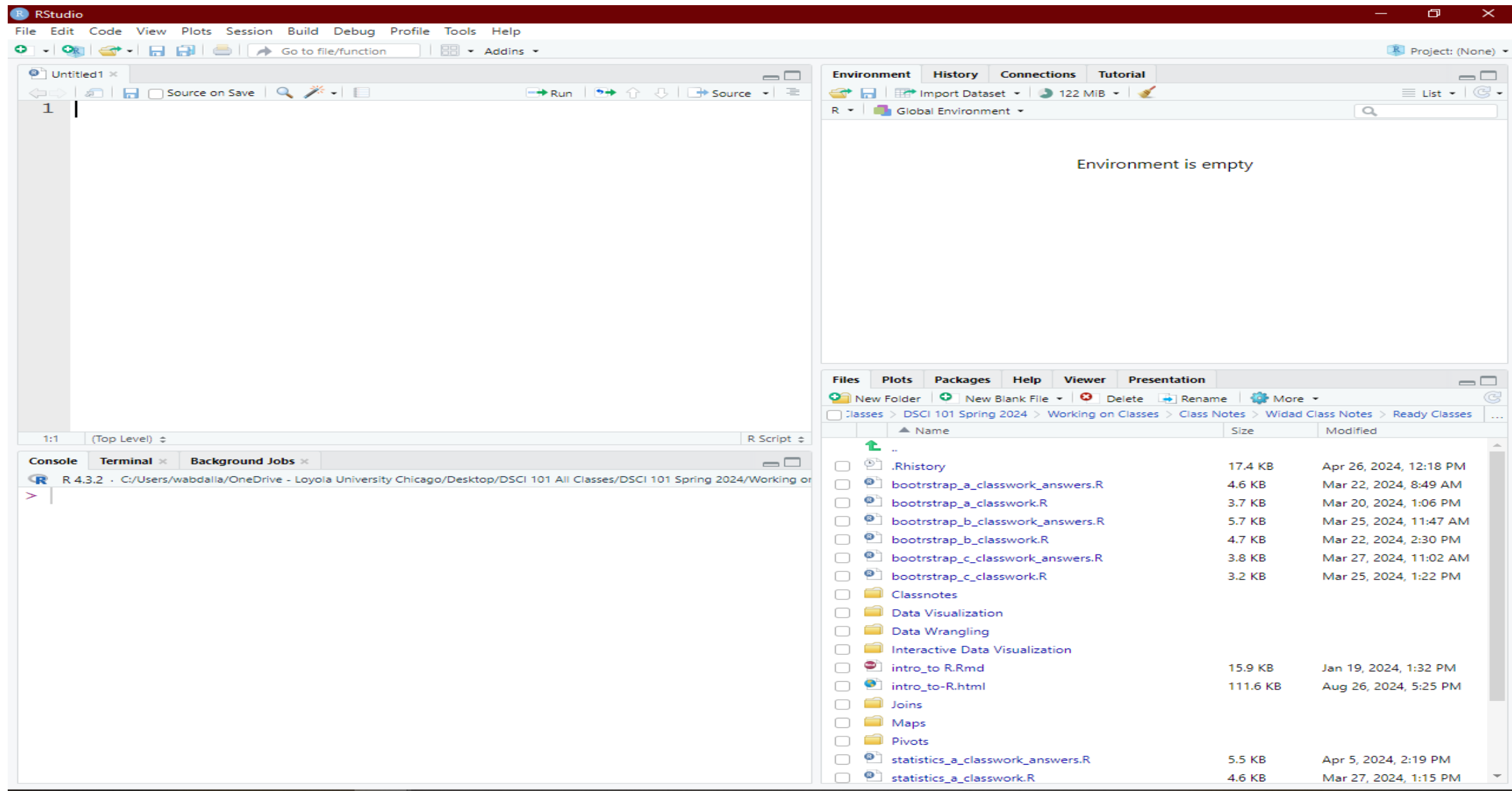


# Coding Basics

## Part 1

# R & RStudio - Basic Components



RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Untitled1 x

Source on Save Run Source

1

Environment History Connections Tutorial

Import Dataset 122 MiB

R Global Environment

Environment is empty

Files Plots Packages Help Viewer Presentation

New Folder New Blank File Delete Rename More

.classes > DSCI 101 Spring 2024 > Working on Classes > Class Notes > Widad Class Notes > Ready Classes

