Getting Started

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Introduction to R Programming

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R vs Rstudio

- R is a programming language and free software environment for statistical computing and graphics.
- RStudio is an integrated development environment (IDE) for R.
- R and Rstudio are not two different versions of the same thing.
- You can use R without using RStudio, but you can't use Rstudio without using R.

This is How R Looks Like

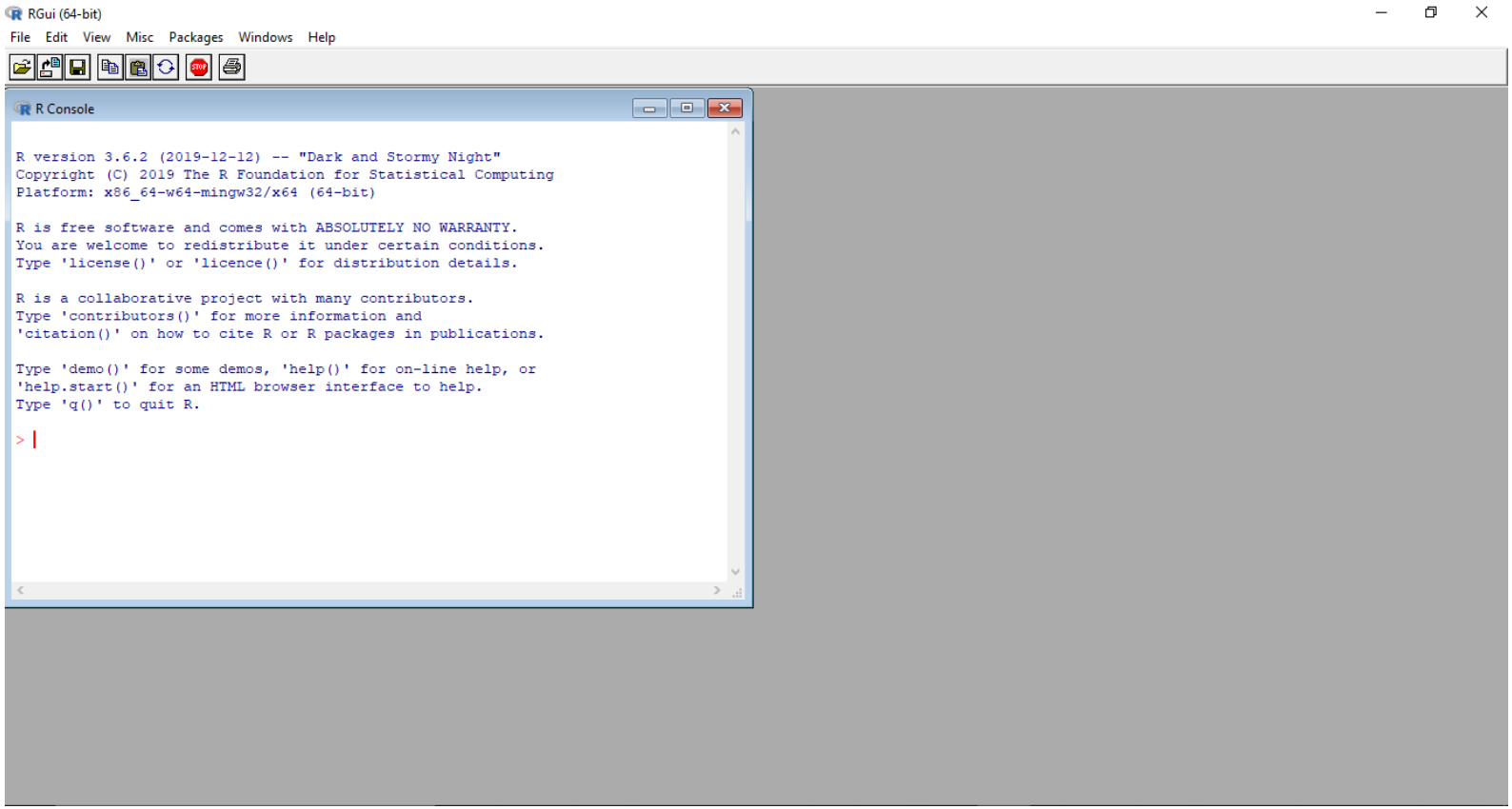


Figure 1: R console on windows

This is How R Looks Like

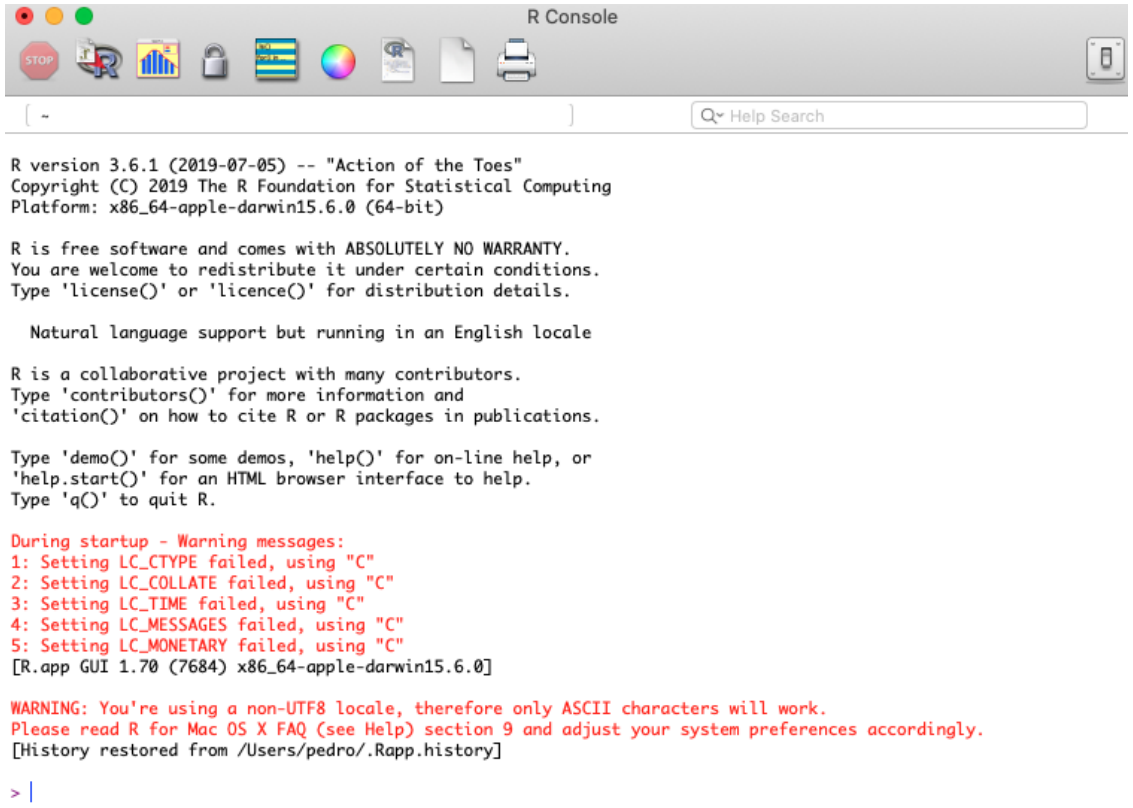


Figure 2: R console on MacOS

This is How R Looks Like

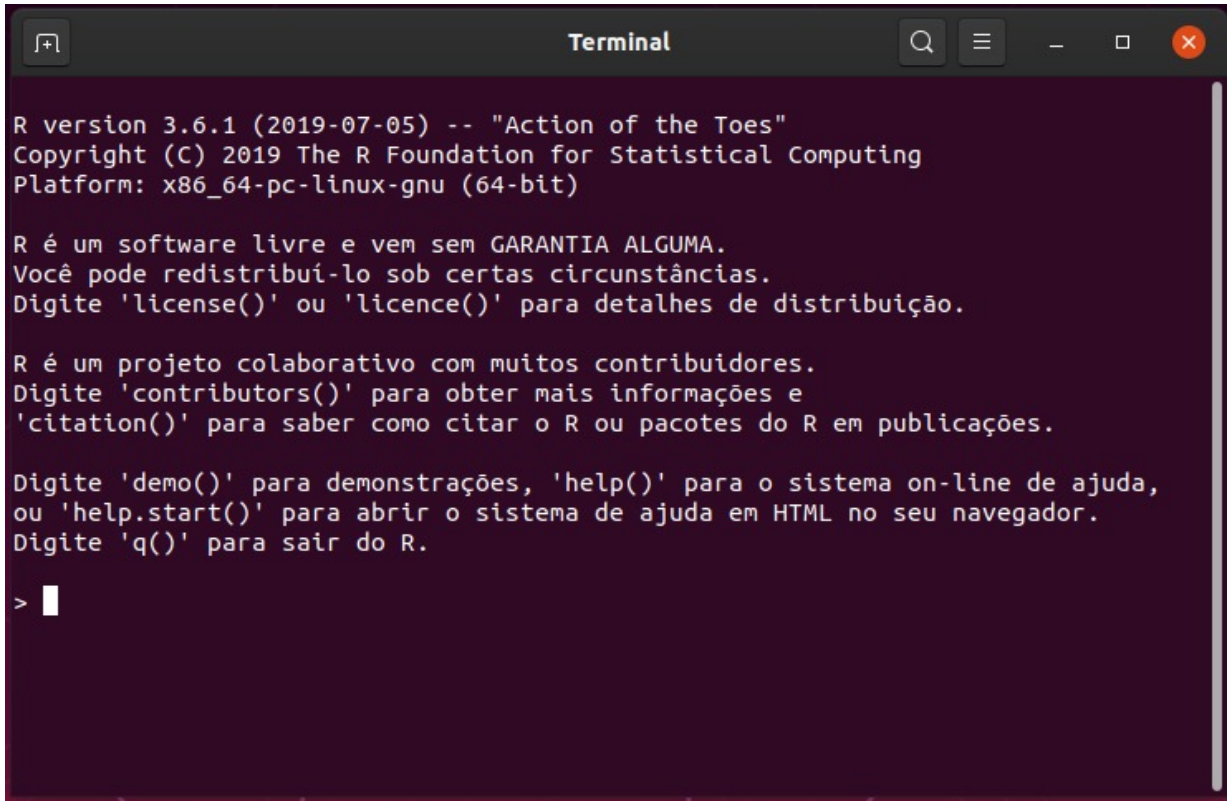


Figure 3: R console on Linux

This is How Rstudio Looks Like

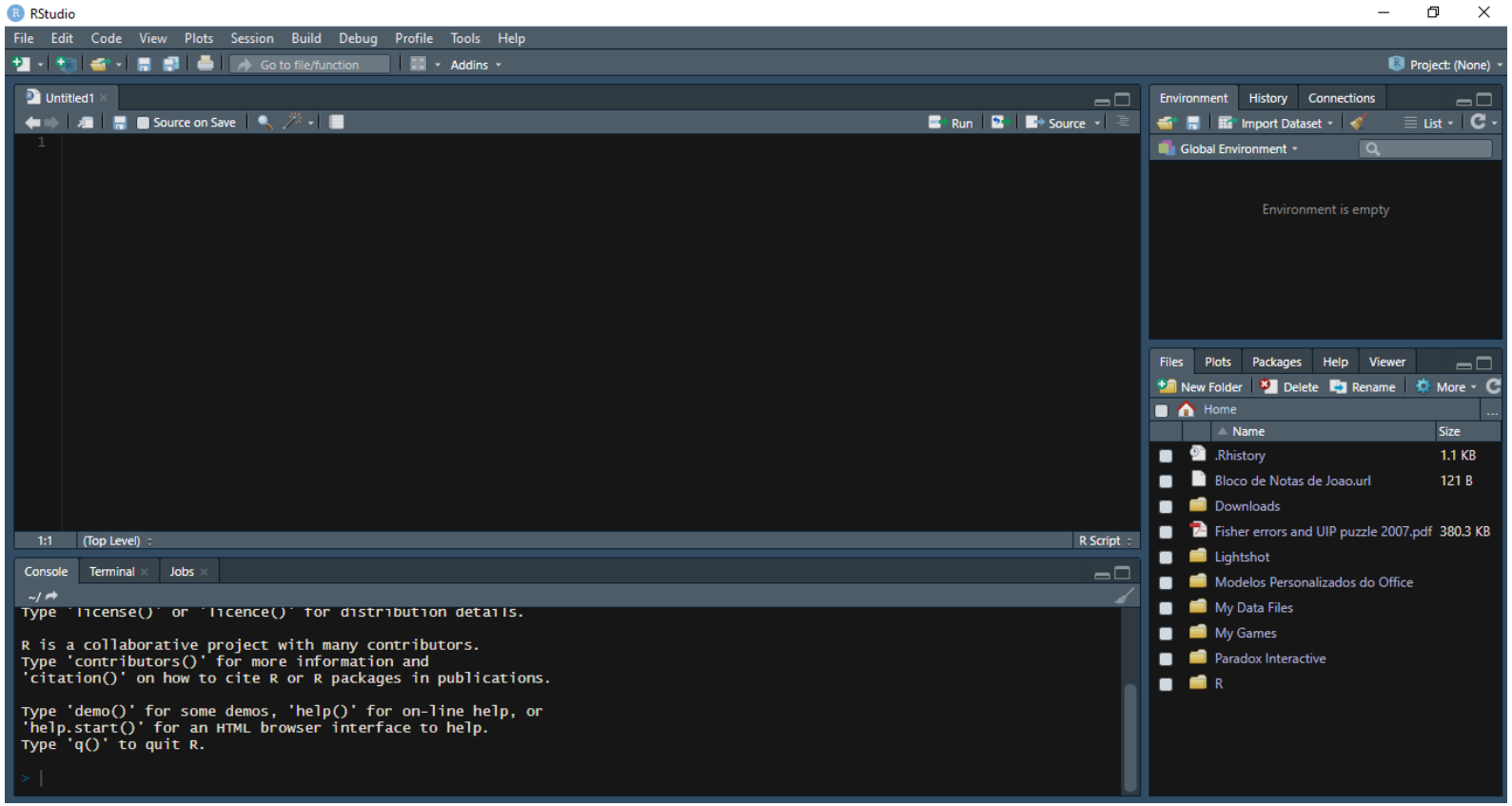


