Intro to R

RStudio

Working with R – RStudio

RStudio is an Integrated Development Environment (IDE) for R

- It helps the user effectively use R
- Makes things easier
- Is NOT a dropdown statistical tool (such as Stata)
  - See Rcmdr or Radiant
- All R Studio snapshots are taken from http://ayeimanol-r.net/2013/04/21/289/

[source]

RStudio

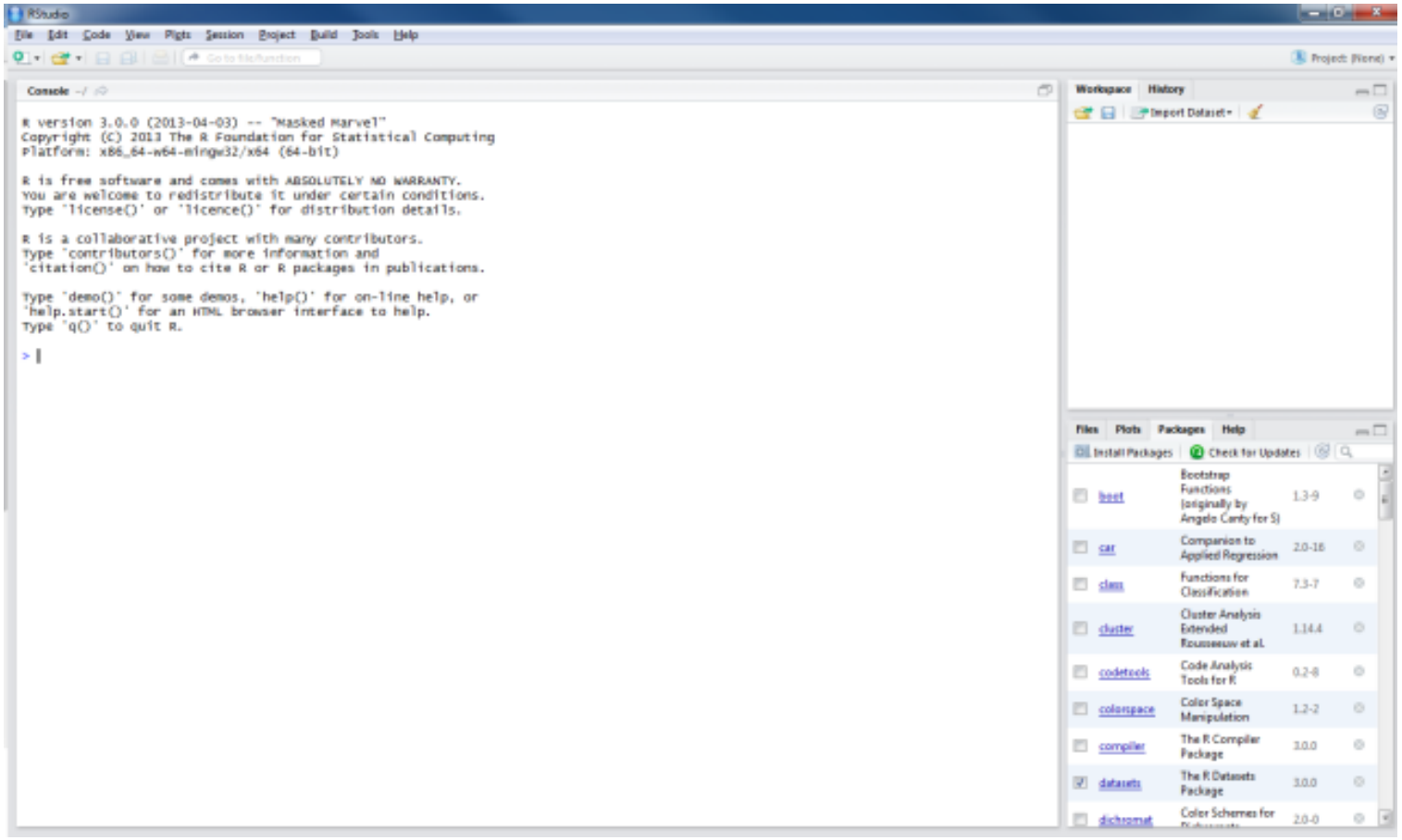
Easier working with R

- Syntax highlighting, code completion, and smart indentation
- Easily manage multiple working directories and projects

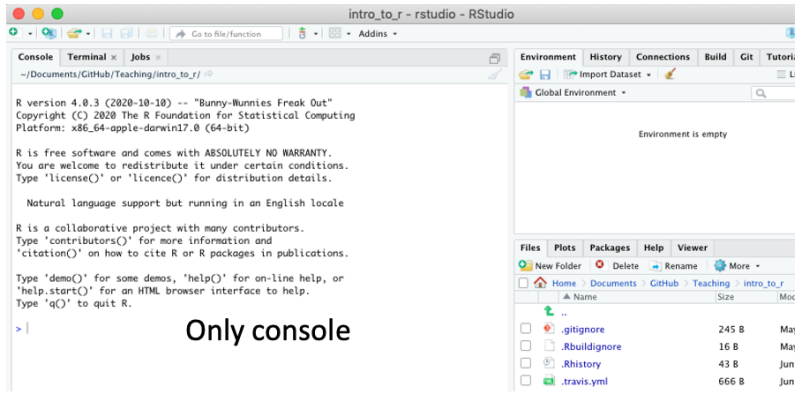
More information

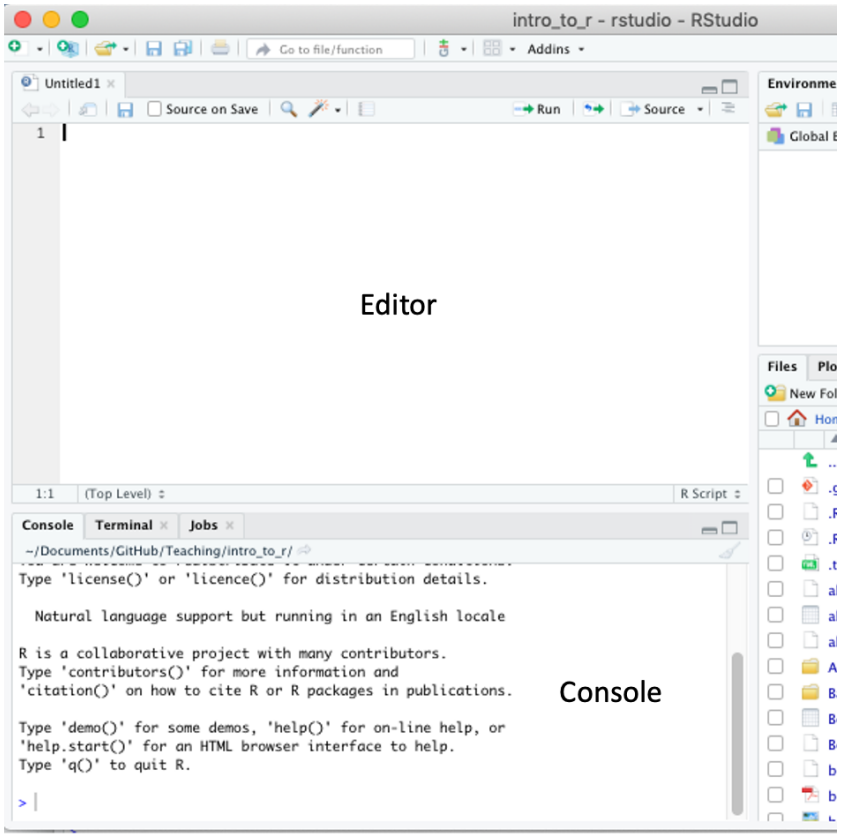
- Workspace browser and data viewer
- Plot history, zooming, and flexible image and PDF export
- Integrated R help and documentation
- Searchable command history

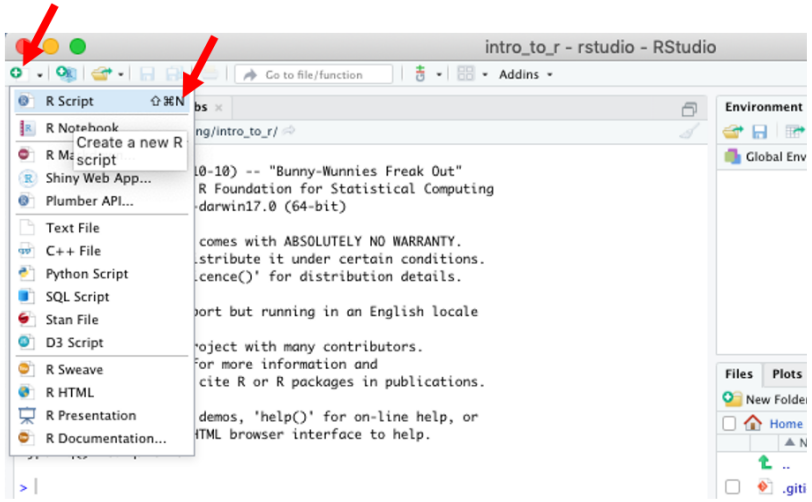
RStudio


RStudio
File Edit Code View Plots Session Project Build Tools Help
Console ~/
R version 3.0.0 (2013-04-03) -- "Masked Marvel"
Copyright (C) 2013 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)
R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
>
Workspace History
Import Dataset
Files Plots Packages Help
Install Packages
Check for Updates
boot
Bootstrap Functions (originally by Angelo Canty for S)
1.3-9
car
Companion to Applied Regression
2.0-16
class
Functions for Classification
7.3-7
cluster
Cluster Analysis Extended Rousseeuw et al.
1.14.4
codetools
Code Analysis Tools for R
0.2-8
colorspace
Color Space Manipulation
1.2-2
compiler
The R Compiler Package
3.0.0
datasets
The R Datasets Package
3.0.0
dichromat
Color Schemes for
2.0-0

Getting the editor







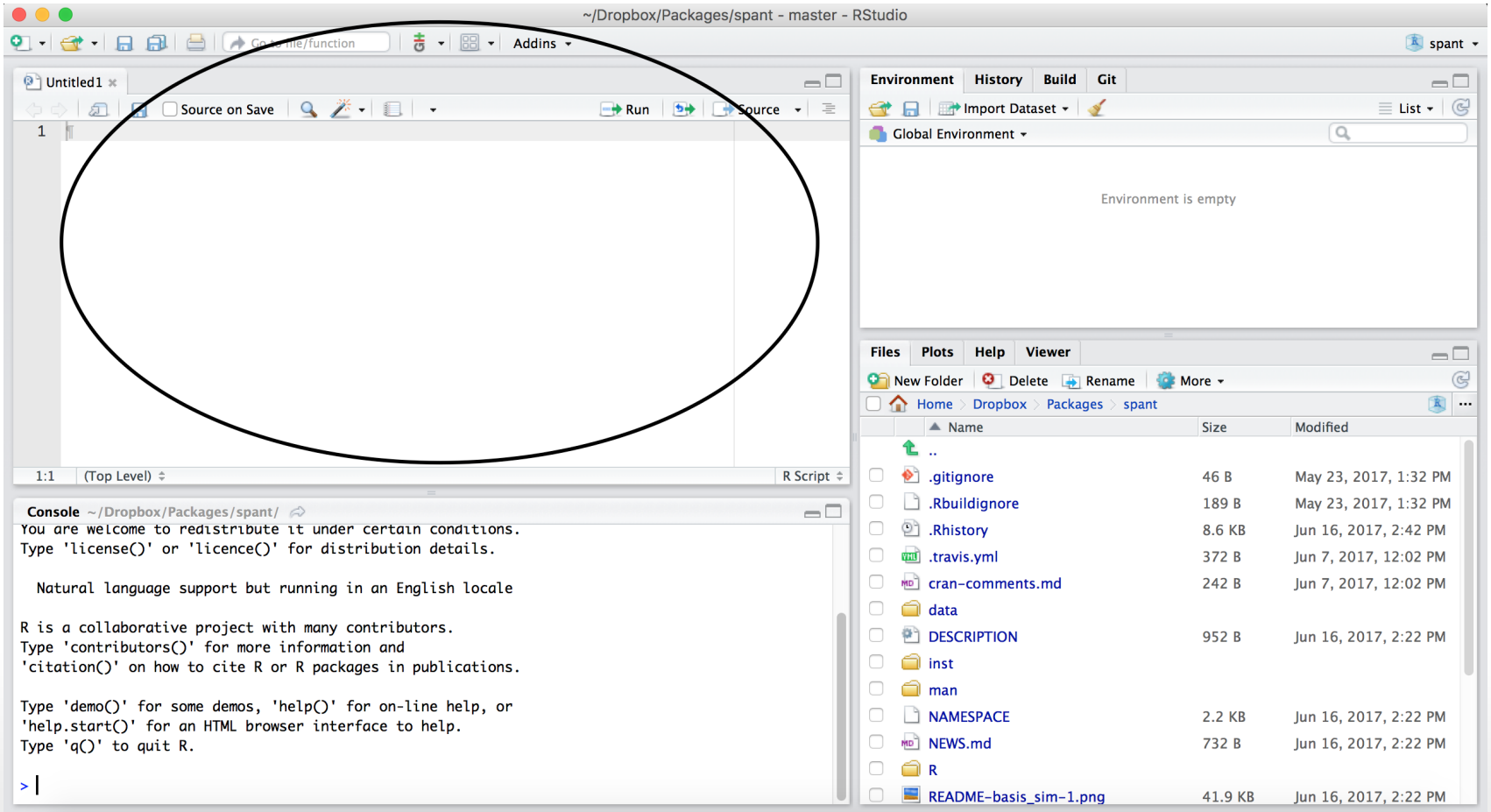
Working with R in R Studio - 2 major panes:

1. The **Source/Editor**: “Analysis” Script + Interactive Exploration
   - Static copy of what you did (reproducibility)
   - Try things out interactively, then add to your script
2. The **R Console**: “interprets” whatever you type
   - Calculator
   - Creating variables
   - Applying functions

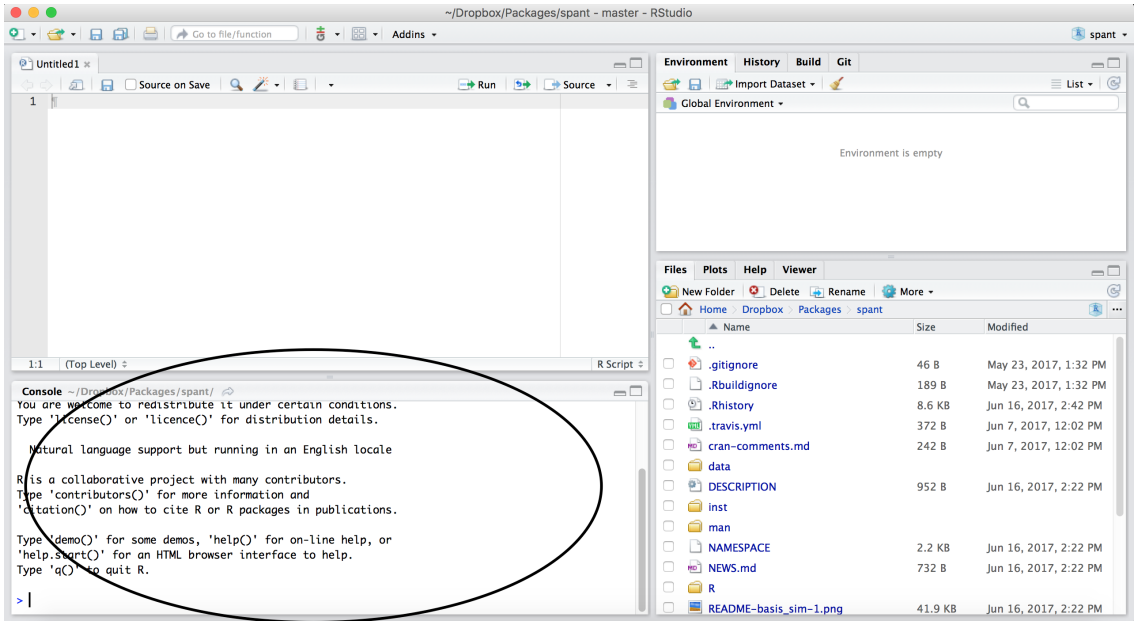
Source / Editor

- Where files open to
- Have R code and comments in them
- Can highlight and press (CMD+Enter (Mac) or Ctrl+Enter (Windows)) to run the code

In a .R file (we call a script), code is saved on your disk



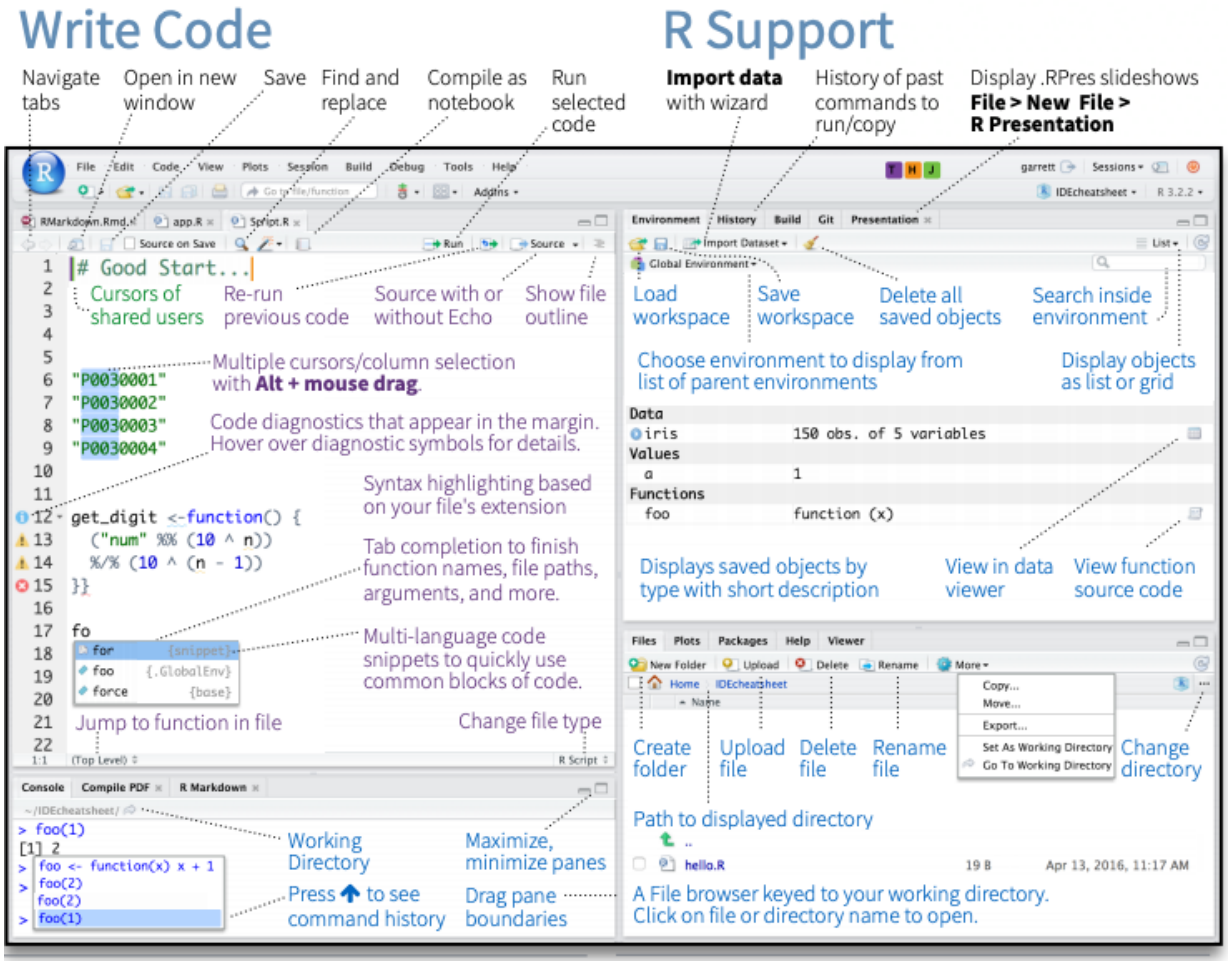
R Console



- Where code is executed (where things happen)
- You can type here for things interactively
- Code is **not saved** on your disk

RStudio

Super useful “cheat sheet”:
https://github.com/rstudio/cheatsheets/raw/master/rstudio-ide.pdf



More on Functions and Packages

- R revolves around **functions**
  - Commands that take input, performs computations, and returns results
- Functions are enclosed in **packages**
  - When you download R, it has a “base” set of functions/packages (**base R**)
  - You can install additional packages for your uses from CRAN or GitHub
  - These additional packages are written by RStudio or R users/developers (like us)
  - Think of them as “R Extensions”

Using Packages

- It helps to be somewhat familiar with base R - answers on Google commonly use it
- We will focus on newer and **more intuitive** ways to do things (tidyverse), not in base R
- RStudio (the company) makes a lot of great packages
- Not all packages available on CRAN or GitHub are trustworthy
- Who wrote it? **Hadley Wickham** is a major authority on R (Employee and Developer at RStudio)
- How to trust an R package: http://simplystatistics.org/2015/11/06/how-i-decide-when-to-trust-an-r-package/

(source: https://twitter.com/hadleywickham)

Let’s take a look at R Studio ourselves!

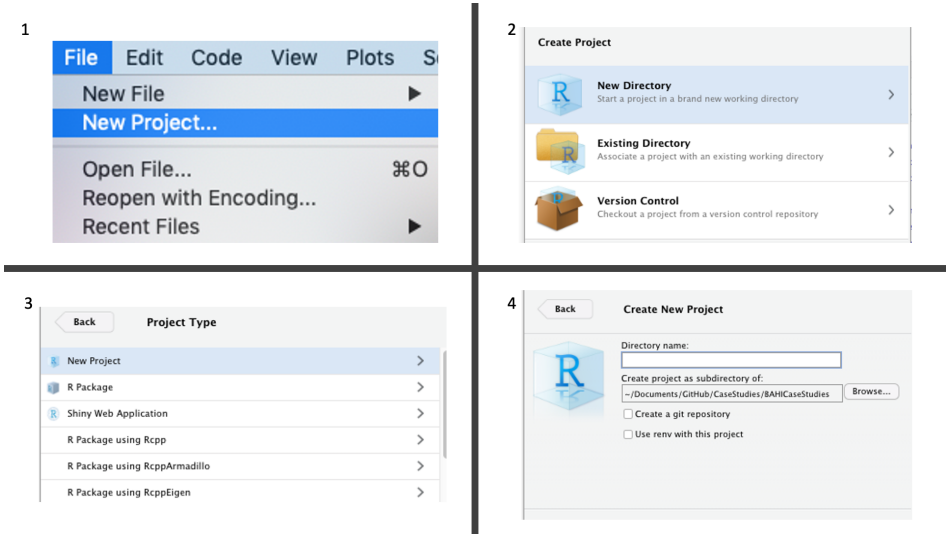
RStudio

Let's start by making an RStudio "Project".

1. Helps you organize your work.
2. Helps with working directories (discussed later).
3. Allows you to easily know which project you're on.

Go to File → New Project → New Directory → New Project

Call your Project "Intro_to_R"



R Markdown file

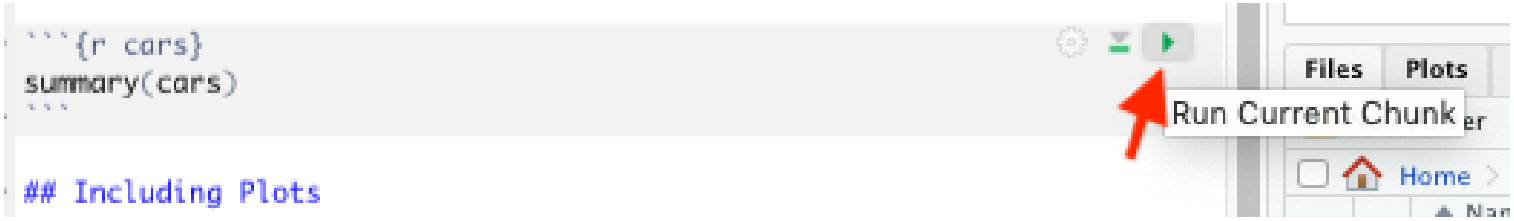
R Markdown files (.Rmd) help generate reports that include your code and output. Think of them as fancier scripts.

1. Helps you describe your code
2. Allows you to check the output
3. Can create many different file types

Code chunks

Within R Markdown files are code “chunks”

This is where you can type R code and run it!

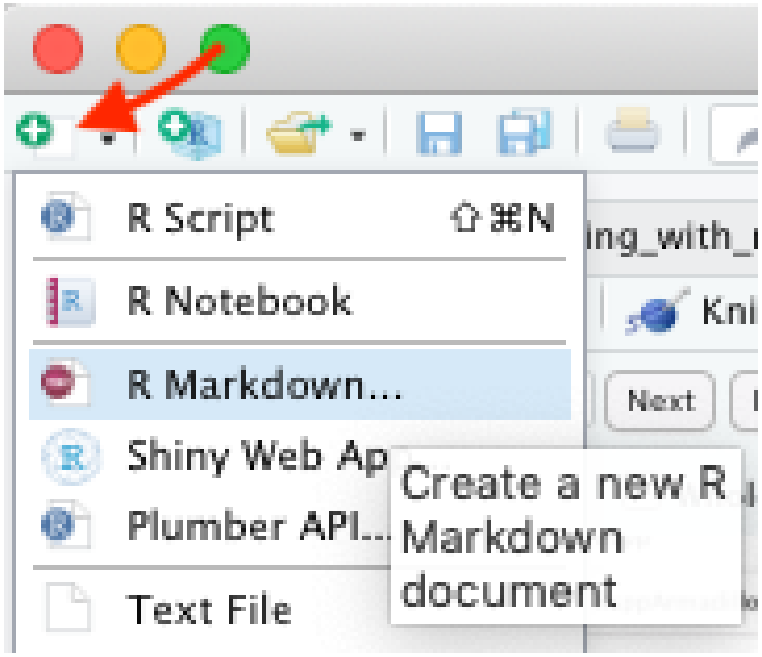


Knit

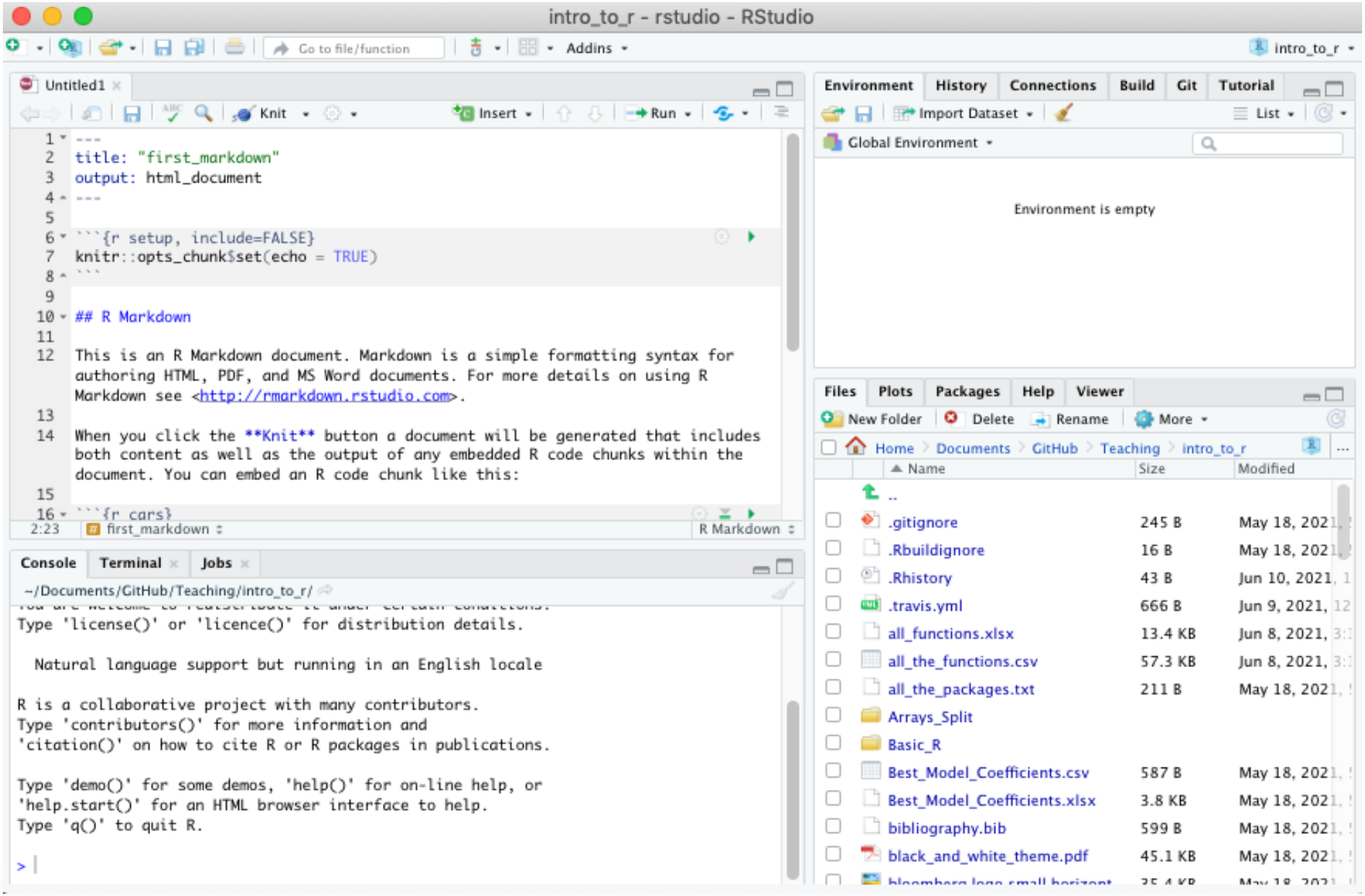
Create an R Markdown file

Go to File → New File → R Markdown

Call your file “first_markdown”



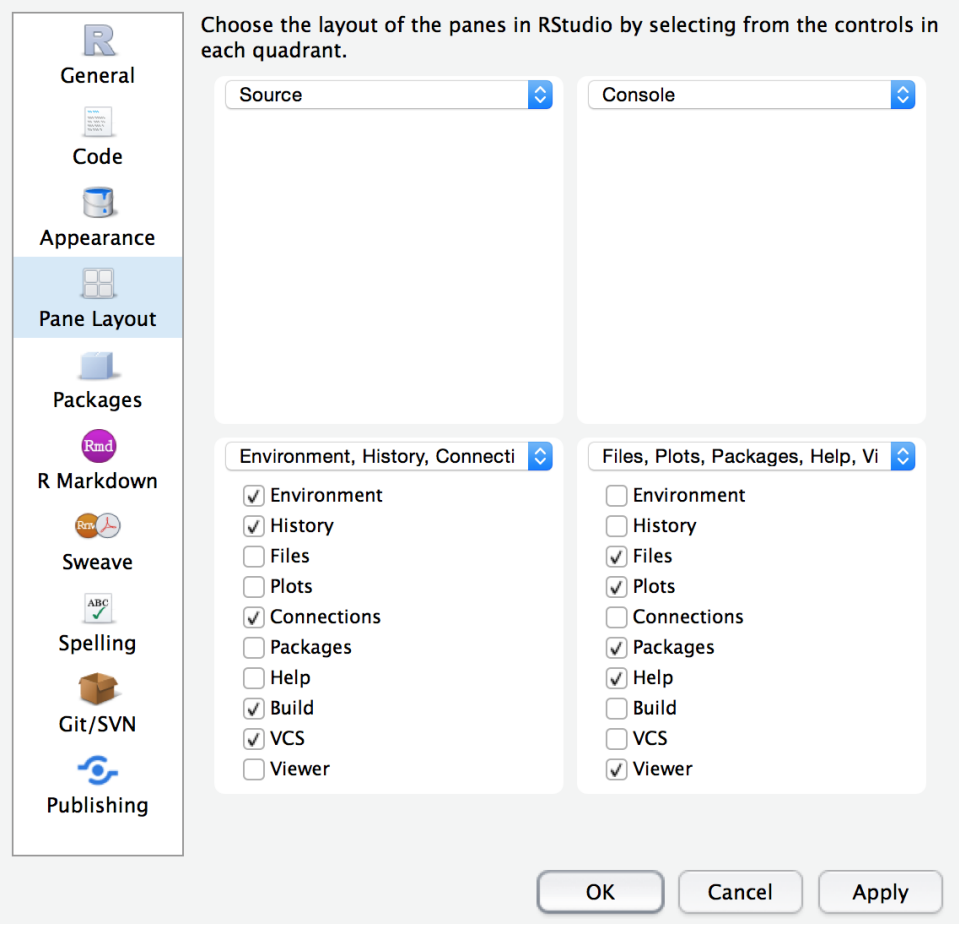
RStudio layout



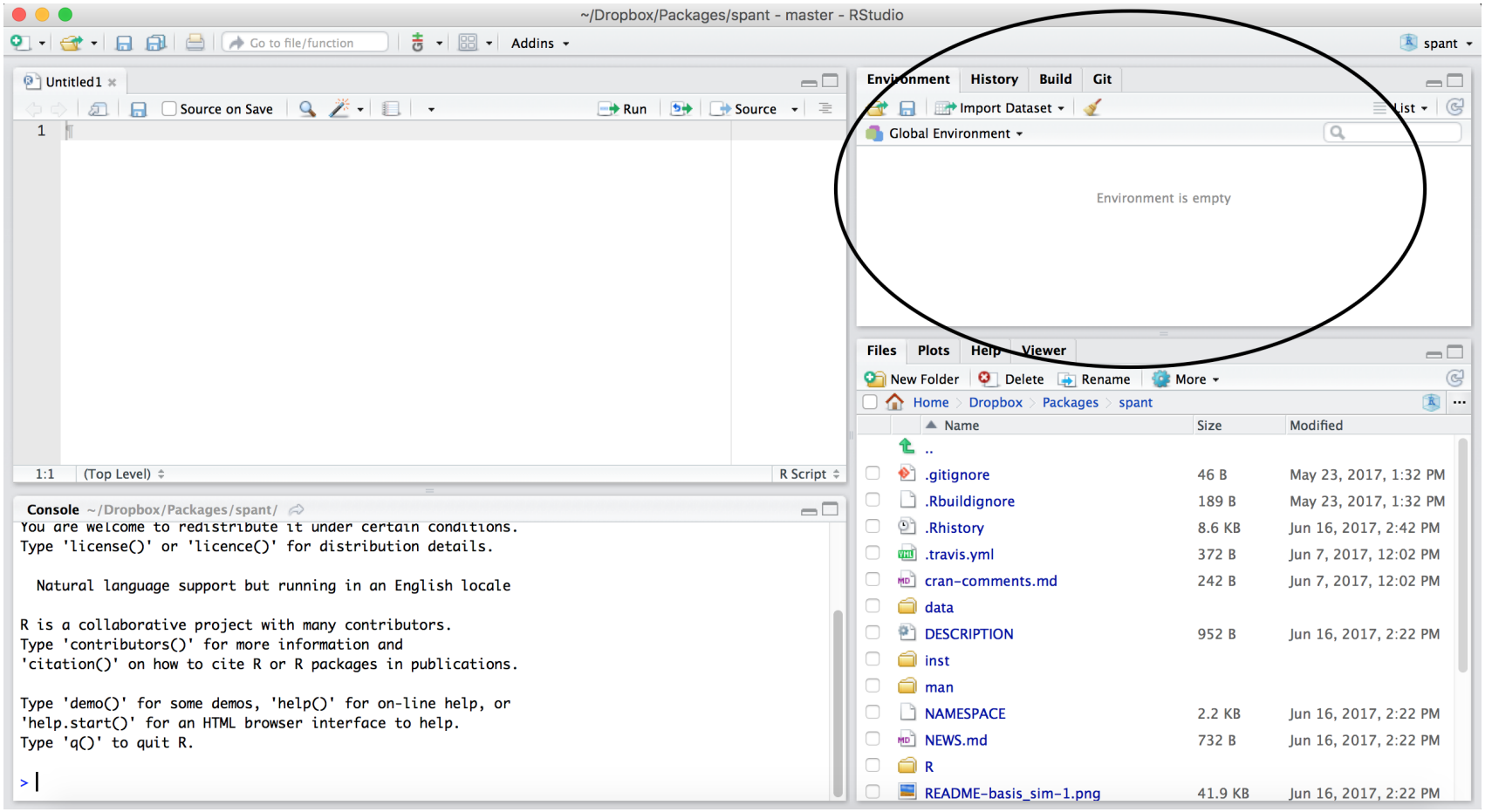
RStudio Layout

If RStudio doesn't look the way you want (or like our RStudio), then do:

RStudio –> Preferences –> Pane Layout



Workspace/Environment



Workspace/Environment

- Tells you what **objects** are in R
- What exists in memory/what is loaded?/what did I read in?

History

- Shows previous commands. Good to look at for debugging, but **don't rely** on it.
  Instead use RMarkdown!
- Also type the "up" key in the Console to scroll through previous commands

Other Panes

- **Files** - shows the files on your computer of the directory you are working in
- **Viewer** - can view data or R objects
- **Help** - shows help of R commands
- **Plots** - pictures and figures
- **Packages** - list of R packages that are loaded in memory

Useful R Studio Shortcuts

- `Ctrl + Enter` (`Cmd + Enter` on OS X) in your script evaluates that line of code
  - It's like copying and pasting the code into the console for it to run.
- `Ctrl+1` takes you to the script page
- `Ctrl+2` takes you to the console
- http://www.rstudio.com/ide/docs/using/keyboard_shortcuts

Viewing data

The `View` command allows you to view data in a spreadsheet format.

```
View(mtcars)
```

```
head(mtcars)
```

```
                   mpg cyl disp  hp drat    wt  qsec vs am gear carb
Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
Valiant           18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
```

```
tail(mtcars)
```

```
                mpg cyl  disp  hp drat    wt qsec vs am gear carb
Porsche 914-2  26.0   4 120.3  91 4.43 2.140 16.7  0  1    5    2
Lotus Europa   30.4   4  95.1 113 3.77 1.513 16.9  1  1    5    2
Ford Pantera L 15.8   8 351.0 264 4.22 3.170 14.5  0  1    5    4
Ferrari Dino   19.7   6 145.0 175 3.62 2.770 15.5  0  1    5    6
Maserati Bora  15.0   8 301.0 335 3.54 3.570 14.6  0  1    5    8
Volvo 142E     21.4   4 121.0 109 4.11 2.780 18.6  1  1    4    2
```

Lab: Starting with R and RMarkdown

Starting with R

Website

Website