	Name	Size	Modified
<input type="checkbox"/>	..		
<input type="checkbox"/>	.Rhistry	17.4 KB	Apr 26, 2024, 12:18 PM
<input type="checkbox"/>	bootstrap_a_classwork_answers.R	4.6 KB	Mar 22, 2024, 8:49 AM
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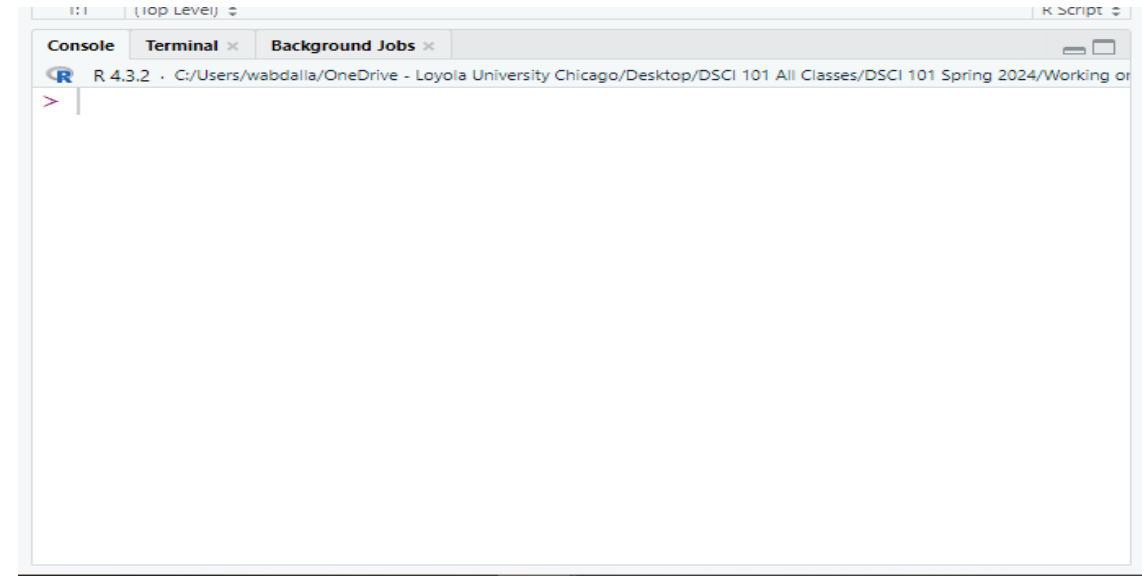
Console Terminal x Background Jobs x

R 4.3.2 C:/Users/wabdalla/OneDrive - Loyola University Chicago/Desktop/DSCI 101 All Classes/DSCI 101 Spring 2024/Working on

>

# Console Window

- located in the bottom left.
- It's where you often will find the output of your coding and computations.
- It is also possible to write code directly into the console.



RStudio

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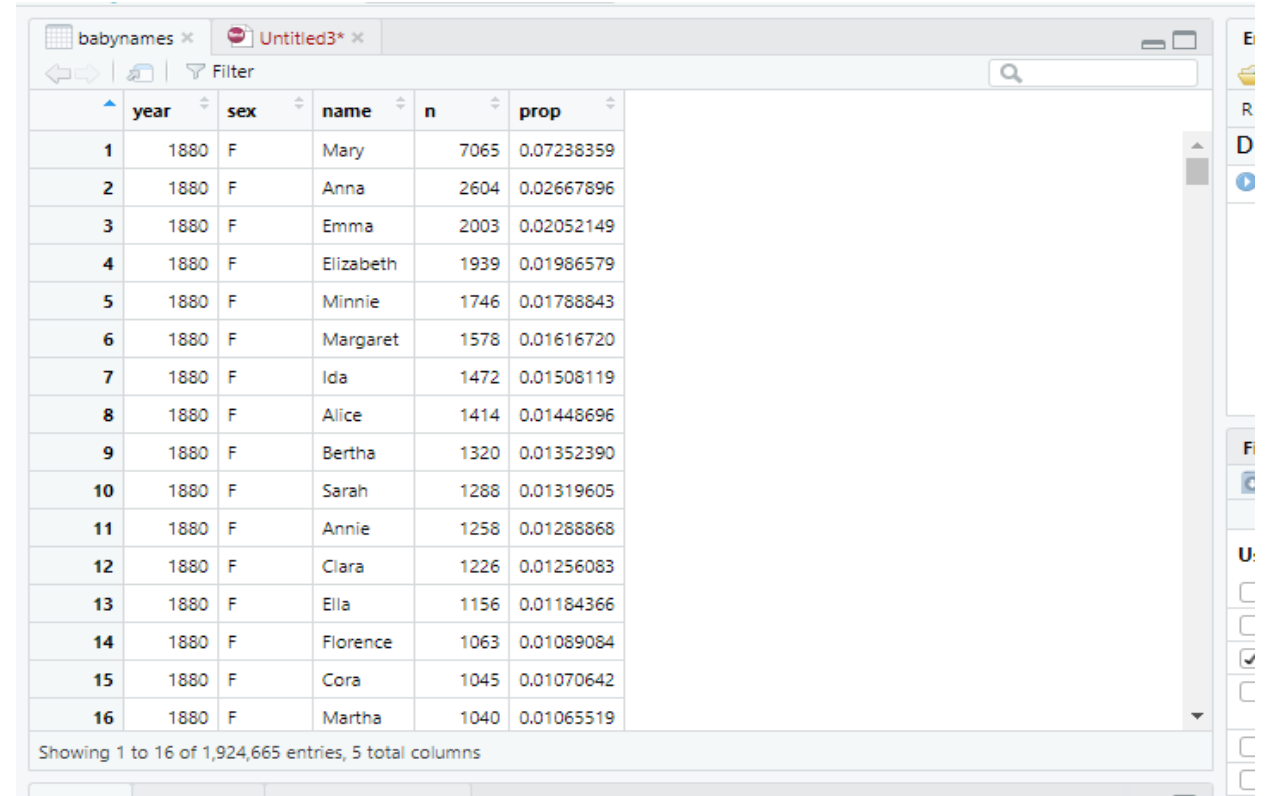
Console Terminal Background Jobs

