

Class 2: Introduction to R and Data Plotting

MGSC 310

Prof. Jonathan Hersh

Class 2: Outline

1. R Studio Introduction
2. Why Use R Studio Projects?
3. Lab Class 2
 - Basics of R
 - Plotting with ggplot2

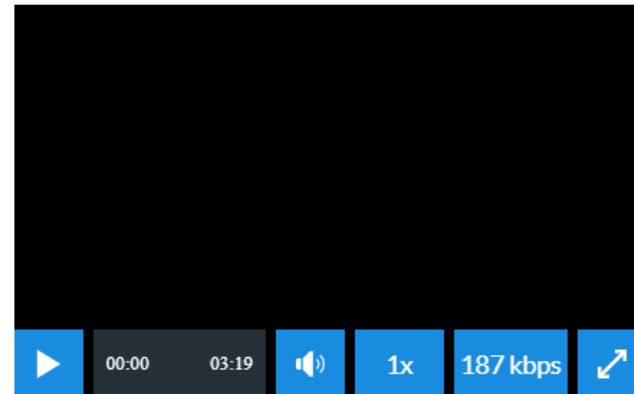
Please Follow Instructions to Install Computer Tools

Below is a list of software you will need for this course. Follow the links to install the software.

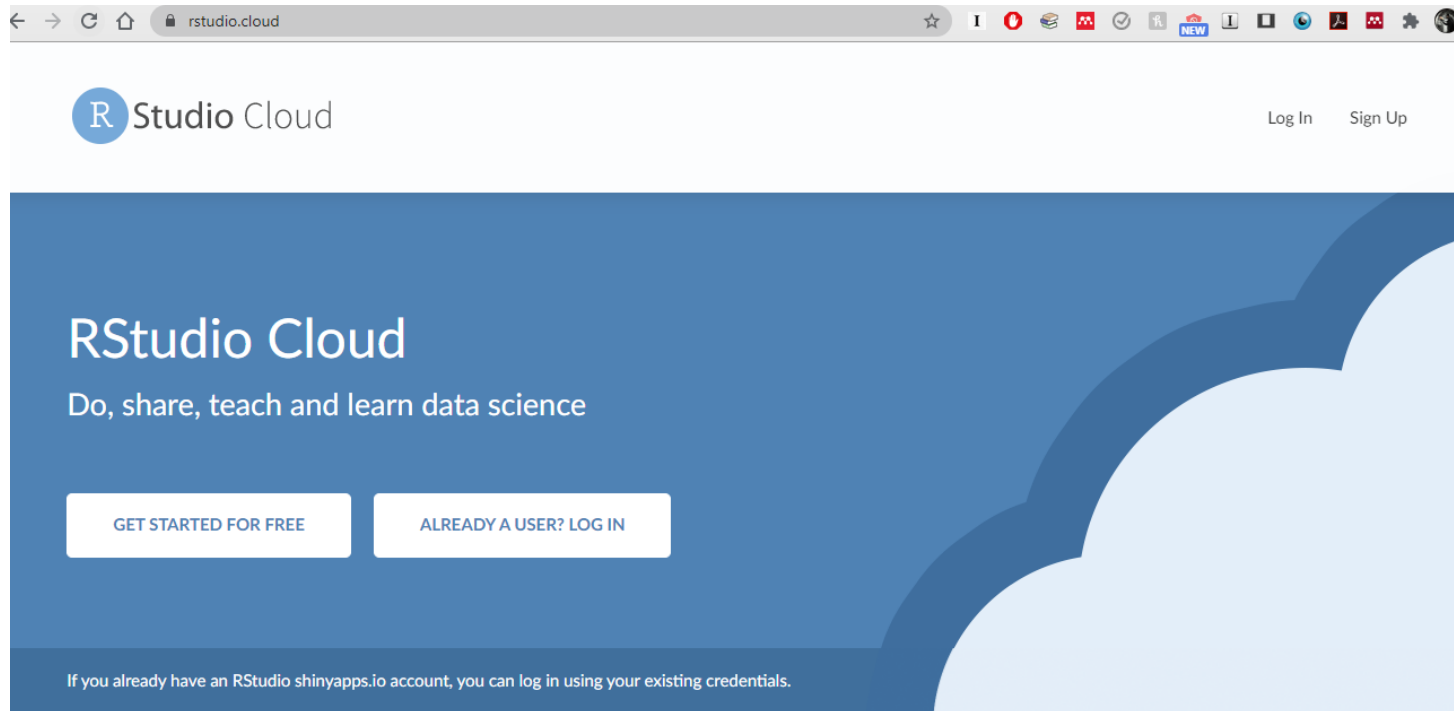
- R 4.0.2:
 - [Window Download](#)
 - [Mac Download](#)
- Rstudio v.1.3.1073:
 - [Download](#)
- Miktex (needed to produce pdf output):
 - [Download](#)
- Compiler tools (needed to load certain packages)
 - Windows
 - [RTools](#)
 - Mac
 - [Xcode and GFortran](#)

[RStudio server.](#)

Update (9/2) This video will help you debug two common errors



R Studio Cloud



- Go to rstudio.cloud if your version of R is ever not working

Data science without the hardware hassles

RStudio Cloud is a lightweight, cloud-based solution that allows anyone to do, share, teach and learn data science online.