Figure 4: Rstudio on Windows and Linux

This is How Rstudio Looks Like

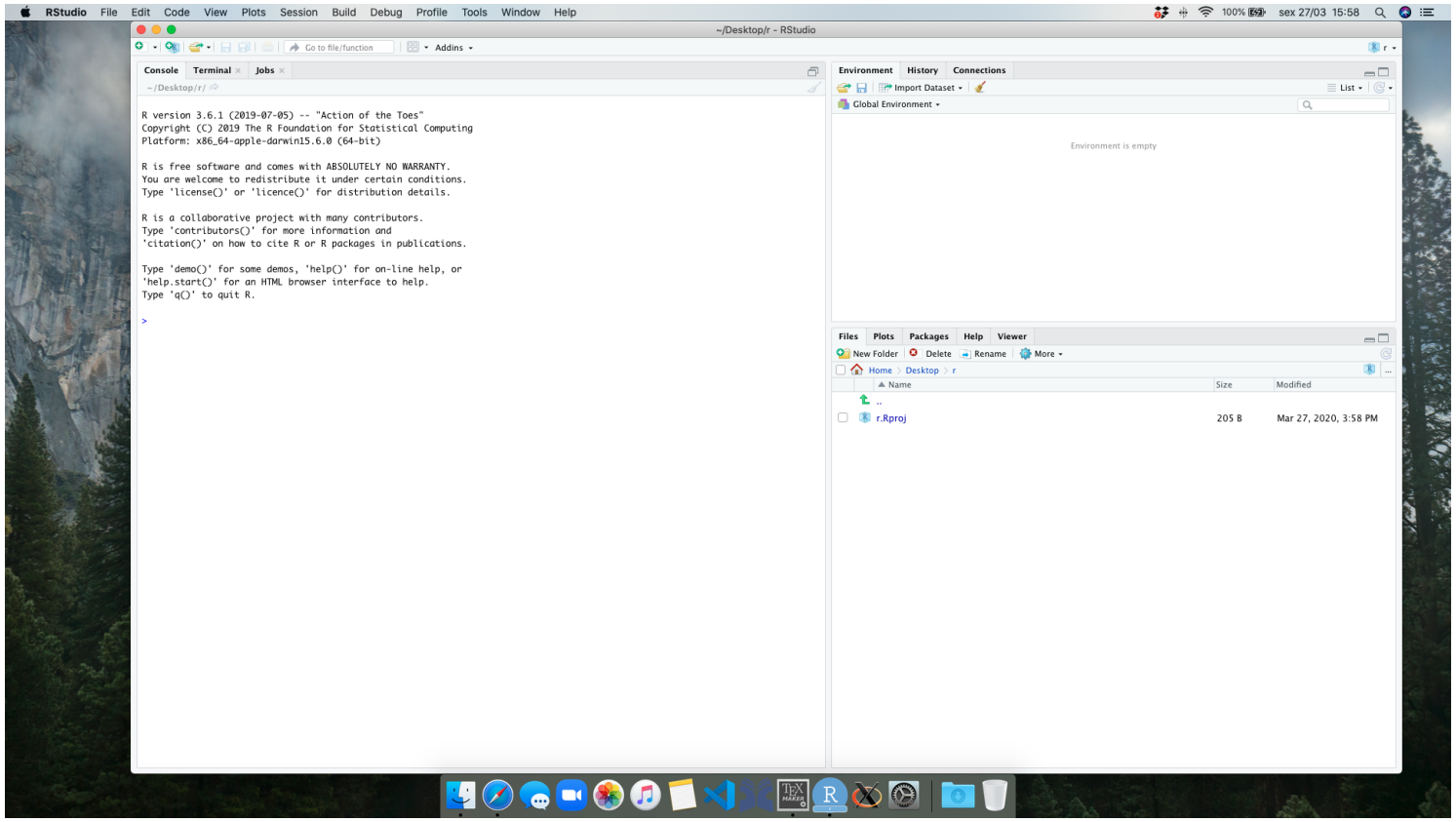


Figure 5: Rstudio on MacOS

Rstudio Cloud

- If you don't want to install R and RStudio:
  1. Go to RStudio Cloud.
  2. Create an account and login.
  3. Click "New Project".

Rstudio Cloud

- You should then see something like this:

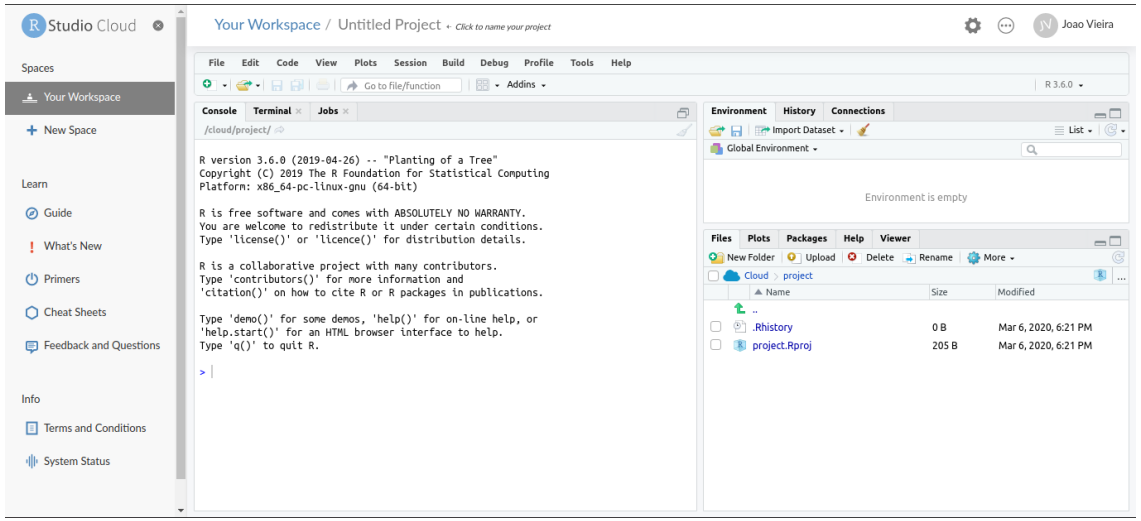
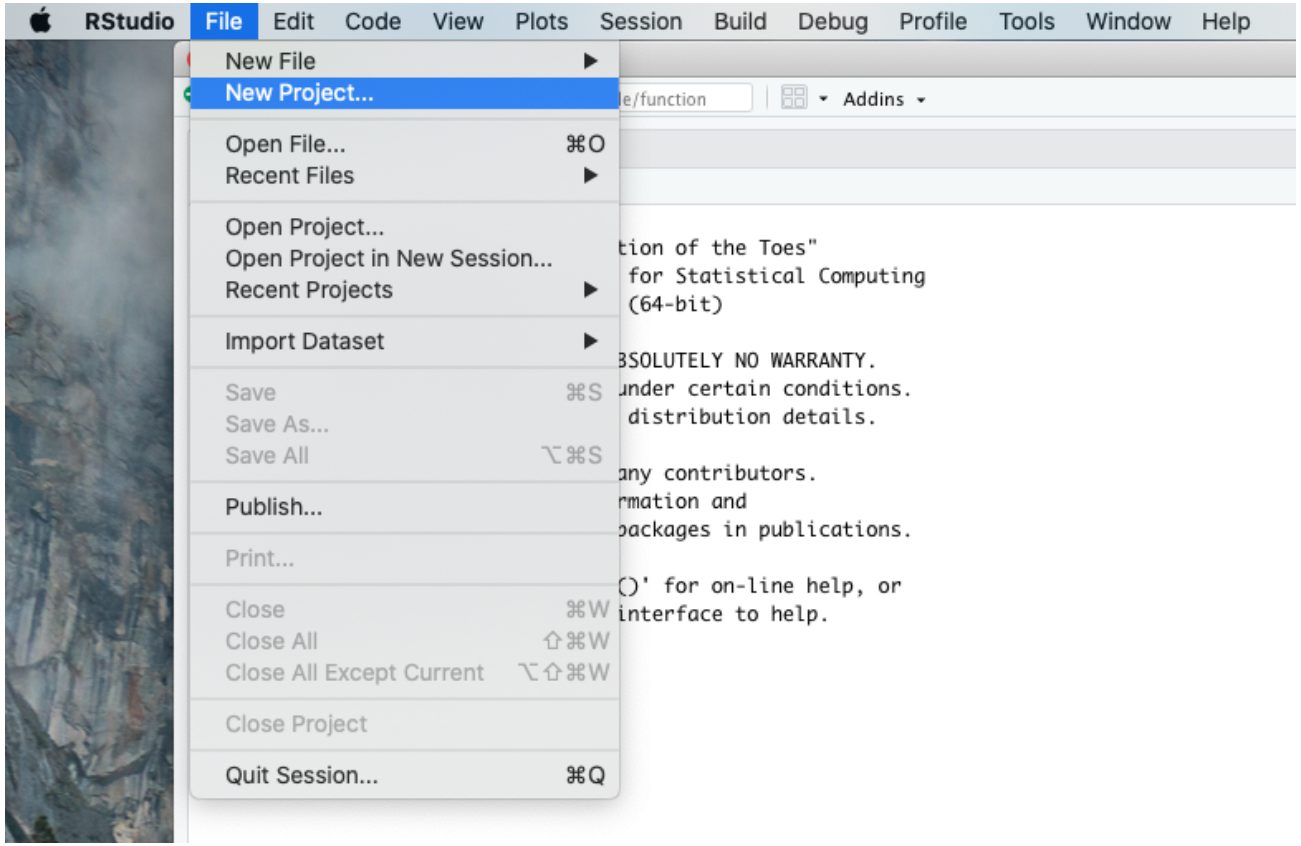


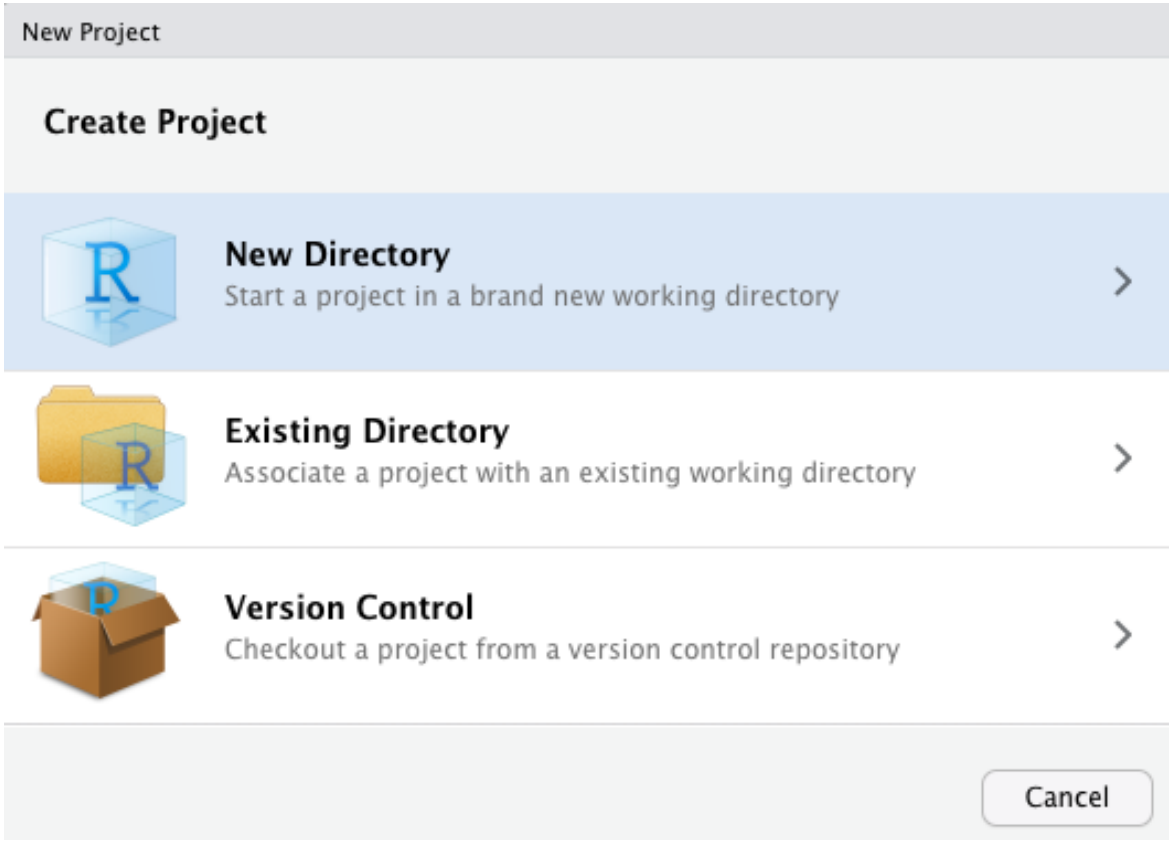
Figure 6: Rstudio Cloud

- For additional information: https://rstudio.cloud/learn/guide

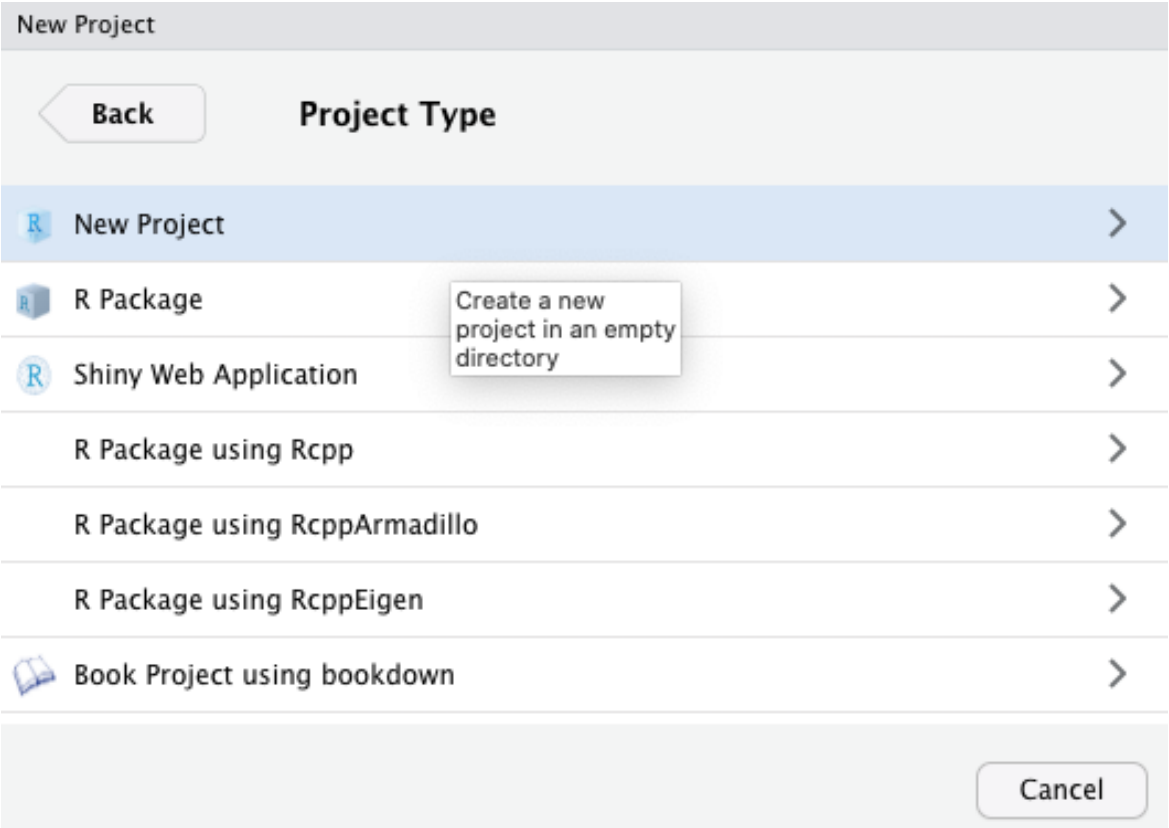
Your First Project