R 4.3.2 C:/Users/wabdalla/OneDrive - Loyola University Chicago/Desktop/DSCI 101 All Classes/DSCI 101 Spring 2024/Working on

>

# Source Window

- Located in the top left.
- “Source” can be understood as any type of file.
- Function of the source window include:
  - ✓ Inspect data in an Excel-like format.
  - ✓ Open programming code and code editing.
  - ✓ Run the analysis you have written.

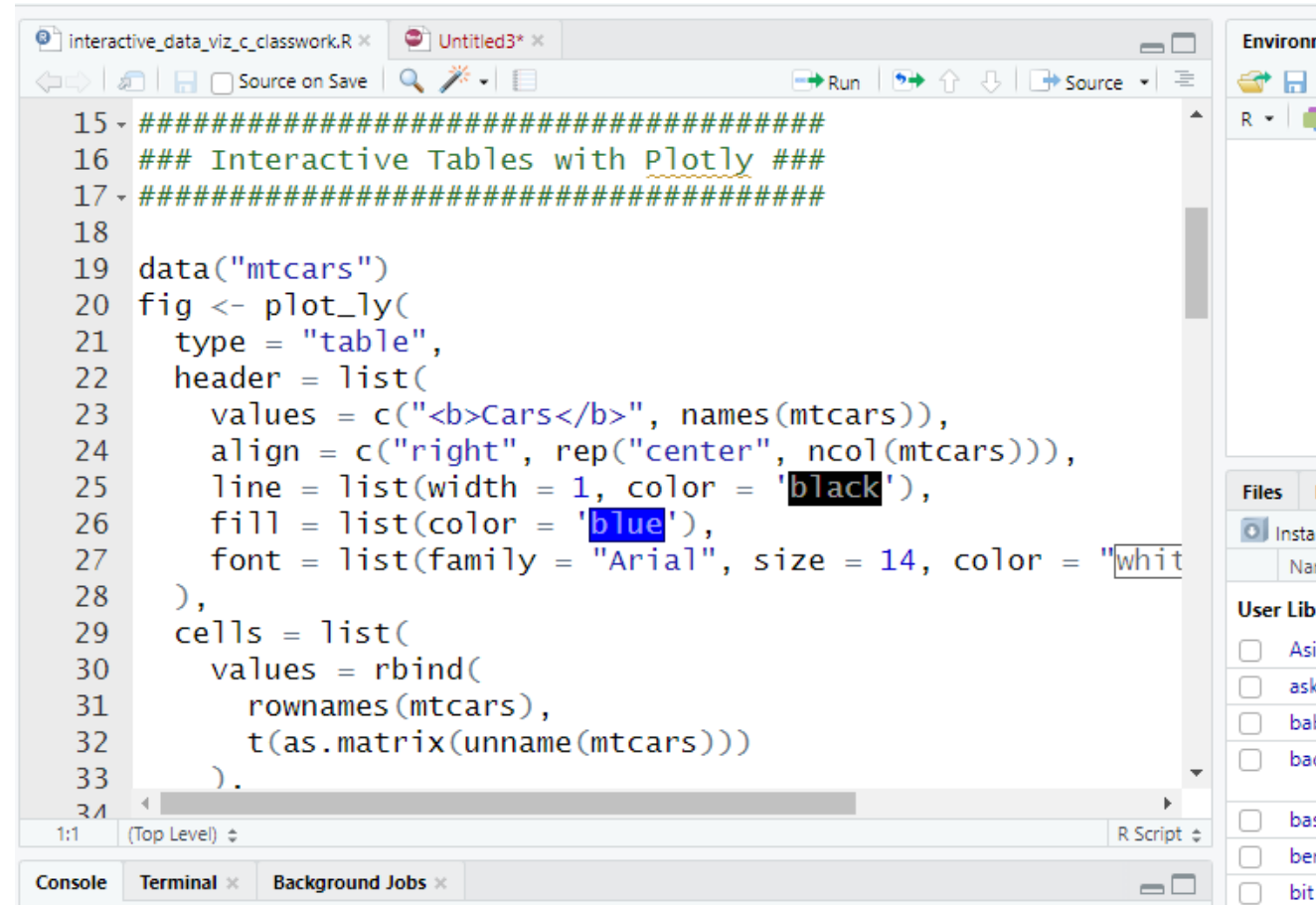


The screenshot shows the Source Window in RStudio. The window title is 'babynames x' and 'Untitled3\* x'. The table has 6 columns: 'year', 'sex', 'name', 'n', and 'prop'. The data is sorted by 'year' (1880) and 'n' (7065). The table shows 16 rows of data, with the first row being Mary (7065) and the last row being Martha (1040). The status bar at the bottom indicates 'Showing 1 to 16 of 1,924,665 entries, 5 total columns'.

	year	sex	name	n	prop
1	1880	F	Mary	7065	0.07238359
2	1880	F	Anna	2604	0.02667896
3	1880	F	Emma	2003	0.02052149
4	1880	F	Elizabeth	1939	0.01986579
5	1880	F	Minnie	1746	0.01788843
6	1880	F	Margaret	1578	0.01616720
7	1880	F	Ida	1472	0.01508119
8	1880	F	Alice	1414	0.01448696
9	1880	F	Bertha	1320	0.01352390
10	1880	F	Sarah	1288	0.01319605
11	1880	F	Annie	1258	0.01288868
12	1880	F	Clara	1226	0.01256083
13	1880	F	Ella	1156	0.01184366
14	1880	F	Florence	1063	0.01089084
15	1880	F	Cora	1045	0.01070642
16	1880	F	Martha	1040	0.01065519

# Source Window

- Located in the top left.
- “Source” can be understood as any type of file.