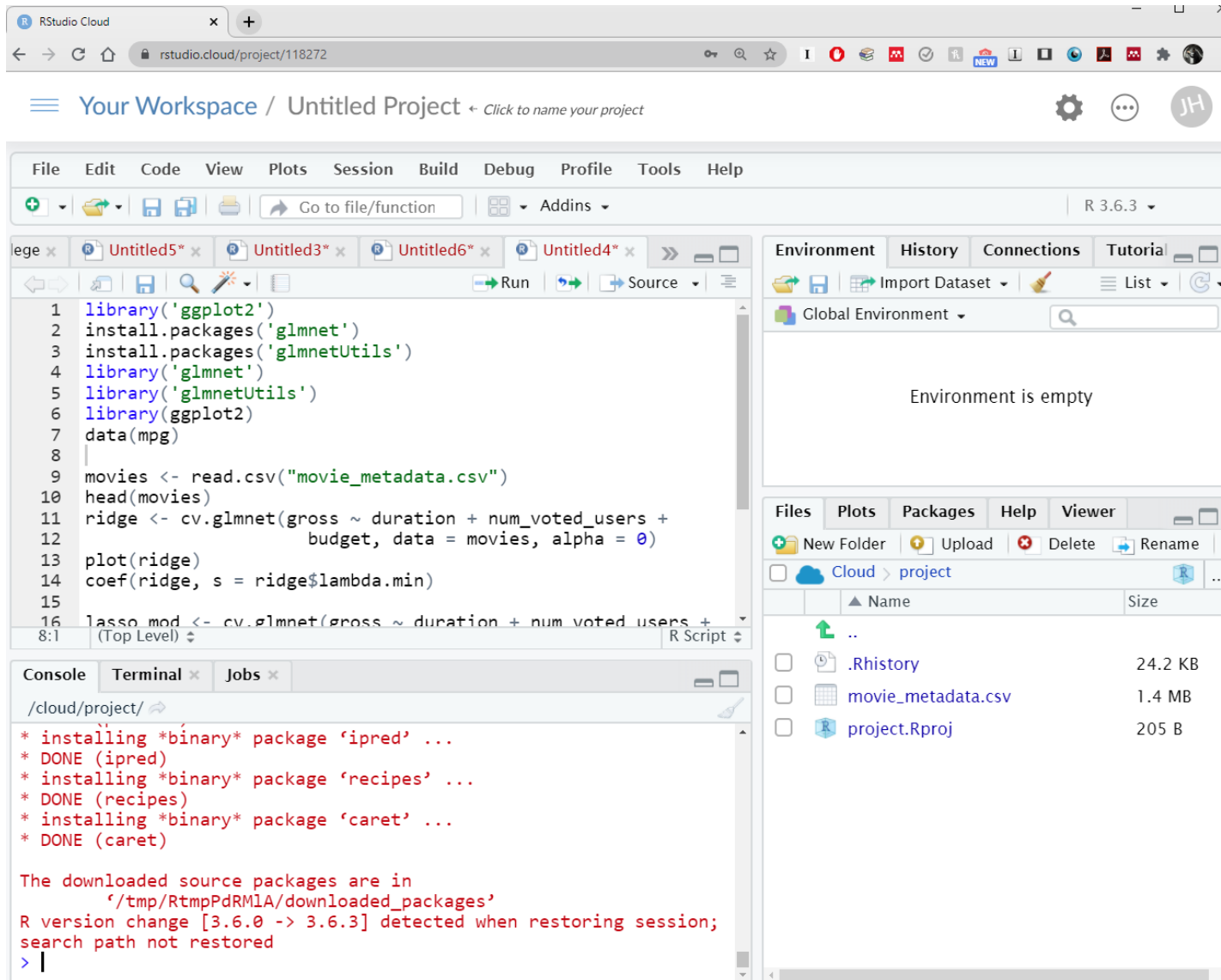
- Analyze your data using the RStudio IDE, directly from your browser.
- Share projects with your team, class, workshop or the world.
- Teach data science with R to your students or colleagues.
- Learn data science in an instructor-led environment or with interactive tutorials.

