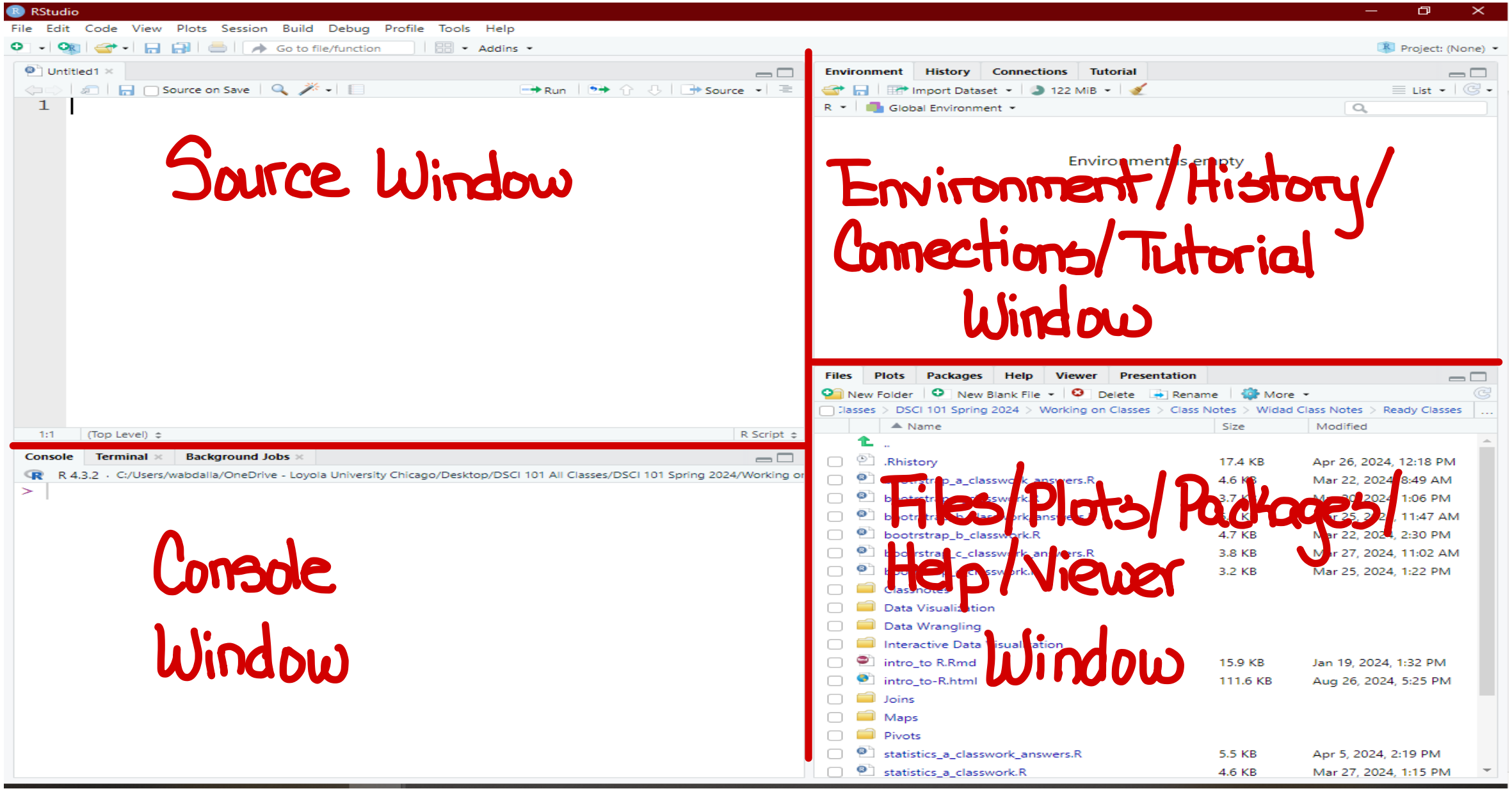
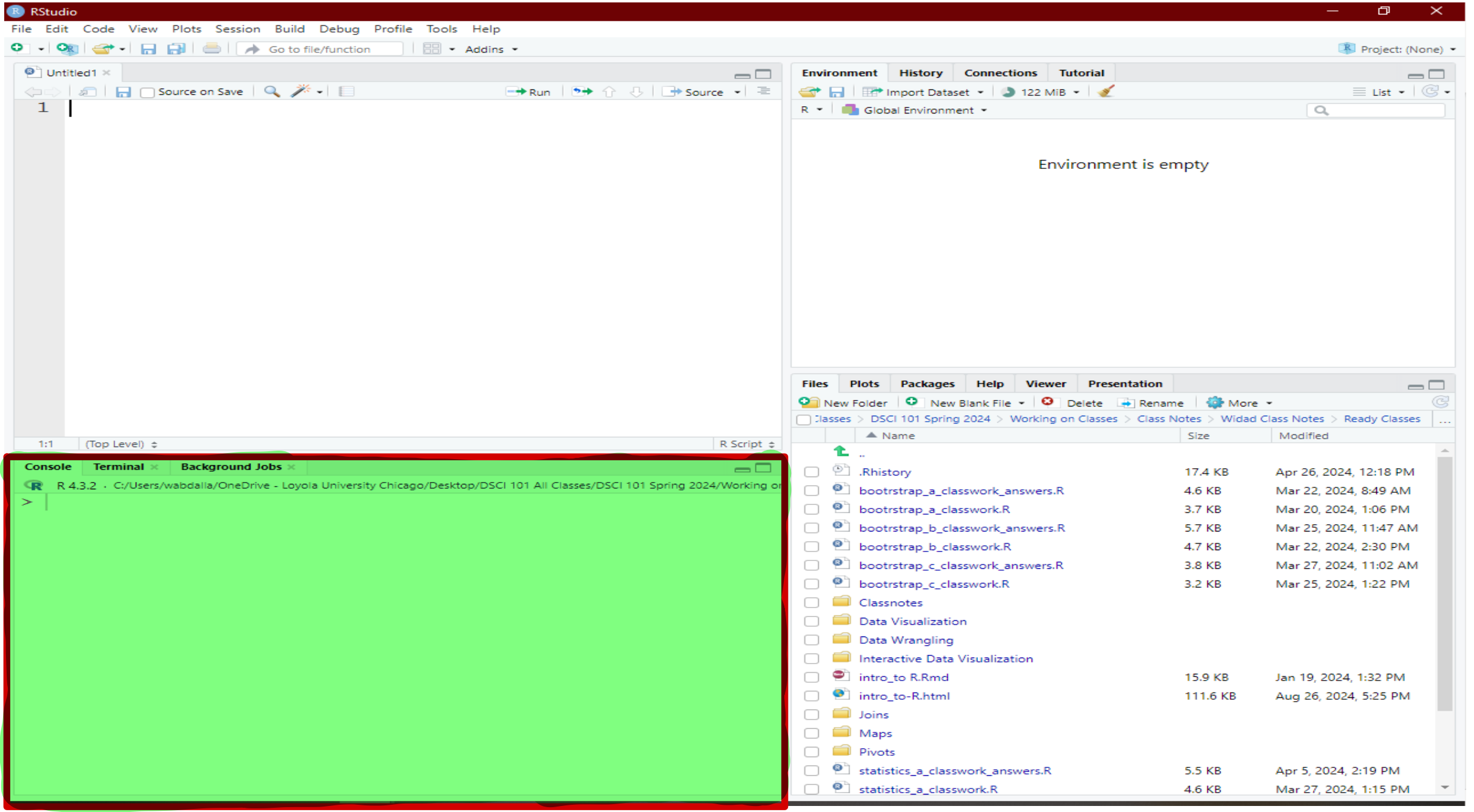
# Coding Basics
# Part 1