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  - ✓ Run the analysis you have written.



The screenshot shows the RStudio Source Window with a file named 'interactive\_data\_viz\_c\_classwork.R'. The code is as follows:

```
15 - #####
16 - ## Interactive Tables with Plotly ##
17 - #####
18
19 data("mtcars")
20 fig <- plot_ly(
21   type = "table",
22   header = list(
23     values = c("<b>Cars</b>", names(mtcars)),
24     align = c("right", rep("center", ncol(mtcars))),
25     line = list(width = 1, color = "black"),
26     fill = list(color = "blue"),
27     font = list(family = "Arial", size = 14, color = "white")
28   ),
29   cells = list(
30     values = rbind(
31       rownames(mtcars),
32       t(as.matrix(unname(mtcars)))
33     )
34   )
35 )
```

The interface includes a toolbar with icons for navigation, saving, and running code. On the right side, there are panels for 'Environment', 'Files', and 'User Libraries'.

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Untitled1 x

Source on Save Run Source

1

Environment History Connections Tutorial

Import Dataset 122 MiB

R Global Environment

Environment is empty

Files Plots Packages Help Viewer Presentation

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Console Terminal Background Jobs

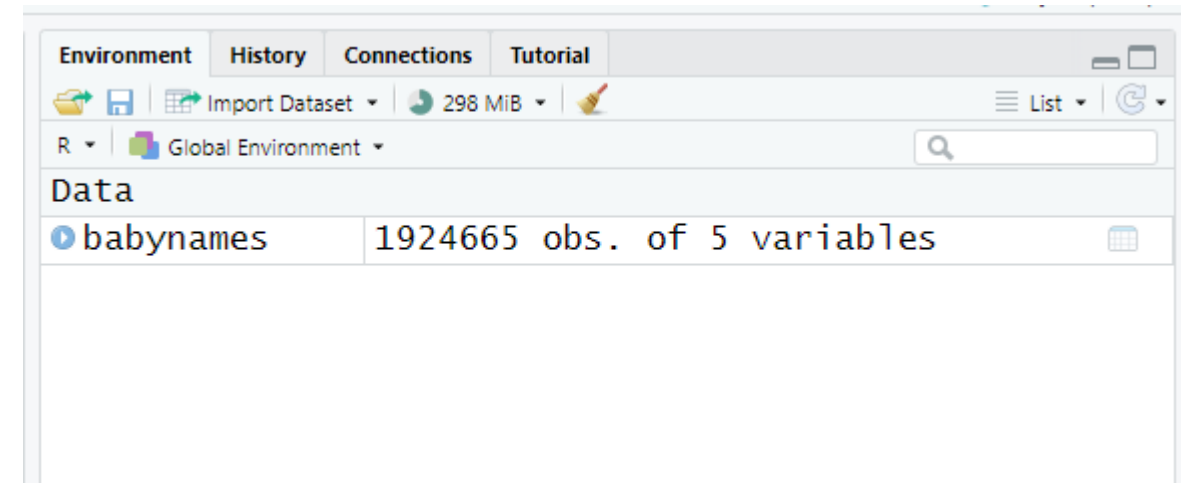
R 4.3.2 C:/Users/wabdalla/OneDrive - Loyola University Chicago/Desktop/DSCI 101 All Classes/DSCI 101 Spring 2024/Working on

>



# Environment/History/Connections/Tutorial Window

- . Located in the top-right.
- . Shows multiples panes, but the most important one is “Environment”.
- . Environment: shows you objects which are available for computation. Some examples of objects include:
  - ✓ Dataset
  - ✓ Vectors
  - ✓ Matrices
  - ✓ Lists
  - ✓ Functions you create yourself.



RStudio

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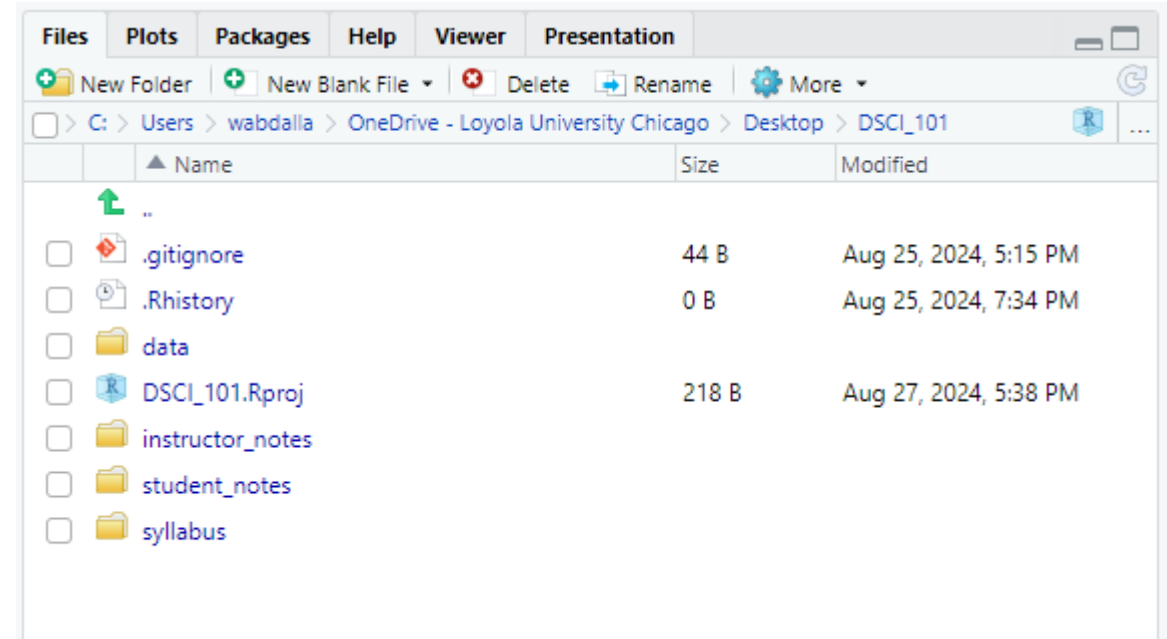
Console Terminal Background Jobs

R 4.3.2 C:/Users/wabdalla/OneDrive - Loyola University Chicago/Desktop/DSCI 101 All Classes/DSCI 101 Spring 2024/Working on