[\\$ AVAILABLE PRICING PLANS](#)

[RSTUDIO CLOUD GUIDE](#)

[RSTUDIO.COM](#)

R Studio Cloud

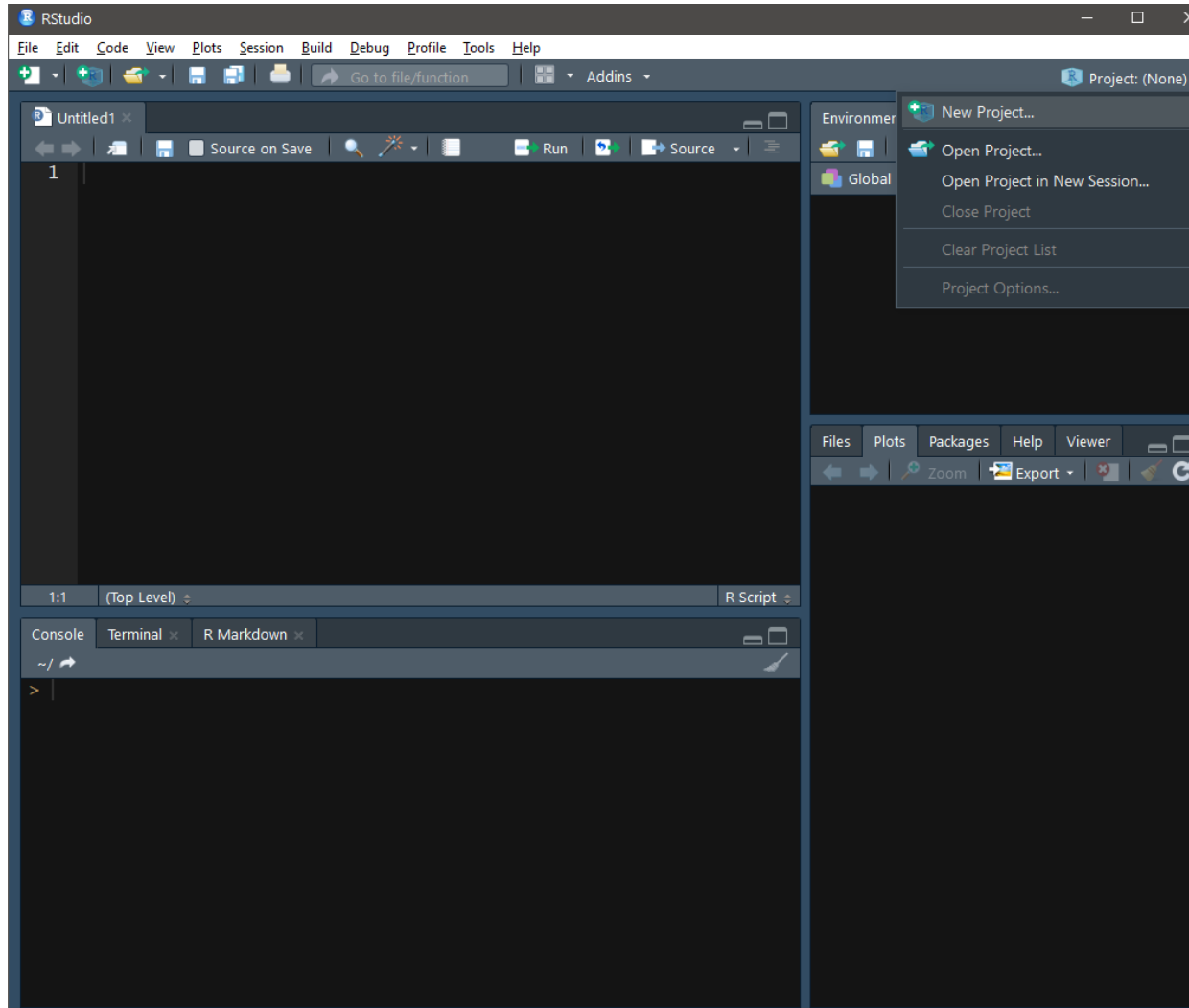


- R Studio Cloud is a full featured version of R in your browser!