# R & RStudio - Basic Components

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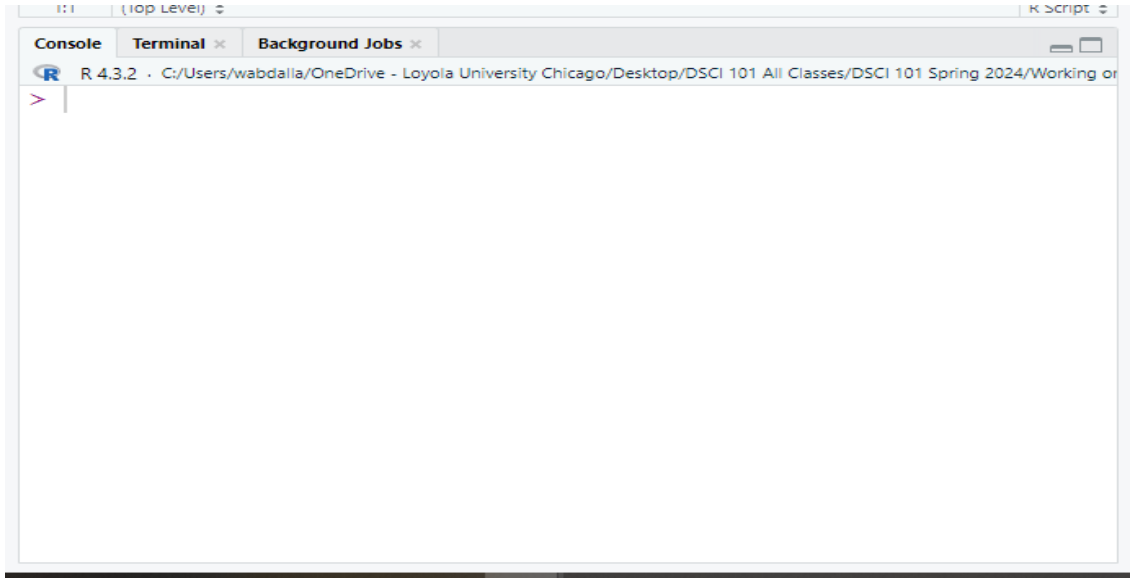
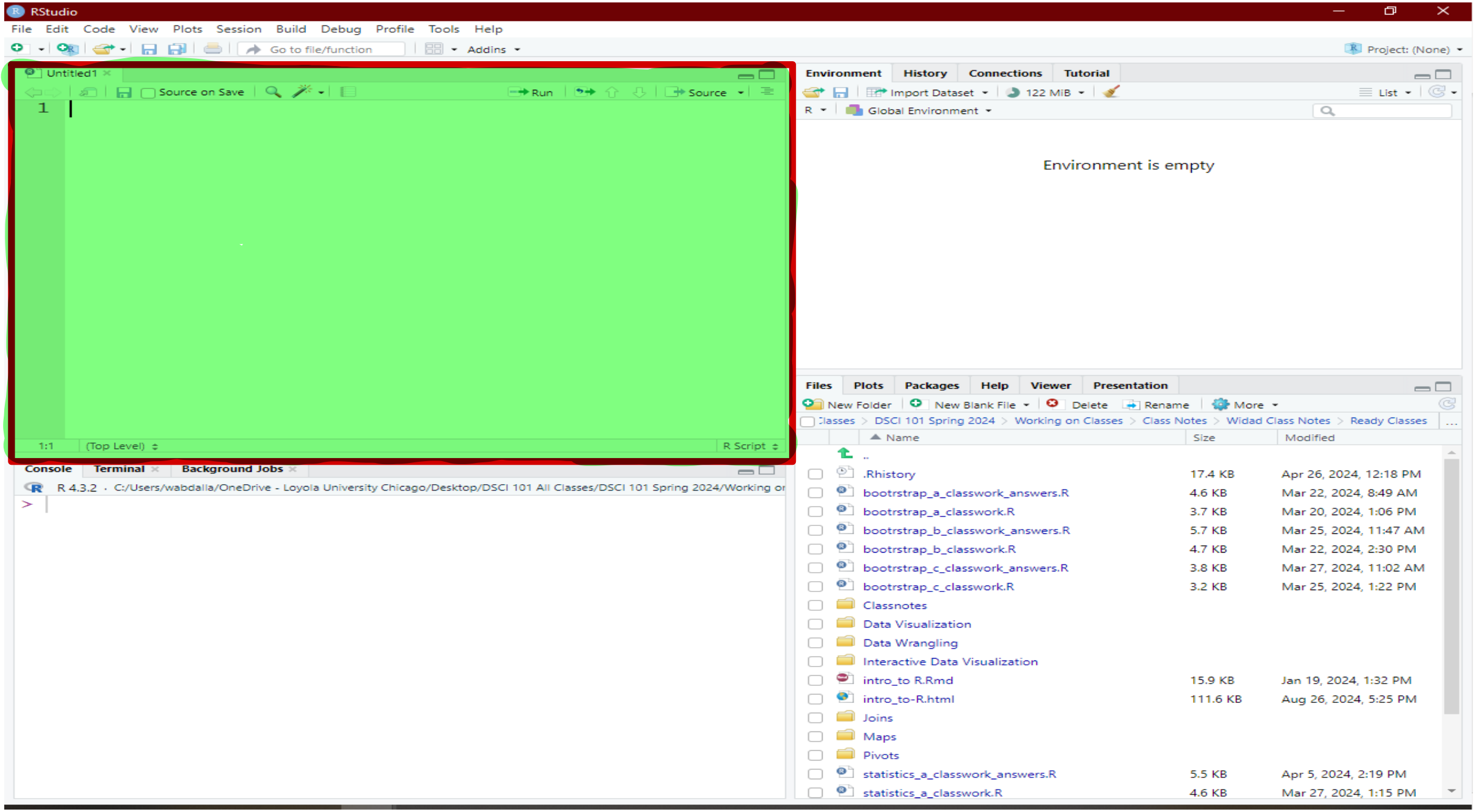
# Console Window

- 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.

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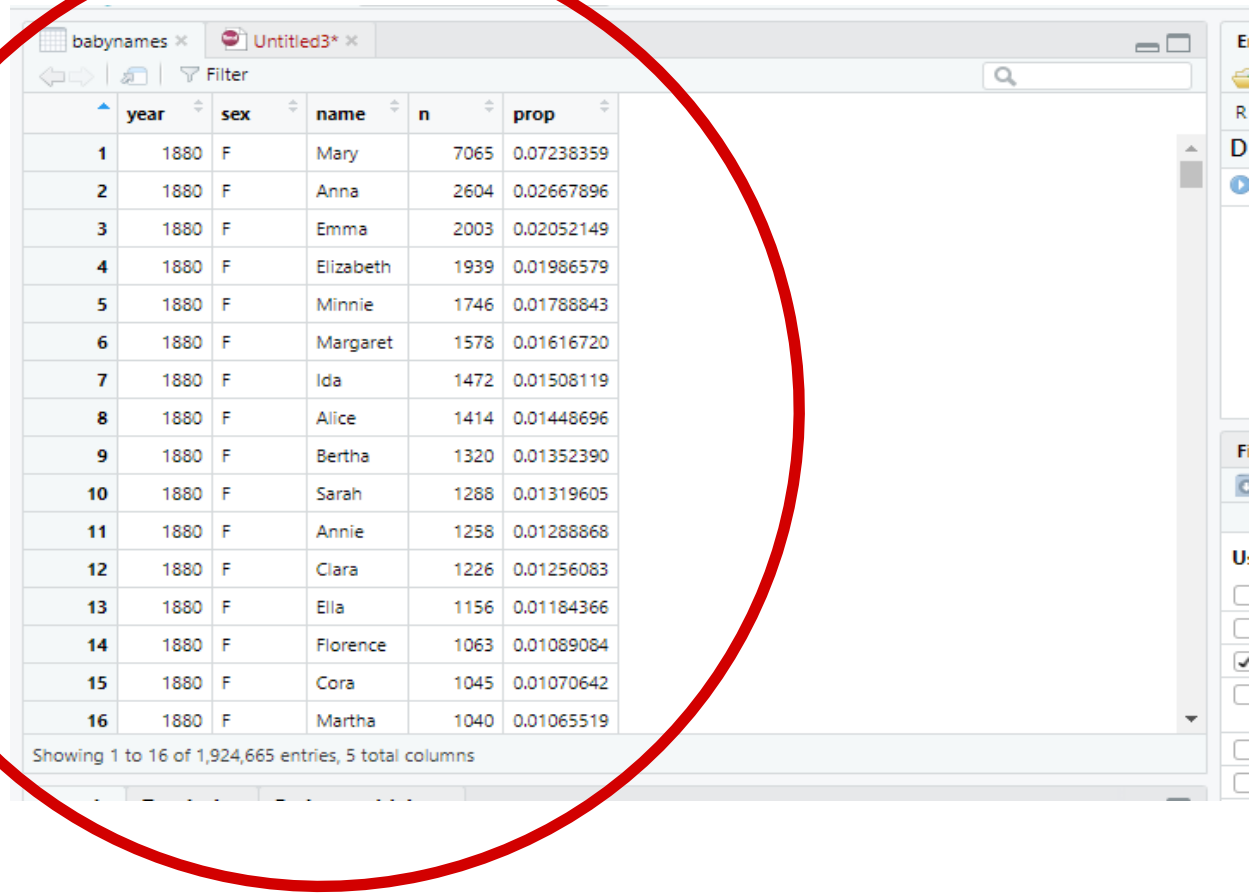
## Source Window