>

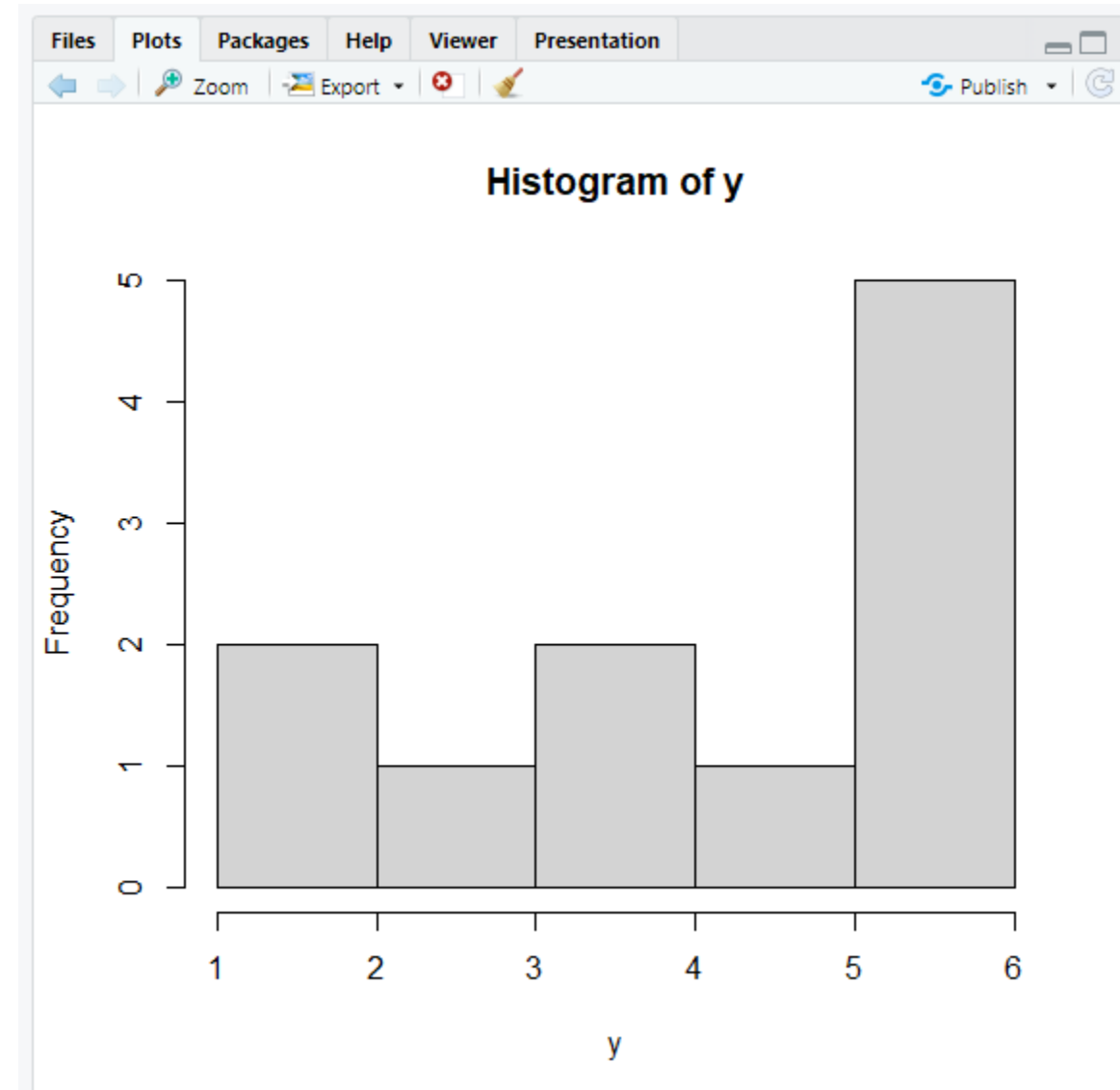
# Files/Plots/Packages/Help/Viewer Window

- Located in the bottom-right.
- It consists of five essential panes:
  - ✓ *Files pane*: lists all the files and folders in your root directory.



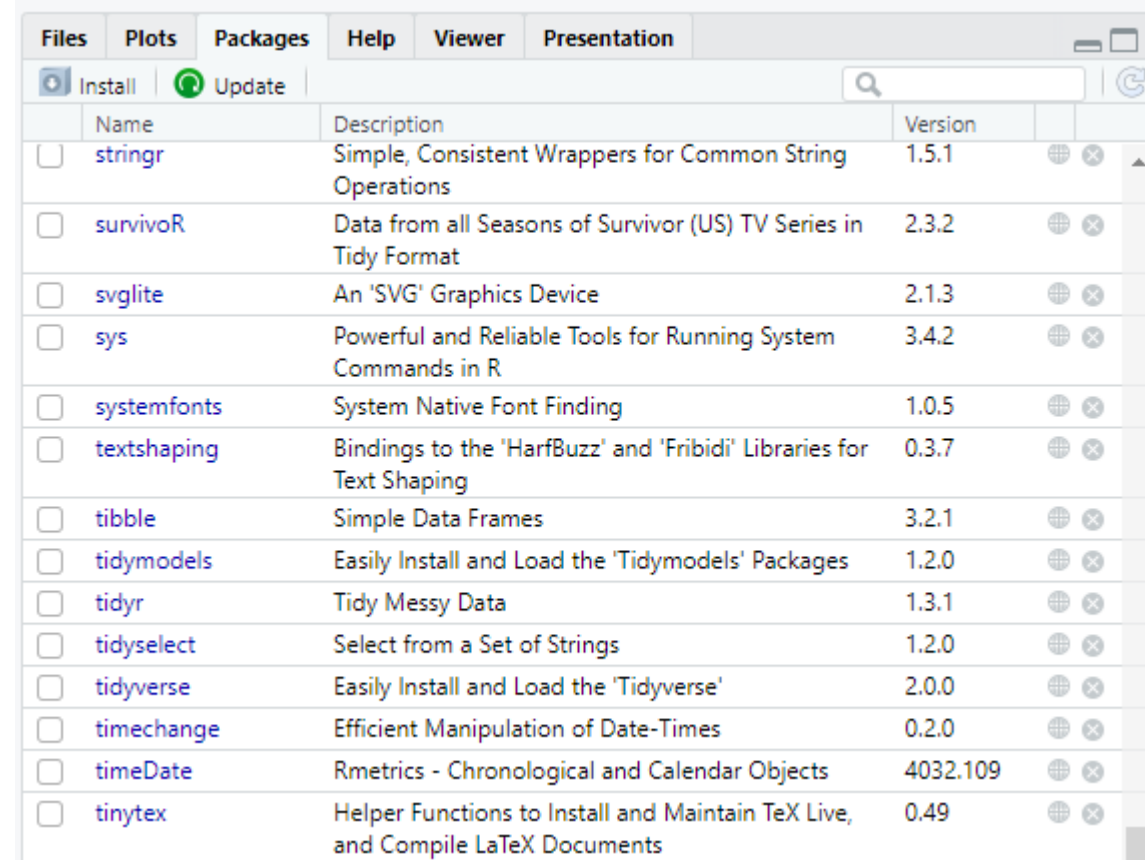
✓ ***Plots pane:*** This pane is exclusively designed to show you any plots you have created using R.