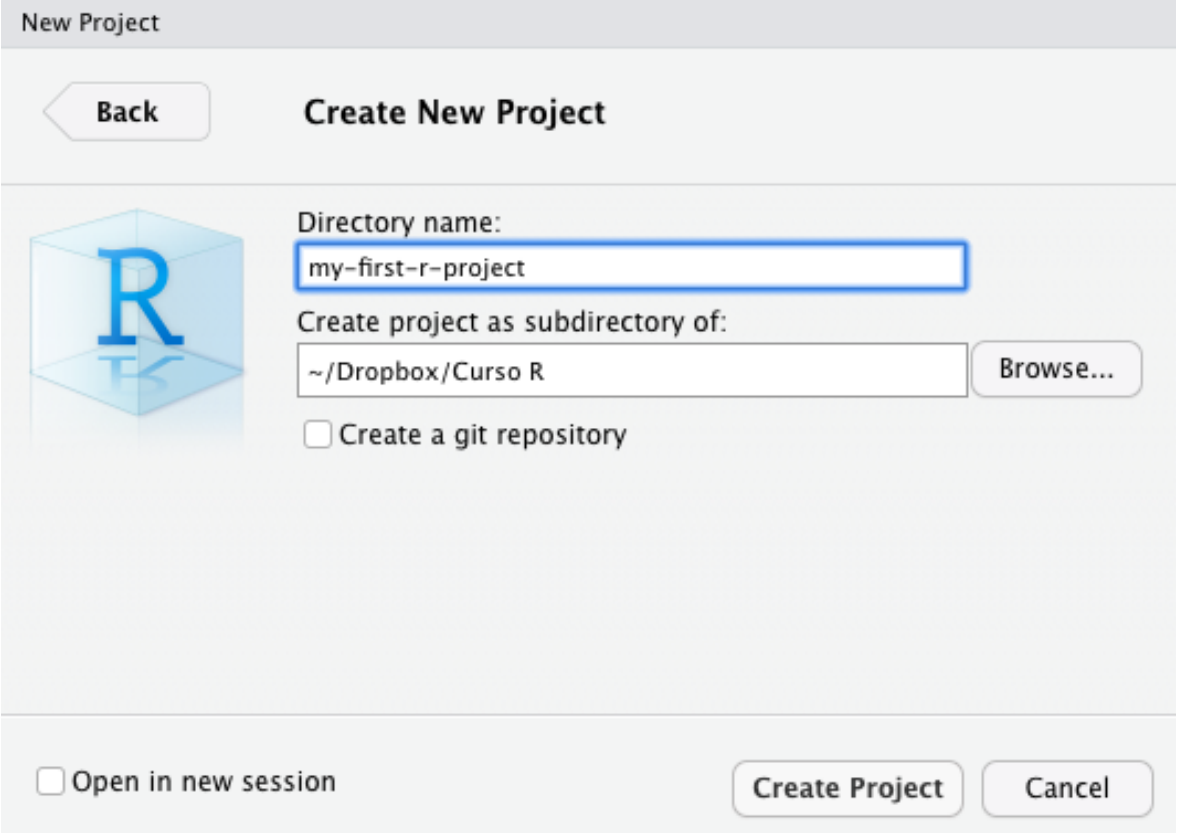
Your First Project



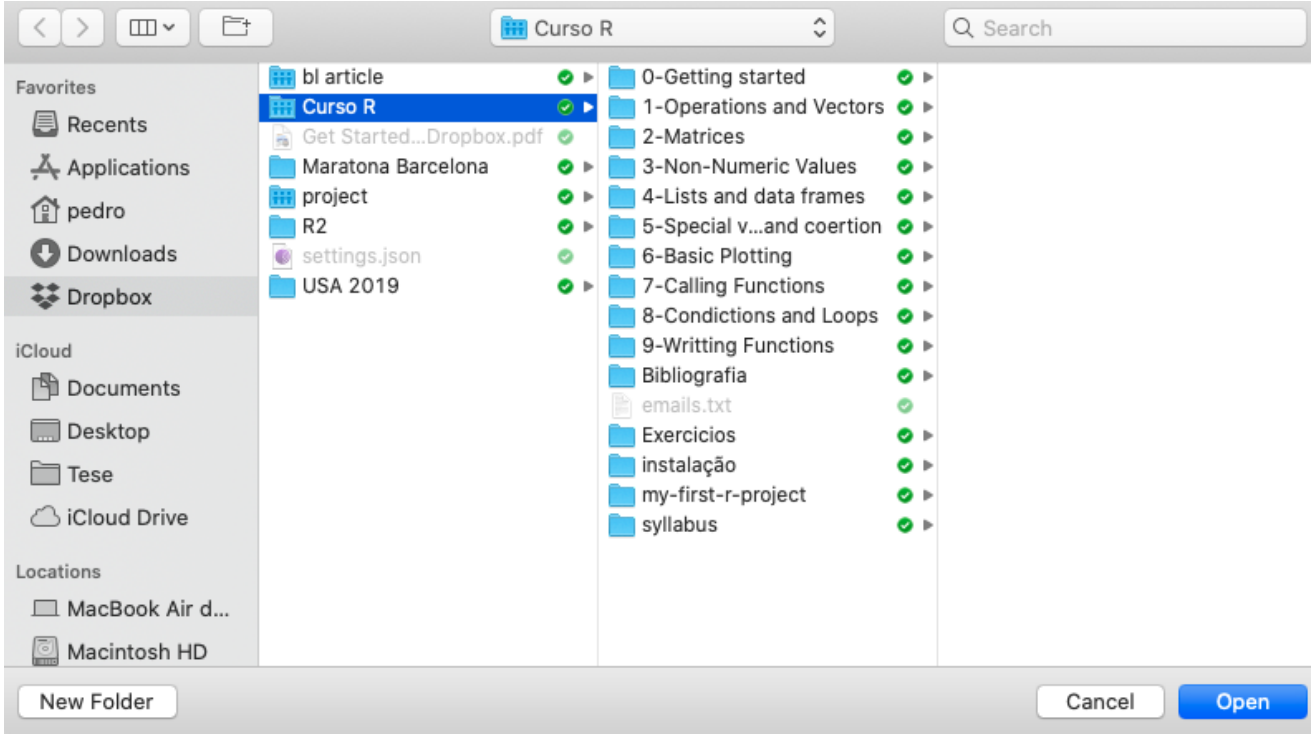
Your First Project



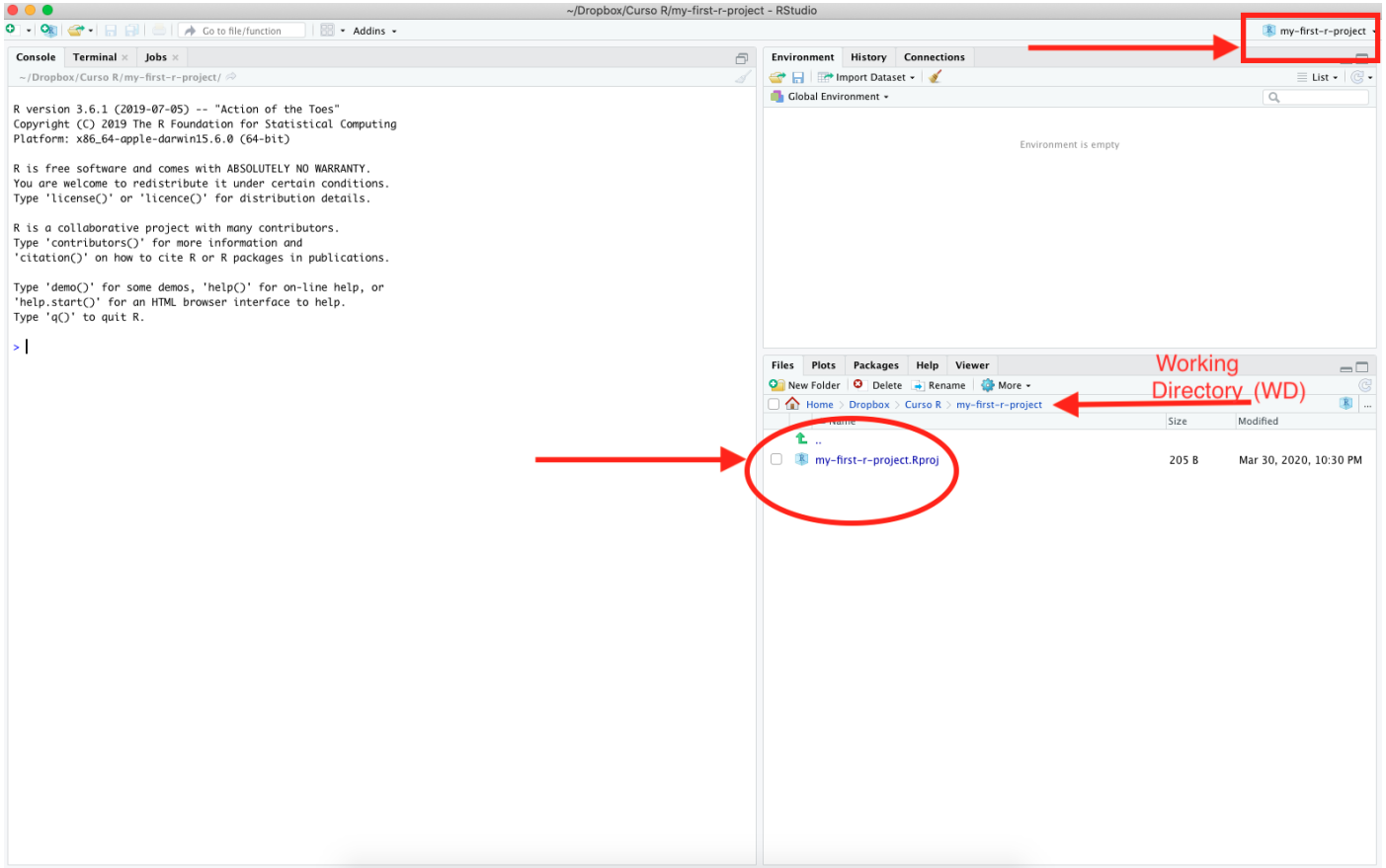
Your First Project



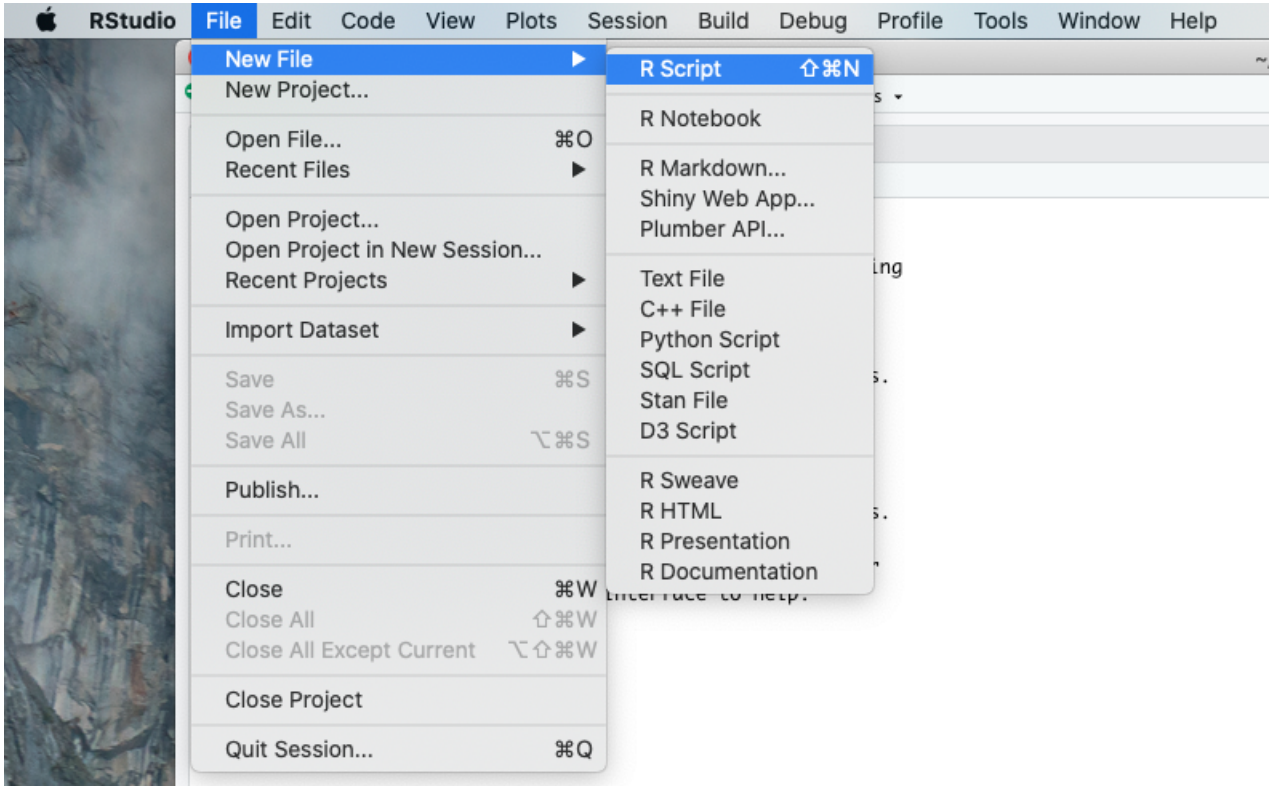
Your First Project



Your First Project

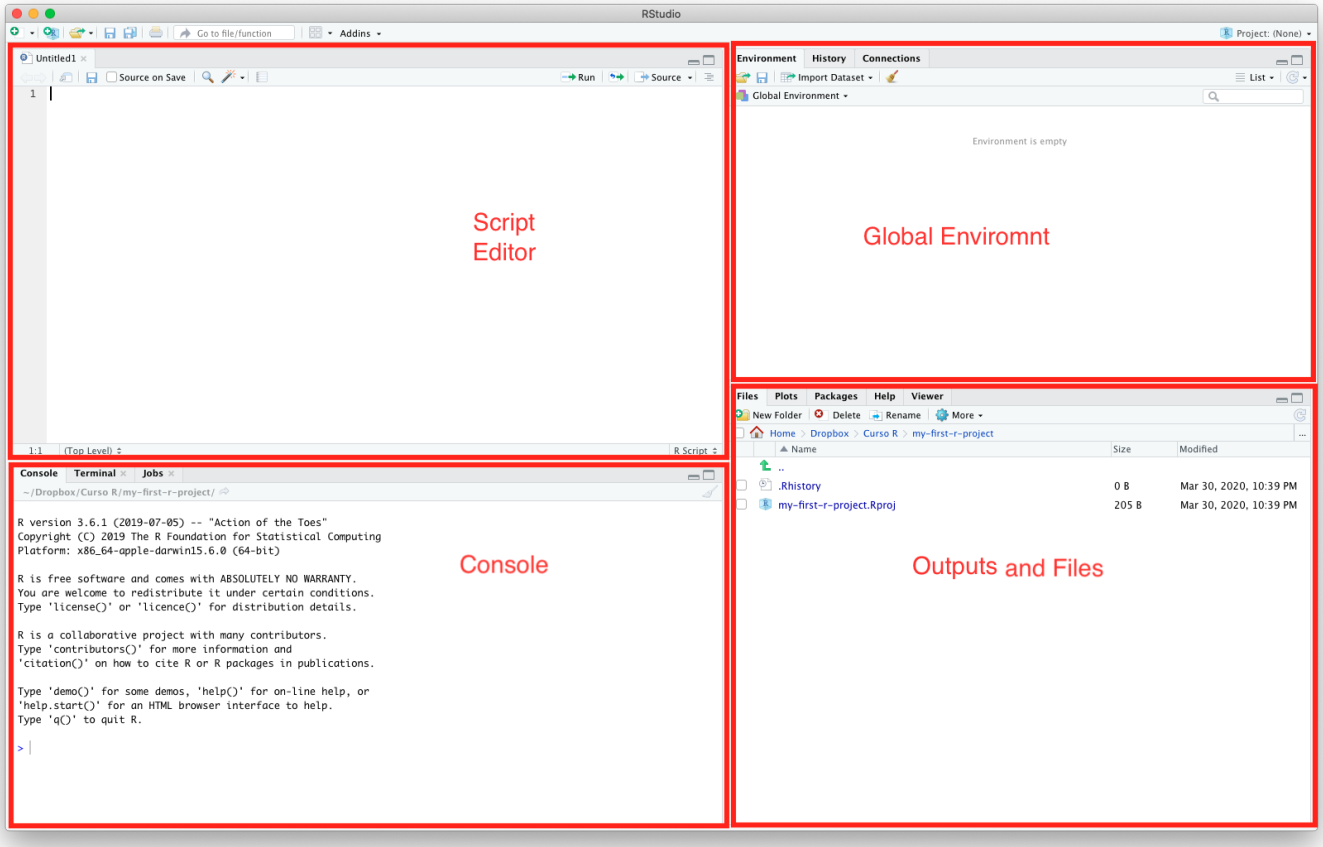


Your First R Script



- Shortcut: Cmd+Shift+N (Mac) or Ctrl+Shift+N (Windows and Linux)

Rstudio Panes



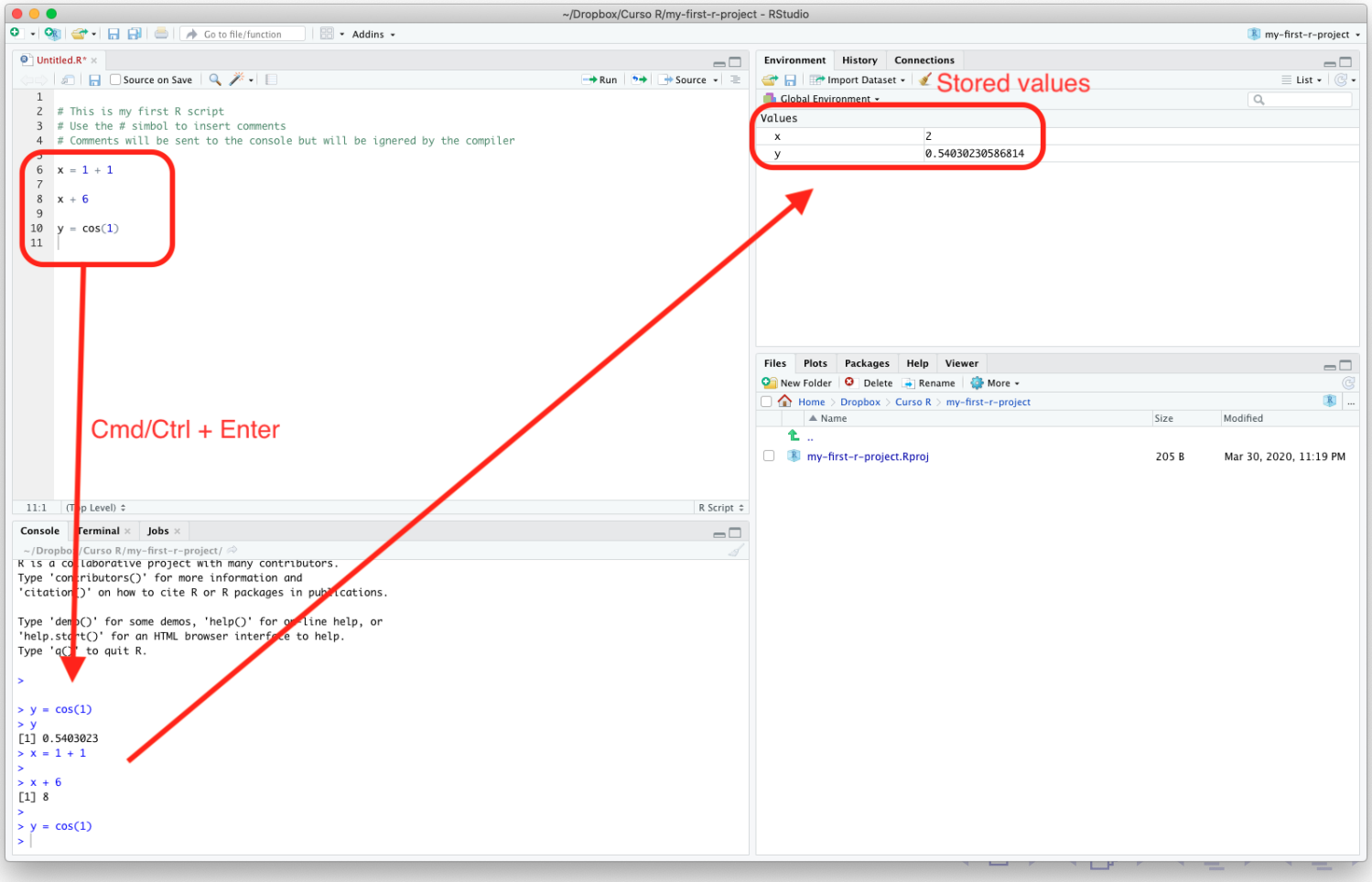
Editor

- The editor is where you can edit the script that you just created. This is where you should write the code that you will learn.
- In the editor you can send text to the console, which is where your code will be run.
- In the editor you can modify, rerun and save your code at any time.
- If instead you write your code directly in the console, your code will be run but you won't be able to modify it or reuse it later.

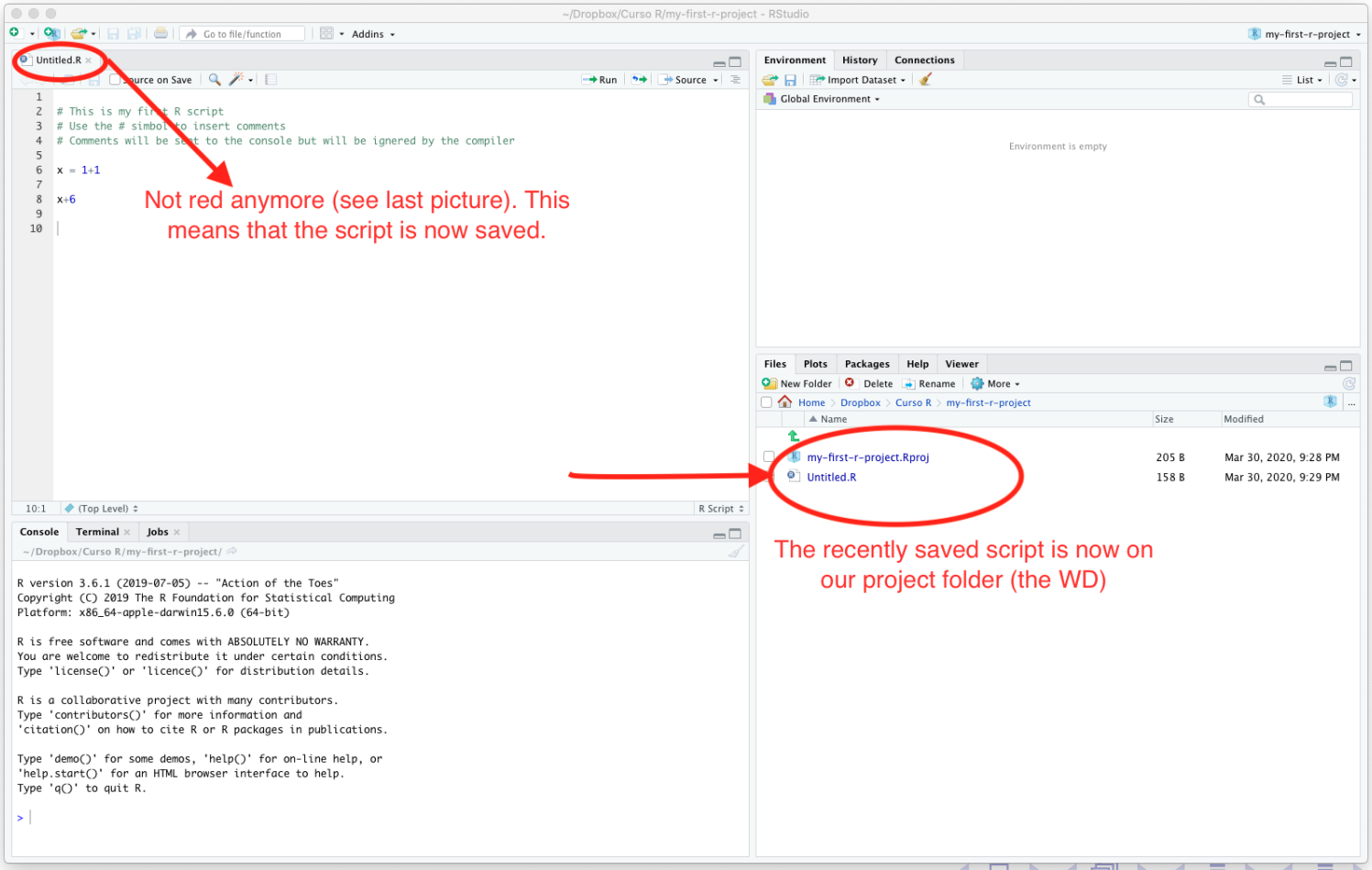
Some Useful Shortcuts

- To save a script use Cmd/Ctrl + S
- To send code from the editor to the console use cmd/ctrl + enter. This will run the current line of code (or the current selection of lines)
- To run the whole script use Cmd/Ctrl + Shift + S

Example


~/Dropbox/Curso R/my-first-r-project - RStudio
Untitled.R*
# This is my first R script
# Use the # simbol to insert comments
# Comments will be sent to the console but will be ignered by the compiler
x = 1 + 1
x + 6
y = cos(1)
Cmd/Ctrl + Enter
Stored values
Values
x 2
y 0.54030230586814
> y = cos(1)
> y
[1] 0.5403023
> x = 1 + 1
> x + 6
[1] 8
> y = cos(1)

Example (cont.)



What is a Working Directory?

- An active R session always has an associated working directory associated. R will use the working directory by default to:
  - Search for files
  - Save outputs (tables, plots, etc)

