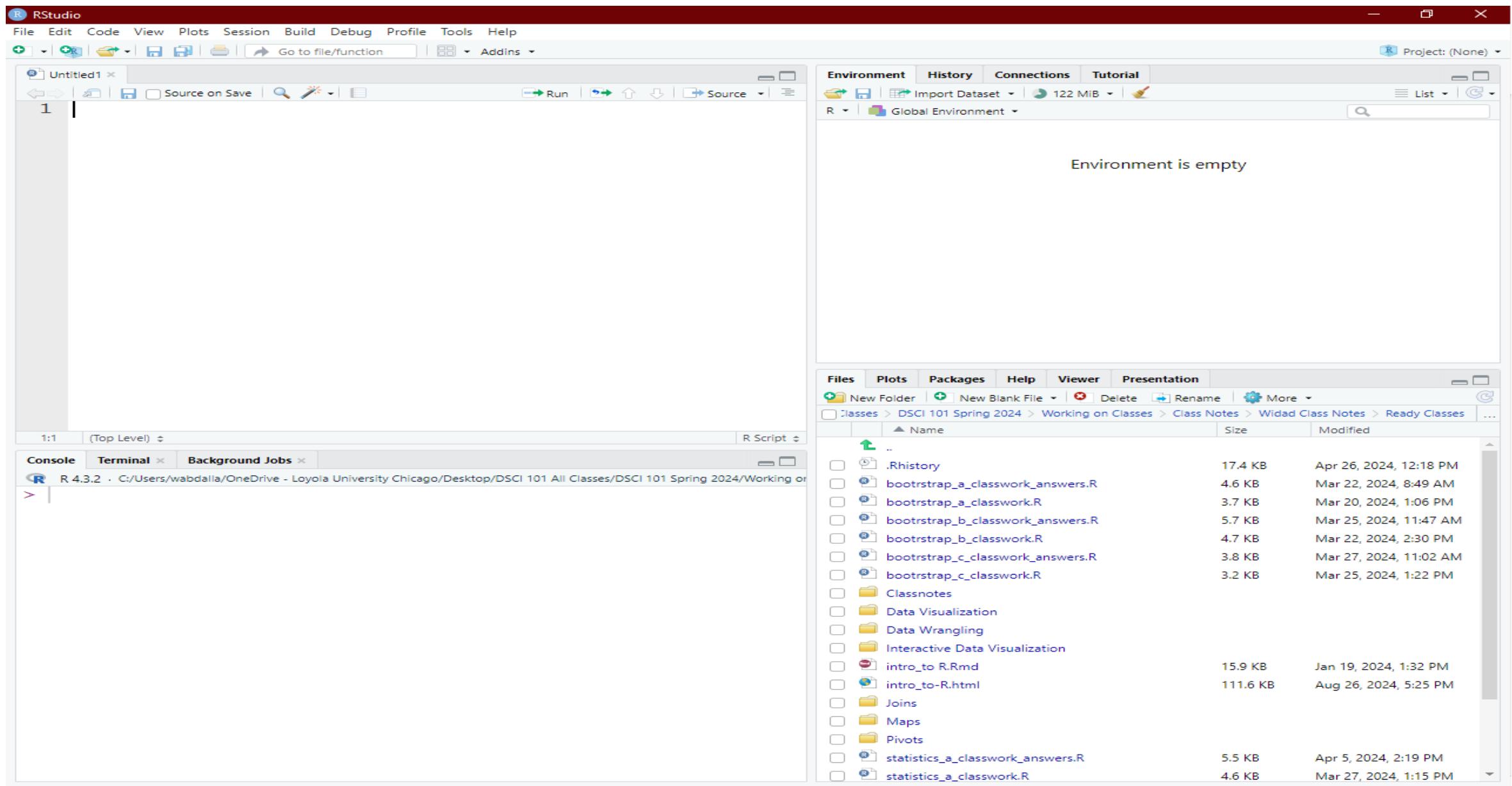


Coding Basics

Part 1

R & RStudio - Basic Components



Untitled1

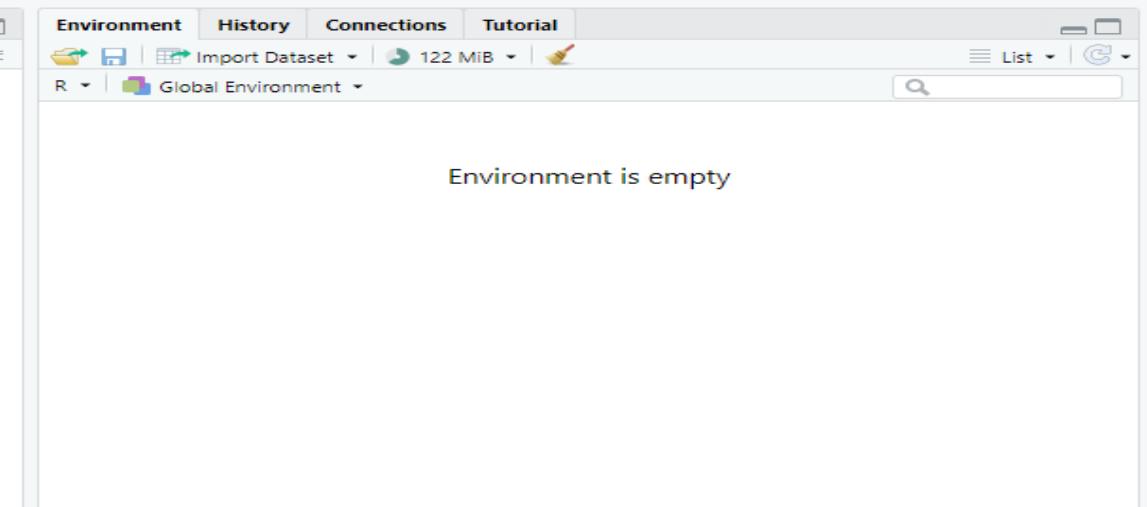
Source on Save Run Source

1

1:1 (Top Level) R Script

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 or