Class 2: Outline

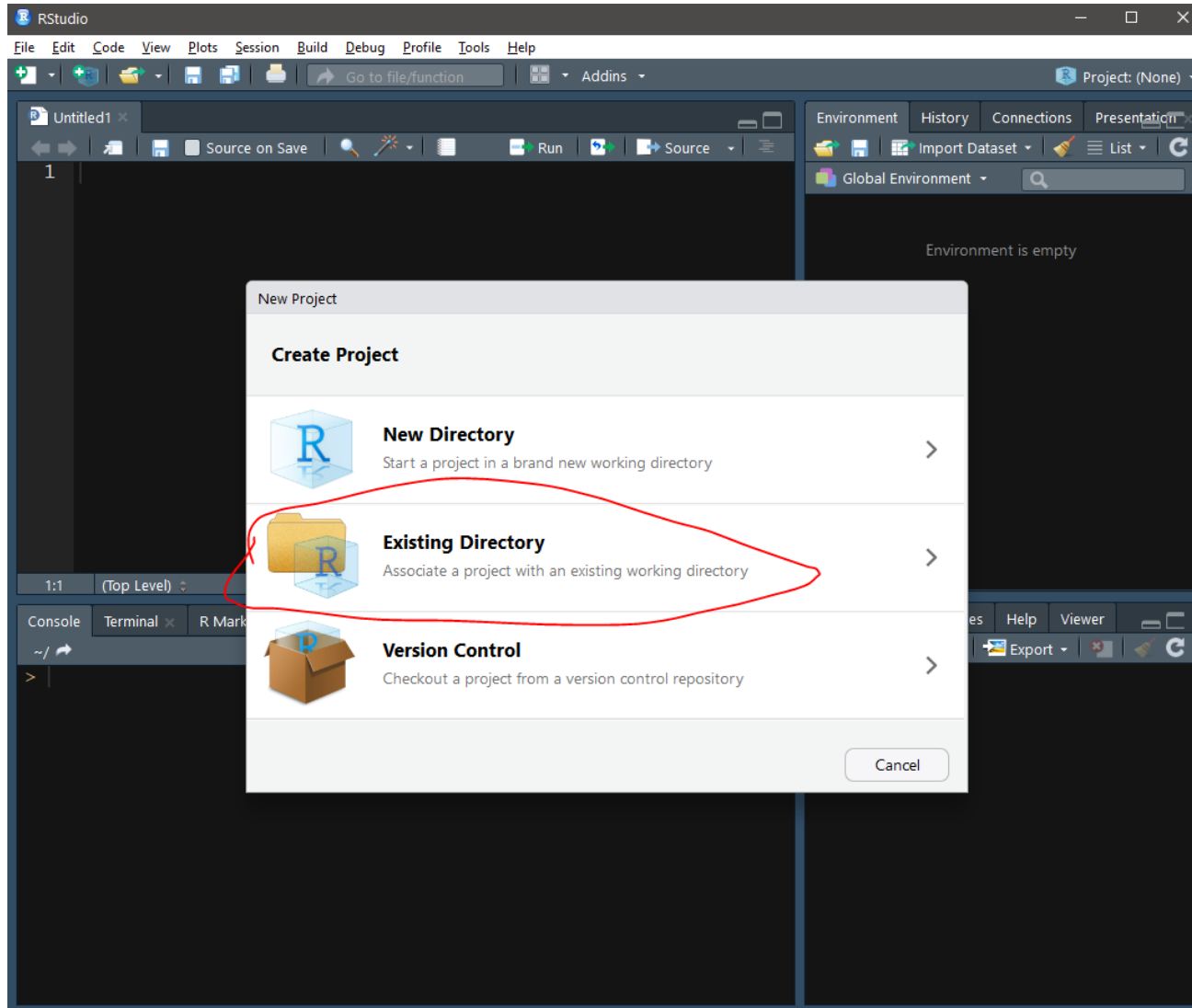
1. R Studio Introduction
- 2. Why Use R Studio Projects?**
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Rstudio Projects



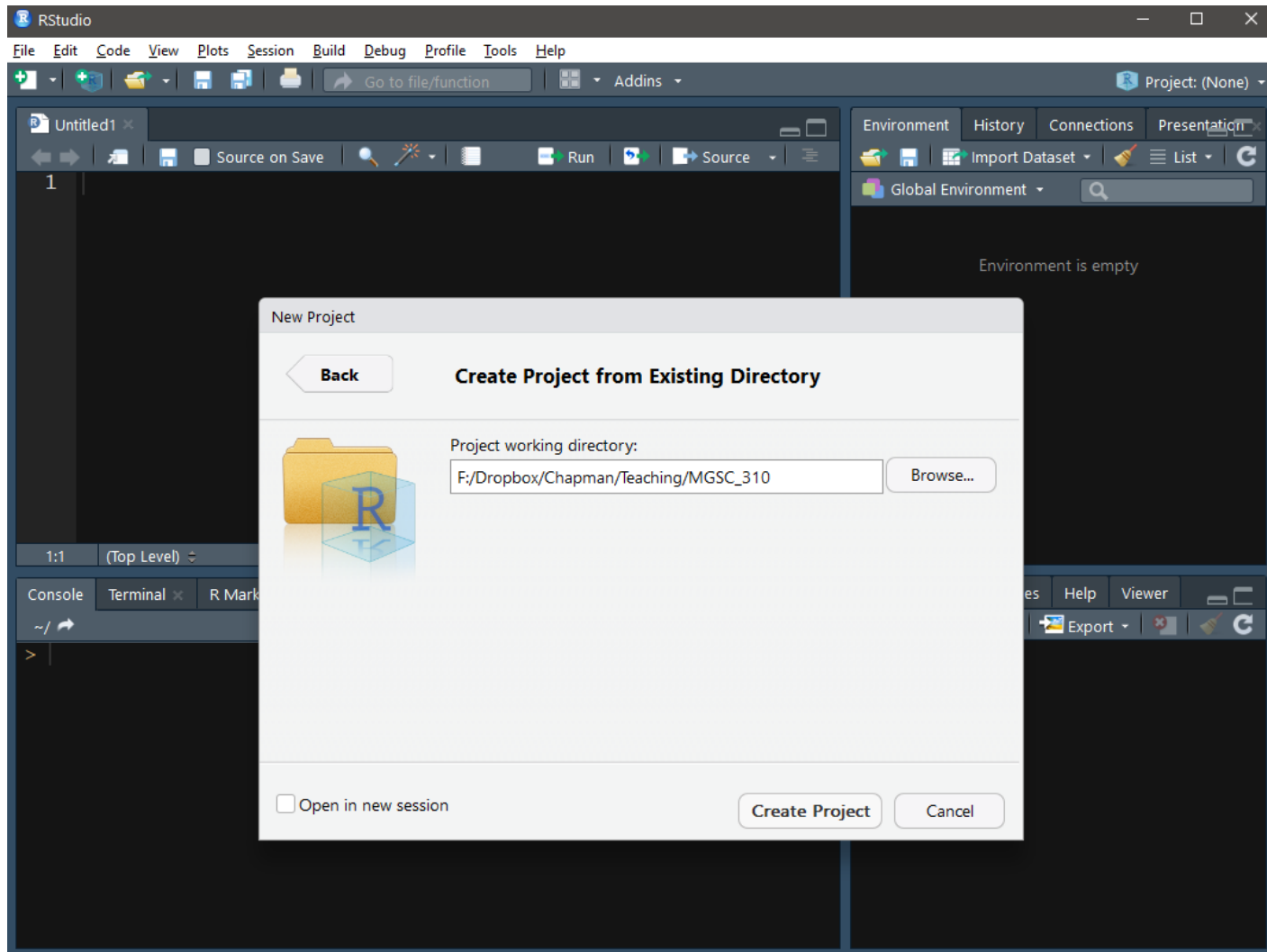
- Rstudio Projects are environments for your code
- They make your life easier, especially across teams and platforms
- Always use Rstudio Projects!

Rstudio Projects



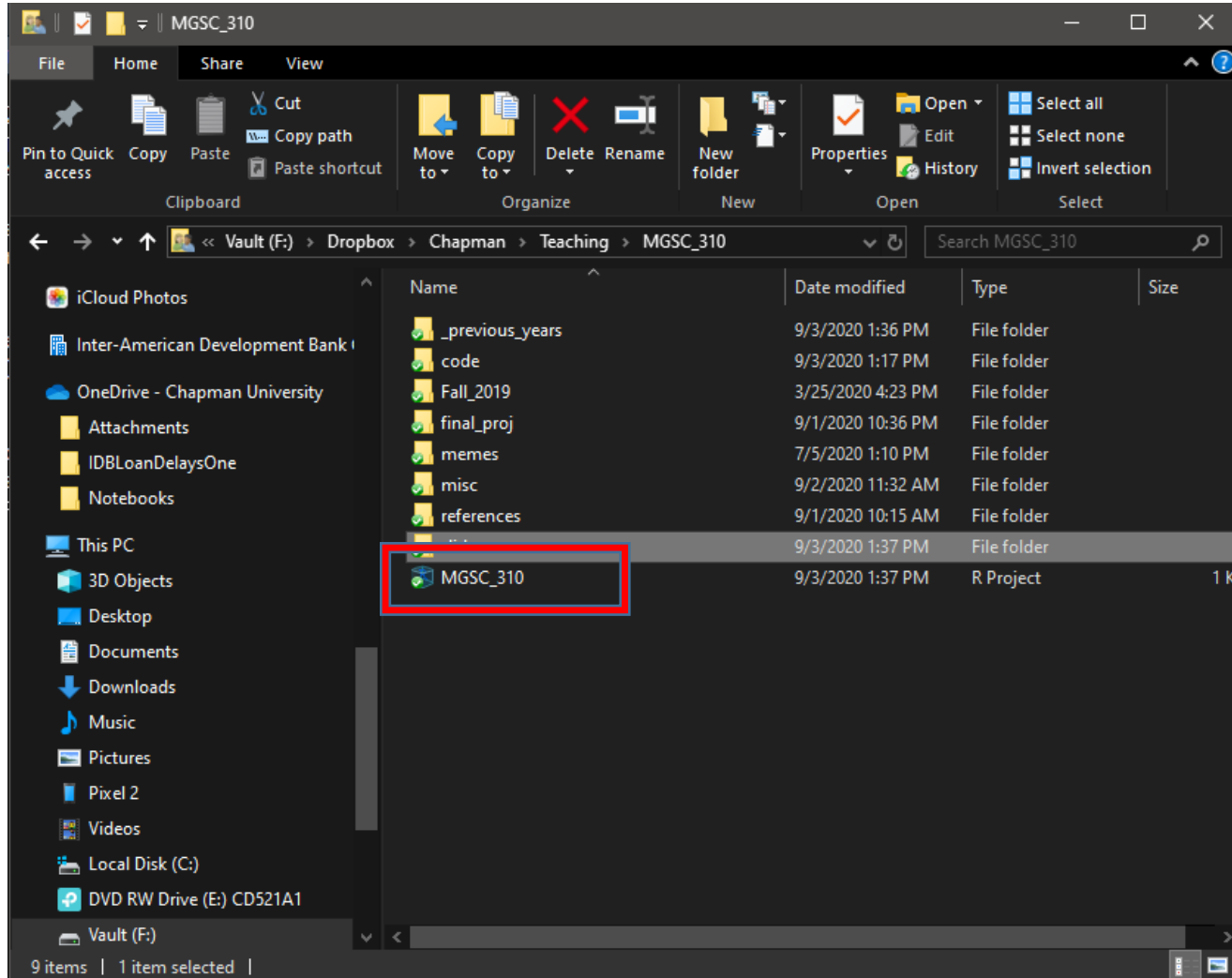
- I recommend you create a new project in your MGSC310 Folder
- Select file -> new project

Rstudio Projects



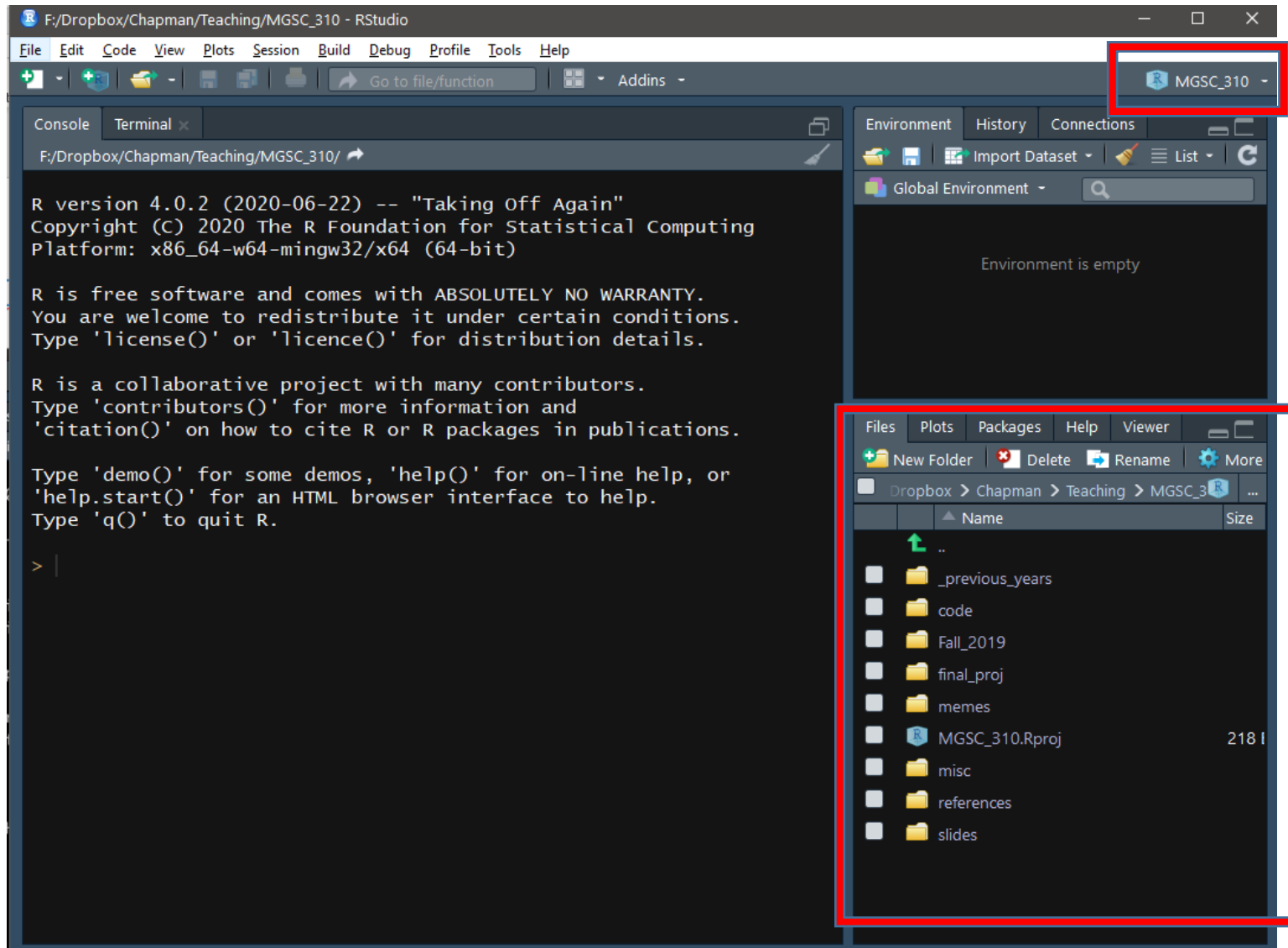
- I recommend you create a new project in your MGSC310 Folder
- Select file -> new project