- 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.

that's how data will look like




| | 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 |

Showing 1 to 16 of 1,924,665 entries, 5 total columns

## Source Window

This is how your code will look like

- Located in the top left.
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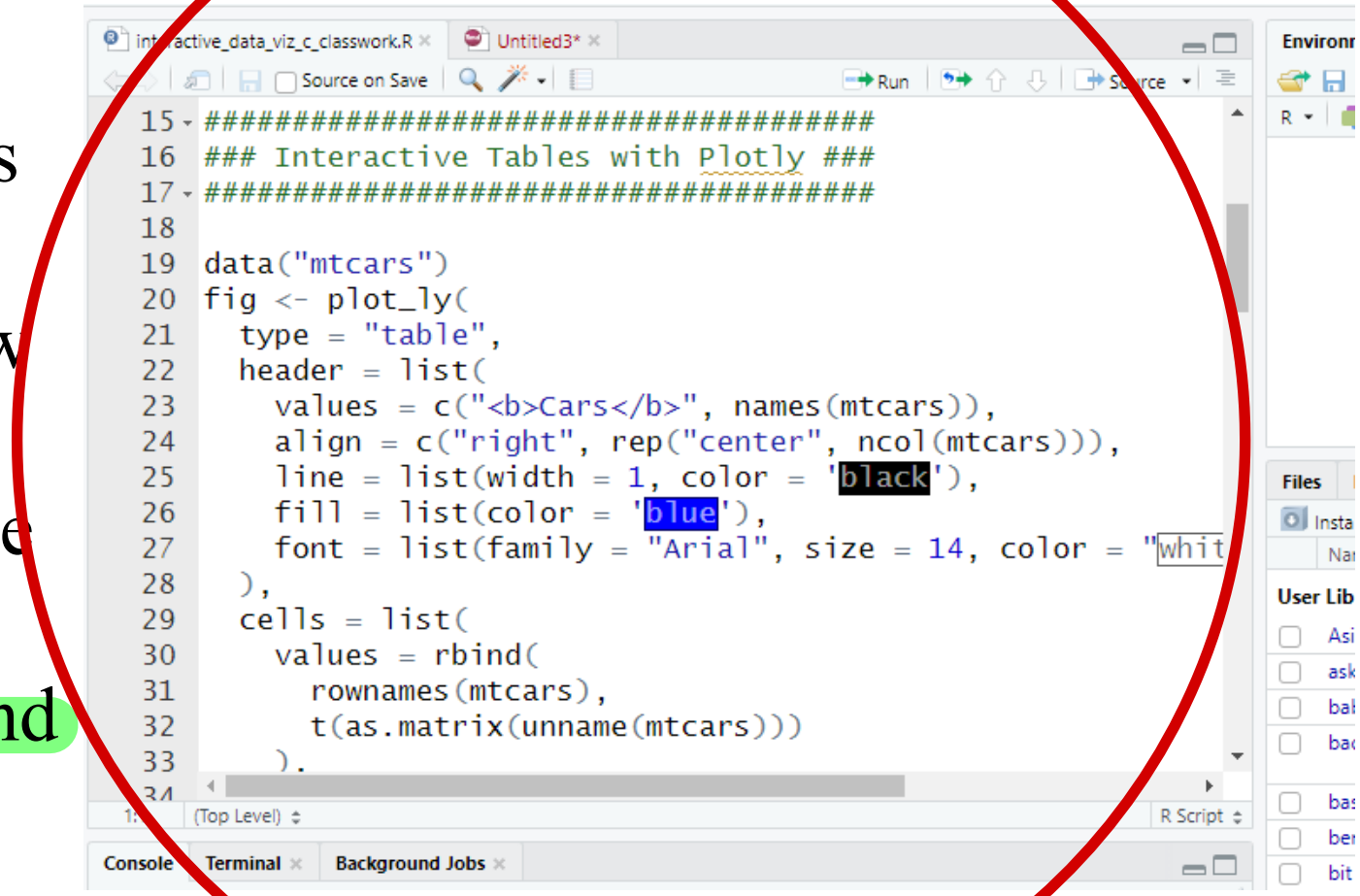