Setting the Working Directory

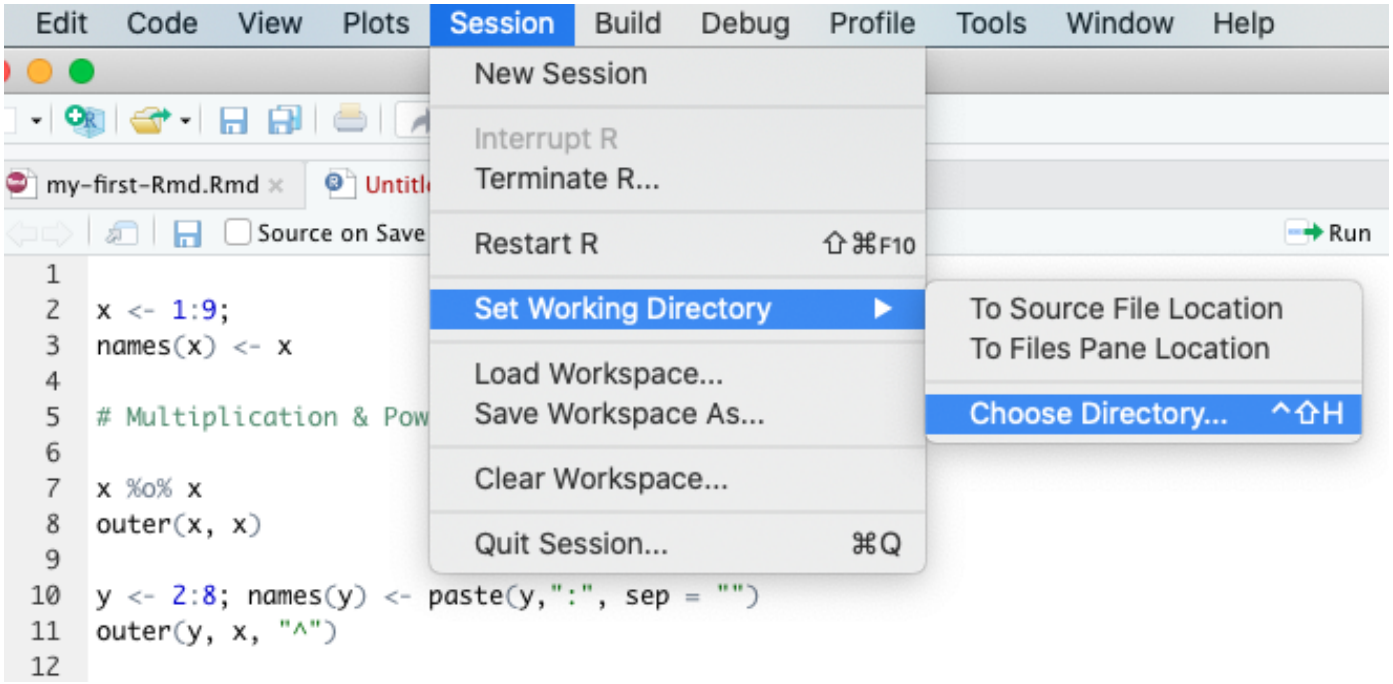


Figure 7: Setting the working directory

Setting the Working Directory

- You can also get or set the working directory in R's console:
  - Getting the working directory

    ```
    > getwd()
    ```

  - Changing the working directory

    ```
    > setwd("/folder1/folder2/folder3/")
    ```

    - The problem with commands like this is that such paths will only exist on your computer
    - Solution: Rstudio projects

Advantages of Rstudio Projects

- Rstudio projects are self-contained.
- They put together all the files that are relevant for a particular project (article, book, research project) in the same folder.
- The project's working directory always points to that folder by default
- Rstudio projects can be moved around on your computer or onto other computers and will still "*just work*". No directory changes are needed.
- If you need to create additional folders or start moving around parts of you project around dont use the *setwd* function. It is safer to reference the full path.

Packages

- The more specialized functions and data sets are available on packages (also referred to as libraries).
  - Installing R Packages:

    ```
    > install.packages("ggplot2", dependencies = TRUE)
    ```
  - Loading R Packages:

    ```
    > library("ggplot2")
    ```
  - Updating R Packages:

    ```
    > update.packages()  # This is rarely necessary
    ```
- Packages are developed by the R core team and also by the community of R users.
- You can develop your own packages and make them available to the community on CRAN (The Comprehensive R Archive Network)

Packages

- It is typically recommend to start your scripts with the packages that you need.
- That way, if you share your code with others, they can easily see what packages they need to install.
- Note, however, that you should never include *install.packages* or *setwd* in a script that you share.
- It is very antisocial to change settings on someone else's computer!

Settings and Appearance

- You can change Rstudio's default settings and appearence:
  - Mac: Tools $->$ Global Option
  - Windows and Linux: Rstudio $->$ preferences
- Shortcut:
  - Mac: "Cmd" + ","
  - Windows and Linux: "Ctrl" + ","

Settings and Appearance

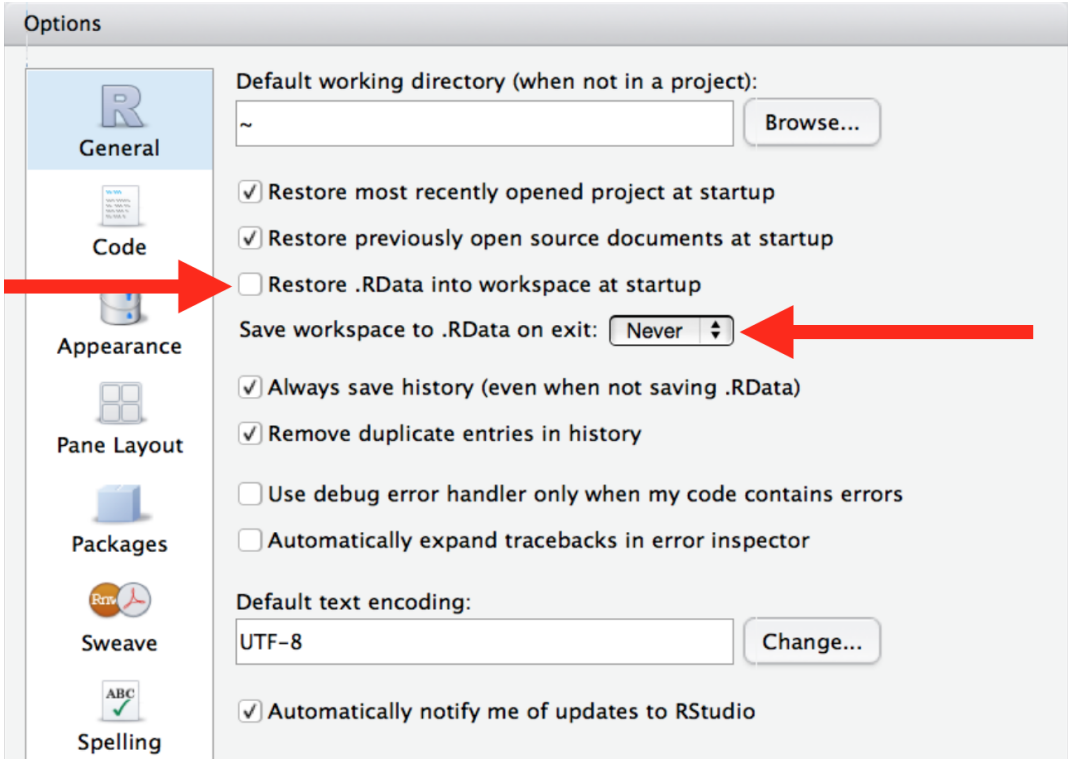


Figure 8: These are the general settings that we recommend

Settings and Appearance

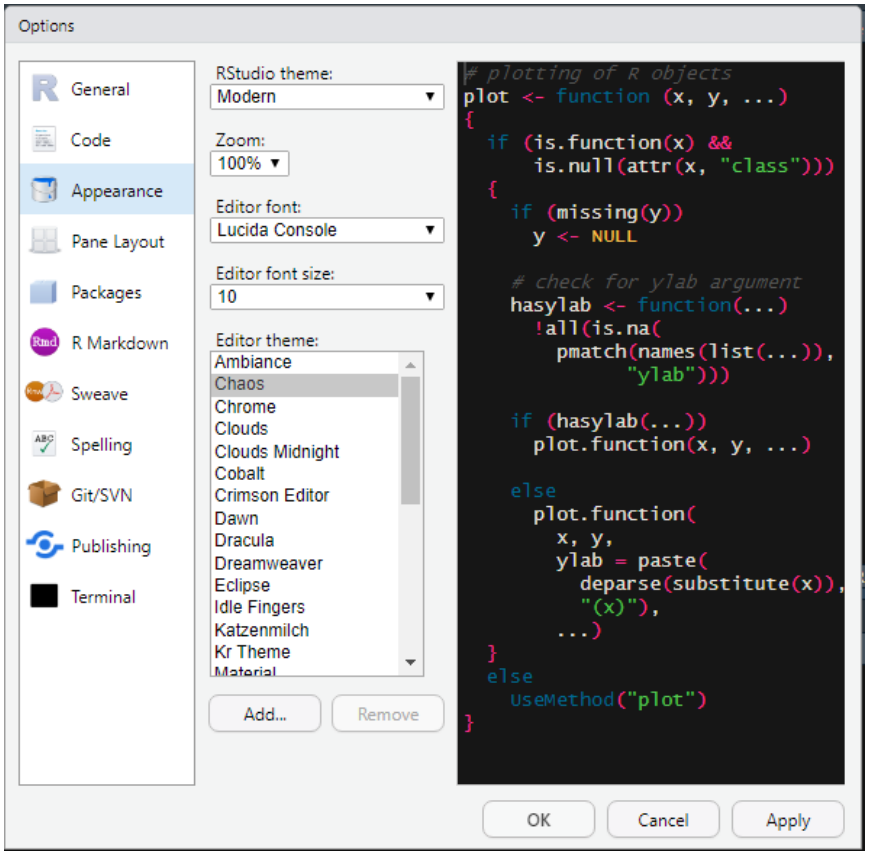


Figure 9: Changing Rstudio's appearence

Questions?