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
..	.Rhistory	17.4 KB	Apr 26, 2024, 12:18 PM
	bootstrap_a_classwork_answers.R	4.6 KB	Mar 22, 2024, 8:49 AM
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	statistics_a_classwork_answers.R	5.5 KB	Apr 5, 2024, 2:19 PM
	statistics_a_classwork.R	4.6 KB	Mar 27, 2024, 1:15 PM

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.



Untitled1

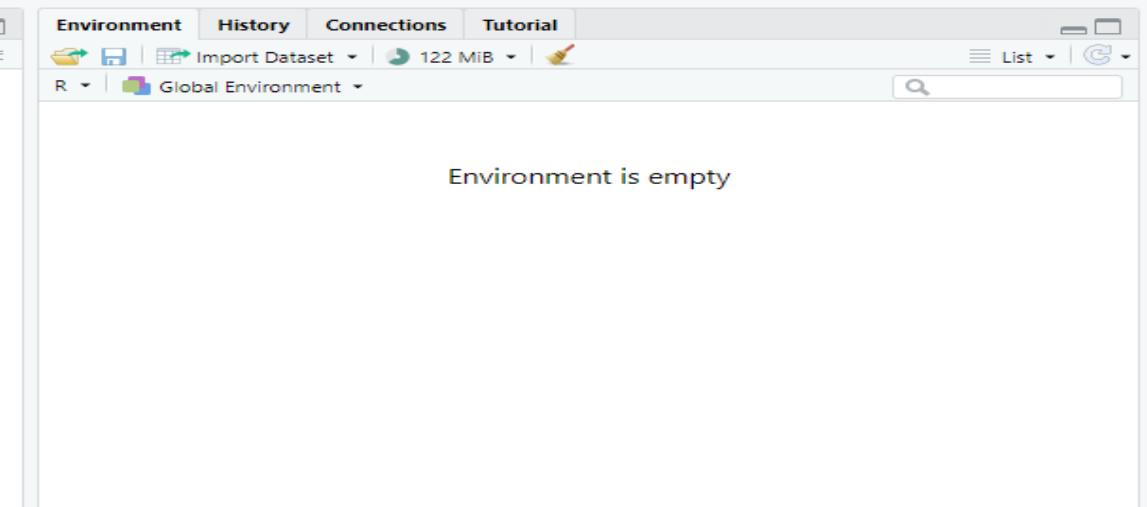
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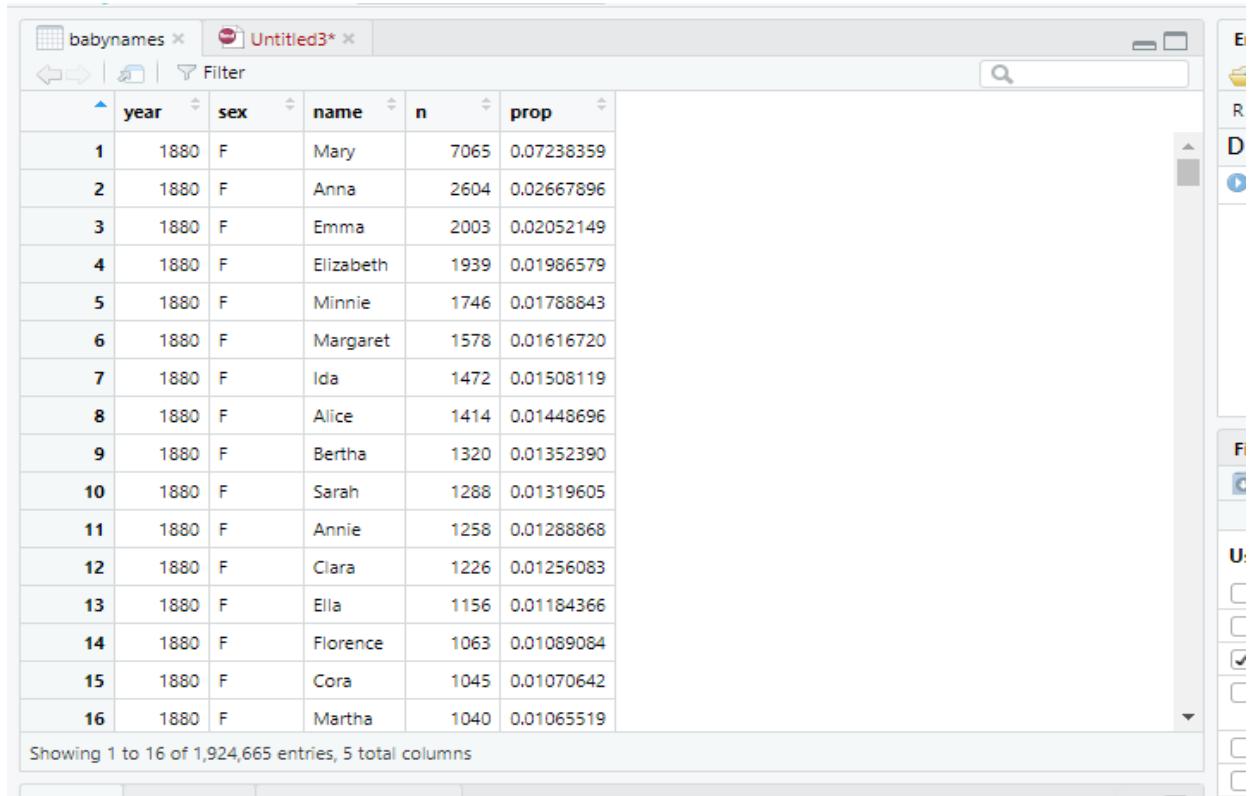
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Source Window