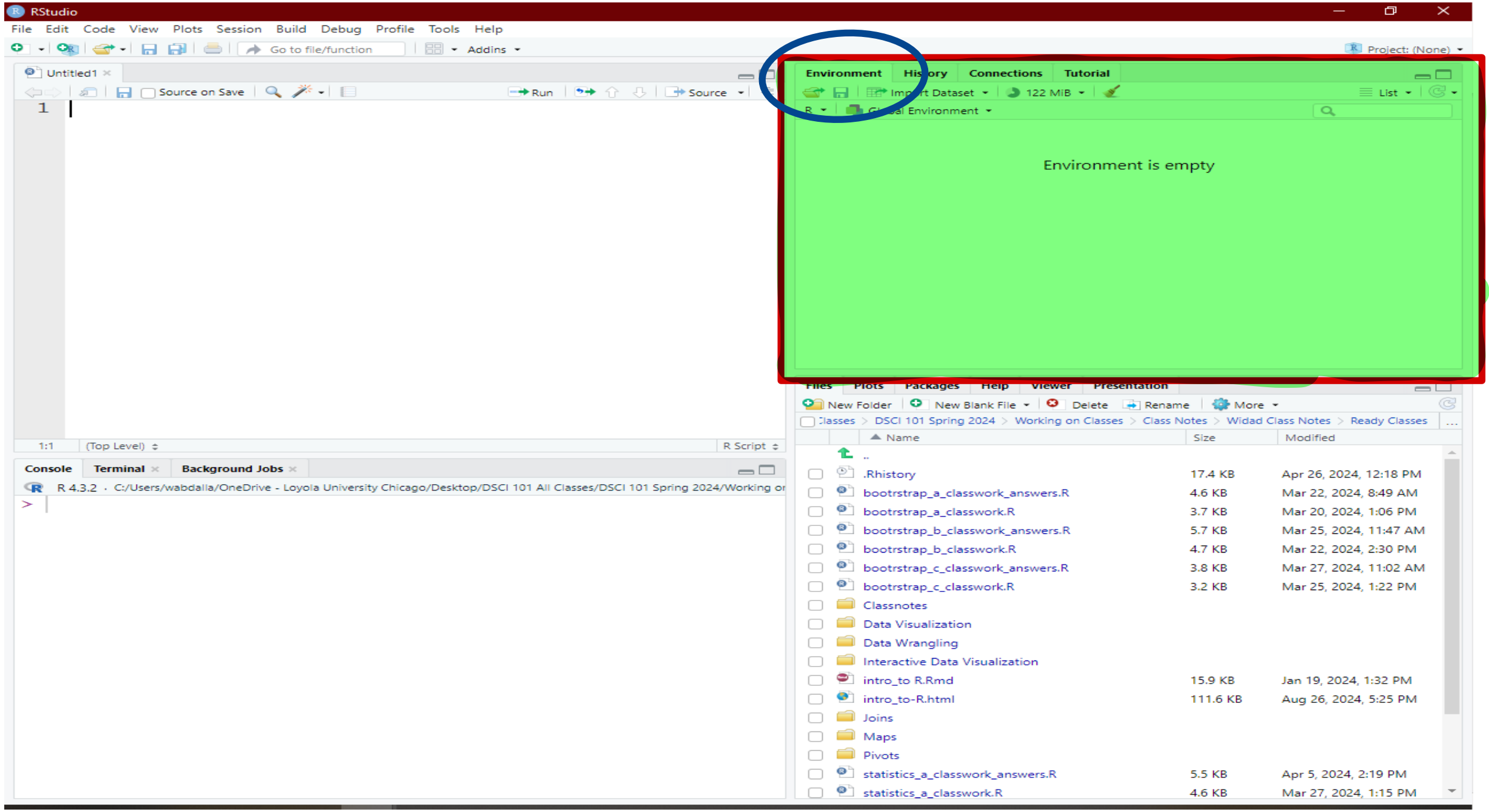
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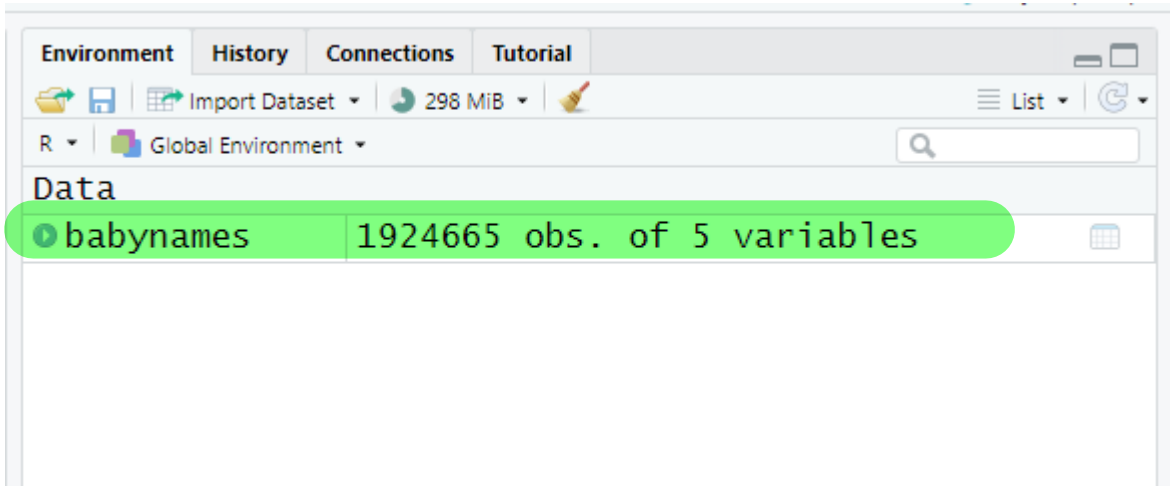
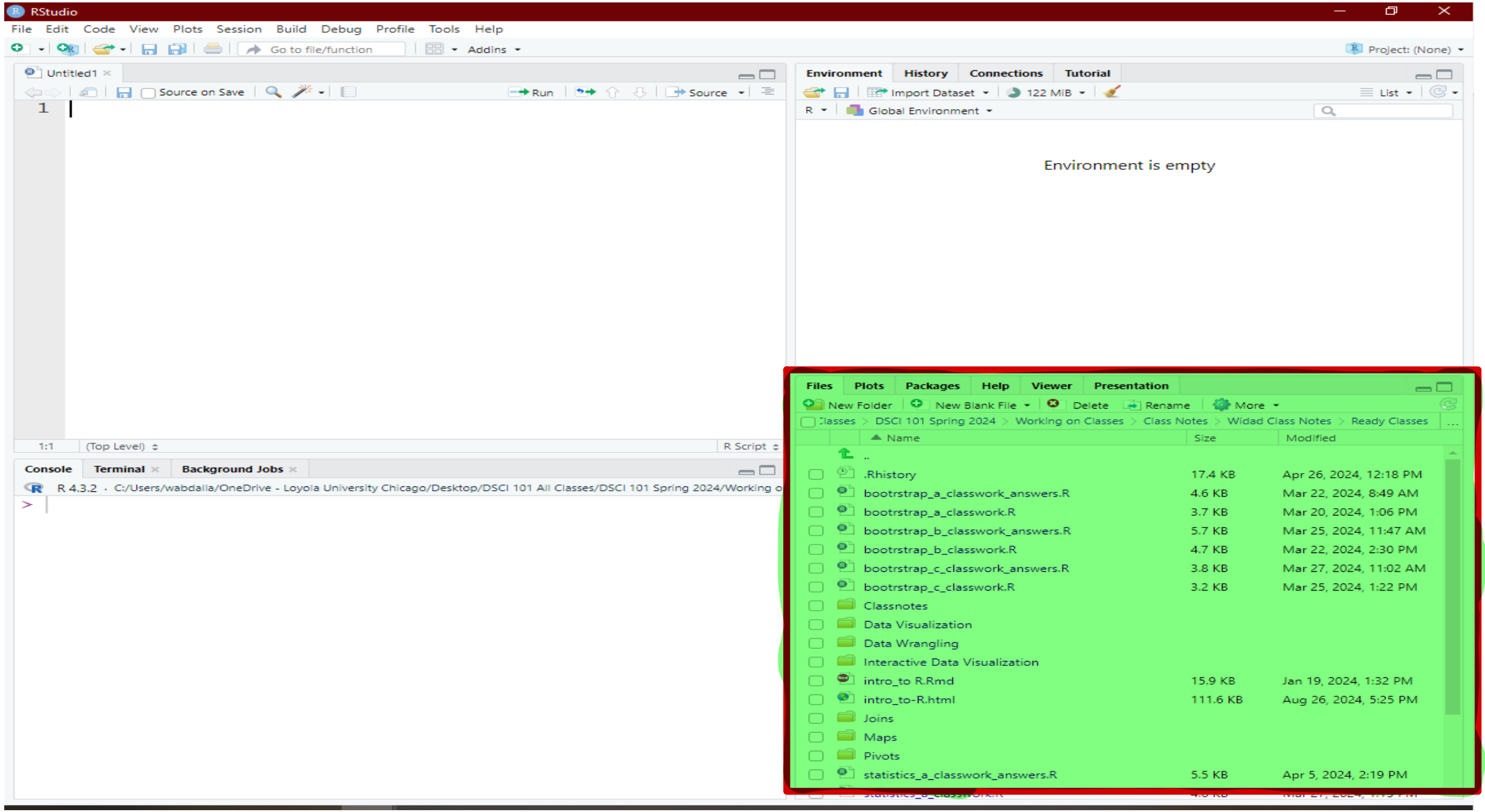
# Environment/History/Connections/Tutorial Window

- 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.

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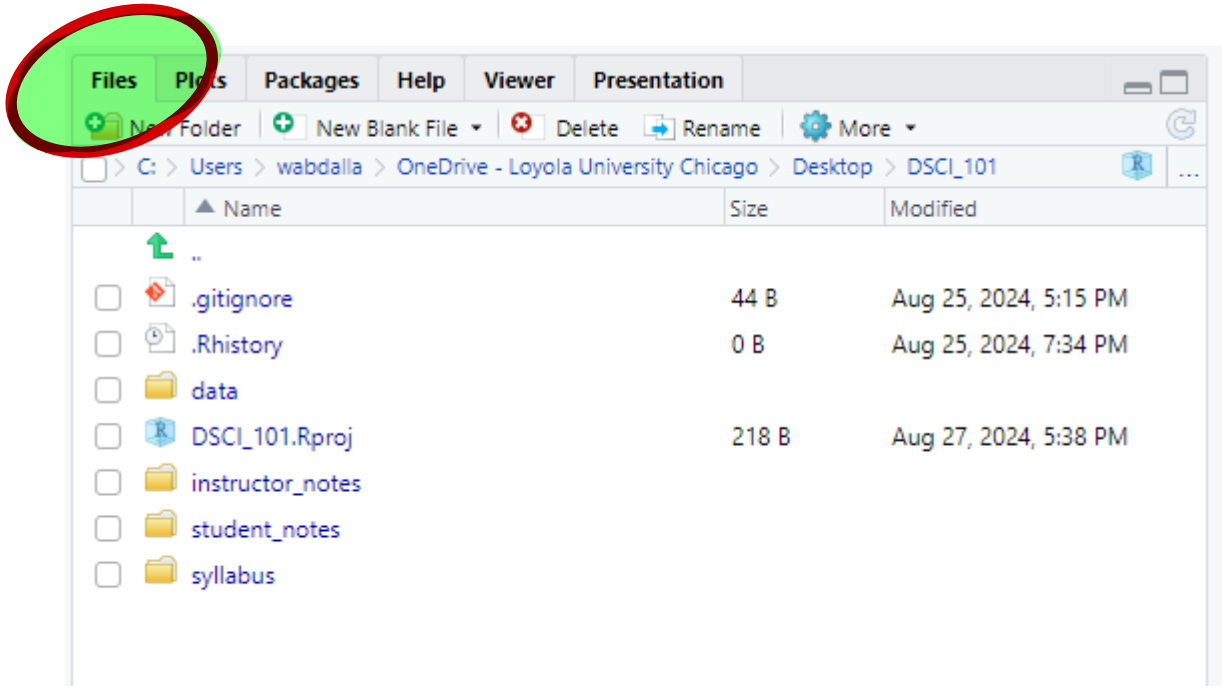
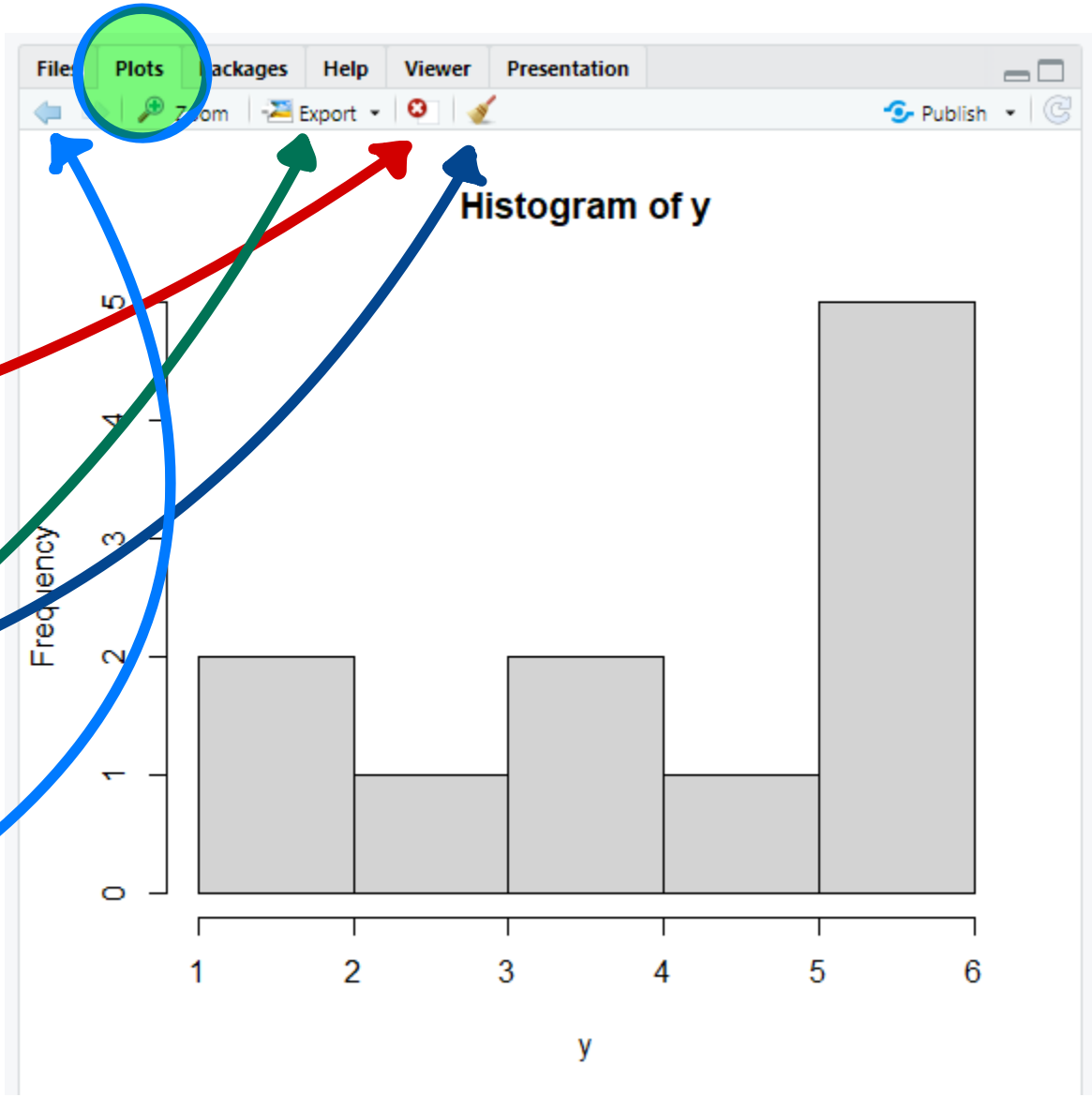
# Files/Plots/Packages/Help/Viewer Window

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

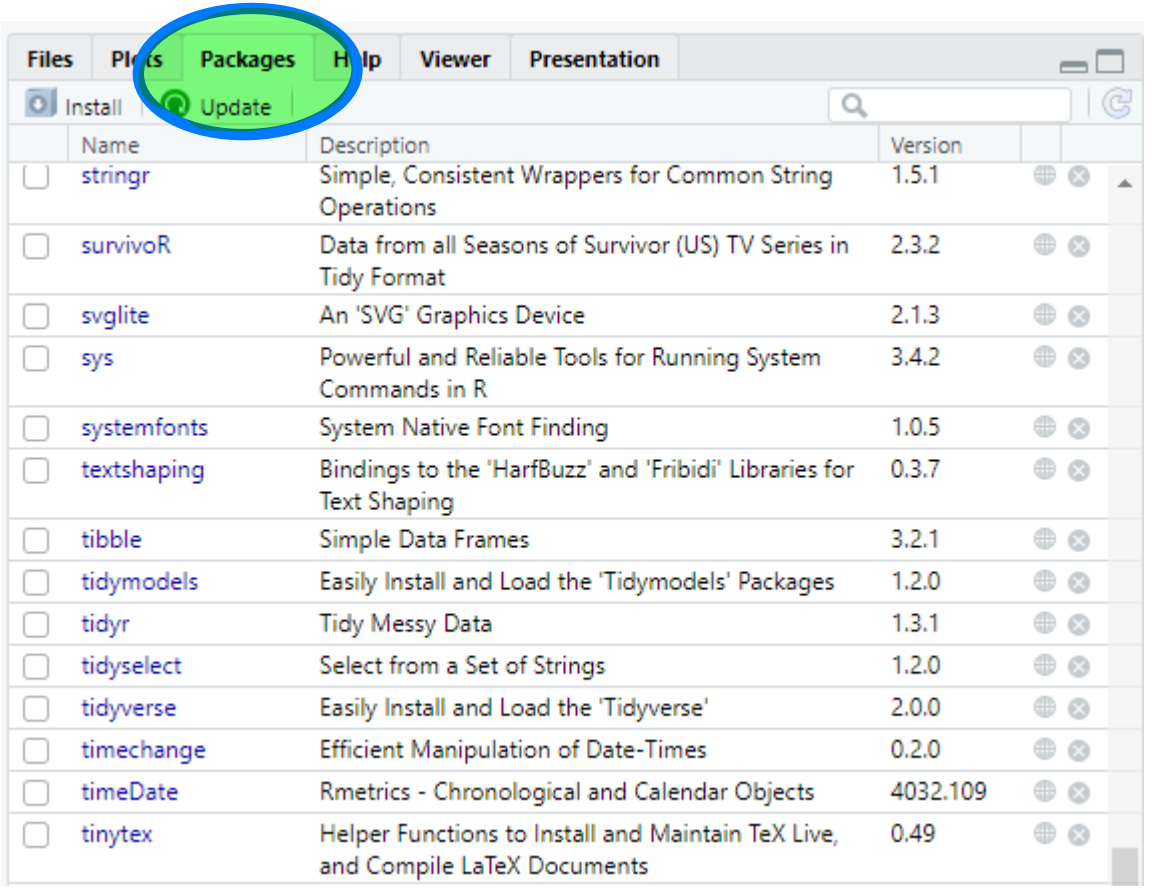
✓ ***Files pane:*** lists all the files and folders in your root directory.



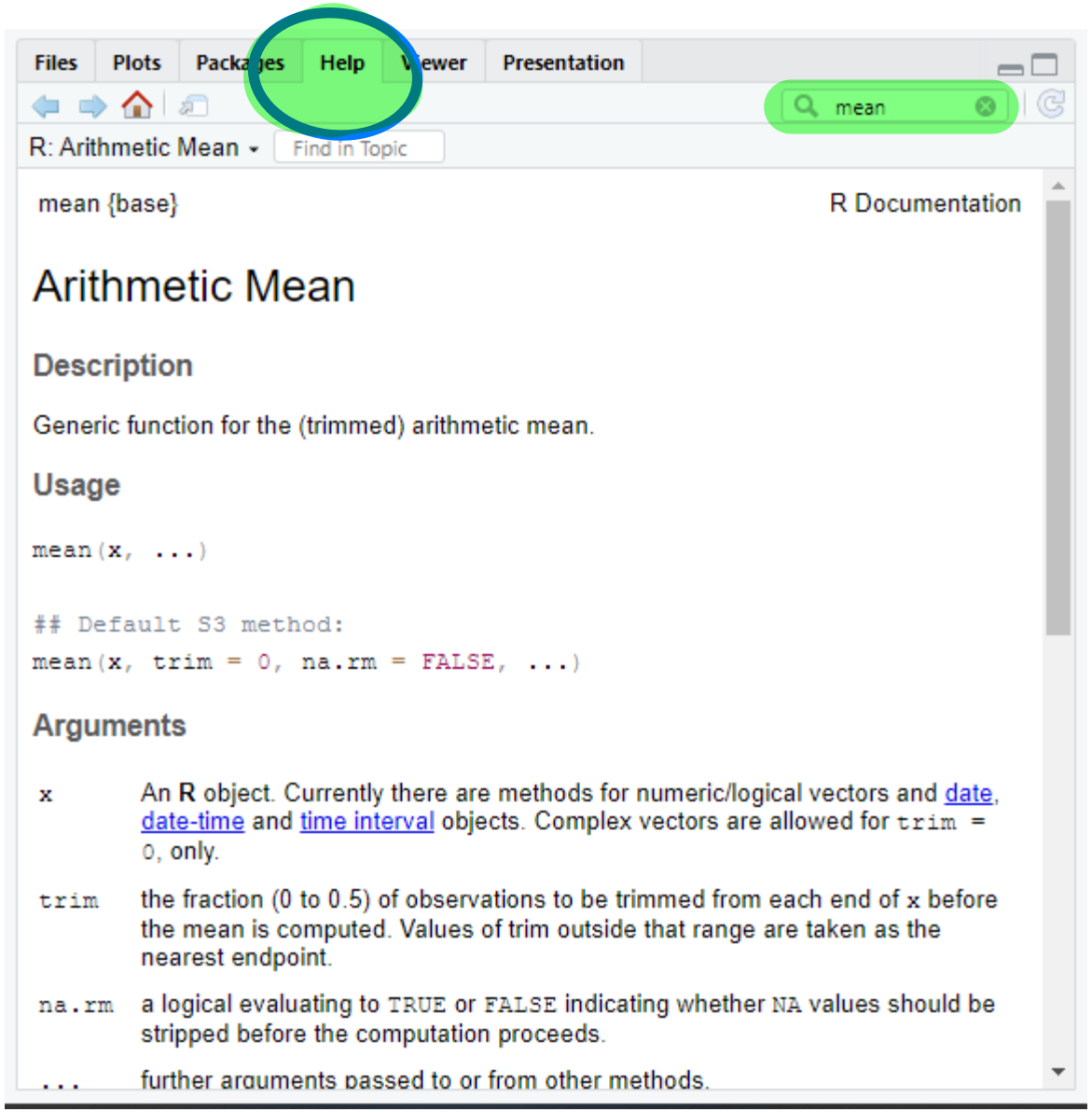
- ✓ ***Plots pane:*** This pane is exclusively designed to show you any plots you have created using R.
  - To delete a plot, you can click on the red circle with a white x symbol.
  - To remove all plots, you can use the broom.
  - There are options to export your plot and move back and forth between 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.



- ✓ ***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: `install.packages("name of package here")`

Example: `install.packages("mdsr")`

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

code: `library(mdsr)`

# 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: `x <- c(4,1,3,8,6,7,5,3,0,9)`

This one has a pattern, so you can define it in two different ways.

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

Code:

```
y<- c(1,2,3,4,5,6,7,8,9,10)
y<- 1:10
```

long way

shorter way

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

use quotation because there are letters

Code:

```
z<- c("x.1", "x 2", "x 3", "x.4", "x.5")
z<-paste("x", 1:5, sep=".")
```

long way

command that means separated by

. **Matrices**

Examples:

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

code:

```
S<- matrix( c(4,6,7,8,9,10), ncol=2,
            byrow=TRUE)
```

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

code:

```
W2- matrix(1:9, ncol=3, byrow=TRUE)
```

play around with these commands by changing different values like byrow= FALSE

See what happens!