Rstudio Projects



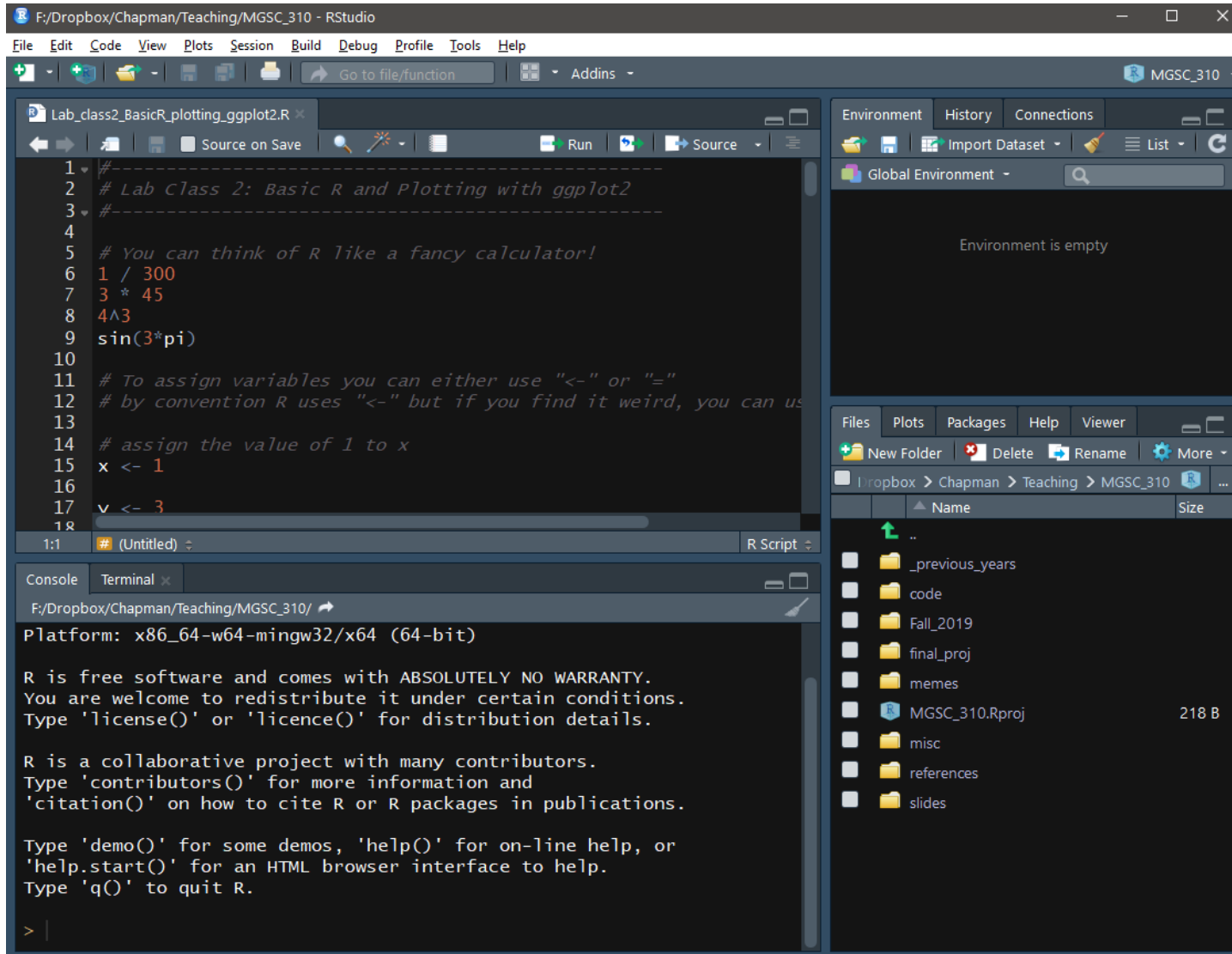
- This creates an .Rproj file you should click and open whenever you want to run code for this class

Rstudio Projects



- You should see your project name in the top right and the “root directory” of the project in the bottom right
- All links to files, datasets are relative to this root folder

Think of R as a Fancy Calculator



The screenshot displays the RStudio environment. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for file operations and a 'Go to file/function' search bar. The main editor window shows a script titled 'Lab_class2_BasicR_plotting_ggplot2.R' with the following content:

```
1 #-----
2 # Lab Class 2: Basic R and Plotting with ggplot2
3 #-----
4
5 # You can think of R like a fancy calculator!
6 1 / 300
7 3 * 45
8 4^3
9 sin(3*pi)
10
11 # To assign variables you can either use "<-" or "="
12 # by convention R uses "<-" but if you find it weird, you can use "="
13
14 # assign the value of 1 to x
15 x <- 1
16
17 v <- 3
18
```

The Environment pane on the right shows 'Global Environment' with a search bar and the message 'Environment is empty'. Below it is a file explorer showing the directory structure: Dropbox > Chapman > Teaching > MGSC_310. The file list includes folders like '_previous_years', 'code', 'Fall_2019', 'final_proj', 'memes', 'misc', 'references', and 'slides', as well as the file 'MGSC_310.Rproj' (218 B).

The Console pane at the bottom shows the R startup message and the prompt '> |'.

Plotting with ggplot2



Search...

Reference

Ne

Overview

ggplot2 is a system for declaratively creating graphics, based on [The Grammar of Graphics](#). You provide the data, tell ggplot2 how to map variables to aesthetics, what graphical primitives to use, and it takes care of the details.

Installation

```
# The easiest way to get ggplot2 is to install the whole tidyverse:  
install.packages("tidyverse")  
  
# Alternatively, install just ggplot2:  
install.packages("ggplot2")  
  
# Or the development version from GitHub:  
# install.packages("devtools")  
devtools::install_github("tidyverse/ggplot2")
```

- ggplot2 is a package in the tidyverse that allows for high quality graphics in using a minimal amount of code

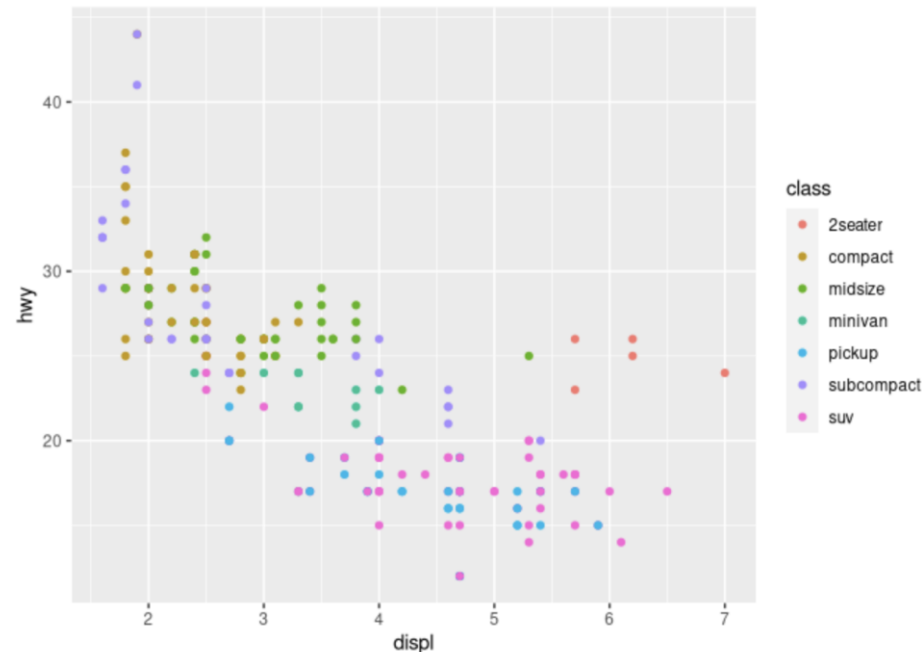
ggplot2: “Grammar of Data Manipulation”

Usage

It's hard to succinctly describe how ggplot2 works because it embodies a deep philosophy of visualisation. However, in most cases you start with `ggplot()`, supply a dataset and aesthetic mapping (with `aes()`). You then add on layers (like `geom_point()` or `geom_histogram()`), scales (like `scale_colour_brewer()`), faceting specifications (like `facet_wrap()`) and coordinate systems (like `coord_flip()`).

```
library(ggplot2)
```

```
ggplot(mpg, aes(displ, hwy, colour = class)) +  
  geom_point()
```



- ggplot2 uses a grammar of data manipulation
- We begin with a “canvas” (usually x,y plane) and add points, lines, etc. on that canvas
- Each new part is added using a “+” operator