- To delete a plot, you can click on the red circle with a white x symbol.
- To remove all plots, you can use the broom.
- There are options to export your plot and move back and forth between different plots.



✓ **Packages:** they are additional tools you can import and use when performing your analysis.

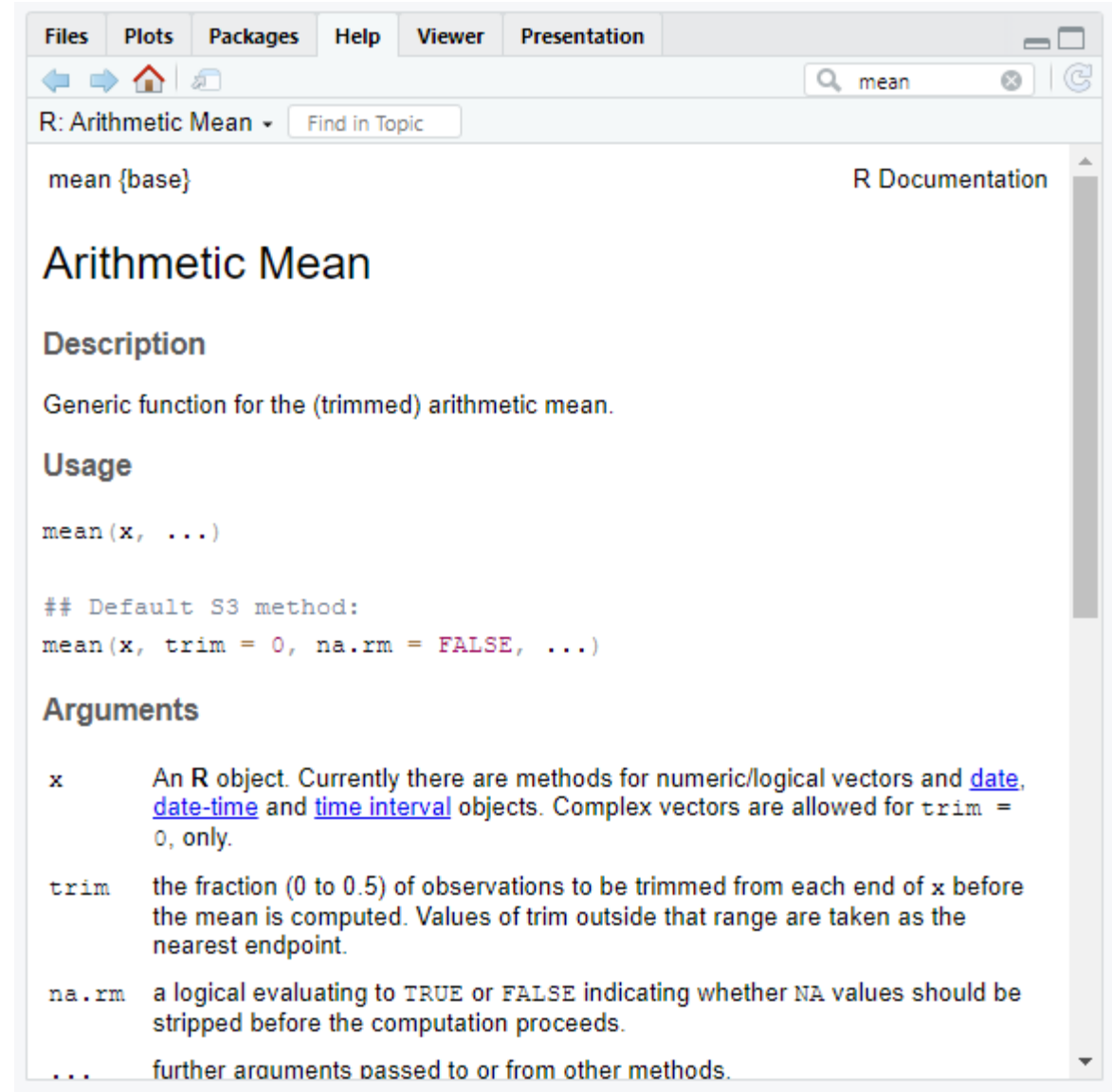
- A frequent analogy people use to explain packages is your phone and the apps you install. Each package you download is equivalent to an app on your phone.
- It can enhance different aspects of working in R, such as creating animated plots, or simply making your life easier by doing multiple computations with just one single line of code.