- 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.

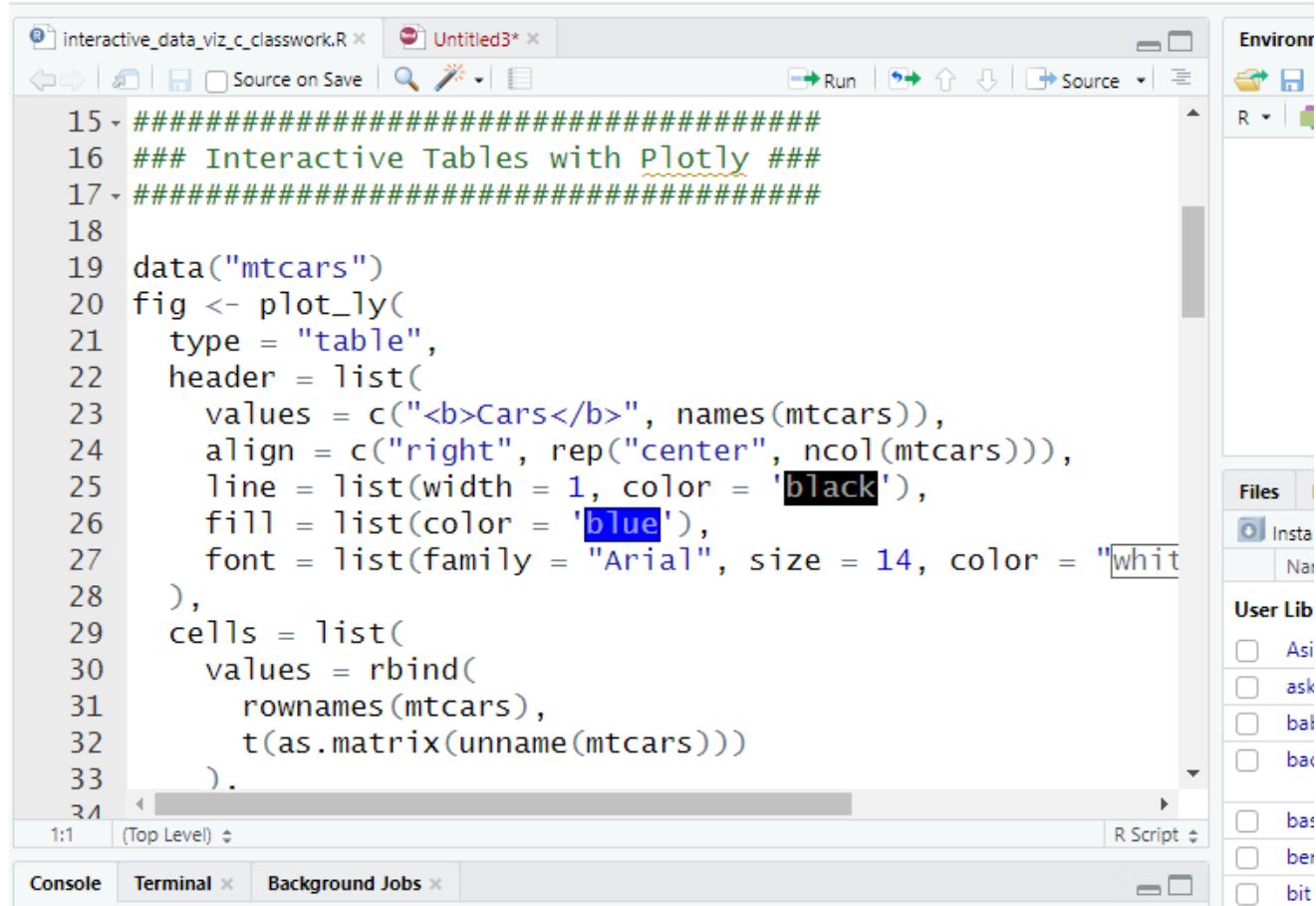


The screenshot shows a Jupyter Notebook interface with a data preview in the Source window. The title bar says "babynames x Untitled3*". The preview table has columns: year, sex, name, n, and prop. The data shows the most popular female names in 1880, with Mary being the top name. The bottom of the preview shows "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

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- “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.
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The screenshot shows the RStudio interface with the Source window active. The code in the window is:

```
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 code uses the `plot_ly` function from the `plotly` package to create an interactive table from the `mtcars` dataset. The table has a header row with bolded column names and a body row with the row names of the dataset.

Untitled1

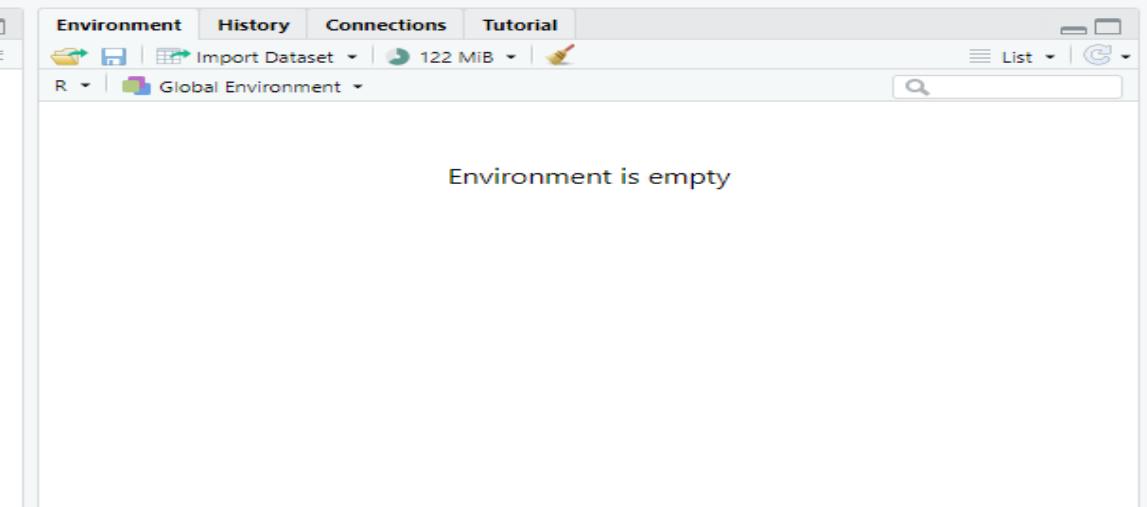
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Files Plots Packages Help Viewer Presentation

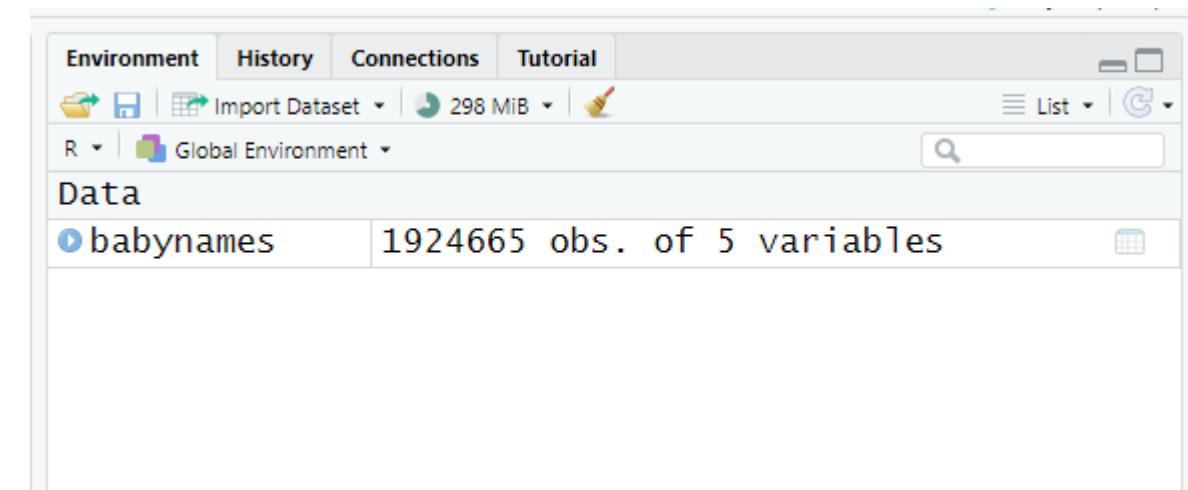
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Environment/History/Connections/Tutorial Window

- 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.



Untitled1

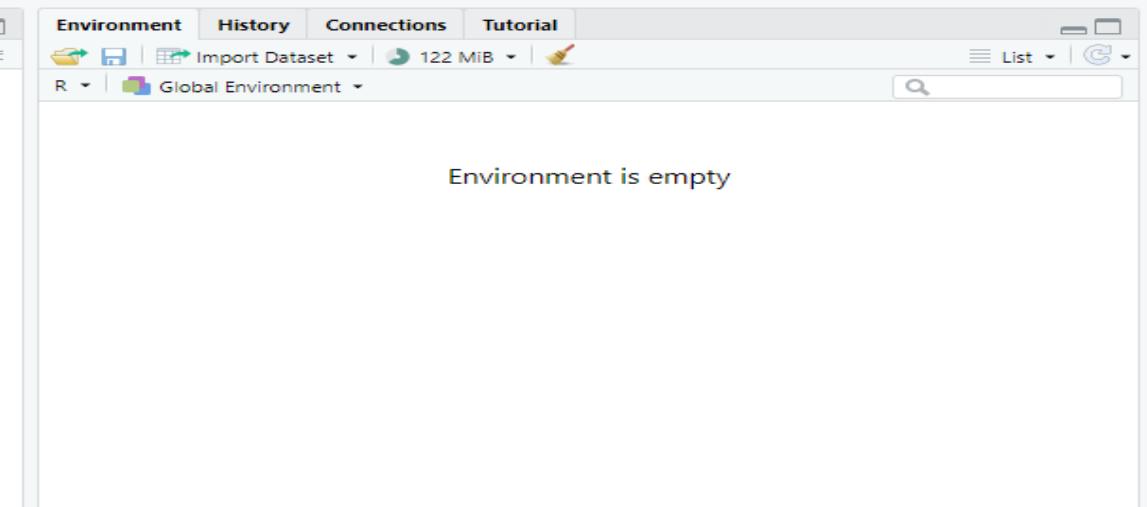
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Files Plots Packages Help Viewer Presentation

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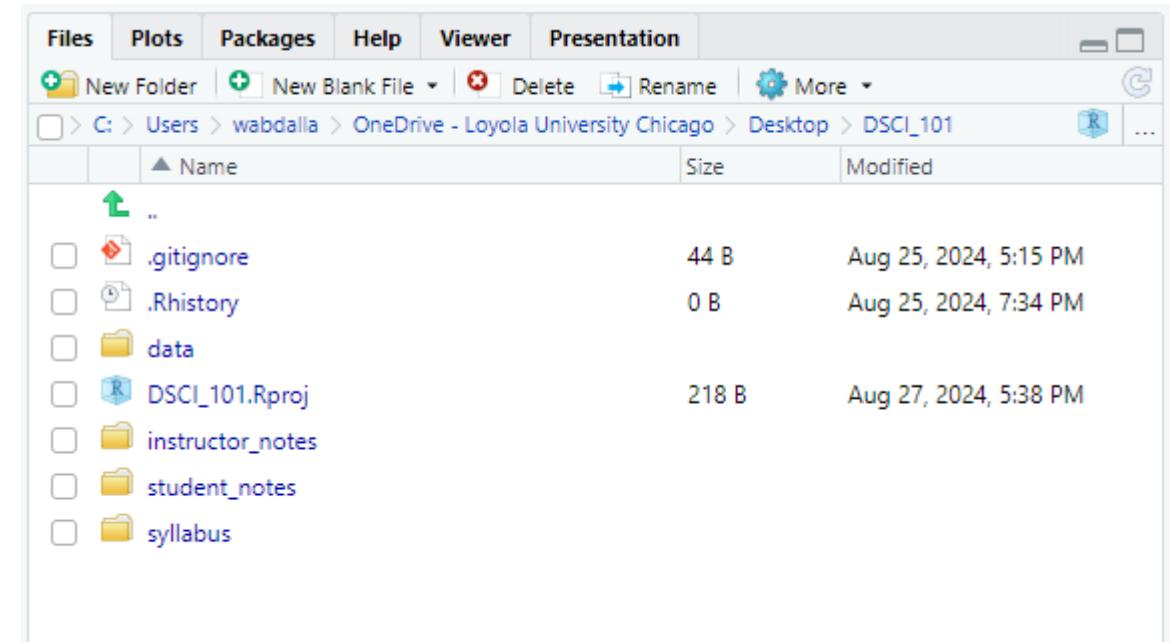
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Files/Plots/Packages/Help/Viewer Window

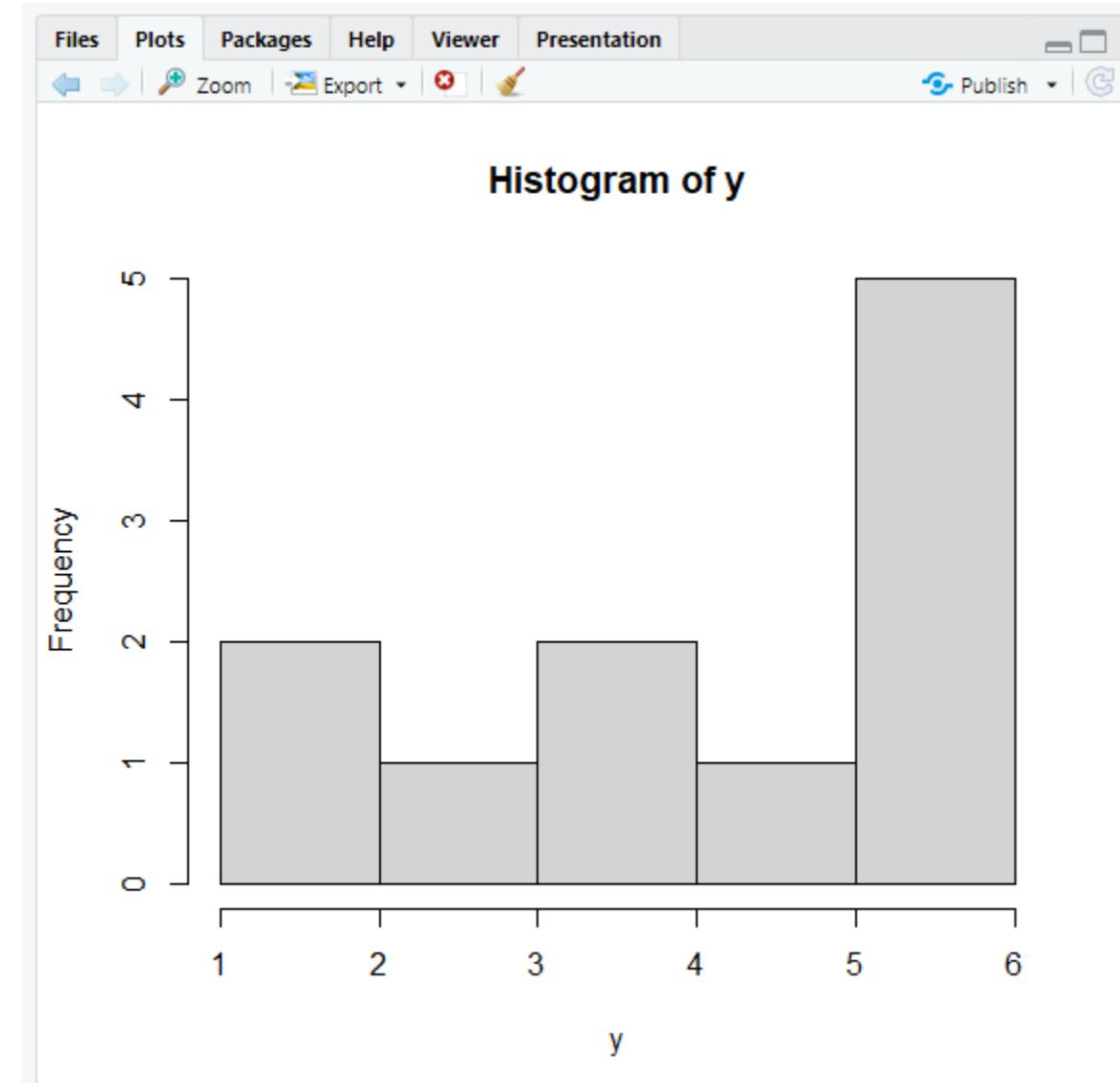
- Located in the bottom-right.
