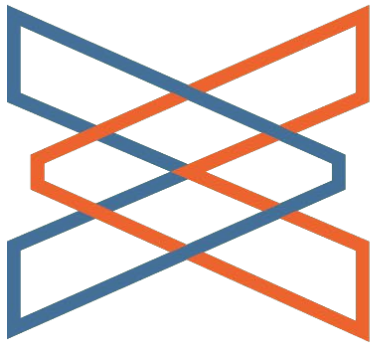
GRADUATE STATISTICS PSYC 640

FALL 2024

INSTALLING R & R-STUDIO



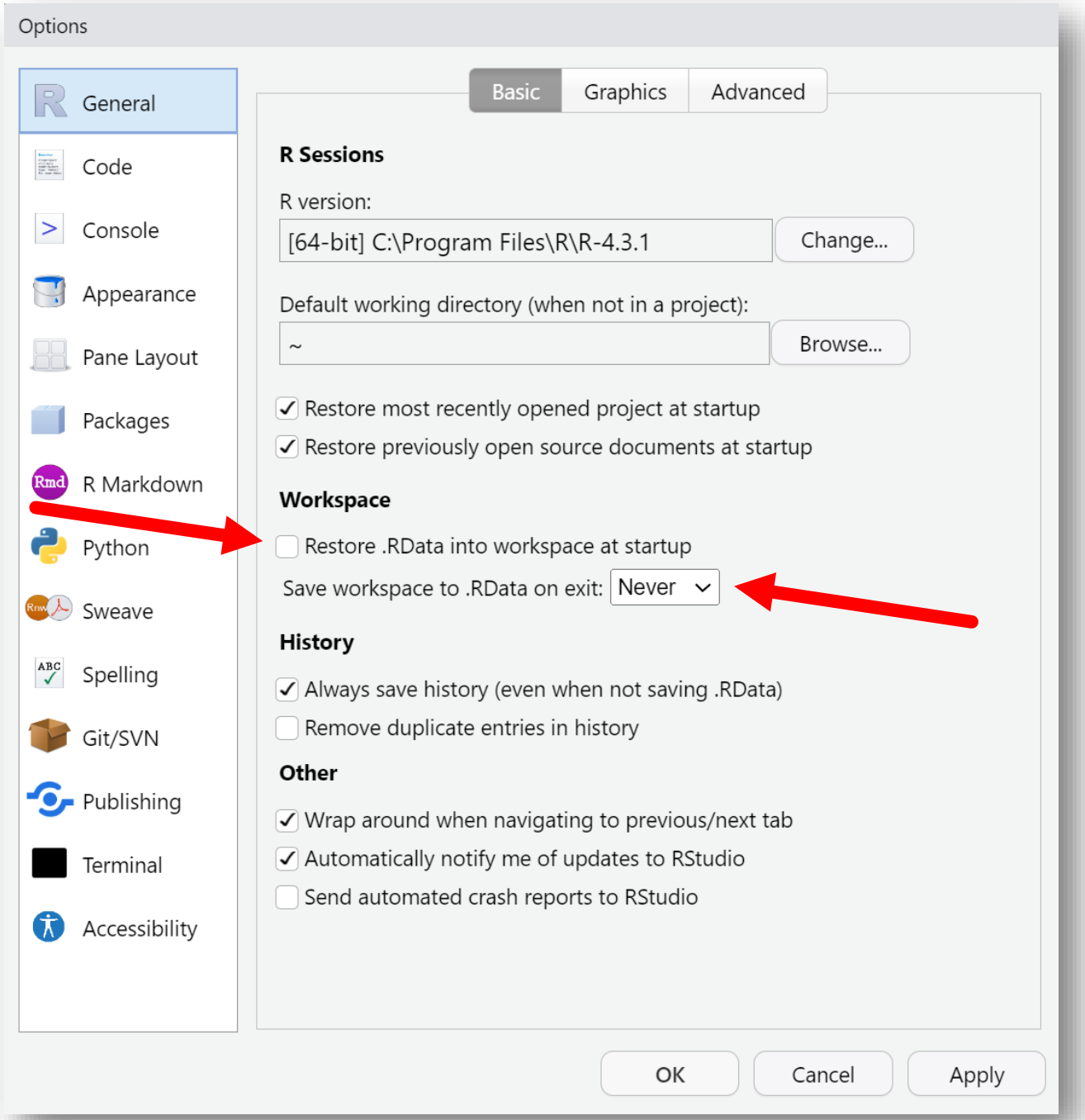
RStudio®

posit™

LINK TO INSTALL GUIDE

GETTING STARTED

- Start with a Blank Slate
- Make the code work for you
- This is your space – Redecorate!



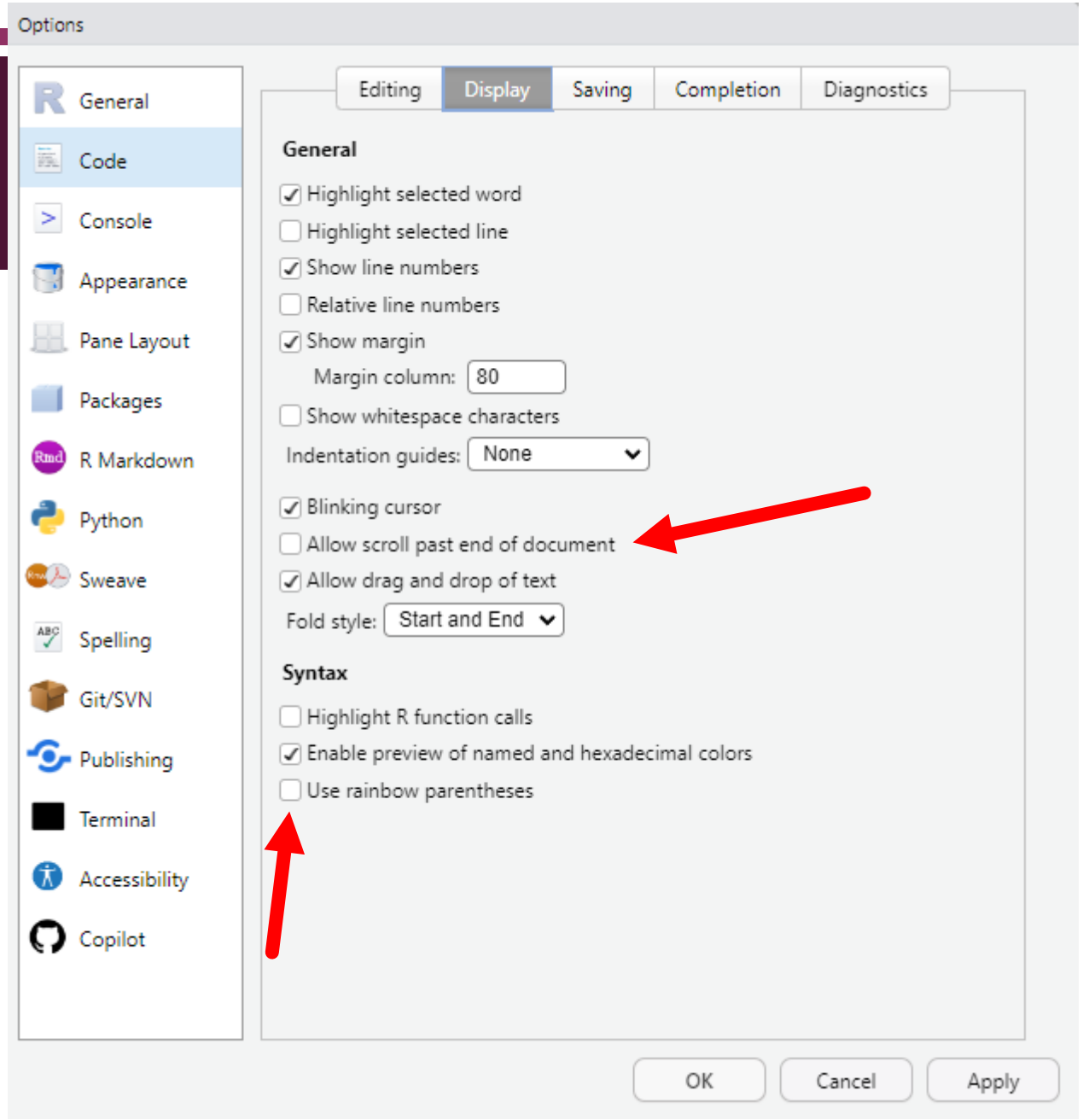
START WITH A BLANK SLATE

- Navigate to ***Tools > Global Options***
- By default, R Studio saves all of the objects in your environment. In general, this is not ideal, because it means that you may have taken steps interactively that are not documented in your code.

CODE UPDATES

- Navigate to ***Tools > Global Options > Code > Display***

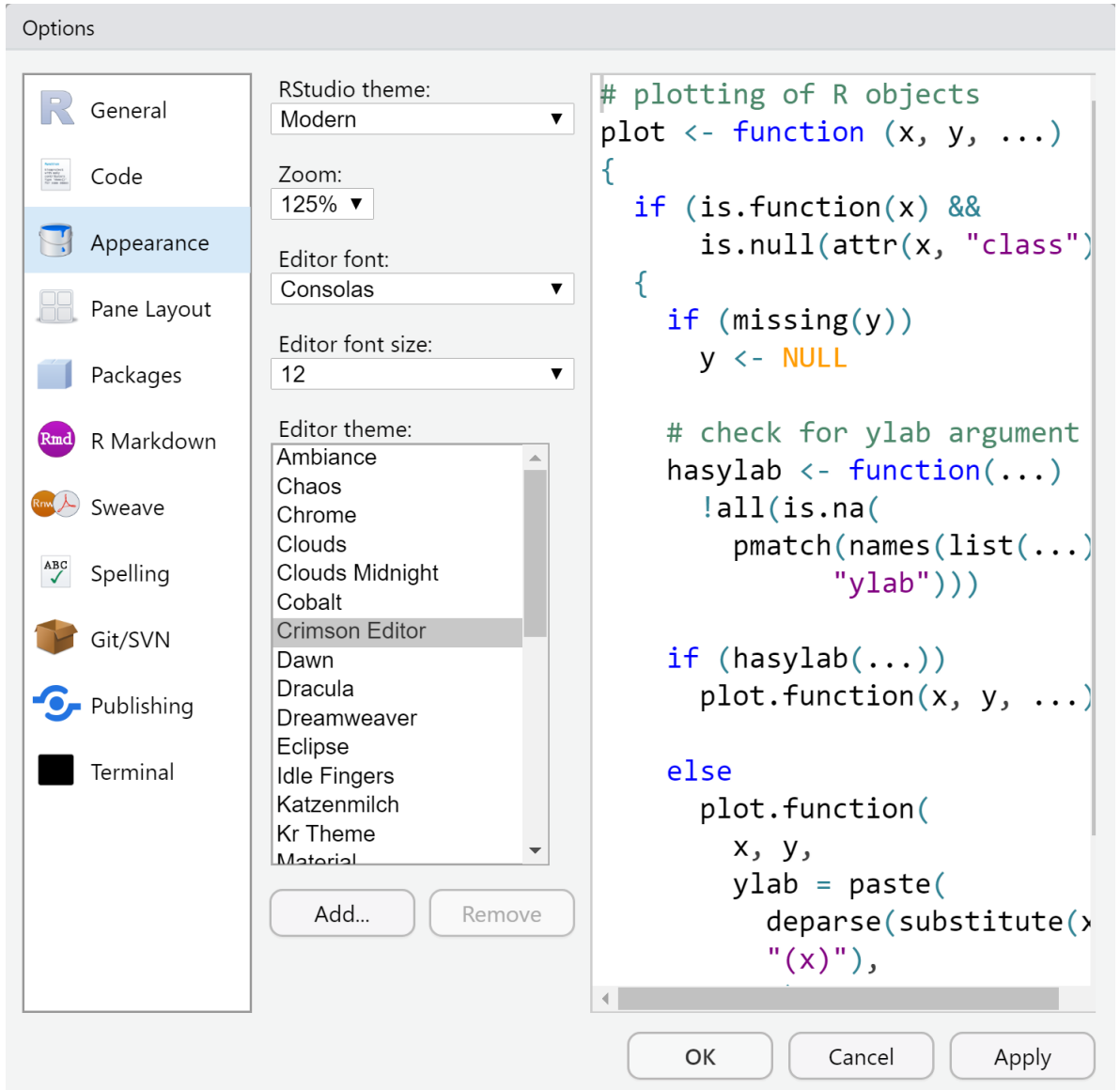
- Make sure these options are checked:
  - “Allow scroll past end of document”
  - “Use rainbow parentheses”



MAKE IT PRETTY

Tools > Global Options > Appearance

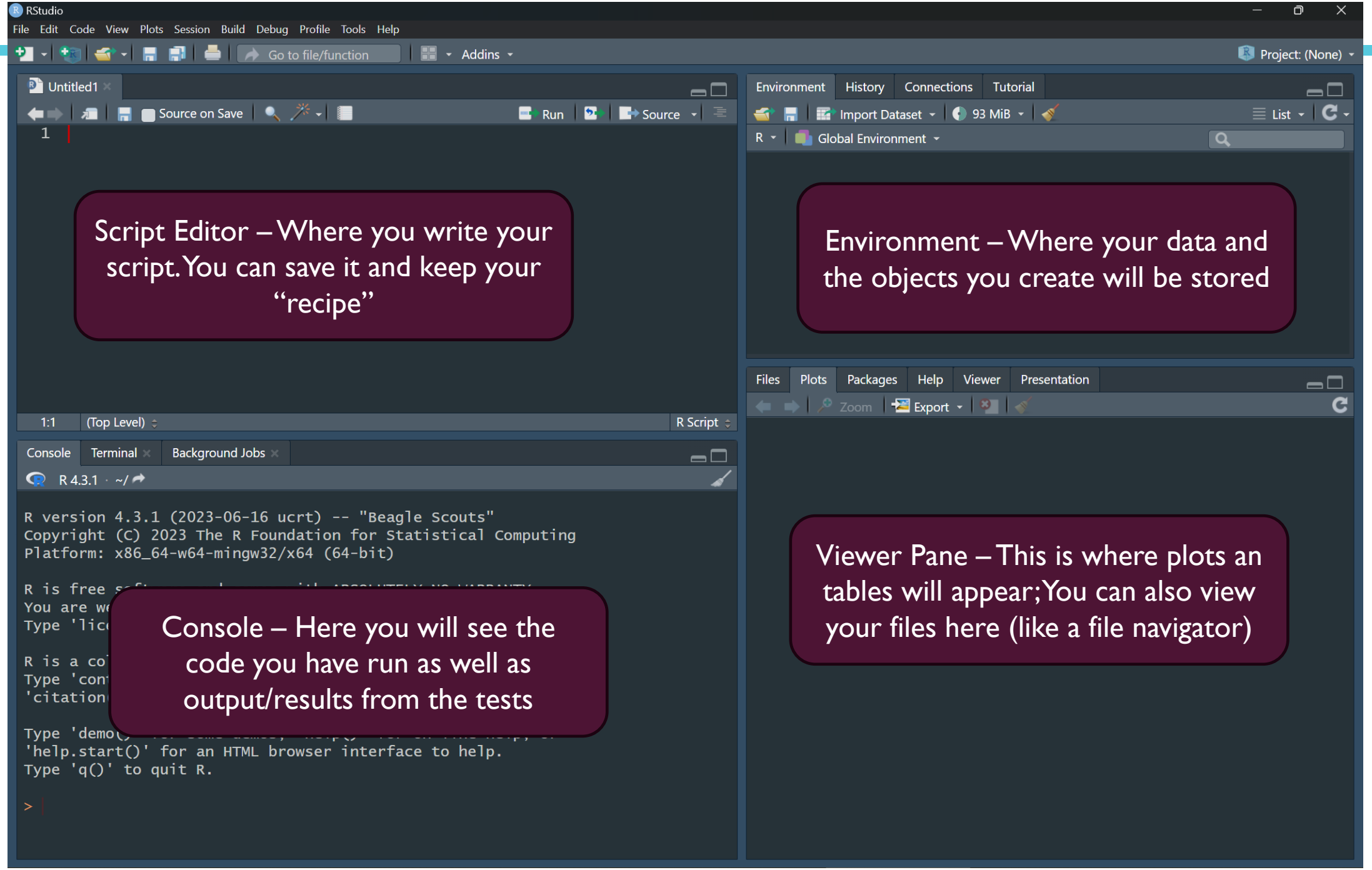
Update the appearance! This is your program and it should look how you want it to



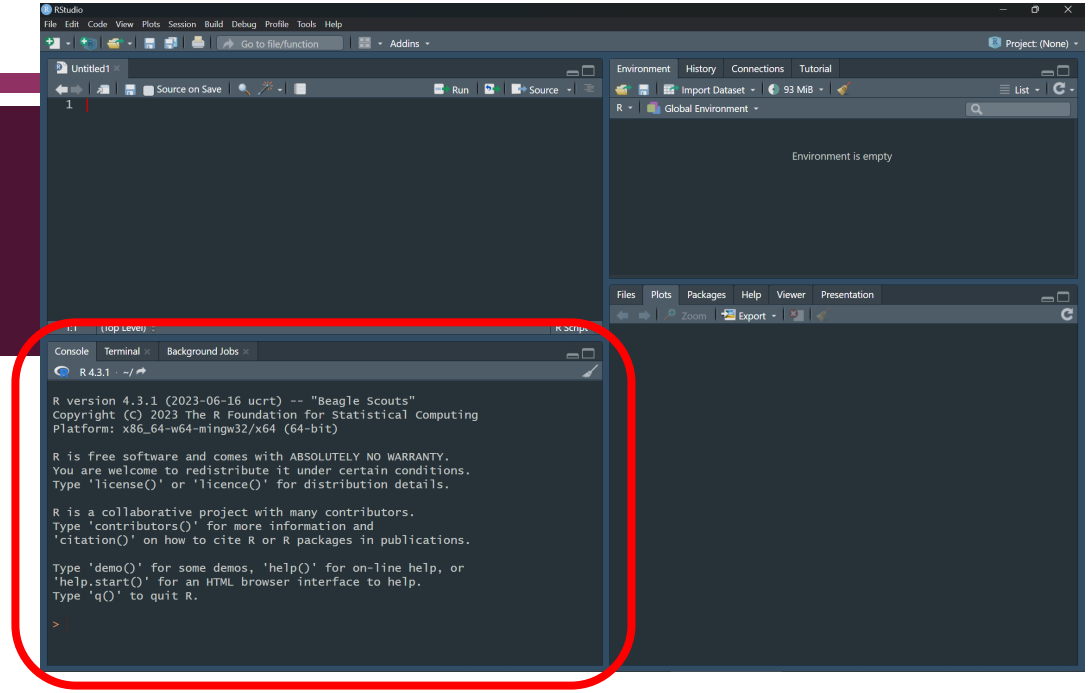
THE GREAT BRITISH BAKING SHOW

WHAT DOES THE KITCHEN LOOK LIKE?

- Familiarizing with the layout
  - R-Studio has four main panes that you will be interacting with
  - It will default to opening only 3, so we need to do something to get it to where we want, but we will be doing that later today

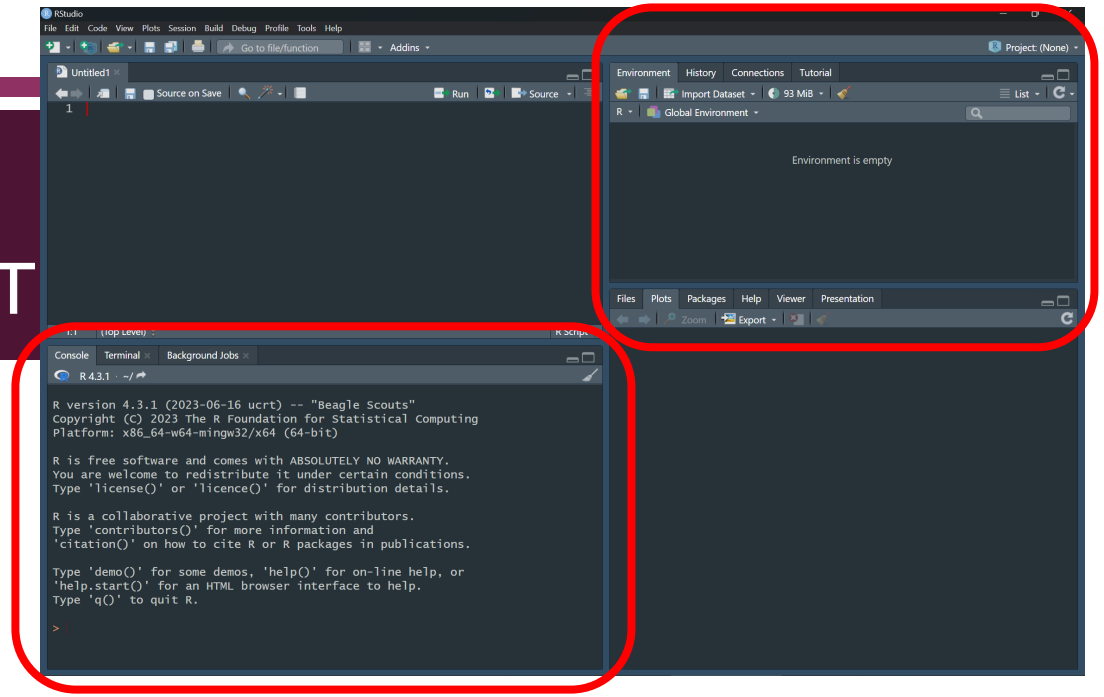

RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function
Addins
Project: (None)
Untitled1
Source on Save
Run
Source
1
Script Editor – Where you write your script. You can save it and keep your "recipe"
1:1
(Top Level)
R Script
Environment
History
Connections
Tutorial
Import Dataset
93 MiB
List
R
Global Environment
Environment – Where your data and the objects you create will be stored
Files
Plots
Packages
Help
Viewer
Presentation
Zoom
Export
Console
Terminal
Background Jobs
R 4.3.1 · ~/
R version 4.3.1 (2023-06-16 ucrt) -- "Beagle Scouts"
Copyright (C) 2023 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)
Type 'lic
Type 'cont
'citation
Type 'demo
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
>
Console – Here you will see the code you have run as well as output/results from the tests
Viewer Pane – This is where plots an tables will appear; You can also view your files here (like a file navigator)

RSTUDIO - CONSOLE



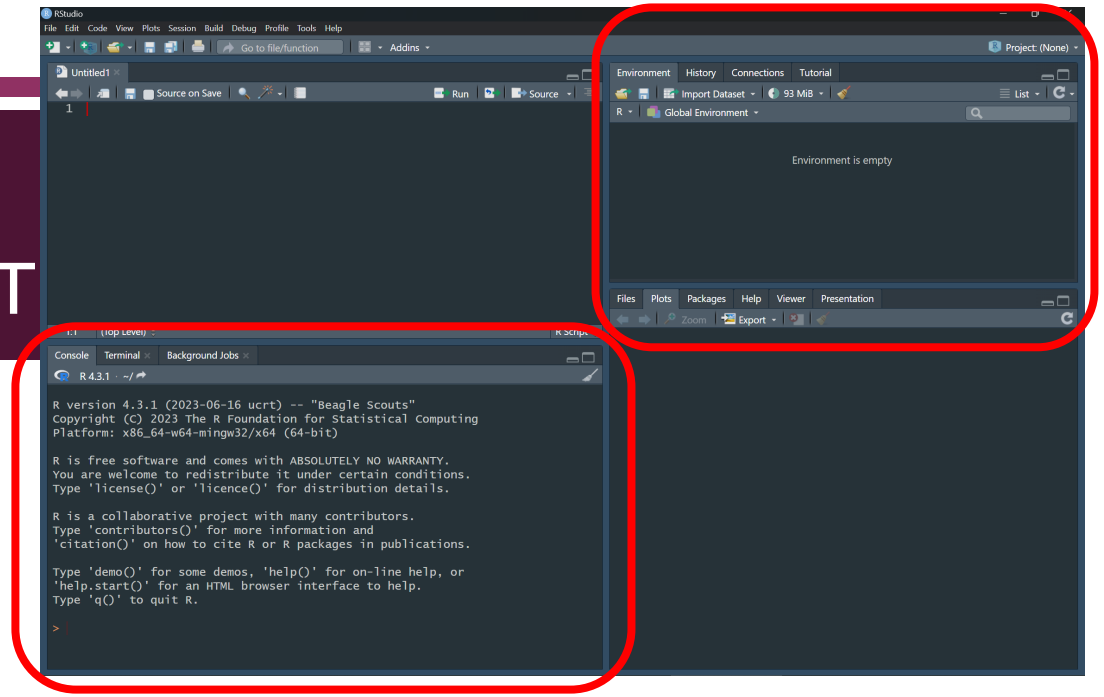
- You can type directly into this
- It will not be saved
- Simplest thing is to use it as a calculator! Go ahead and try it out
  - Type 42 + 13 and hit ENTER ← This is a ***command***
  - You are commanding the computer to perform the task that you want
  - Note: Take a look at 3.2 in Learning Statistics with R
    - Another resource is R for Data Science Chapter 2

RSTUDIO – CONSOLE & ENVIRONMENT



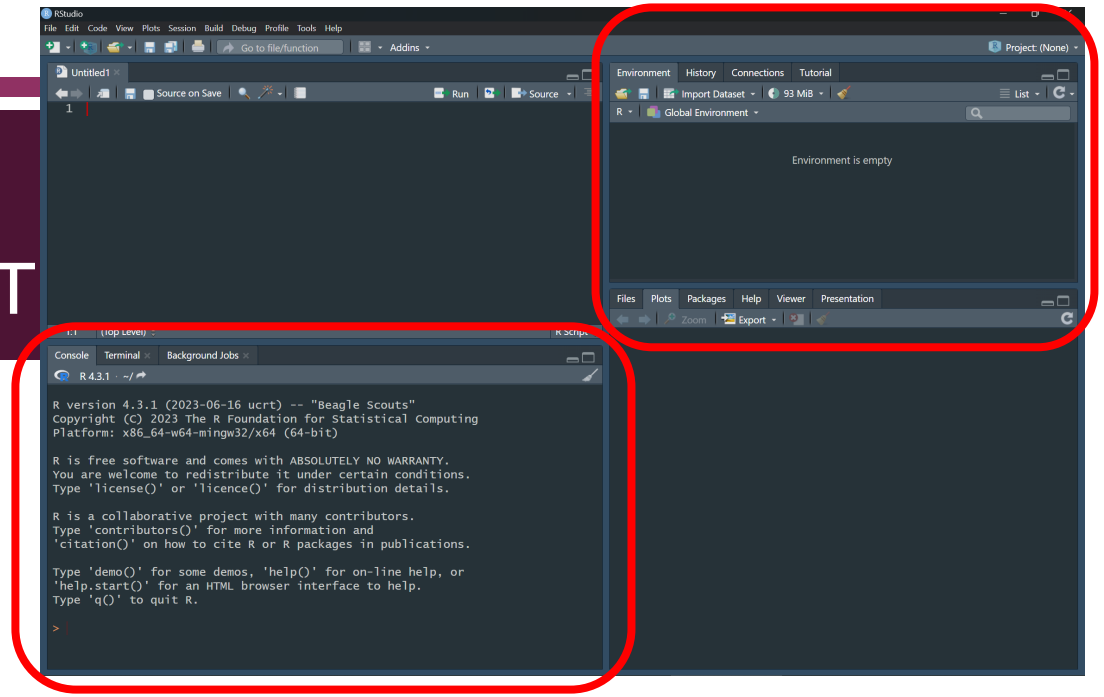
- Creating Objects
  - "Objects" are containers for information
  - They are created by using the assignment operator ←
    - Shortcut for inserting the operator: Alt + - (minus sign)
  - Try it out! Create an object named "class" and assign it the number of students (20)
  - Once it is run, you will not see it in the console, but it will appear in the Environment

RSTUDIO – CONSOLE & ENVIRONMENT



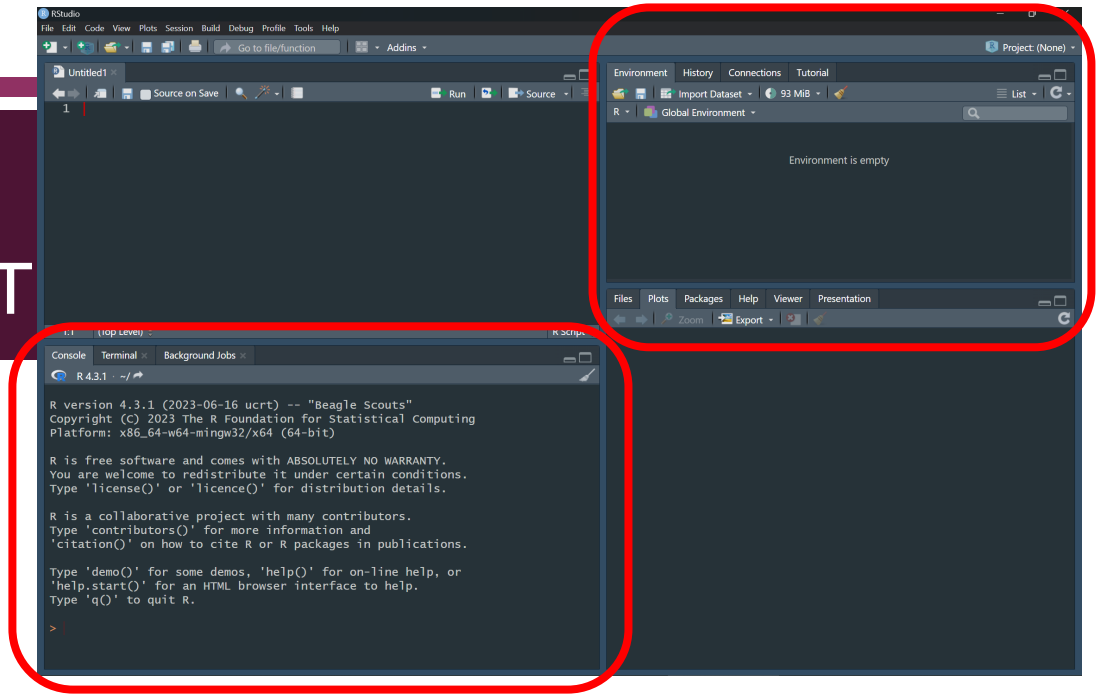
- Manipulating Objects
  - You can use object names in calculations
  - What happens if 4 students leave the class, how many are left?
  - Call the object again…did it change?
    - Updating objects

RSTUDIO – CONSOLE & ENVIRONMENT



- Using Functions
  - Create object `class_grade` and assign it a list of numbers (separated by commas) using the combine function `c()`
  - Use a function to find the average of the grades using a function (Use Google)
  - Calculate the average manually (with R) to see if they match!
  - Create an object `class_average` that has the class average that you calculated
    - Maybe you don't want that many decimal places…

RSTUDIO – CONSOLE & ENVIRONMENT



Usage

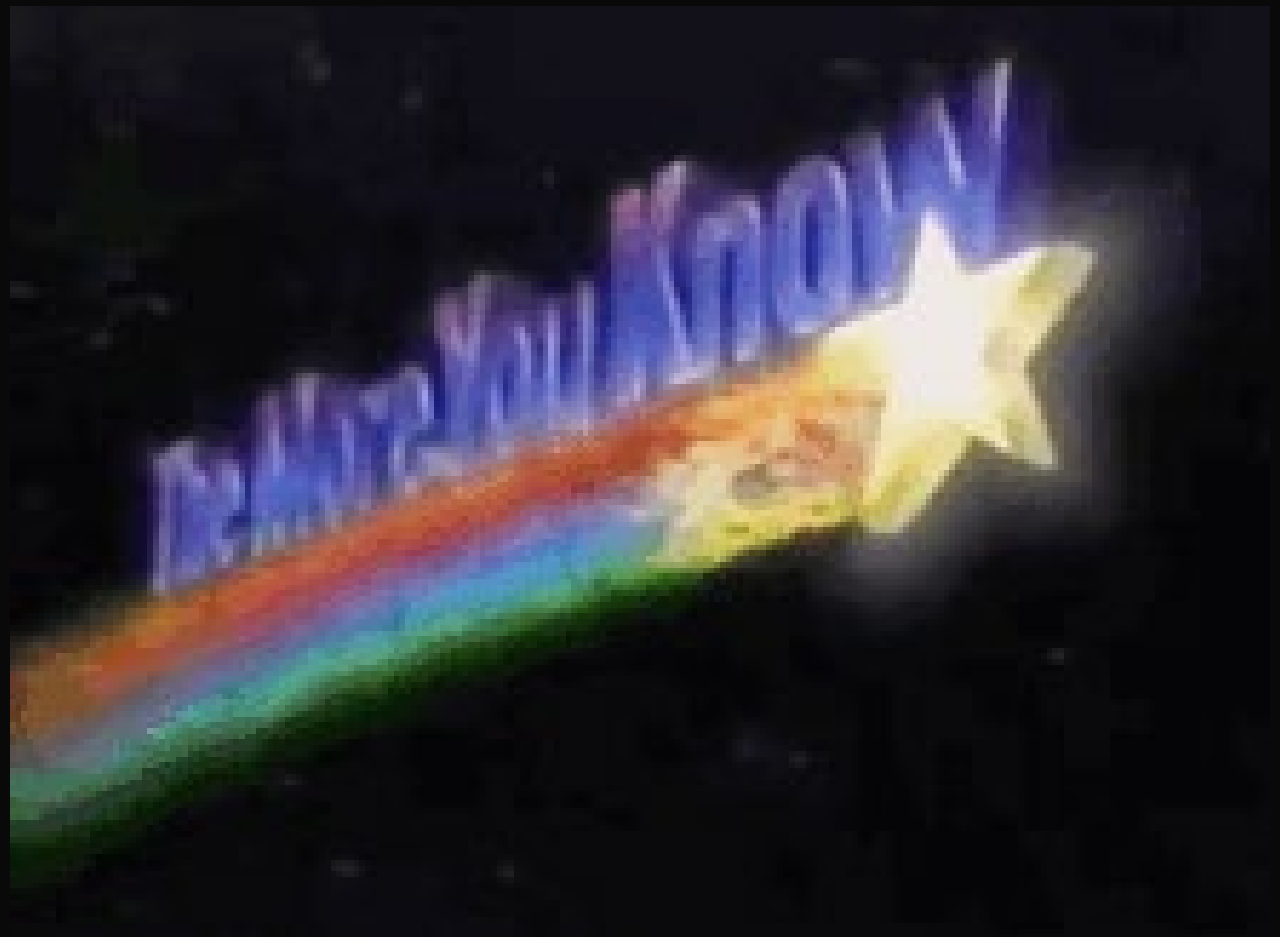
```
ceiling(x)
floor(x)
trunc(x, ...)

round(x, digits = 0)
signif(x, digits = 6)
```

Arguments

`x`	a numeric vector. Or, for `round` and `signif`, a complex vector.
`digits`	integer indicating the number of decimal places (`round`) or significant digits (`signif`) to be used. For `round`, negative values are allowed (see 'Details').
`...`	arguments to be passed to methods.

- Using Functions
  - The `round()` function (`?round`)
  - Function name & corresponding arguments

IT'S OKAY TO NOT REMEMBER ALL FUNCTIONS ALL THE TIME



CLOSING RSTUDIO

- What do you think will happen with the objects we created once we close and re-open Rstudio?
- What about all the other work that you did?

CLOSING RSTUDIO

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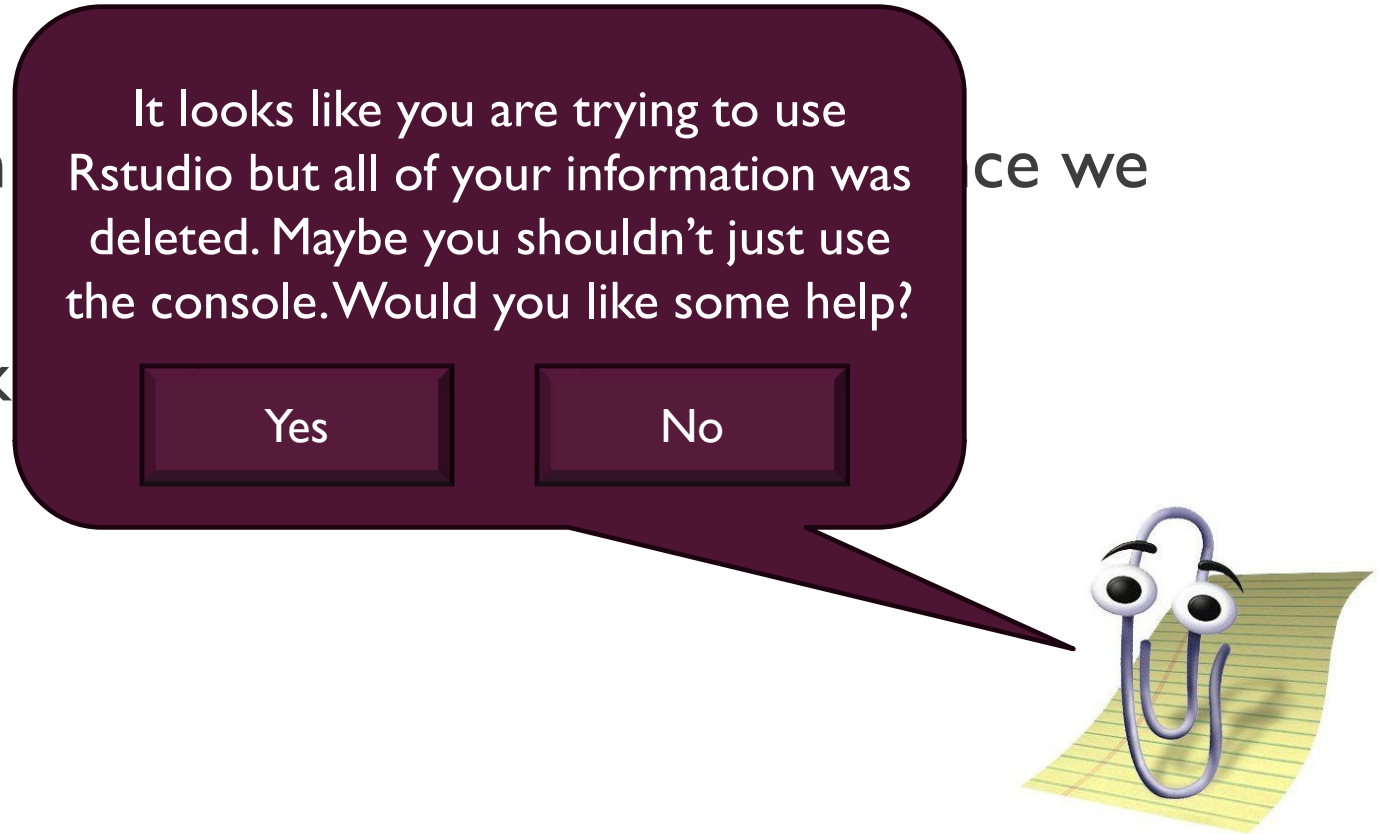
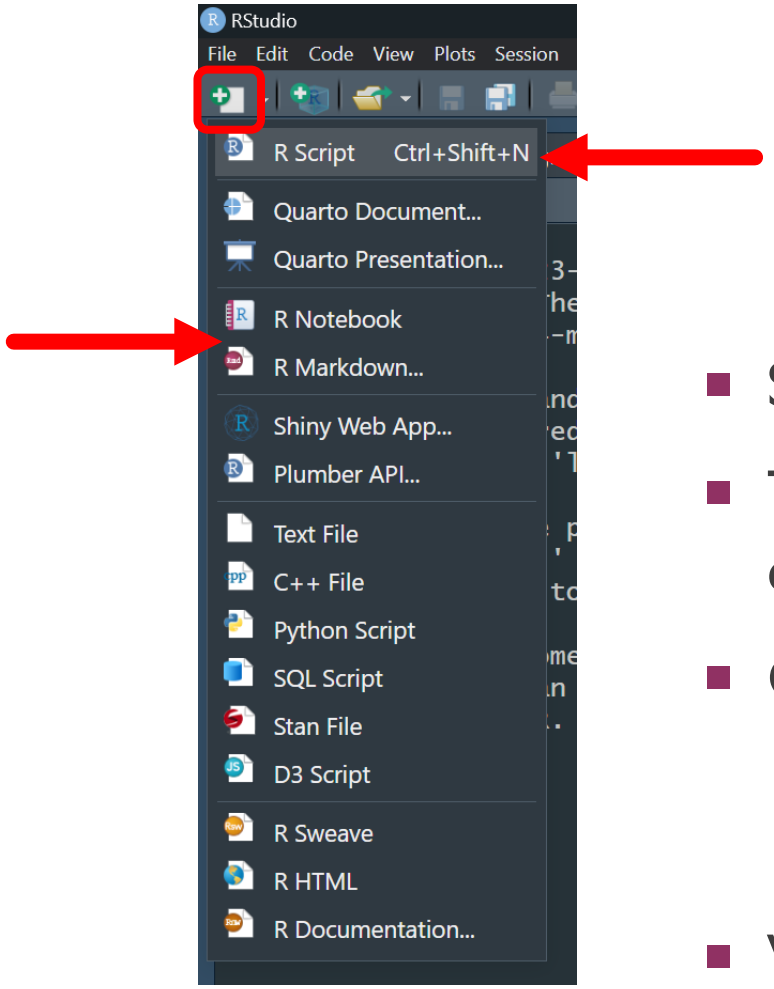
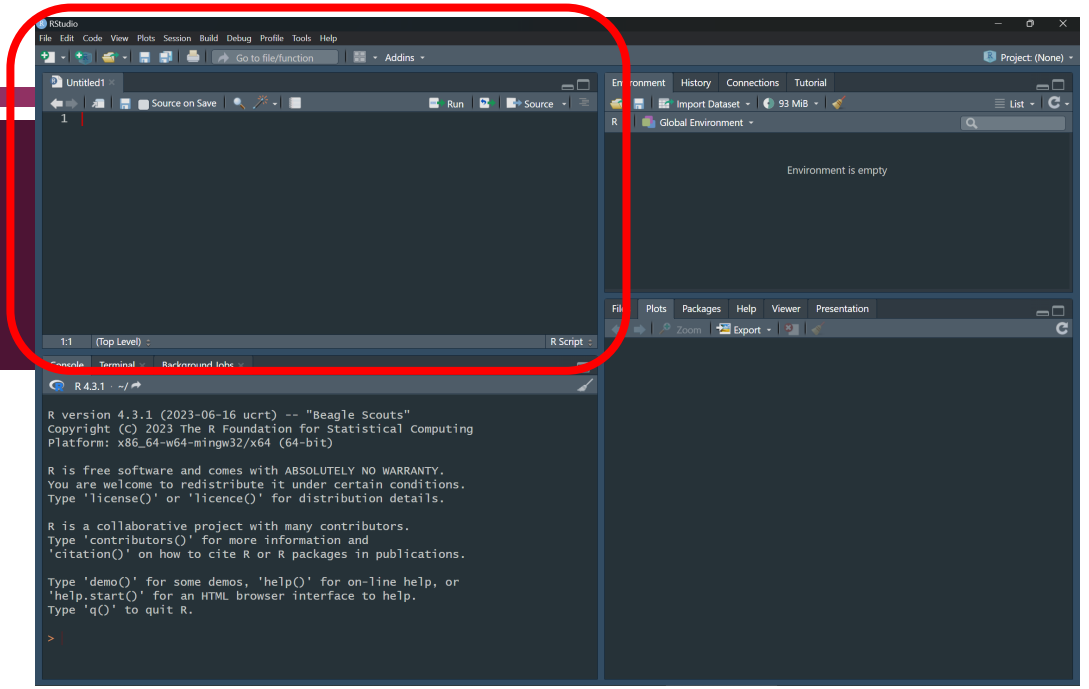
- What about all the other work



RSTUDIO – SCRIPTS & MARKDOWN / NOTEBOOK

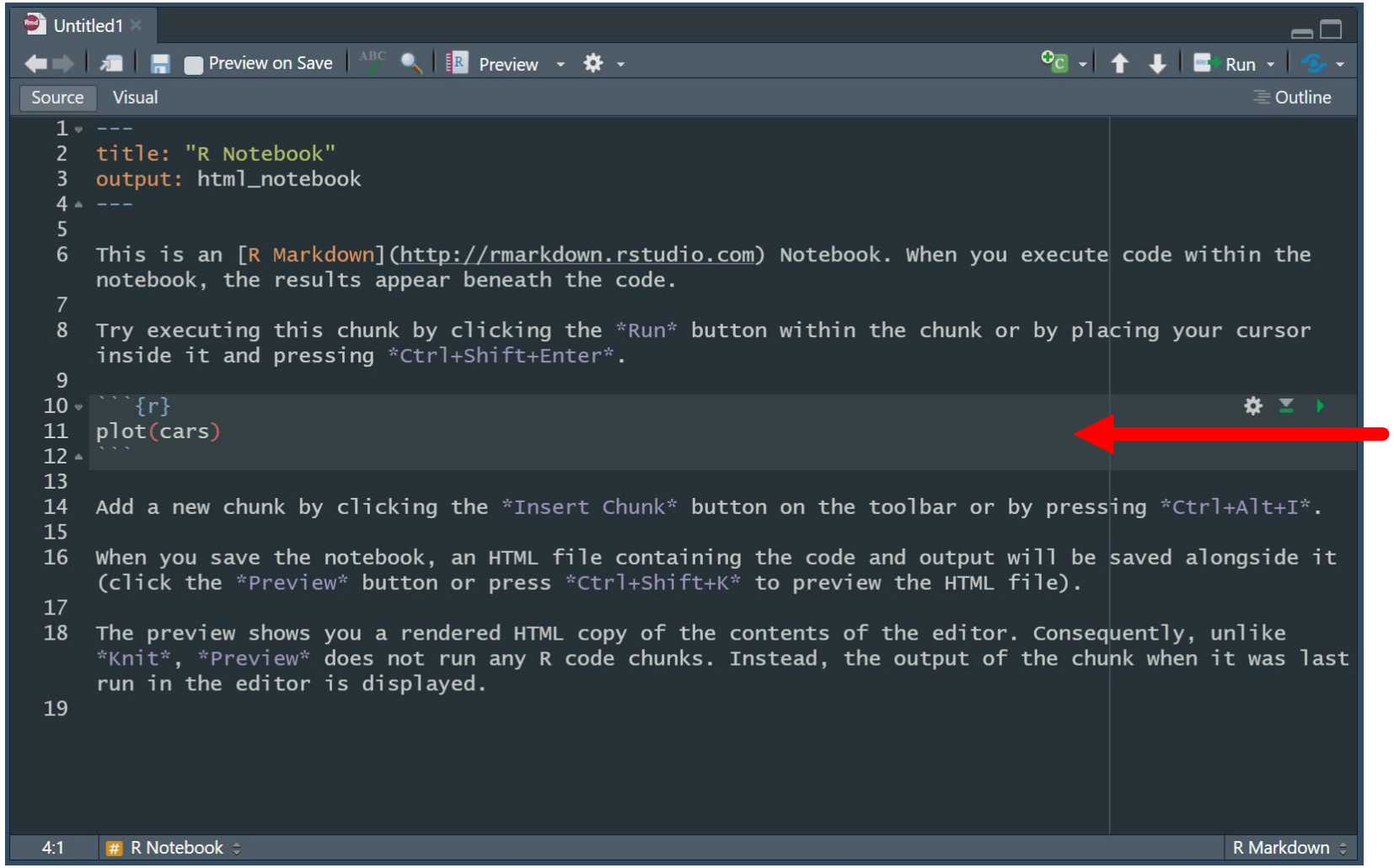




- Scripts & Markdown/Notebooks are like the recipes
- These are the documents that you will be saving in order to continue your projects
- Create one script and one notebook
  - When creating a notebook, you may be prompted to update "a version of the markdown package" – Select Yes
- What are some differences that you notice between the two?

RSTUDIO - NOTEBOOK

Normal Text



Code chunk

CHECKPOINT

- Reviewed the layout of our "kitchen"
- Our own personal "recipes" will be in the form of Notebooks or Markdown files
- We also need some tools to help us with our baking/cooking
  - This is where the R packages and libraries come in!

THE LIBRARY OF R

"A package is a like a book, a library is like a library; you use library() to check a package out of the library"

Hadley Wickham, Chief Scientist, R Studio

THE LIBRARY OF R - INSTALL.PACKAGES()

"Packages" are shareable collections of R code that provide functions (i.e., a command to perform a specific task), data, and documentation. Packages increase the functionality of R by improving and expanding on base R (basic R functions).

Installing and Loading Packages

To download a package, you must call install.packages():

```
install.packages("tidyverse")
```

Put this in the console

You can also navigate to the Packages pane, and then click "Install", which will work the same as the line of code above. This is a way to install a package using code or part of the R Studio interface.

Usually, writing code is a bit quicker, but using the interface can be very useful and complementary to use of code.

THE LIBRARY OF R - LIBRARY()

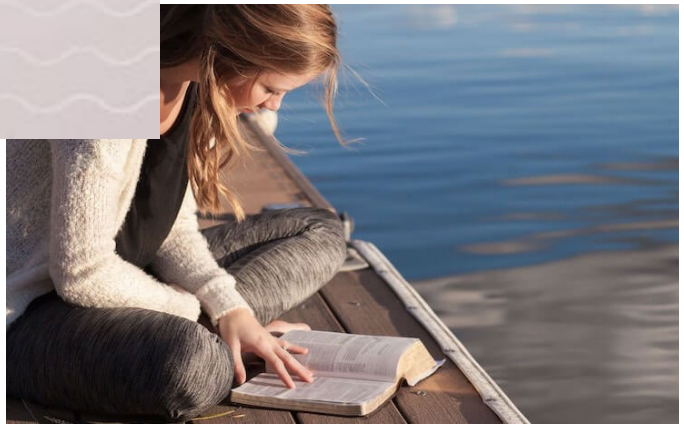
After the package is installed, it must be loaded into your R Studio session using library():

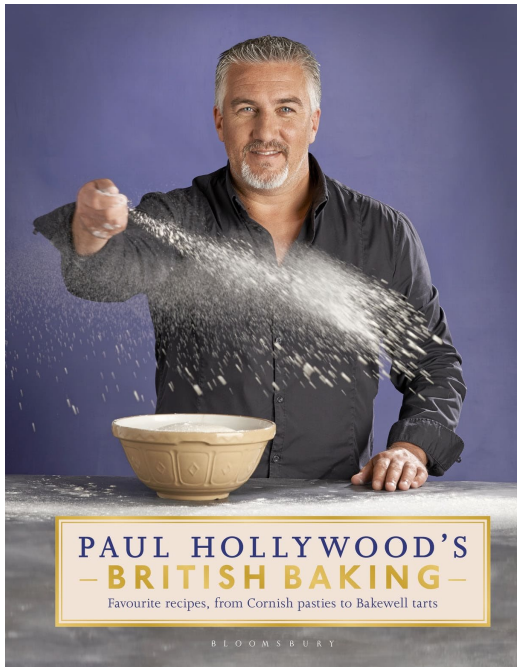
```
library(tidyverse)
```

We only have to *install* a package once, but to use it, we have to load it each time we start a new R session.

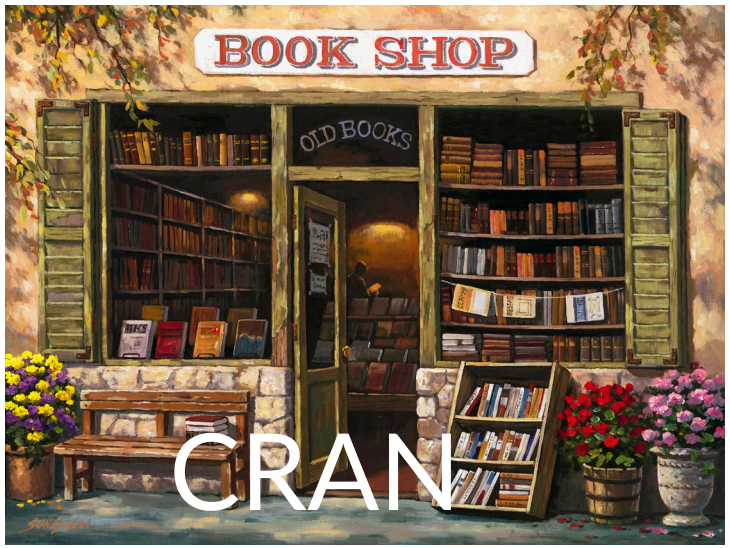

BAKERY
HOUSE

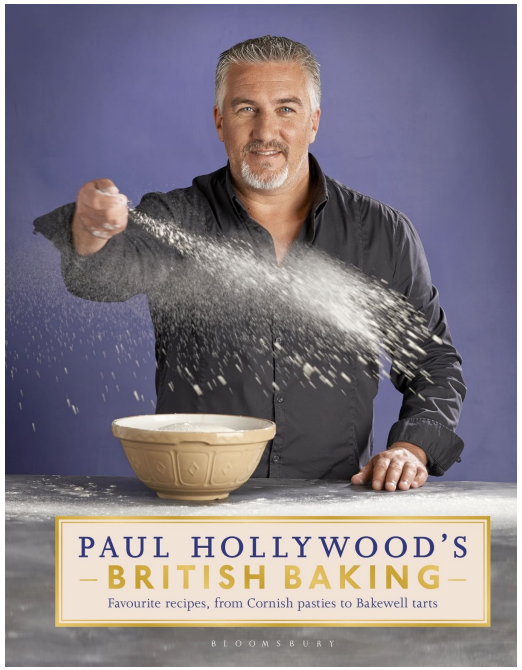

CRAN




PAUL HOLLYWOOD'S
BRITISH BAKING
Favourite recipes, from Cornish pasties to Bakewell tarts
BLOOMSBURY

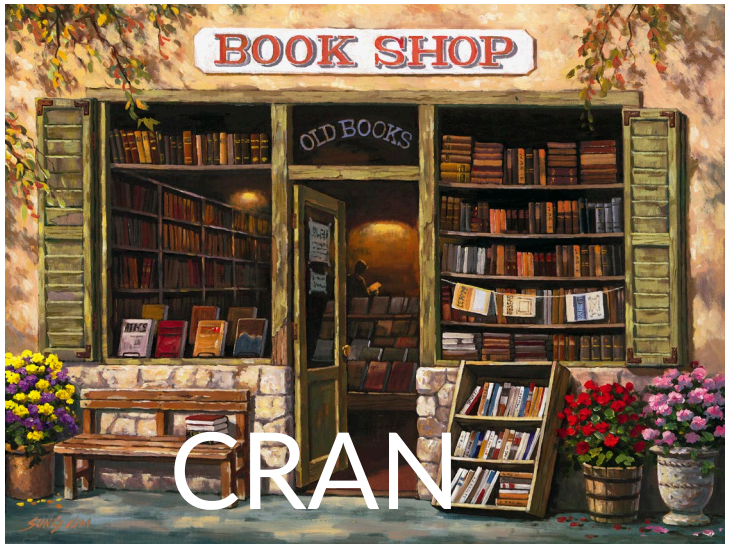

Farmers
MARKET


BOOK SHOP
OLD BOOKS
CRAN



`library(here)`

`install.packages("tidyverse")`



GRAB SOME MORE COOKBOOKS

- here - https://here.r-lib.org/
- rio - http://gesistsa.github.io/rio/
- easystats - https://easystats.github.io/easystats/

PUTTING IT ALL TOGETHER

BUT FIRST…FILE STRUCTURES

PUTTING IT TOGETHER - OVERVIEW

- Step 1: Create File Structure
  - One folder for the current project
  - Download the data to put in there
- Step 2: Create Notebook (helpful resource for further reading)
  - Install packages – `here()`
  - Put libraries in the code chunk
- Step 3: Load in Data
  - Using haven or rio package (https://haven.tidyverse.org/)

FILE STRUCTURES

- https://faculty.washington.edu/otoomet/info201-book/file-system-tree.html
- https://tobloef.com/text2mindmap/
- https://app.mindmup.com/map/new/1724895470210

WORKING DIRECTORY

- How does R know where your data live?

RSTUDIO – IMPORTING/READING DATA

> *If the first line of your R script is*
>
> `setwd("C:\Users\jenny\path\that\only\I\have")`
>
> *I will come into your office and SET YOUR COMPUTER ON FIRE* 🔥.

DATA

- Grab the dataset from myCourses titled “Sleep_Data”
- Download it into the appropriate folder to be used for class

RSTUDIO – IMPORTING/READING DATA

```
read_sav(
  file,
  encoding = NULL,
  user_na = FALSE,
  col_select = NULL,
  skip = 0,
  n_max = Inf,
  .name_repair = "unique"
)
```

file – refers to where on your computer this file lives. How can you give directions to get to this specific data file?

RSTUDIO – IMPORTING/READING DATA

```
read_sav(
  file,
  encoding = NULL,
  user_na = FALSE,
  col_select = NULL,
  skip = 0,
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)
```

file – refers to where on your computer this file lives. How can you give directions to get to this specific data file?

Let's look at the rio/qualtRics package together

https://docs.ropensci.org/qualtRics/

http://gesistsa.github.io/rio/

WRAPPING UP

- Complete the survey if you haven't already
- Read R for Data Science Introduction and Chapter 7
- Let me know if you have any questions!