The screenshot shows the 'Packages' tab in RStudio. It features a table with columns for 'Name', 'Description', and 'Version'. Each row represents a package, with a checkbox on the left for installation status and icons on the right for update and refresh actions. The packages listed include stringr, survivoR, svglite, sys, systemfonts, textshaping, tibble, tidymodels, tidyr, tidyselect, tidyverse, timechange, timeDate, and tinytex.

	Name	Description	Version		
<input type="checkbox"/>	stringr	Simple, Consistent Wrappers for Common String Operations	1.5.1	⌕	✕
<input type="checkbox"/>	survivoR	Data from all Seasons of Survivor (US) TV Series in Tidy Format	2.3.2	⌕	✕
<input type="checkbox"/>	svglite	An 'SVG' Graphics Device	2.1.3	⌕	✕
<input type="checkbox"/>	sys	Powerful and Reliable Tools for Running System Commands in R	3.4.2	⌕	✕
<input type="checkbox"/>	systemfonts	System Native Font Finding	1.0.5	⌕	✕
<input type="checkbox"/>	textshaping	Bindings to the 'HarfBuzz' and 'Fribidi' Libraries for Text Shaping	0.3.7	⌕	✕
<input type="checkbox"/>	tibble	Simple Data Frames	3.2.1	⌕	✕
<input type="checkbox"/>	tidymodels	Easily Install and Load the 'Tidymodels' Packages	1.2.0	⌕	✕
<input type="checkbox"/>	tidyr	Tidy Messy Data	1.3.1	⌕	✕
<input type="checkbox"/>	tidyselect	Select from a Set of Strings	1.2.0	⌕	✕
<input type="checkbox"/>	tidyverse	Easily Install and Load the 'Tidyverse'	2.0.0	⌕	✕
<input type="checkbox"/>	timechange	Efficient Manipulation of Date-Times	0.2.0	⌕	✕
<input type="checkbox"/>	timeDate	Rmetrics - Chronological and Calendar Objects	4032.109	⌕	✕
<input type="checkbox"/>	tinytex	Helper Functions to Install and Maintain TeX Live, and Compile LaTeX Documents	0.49	⌕	✕

✓ **Help pane:** you can search for specific topics, for example how certain computation works. The Help pane also had documentation on different datasets that are included in R, Rstudio or R packages you have installed.



# **Customize your Interface**

Go to Tools > Global Options > Appearance

# Packages

- Many of R's most useful functions do not come preloaded when you start R, but reside in packages that can be installed on top of R.
- An R package bundles together useful functions, help files, and data sets.
- You can use these functions within your own R code once you load the package they live in.
- You only need to install a package once in your computer.

code:

- You need to load the package every time you open R.

code:



# File Types

- R Script
  - ✓ Extension: .R
  - ✓ This is a file you can write your codes in it.
- RMarkdown Script
  - ✓ Extension: .Rmd
  - ✓ Incorporates code and texts together to *knit* a document together.
  - ✓ Knitting an rmd file compiles the text and code together to create another file such as an .html or .pdf

# File Types

- R Project
  - ✓ Extension: .Rproj
  - ✓ Helps you organize your different coding projects.
  - ✓ The working directory will automatically be set to the directory that the .RProj file is located in allowing easier organization and access to your data and files.

# Data Structure

***Data Structure*** is a specific way to organize, store, process, and retrieve your data.

## . **Vectors**

Examples of vectors:

[4, 1, 3, 8, 6, 7, 5, 3, 0, 9]

Code:

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

Code:

[x.1, x.2, x.3, x.4, x.5]

Code:

## . **Matrices**

Examples:

$$\begin{bmatrix} 4 & 6 \\ 7 & 8 \\ 9 & 10 \end{bmatrix}$$

code:

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

code: