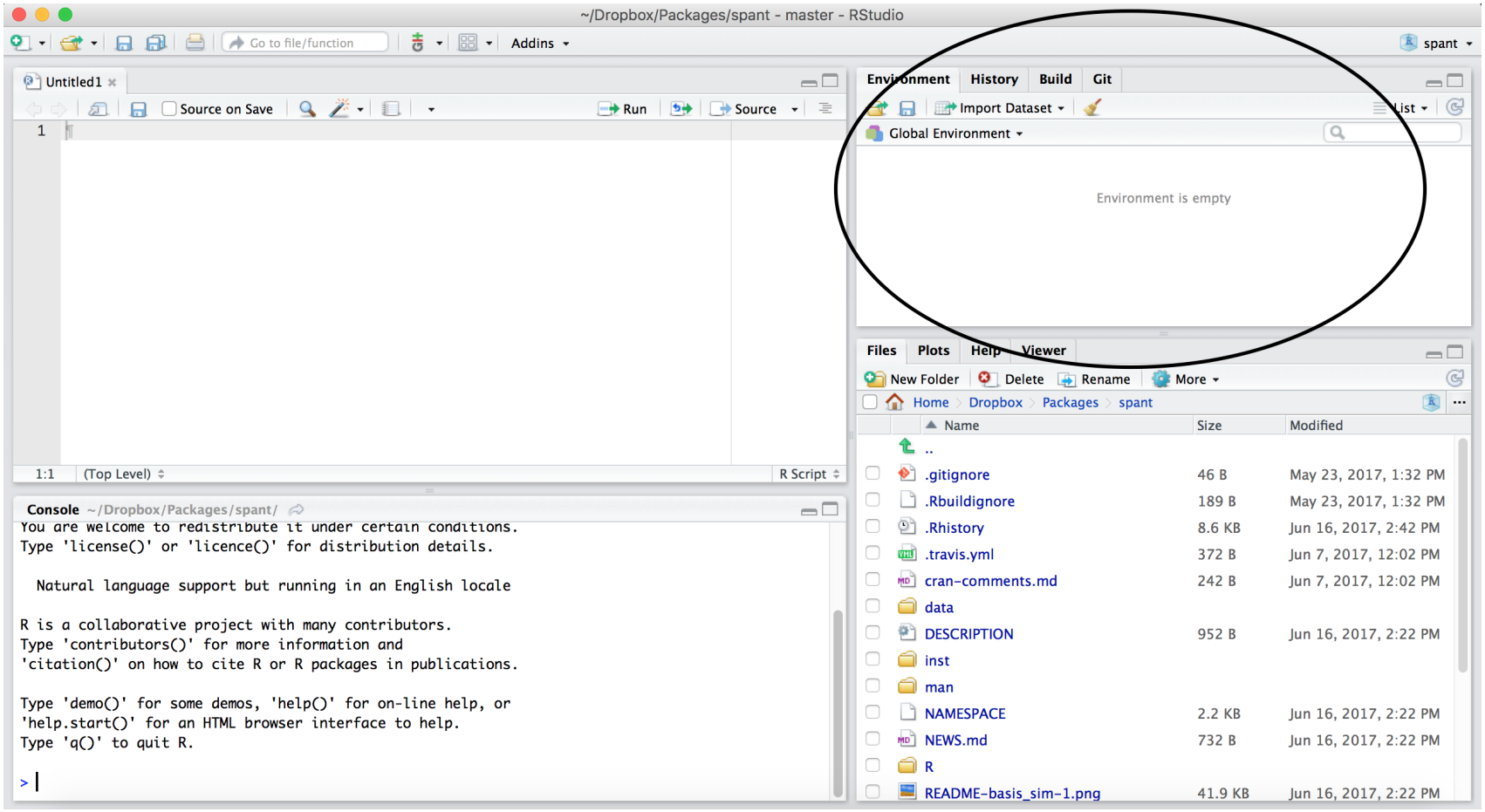


Scripts and R Markdown

Although people will use scripts often, and they are good for more programmatic purposes, we generally don't recommend them for data analyses.

R Markdown files are generally superior because they allow you to check your code and write more info about your code.

Workspace/Environment



TERM: Object

object: an object is something that can be worked with or on in R - can be lots of different things! You can think of objects as **nouns** in R.

- a vector of numbers
- a plot
- a function
- data

... many more

Workspace/Environment

- Tells you what **objects** are in R
- What exists in memory/what is loaded?/what did I read in?

History

- Shows previous commands. Good to look at for debugging, but **don't rely** on it.
  Instead use RMarkdown!
- Also type the "up" key in the Console to scroll through previous commands

Other Panes

- **Files** - shows the files on your computer of the directory you are working in
- **Viewer** - can view data or R objects
- **Help** - shows help of R commands
- **Plots** - pictures and figures
- **Packages** - list of R packages that are loaded in memory

Practice: Let’s take a look at R Studio ourselves!

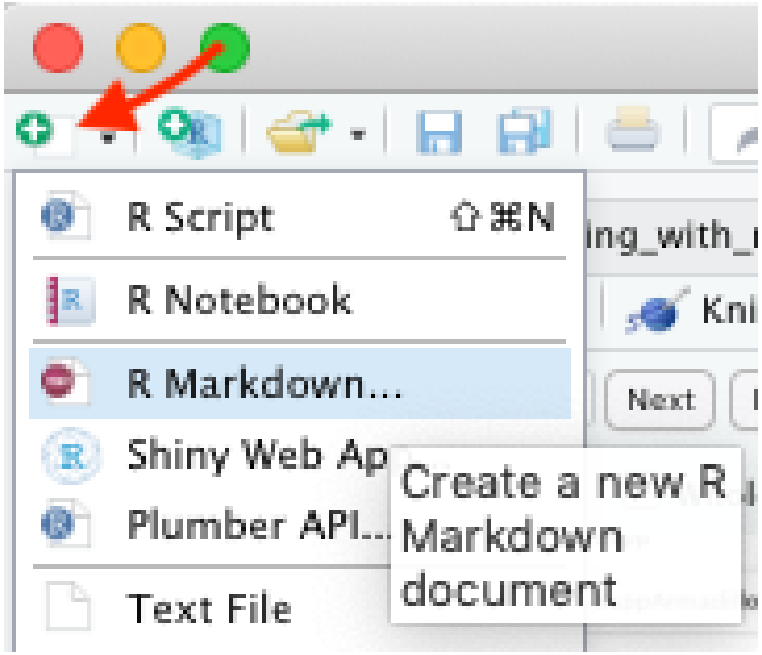
R Markdown file

R Markdown files (.Rmd) help generate reports that include your code and output. Think of them as fancier scripts.

1. Helps you describe your code
2. Allows you to check the output
3. Can create many different file types

Create an R Markdown file

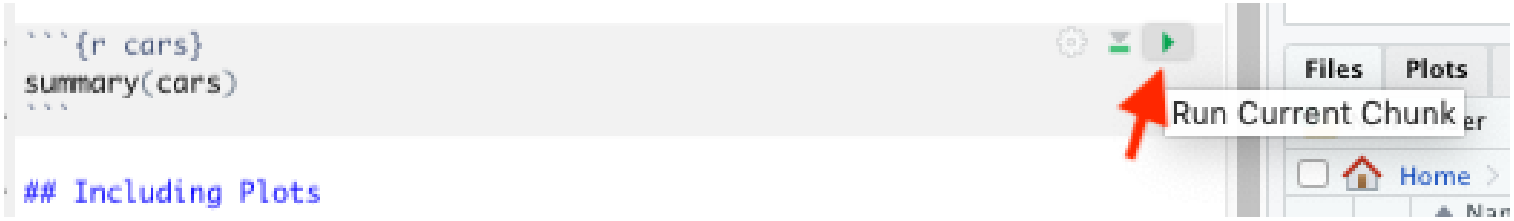
Go to File → New File → R Markdown or click the green add file button.



Code chunks

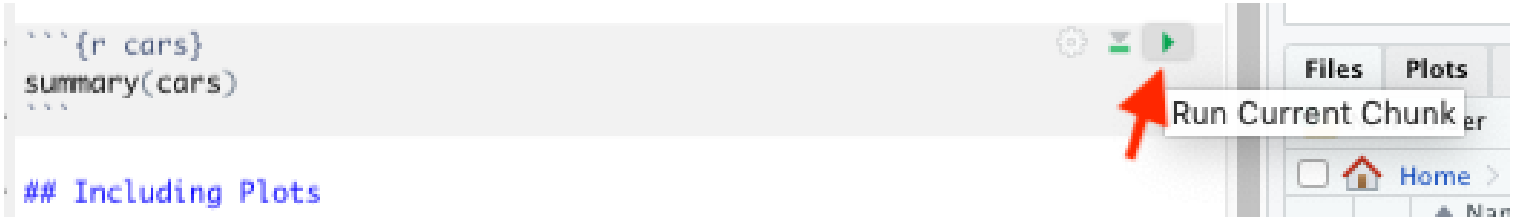
Within R Markdown files are code “chunks”.

This is where you can type R code and run it!



Run code in a chunk

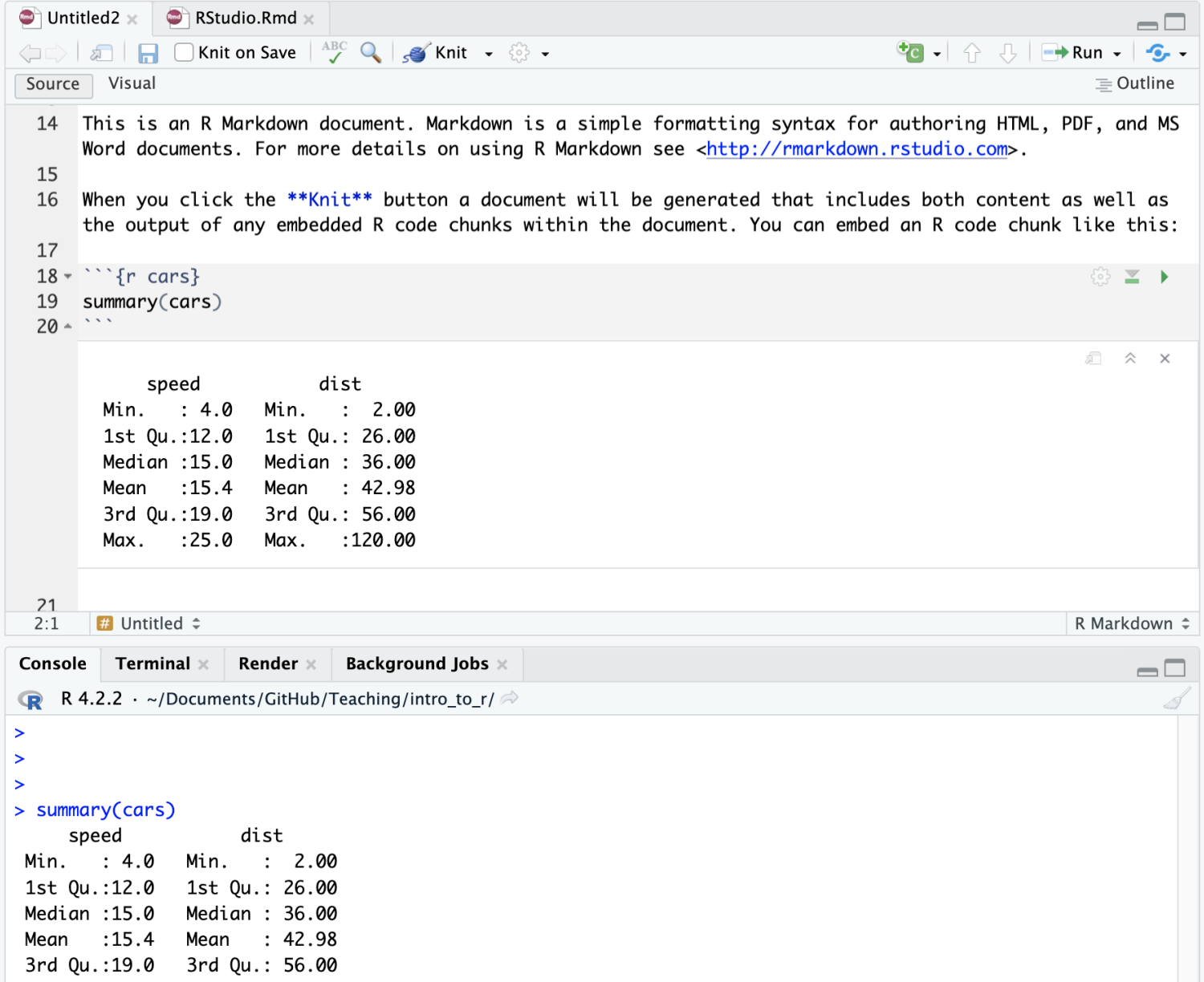
Clicking the run (play) button runs the code in the chunk.



`Ctrl + Enter` on Windows or `Command + Enter` on Mac in your script evaluates that line of code

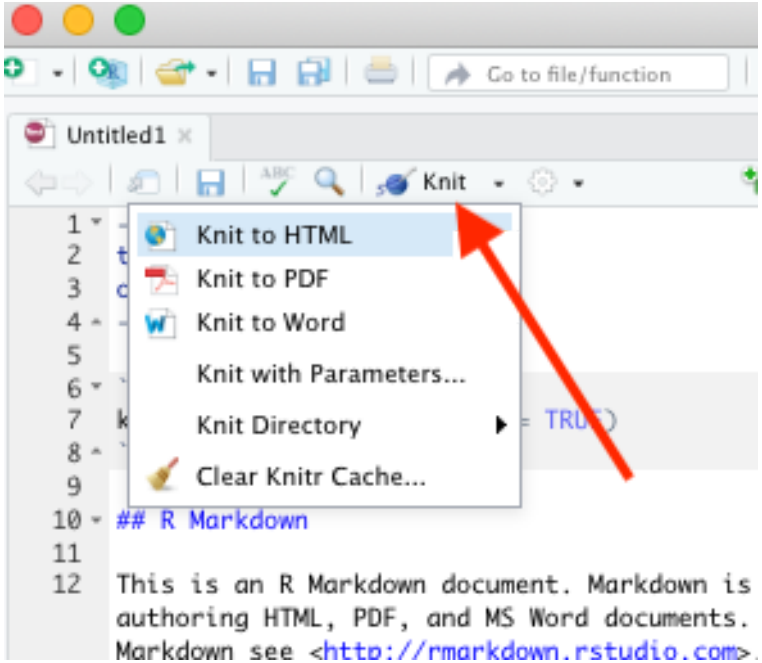
Running a chunk executes the code

- generally see a preview of the output of the code just below the chunk
- see the code in the console



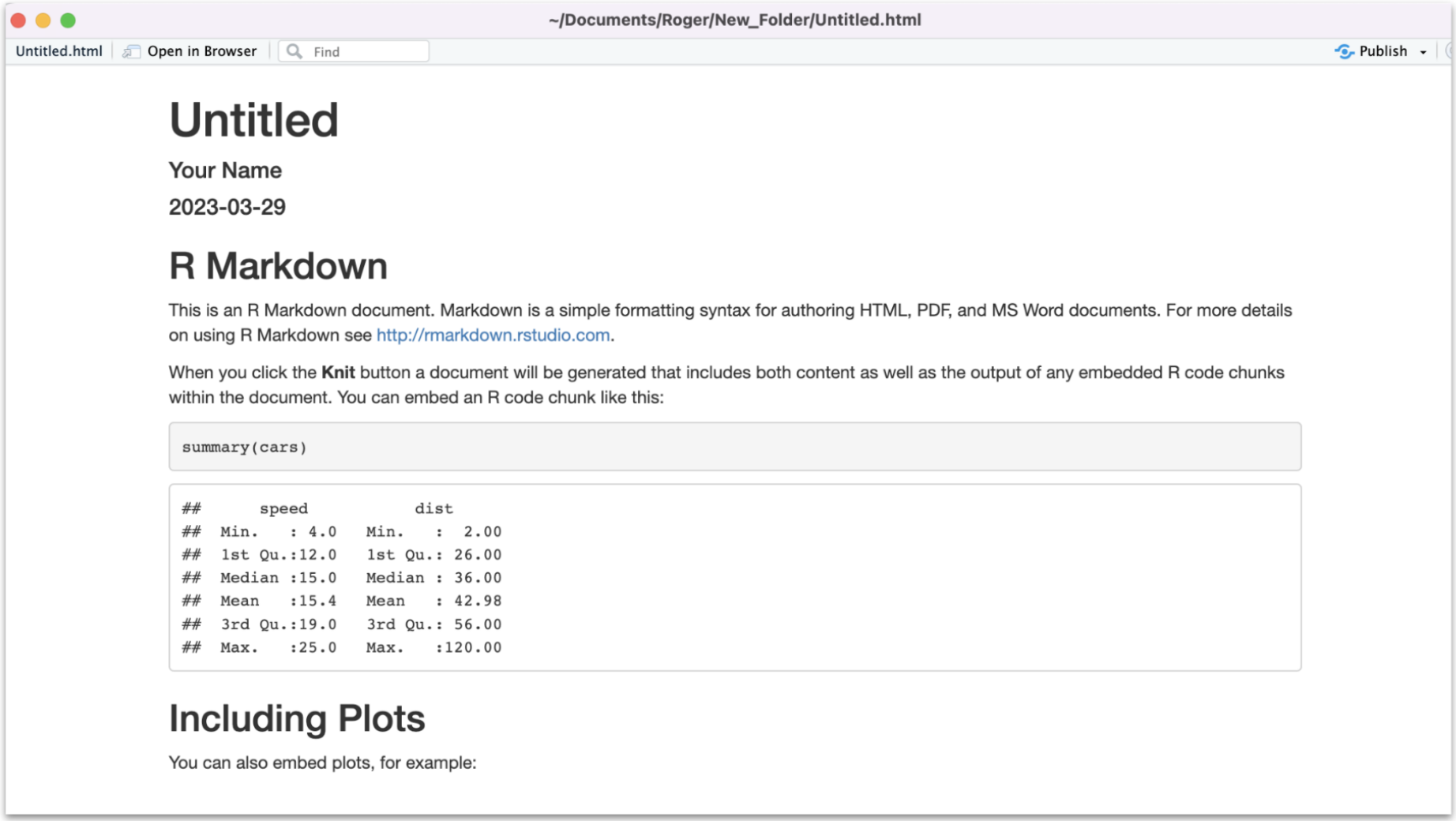
Knit file to html

Running all chunks - this will create a report from the R Markdown document!



Nice report!

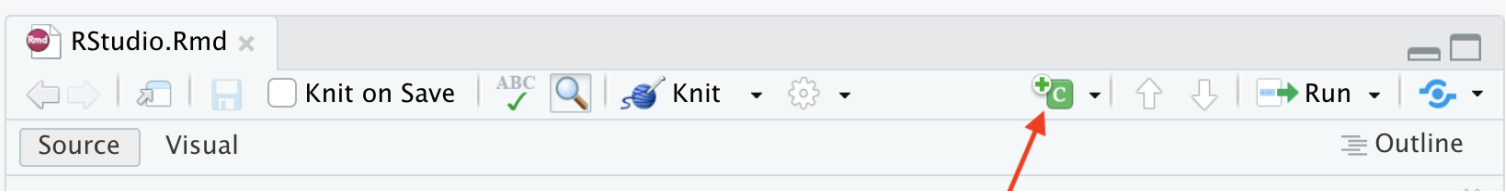
This generates a nice report that you can share with others who can open in any browser.



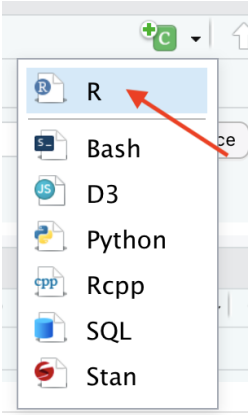
Create Chunks

To create a new R code chunk:

- Use the insert code chunk button at the top of RStudio.



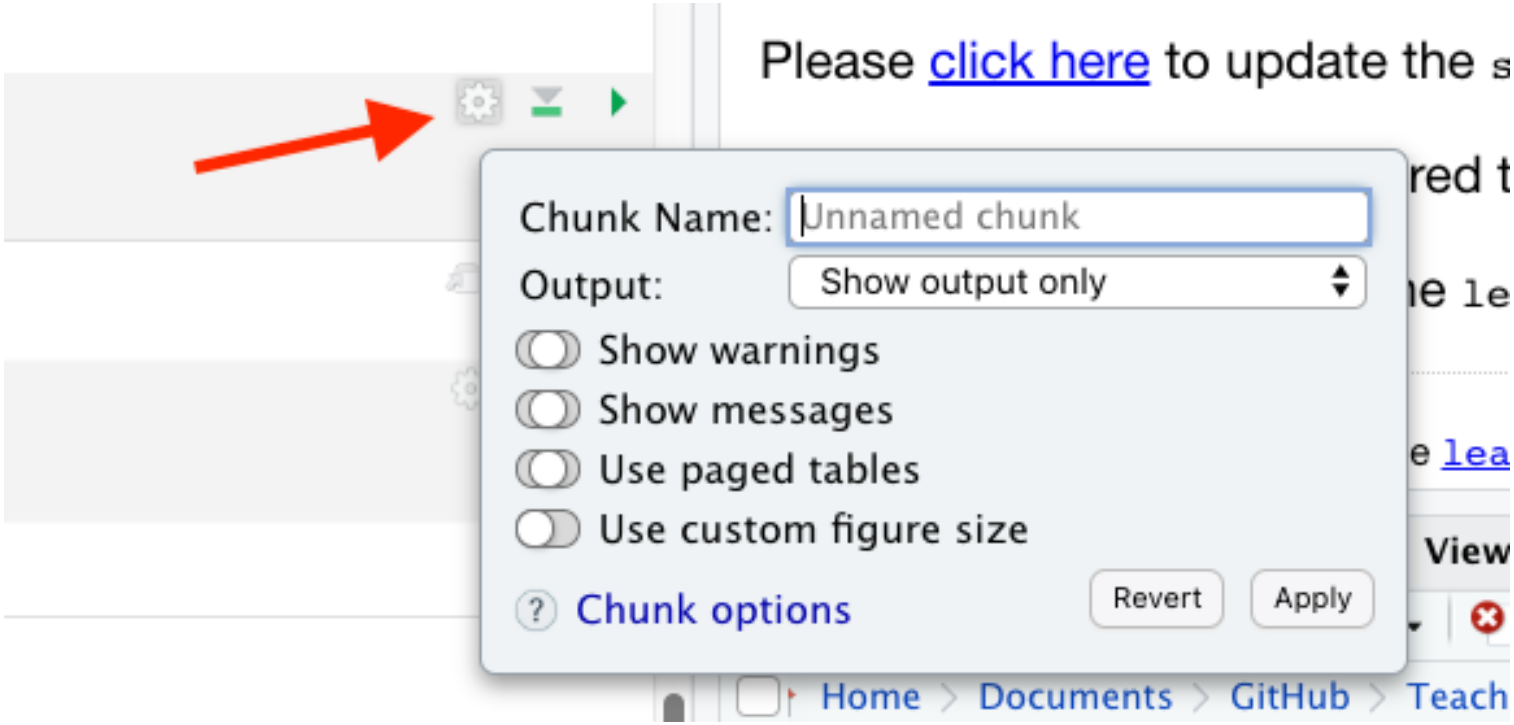
- Select R (default) as the language:



Run previous chunks button

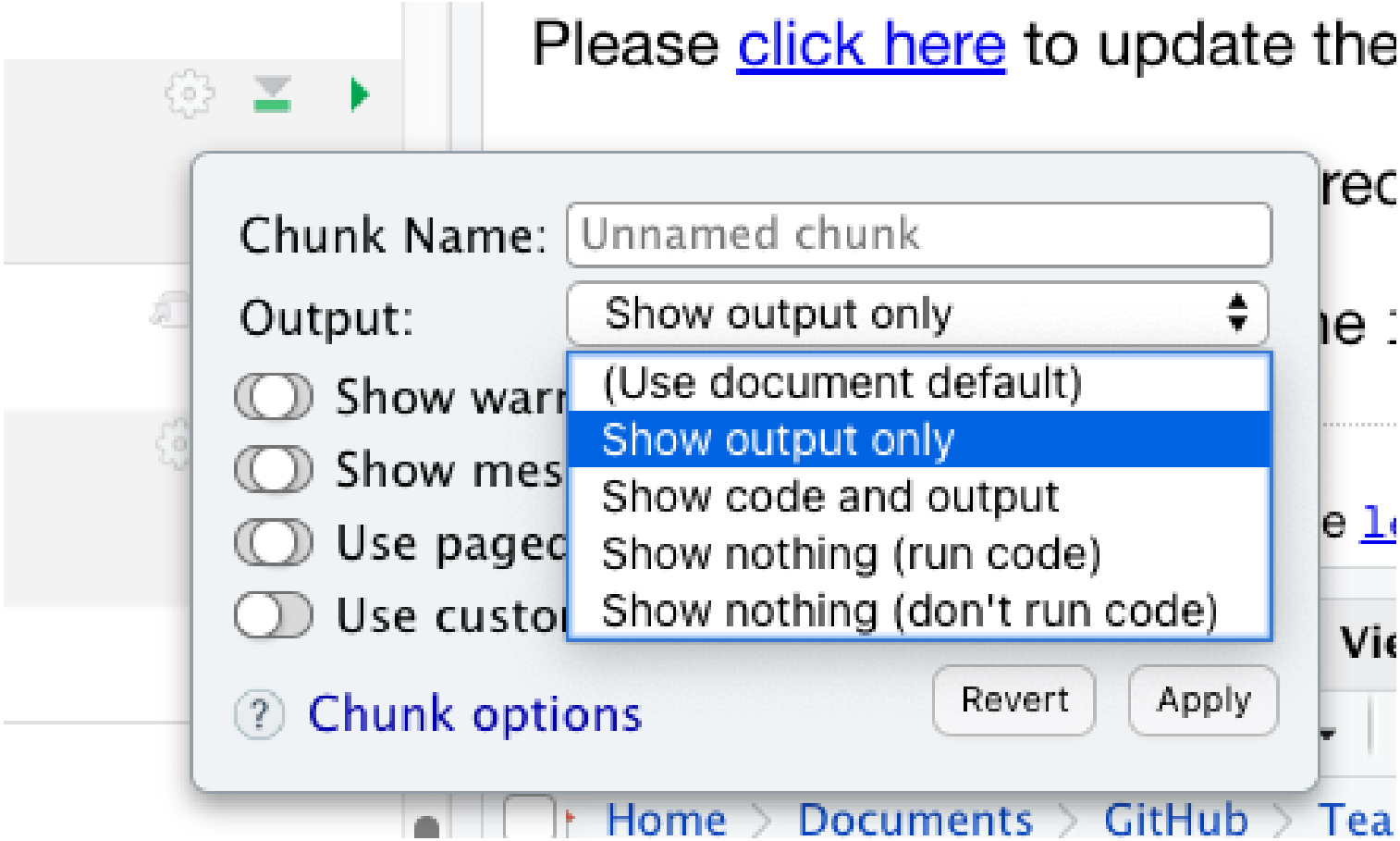
You can run all chunks above a specific chunk using this button:

Chunk settings



Chunk settings

You can specify if a chunk will be seen in the report or not.

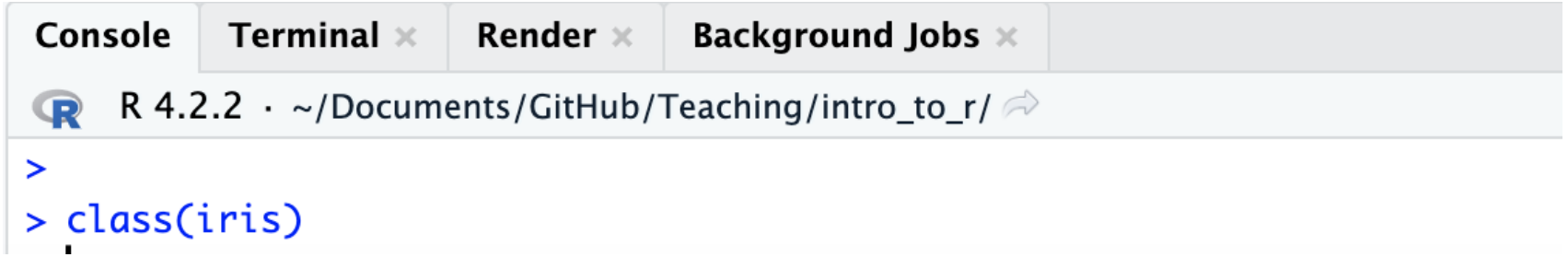


Errors

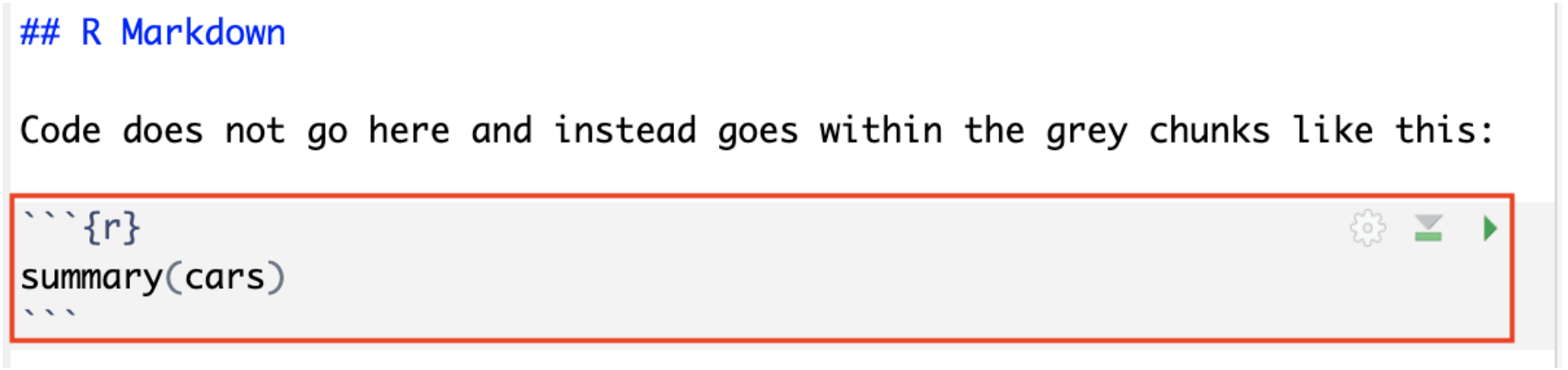
R studio can help you find issues in your code. Note that sometimes the error occurs earlier than RStudio thinks.

Recap of where code goes

- you can test code in the console



- you can save code in a chunk in the editor (Markdown file)



Summary

- RStudio makes working in R easier
- the Editor (top) is for static code like scripts or R Markdown documents
- The console is for testing code (bottom) - best to save your code though!
- R markdown documents are really helpful for lots of reasons!
- R code goes within what is called a chunk (the gray box with a green play button)
- Code chunks can be modified so that they show differently in reports
- **Objects** (like nouns) are data or variables.

Workshop Website