- It consists of five essential panes:

✓ *Files pane*: lists all the files and folders in your root directory.



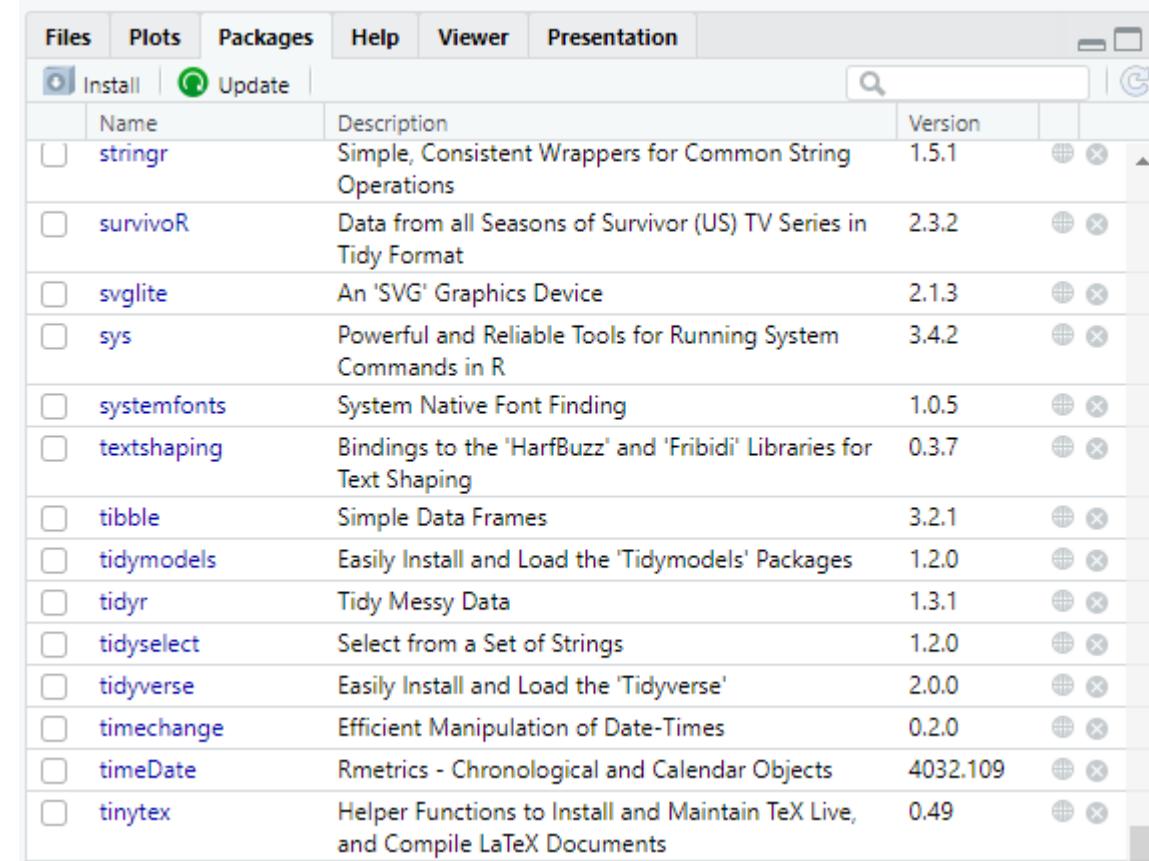
✓ ***Plots pane:*** This pane is exclusively designed to show you any plots you have created using R.

- 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.

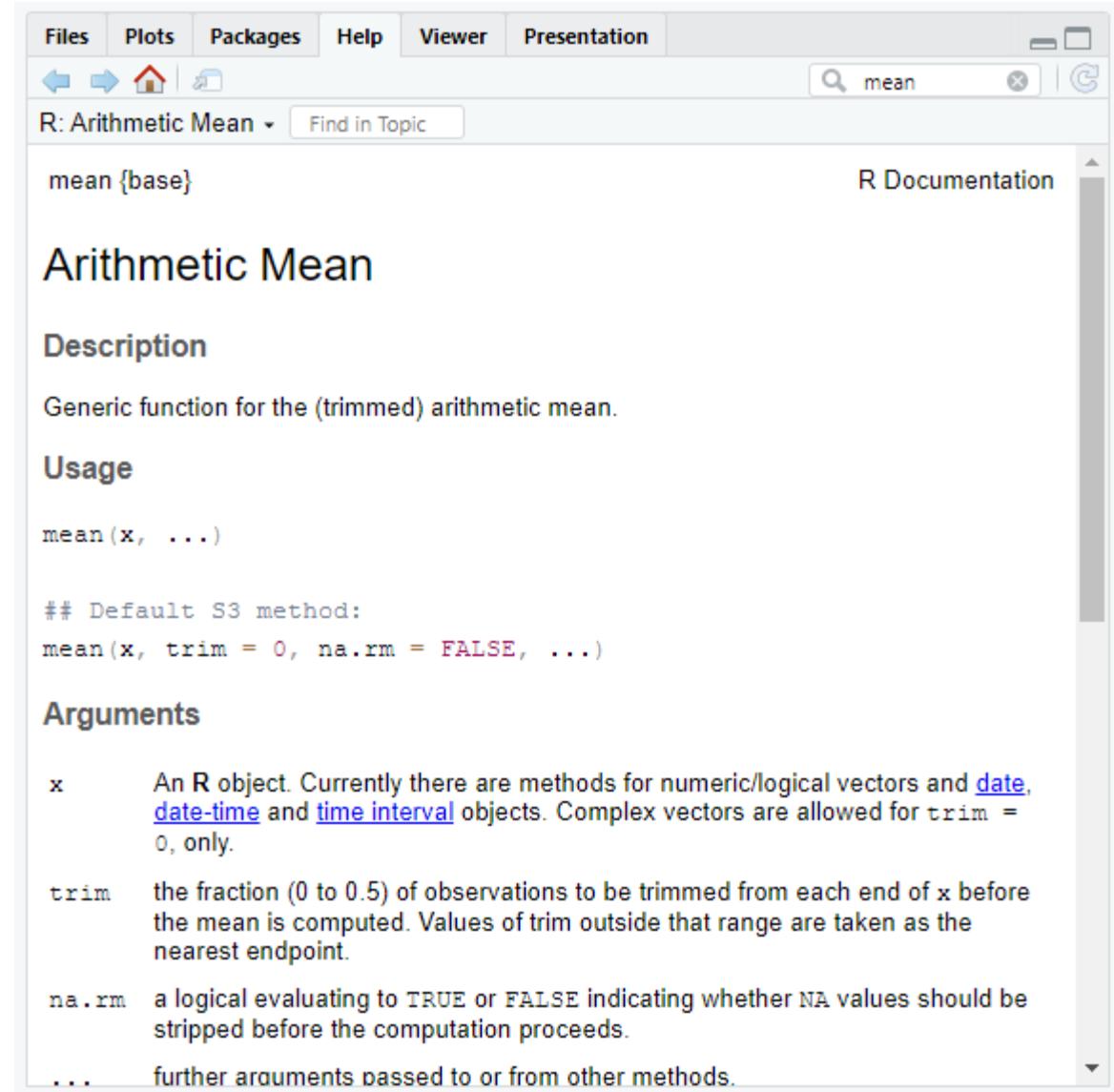
- A frequent analogy people use to explain packages is your phone and the apps you install. Each package you download is equivalent to an app on your phone.
- It can enhance different aspects of working in R, such as creating animated plots, or simply making your life easier by doing multiple computations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



The screenshot shows the RStudio interface with the 'Packages' tab selected in the top navigation bar. Below the tabs, there are two buttons: 'Install' and 'Update'. The main area is a table listing various R packages. The columns in the table are 'Name', 'Description', and 'Version'. Each row contains a checkbox, the package name, its description, and its current version. To the right of each row are three small circular icons with symbols: a globe, a checkmark, and a cross.

	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"/>	tidyverse	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: