Intro to R

RStudio

Help! Office hours

Poll: What times are best for you for office hours?

Today is different

Ava will hold office hours from 5:00pm - 6:00pm EST.

Office hours will always be held at the *same Zoom link*.

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

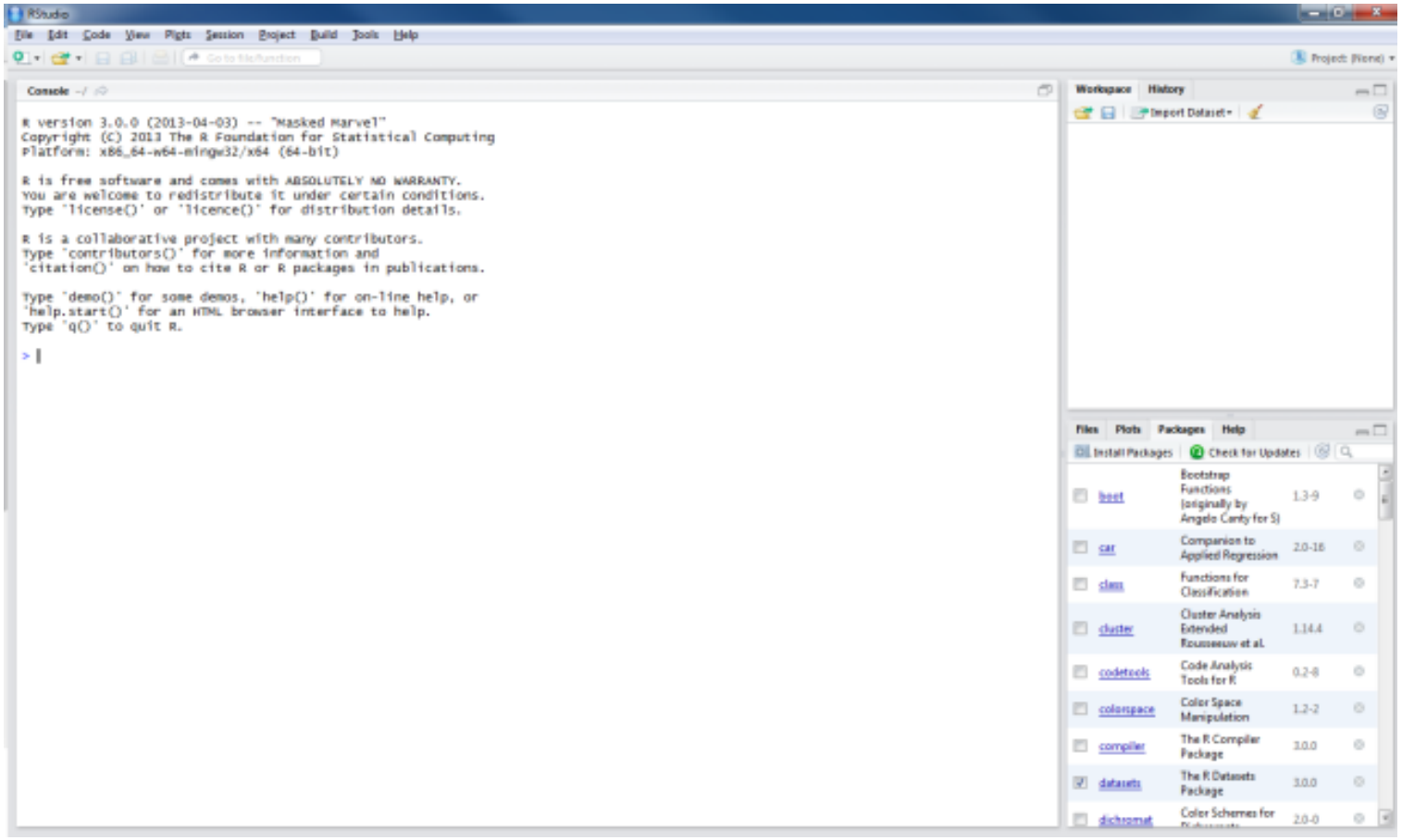
Easier working with R

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

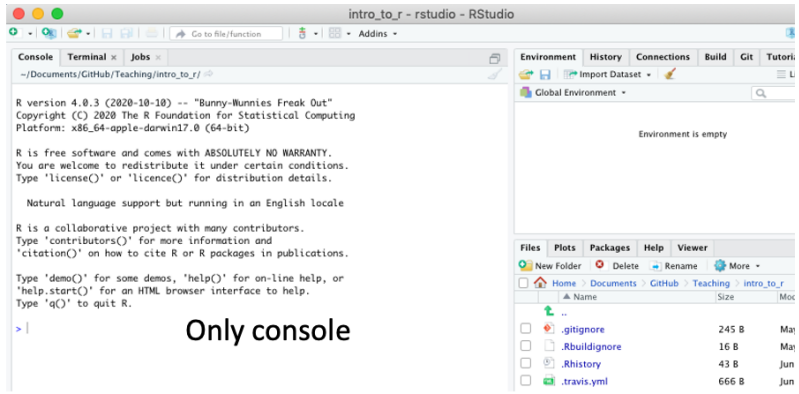
More information

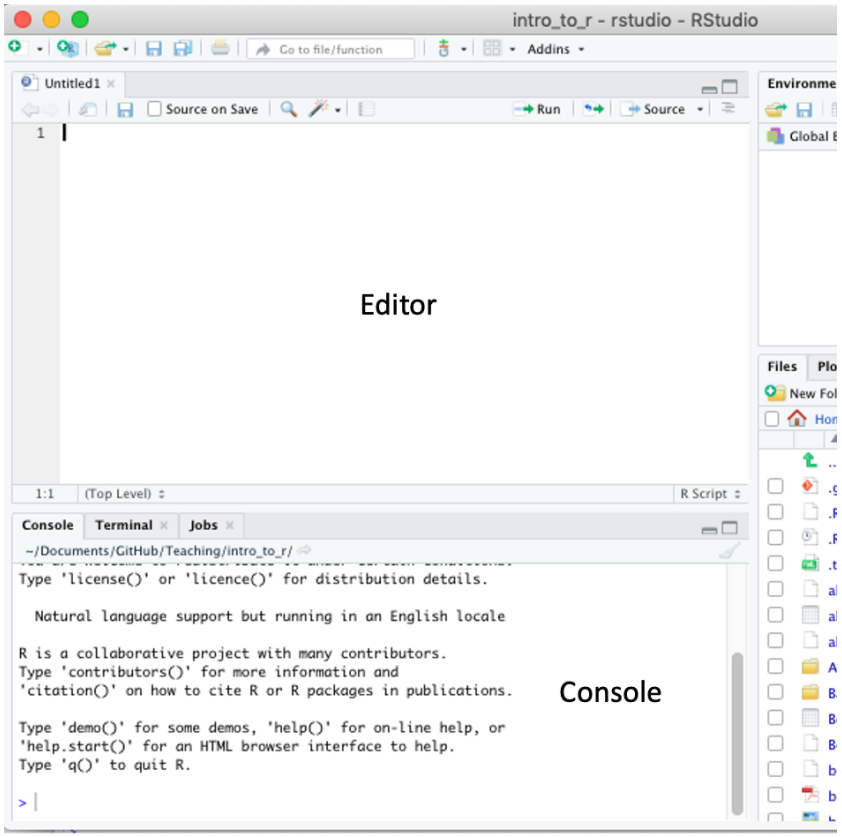
- Workspace browser and data viewer
- Plot history, zooming, and flexible image and file export
- Integrated R help and documentation
- Searchable command history

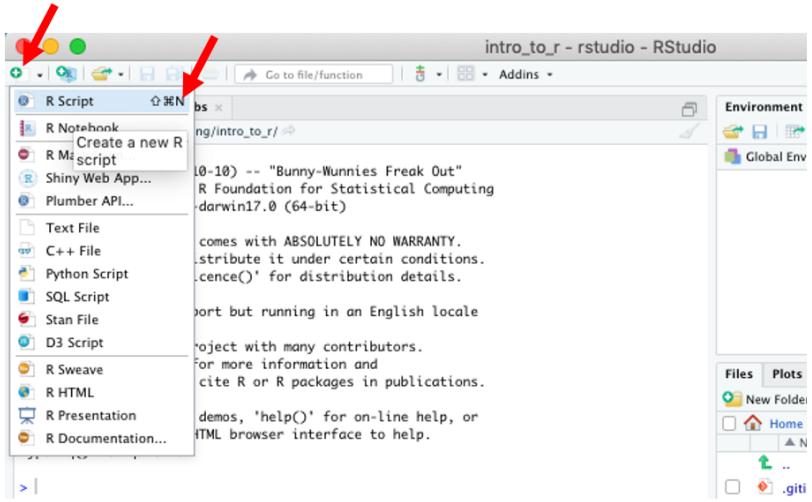
RStudio


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







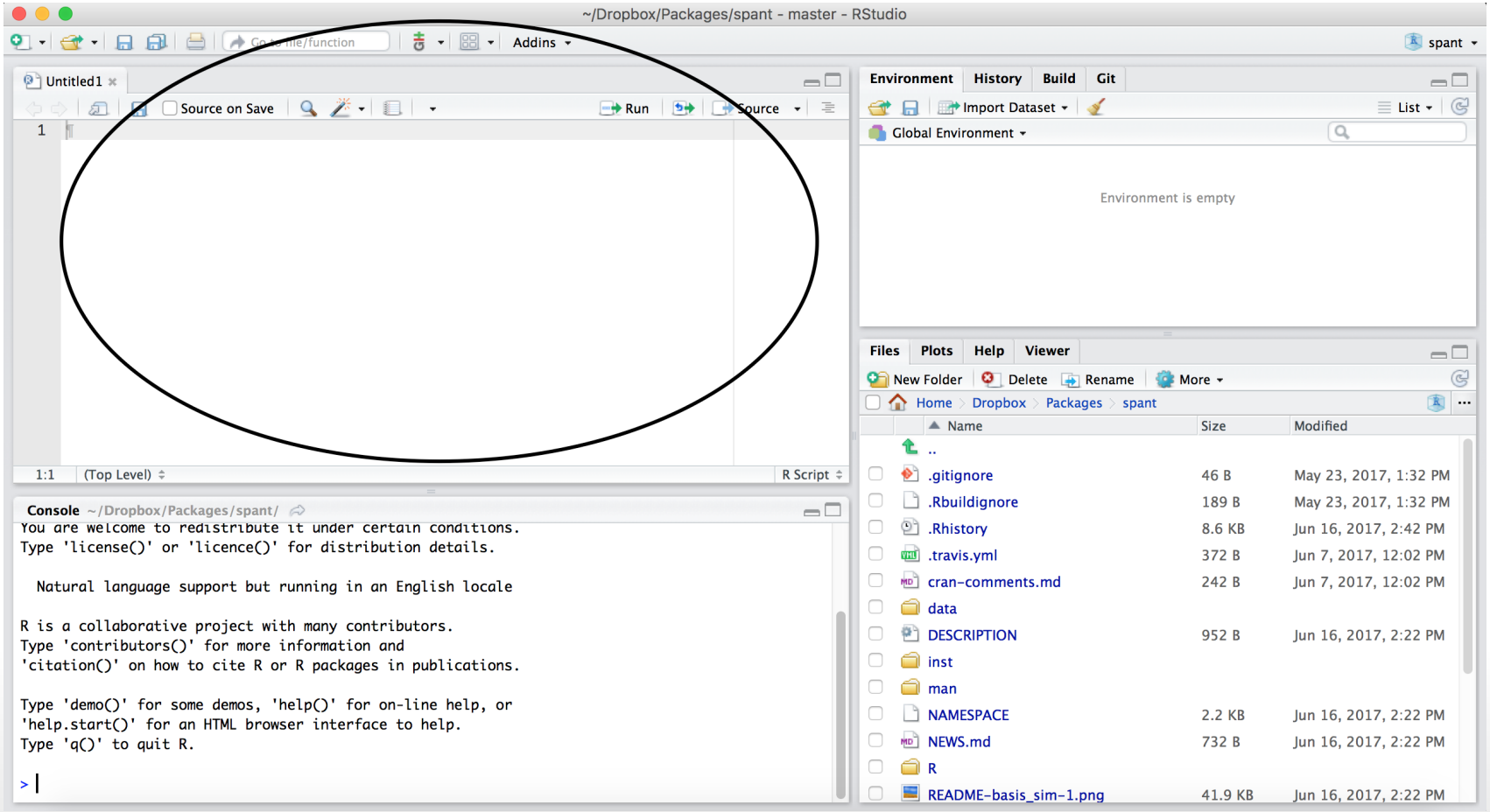
Working with R in R Studio - 2 major panes:

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

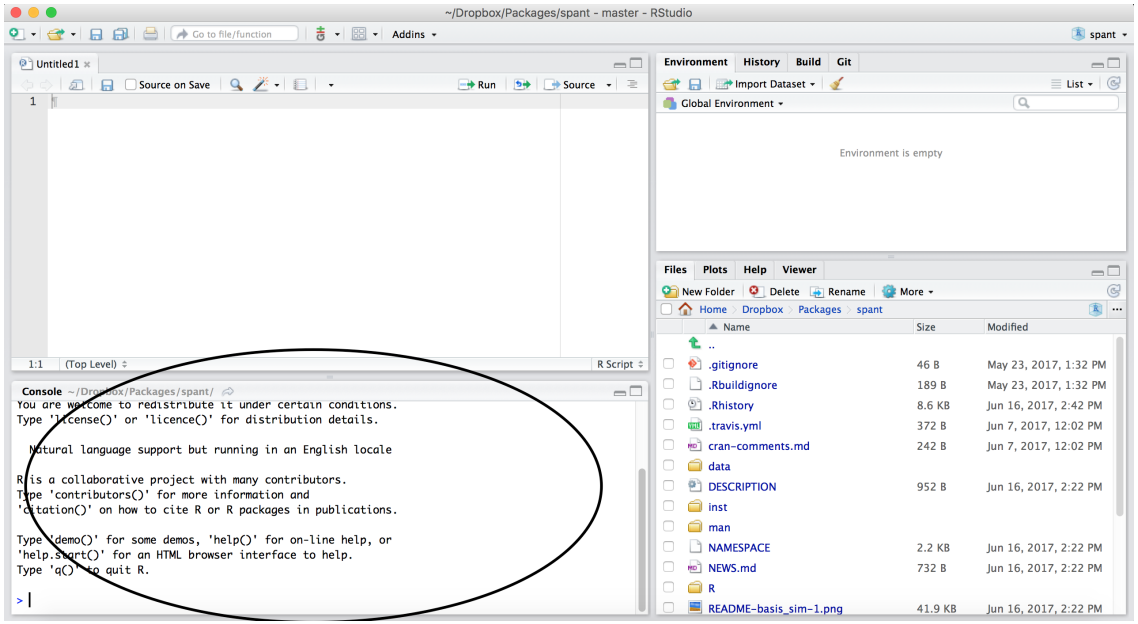
Source / Editor

- 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



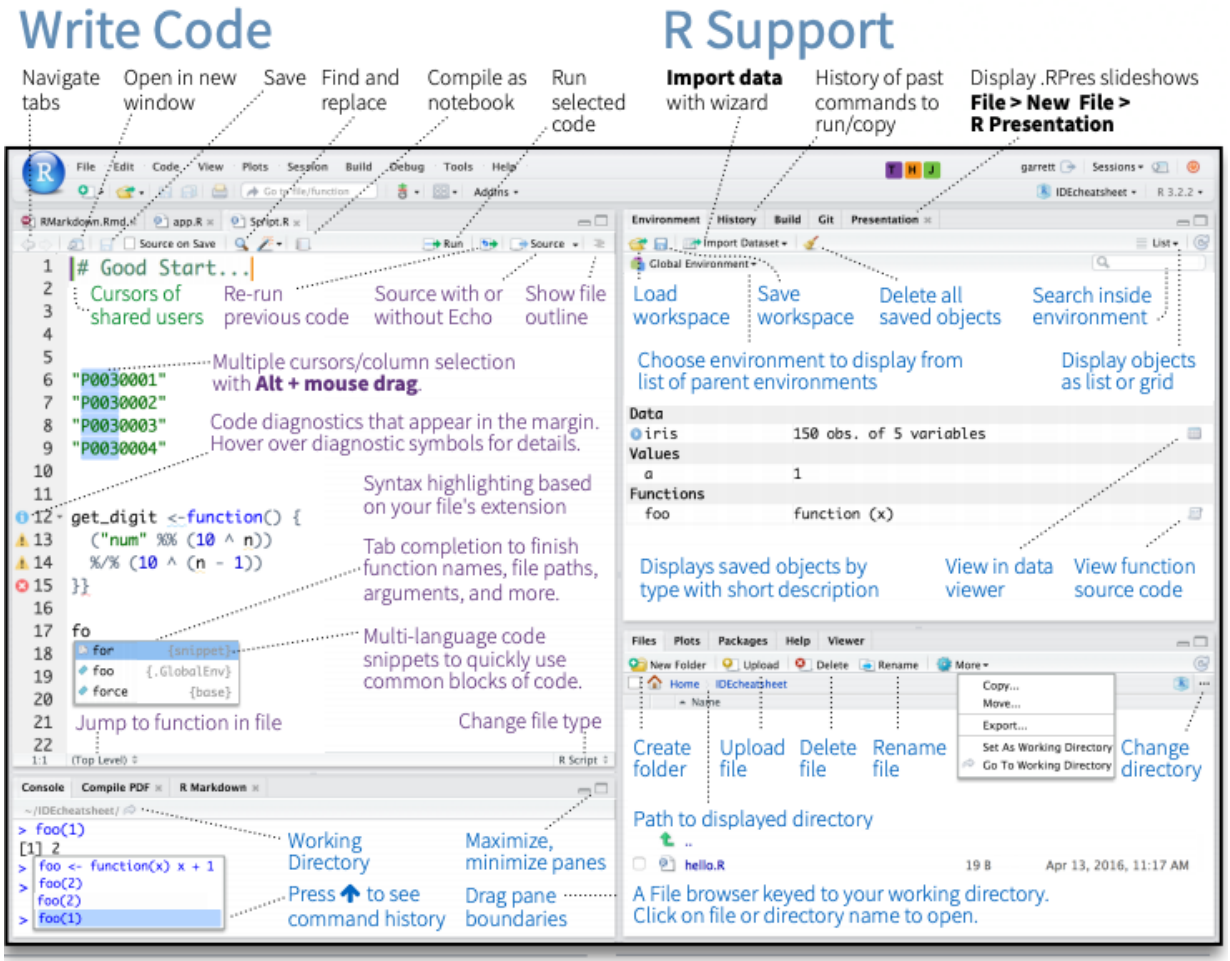
R Console



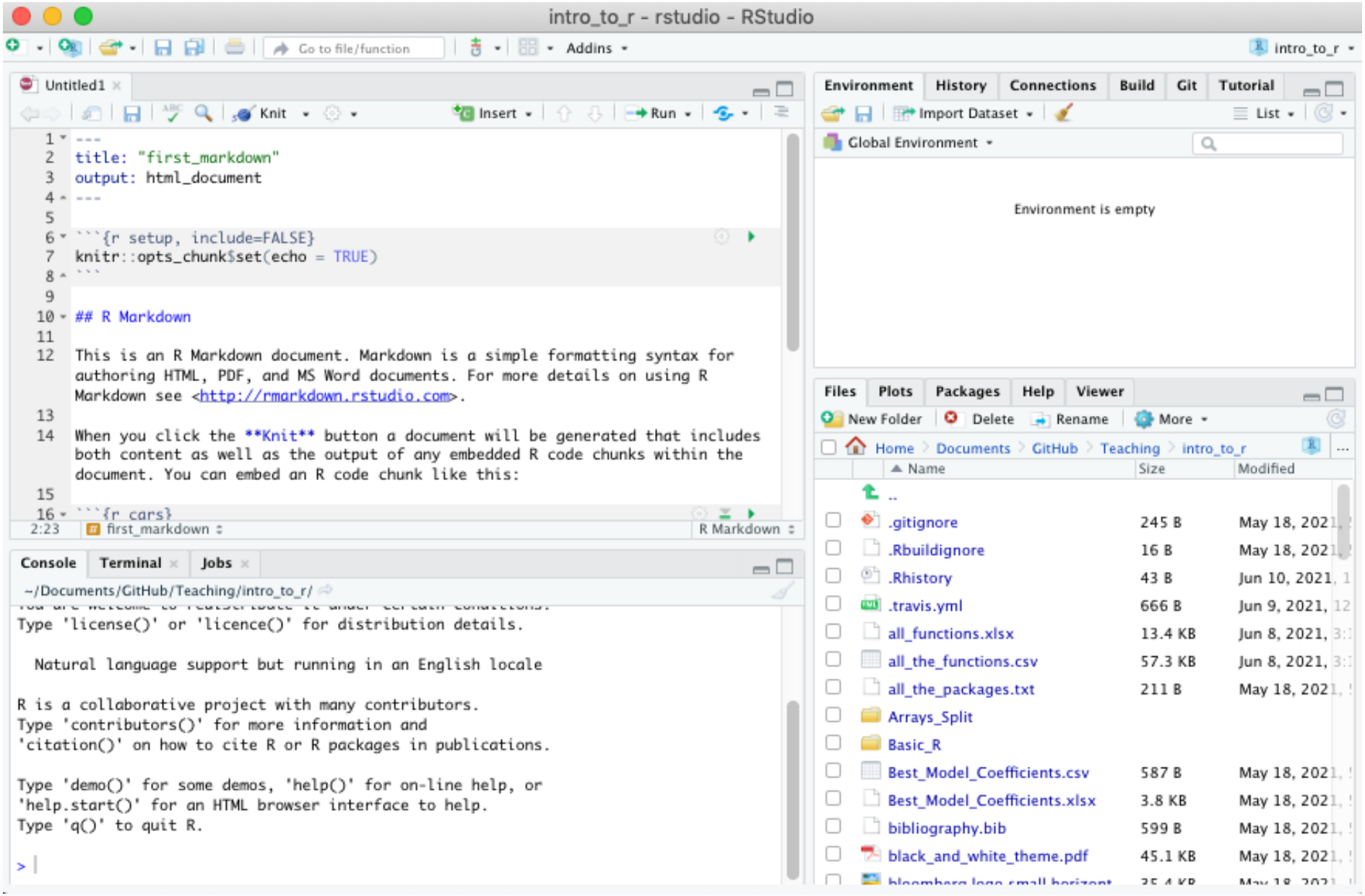
- Where code is executed (where things happen)
- You can type here for things interactively to test code
- Code is **not saved** on your disk

RStudio

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



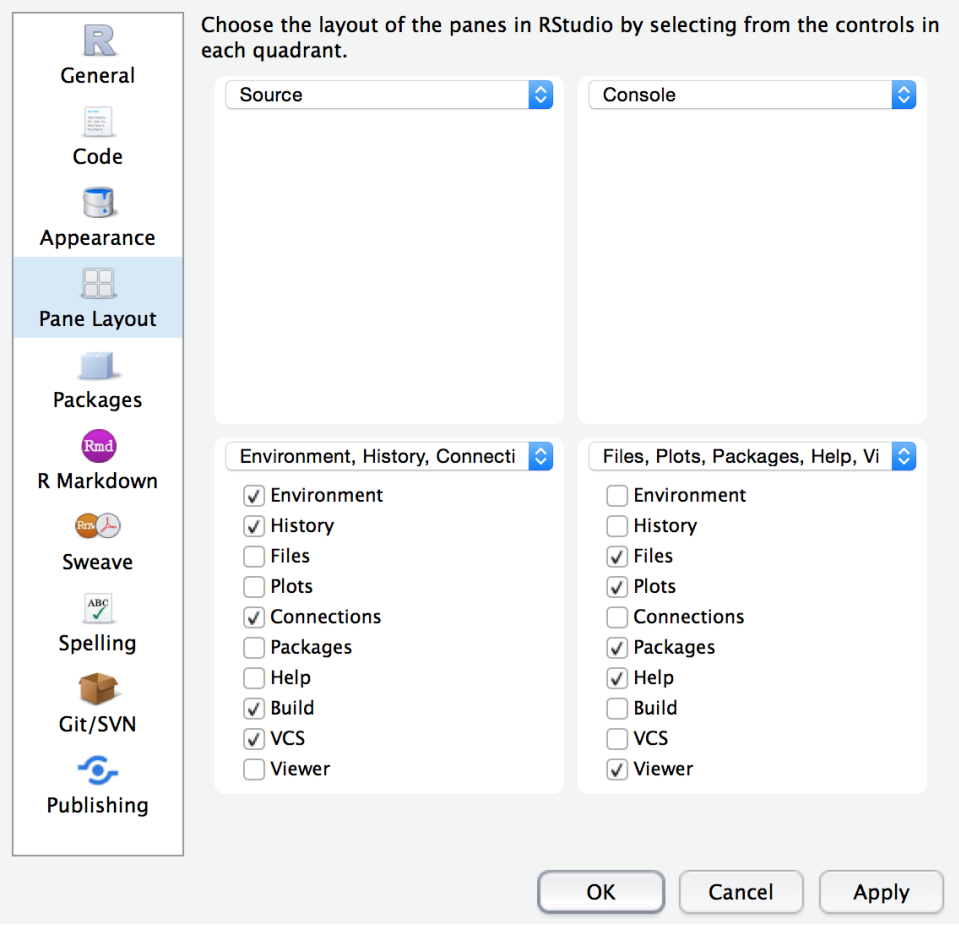
RStudio layout



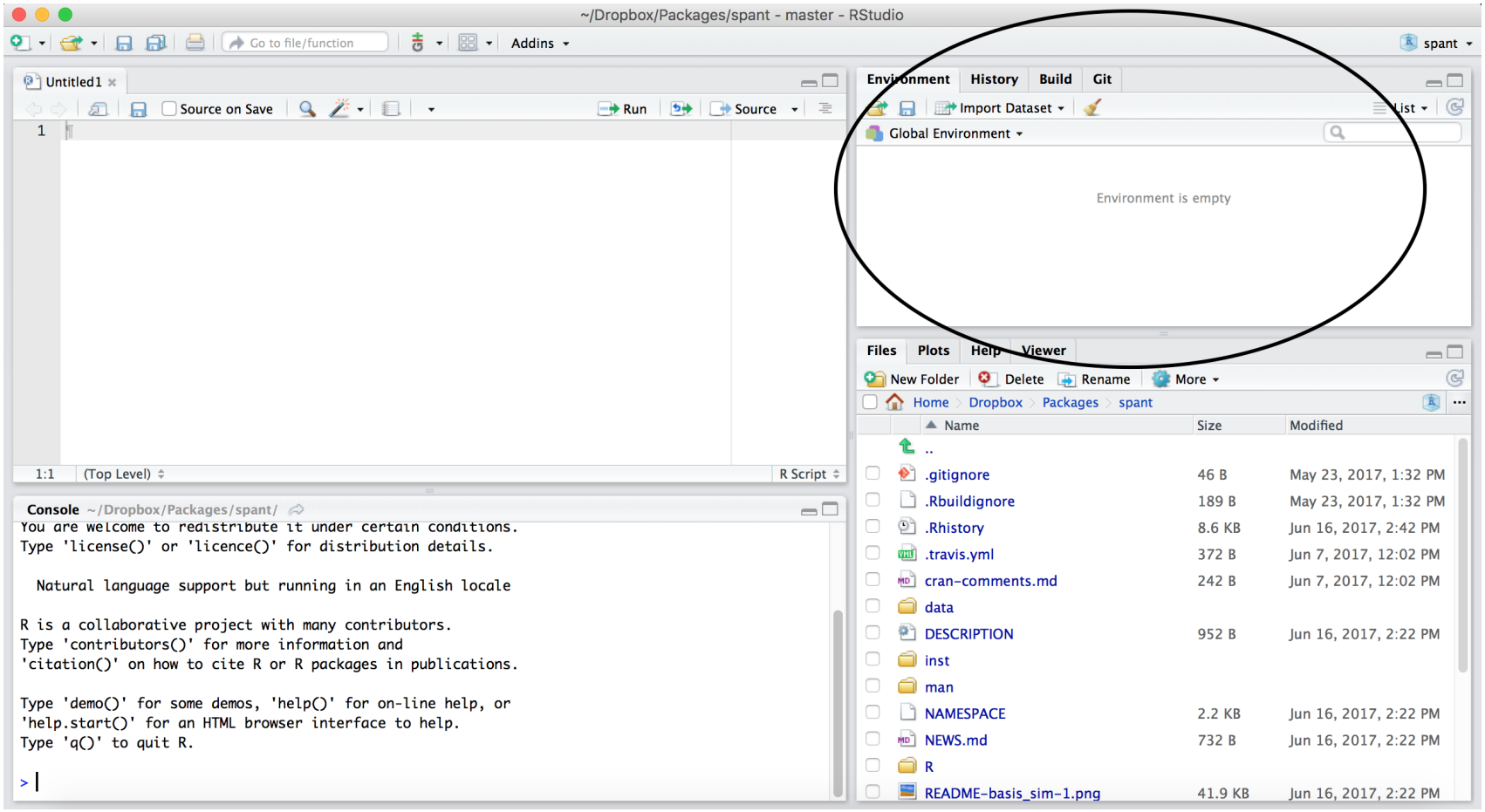
RStudio Layout

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

Let’s take a look at R Studio ourselves!

Lab: Starting with R and RMarkdown

RStudio Lab

To do this lab we need to:

1. Download the file at the link above by clicking on the link or typing in: https://jhudatascience.org/intro_to_r/modules/RStudio/lab/RStudio_Lab.Rmd

(Also on the website schedule page - Lab for day 1) 2) Find the downloaded file on your computer 3) Open the file in RStudio

This may require finding your downloads on your computer.

Recall that these videos can help:

If you have a PC: https://youtu.be/we6vwB7DsNU

If you have a Mac: https://www.youtube.com/watch?v=Ao9e0cDzMrE

R Markdown file

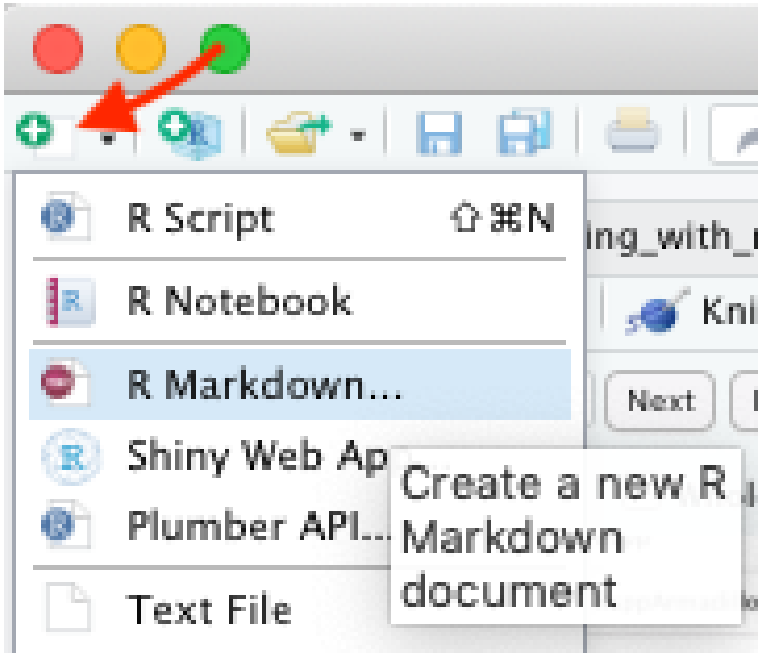
R Markdown files (.Rmd) help generate reports that include your code and output. Think of them as fancier scripts.

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

Create an R Markdown file

Go to File → New File → R Markdown

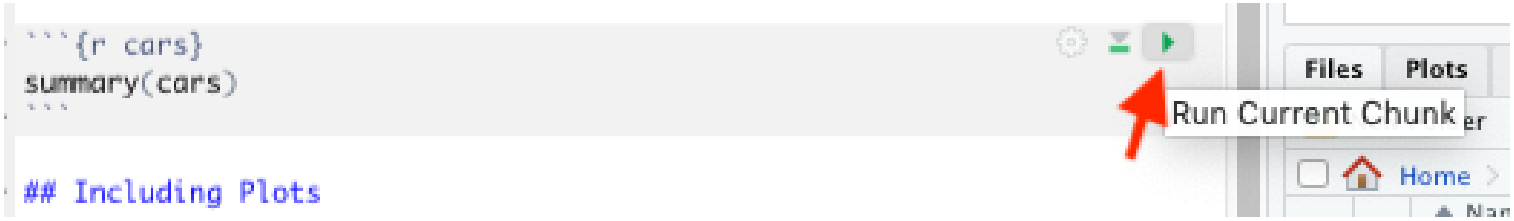
Call your file “first_markdown”



Code chunks

Within R Markdown files are code “chunks”

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

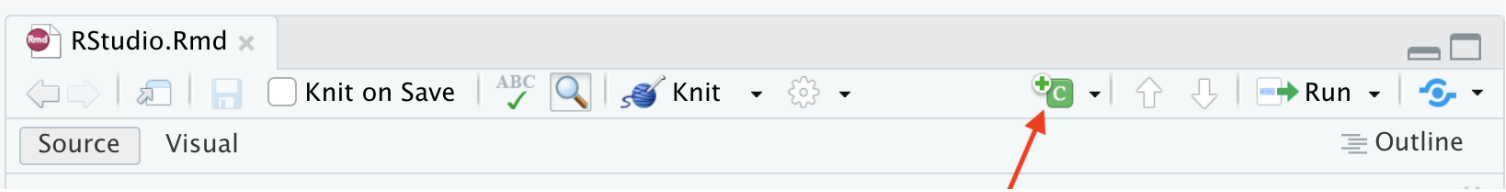


Create Chunks

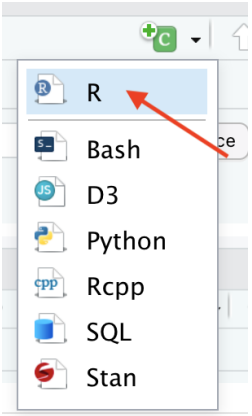
To create a new R code chunk:

Copy paste an existing chunk in the R Markdown file and replace the code **OR**

1. Use the insert code chunk button at the top of RStudio.



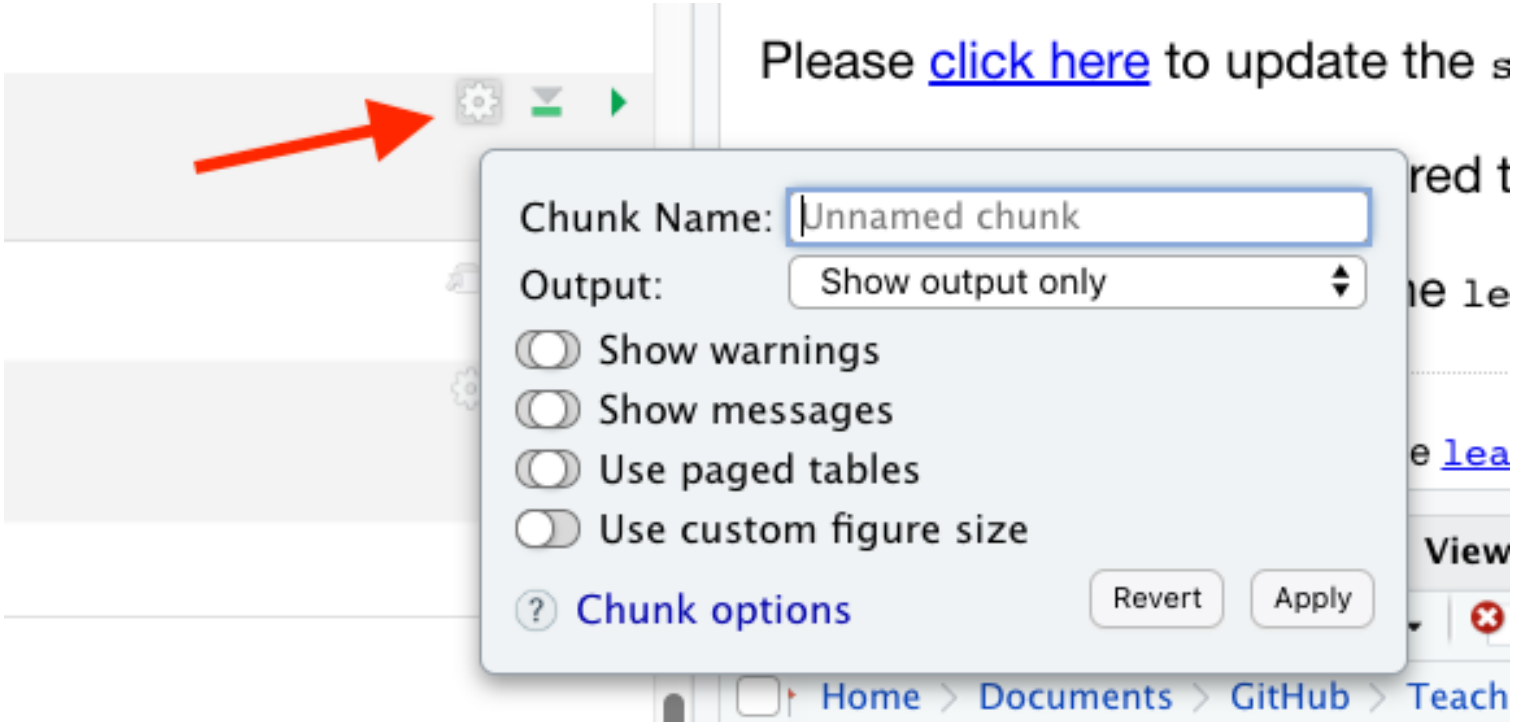
1. Select R (default) as the language:



Run previous chunks button

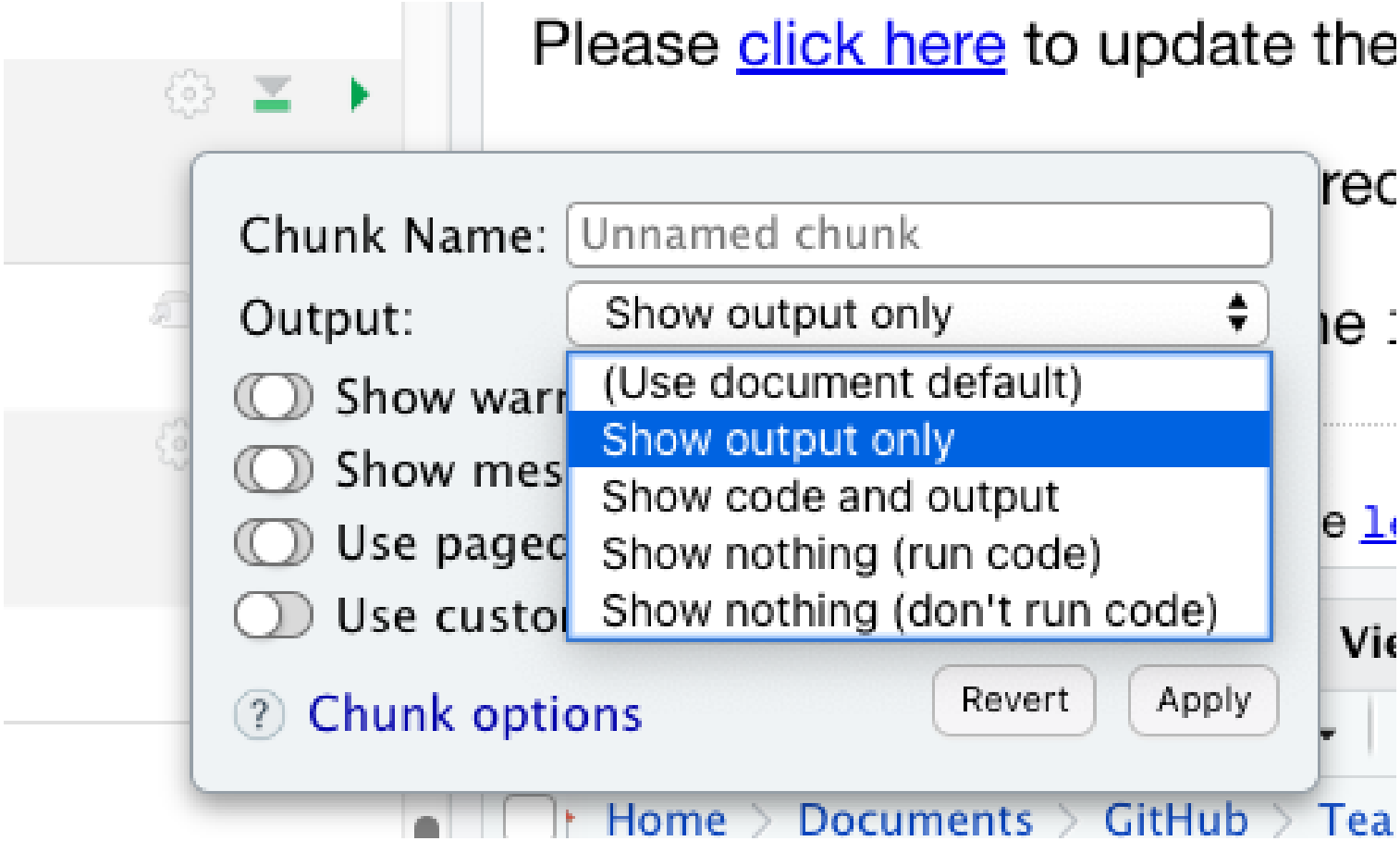
You can run all chunks above a specific chunk using this button:

Chunk settings



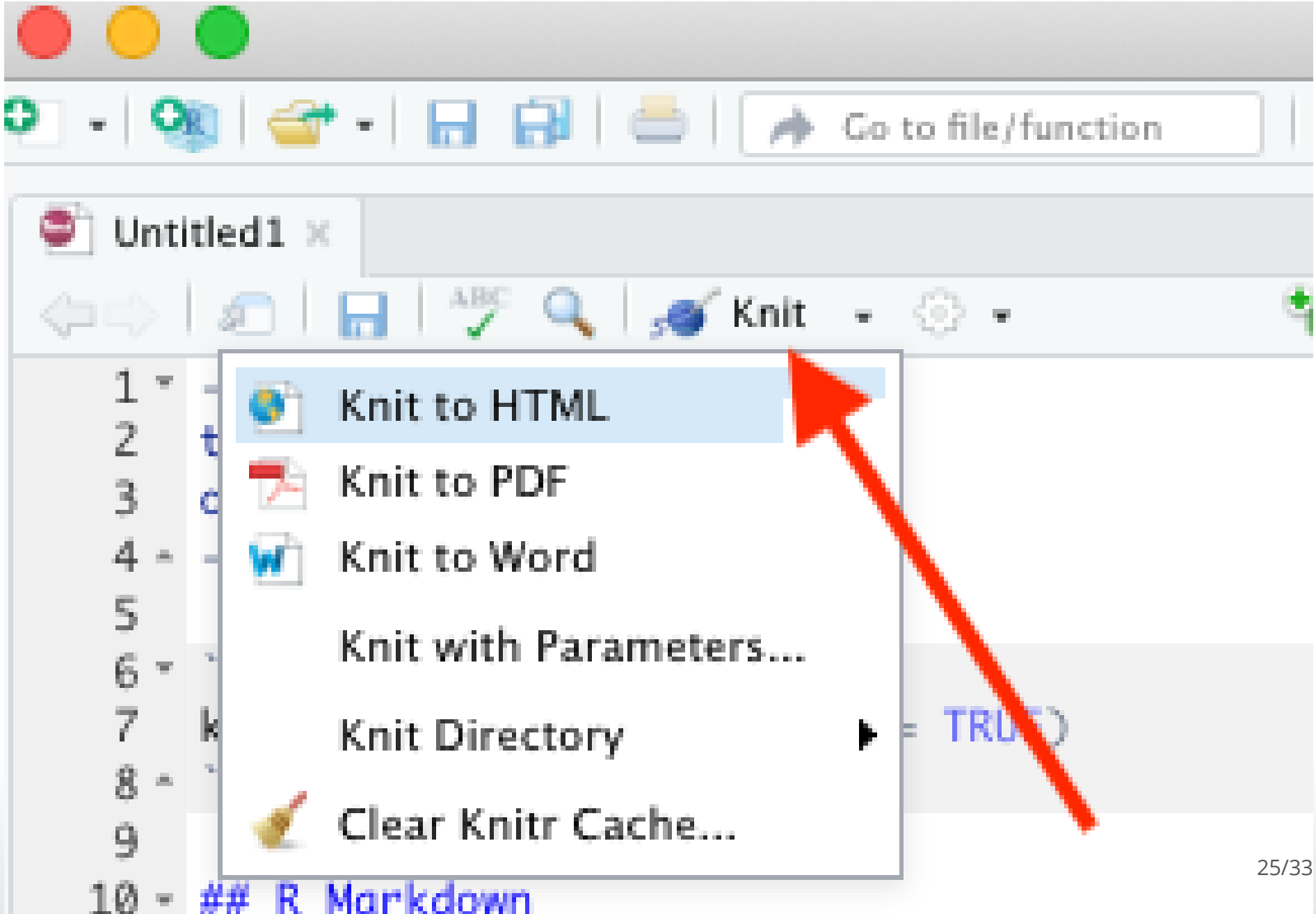
Chunk settings

You can specify if a chunk will be seen in the report or not.



Knit file to html

This will create a report from the R Markdown document!



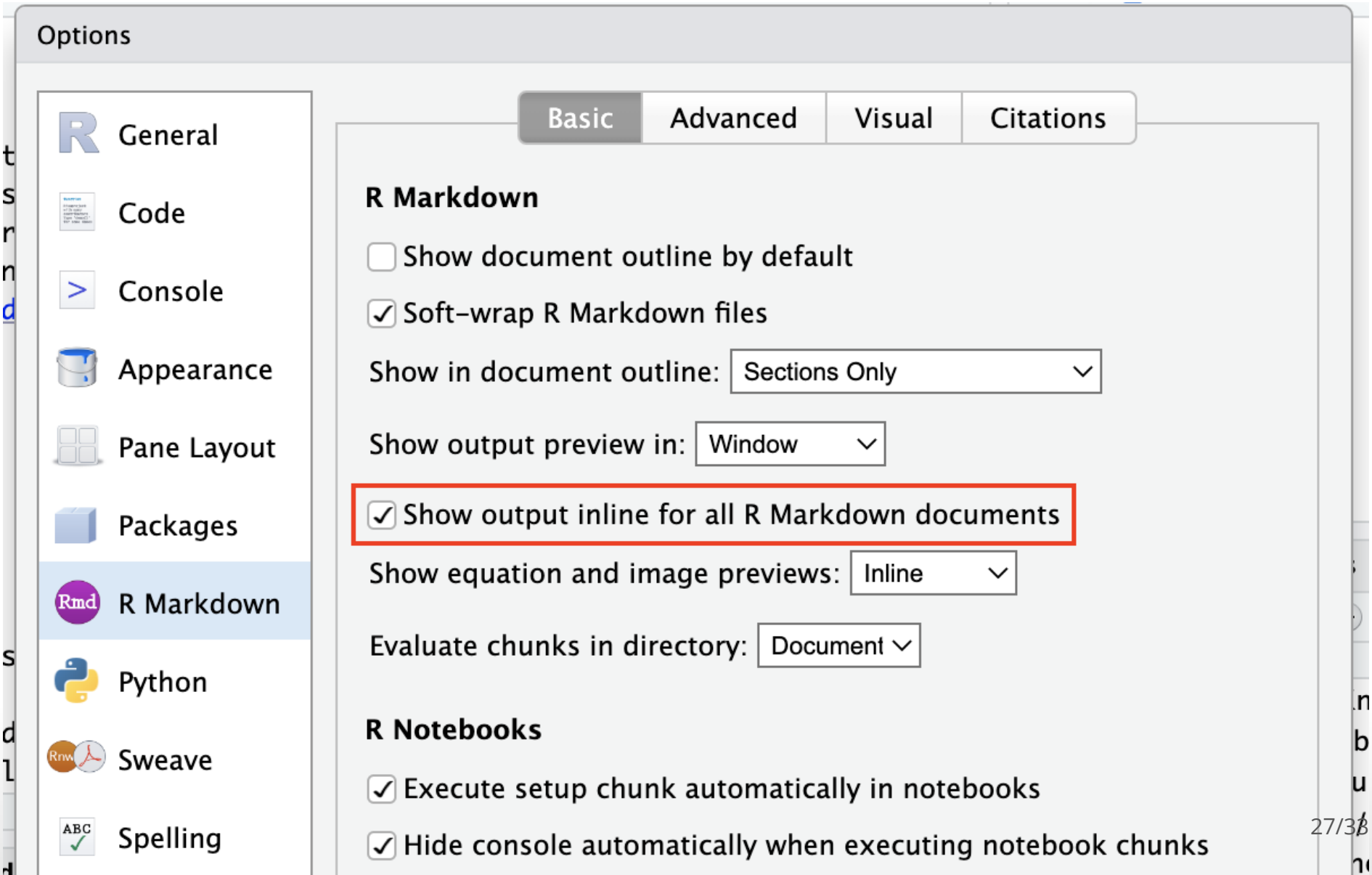
Useful R Studio Shortcuts

- `Ctrl + Enter` 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

If you get annoyed by inline code previews in Markdown files:

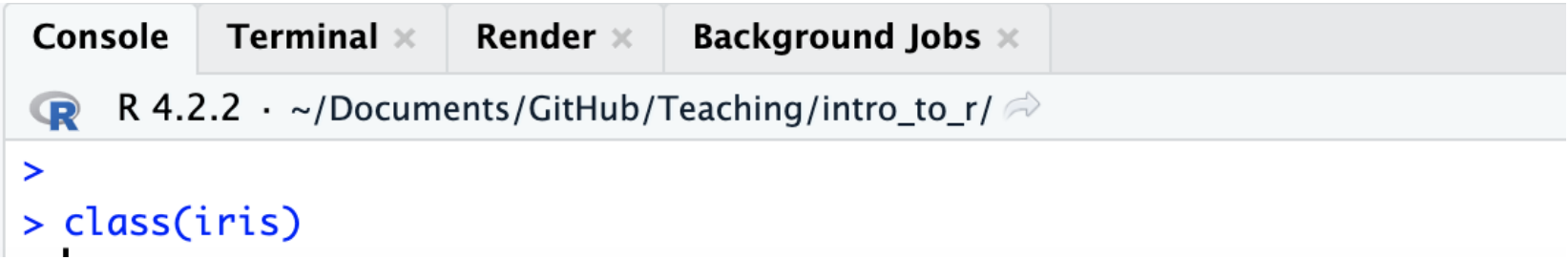
In RStudio Click the Edit tab –> scroll down to Preferences… –> R Markdown

Uncheck the following:

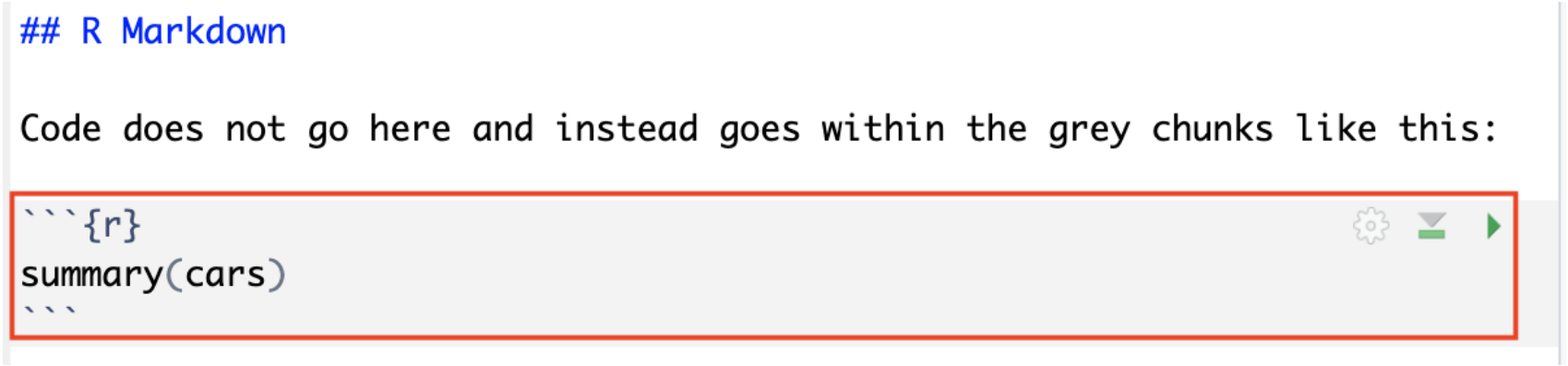


Recap of where code goes

- you can test code in the console

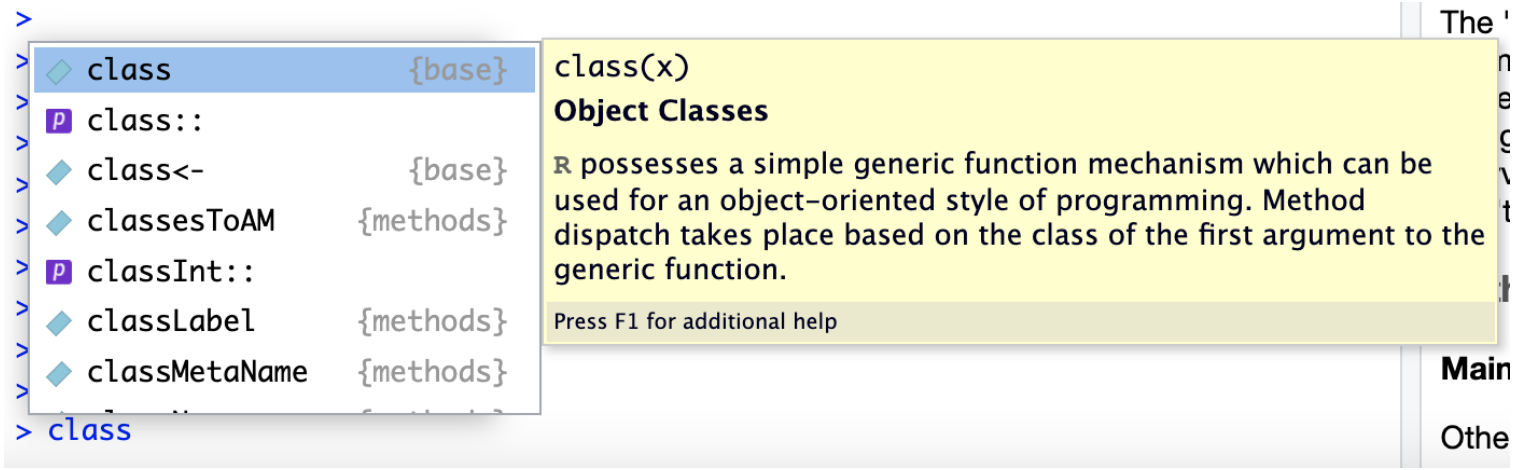


- you can save code in a chunk in the editor (Markdown file)

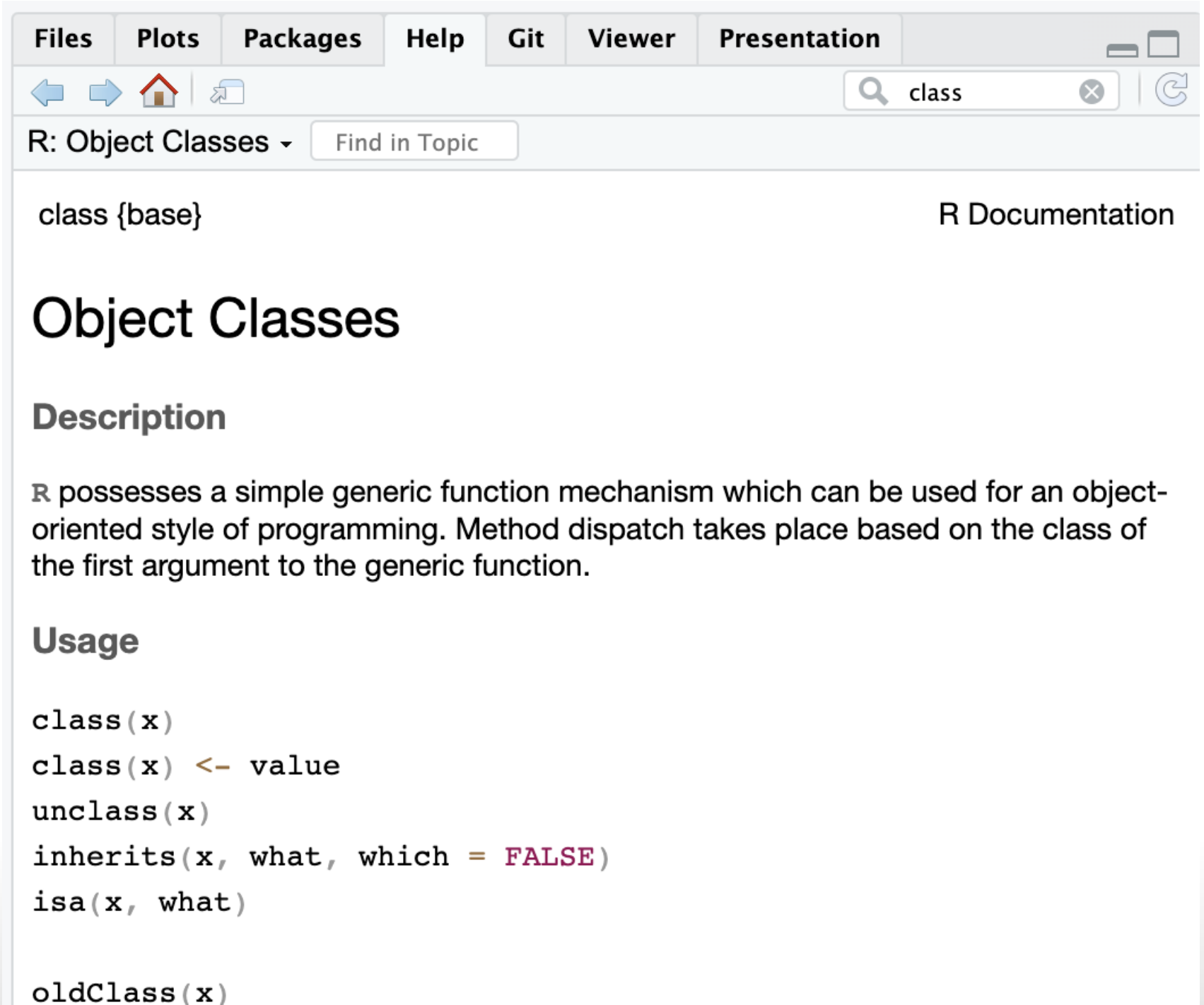


Getting help from the preview

When you type in a function name, a pop up will preview documentation to help you. It also helps you remember the name of the function if you don't remember all of it!



Get help with the help pane

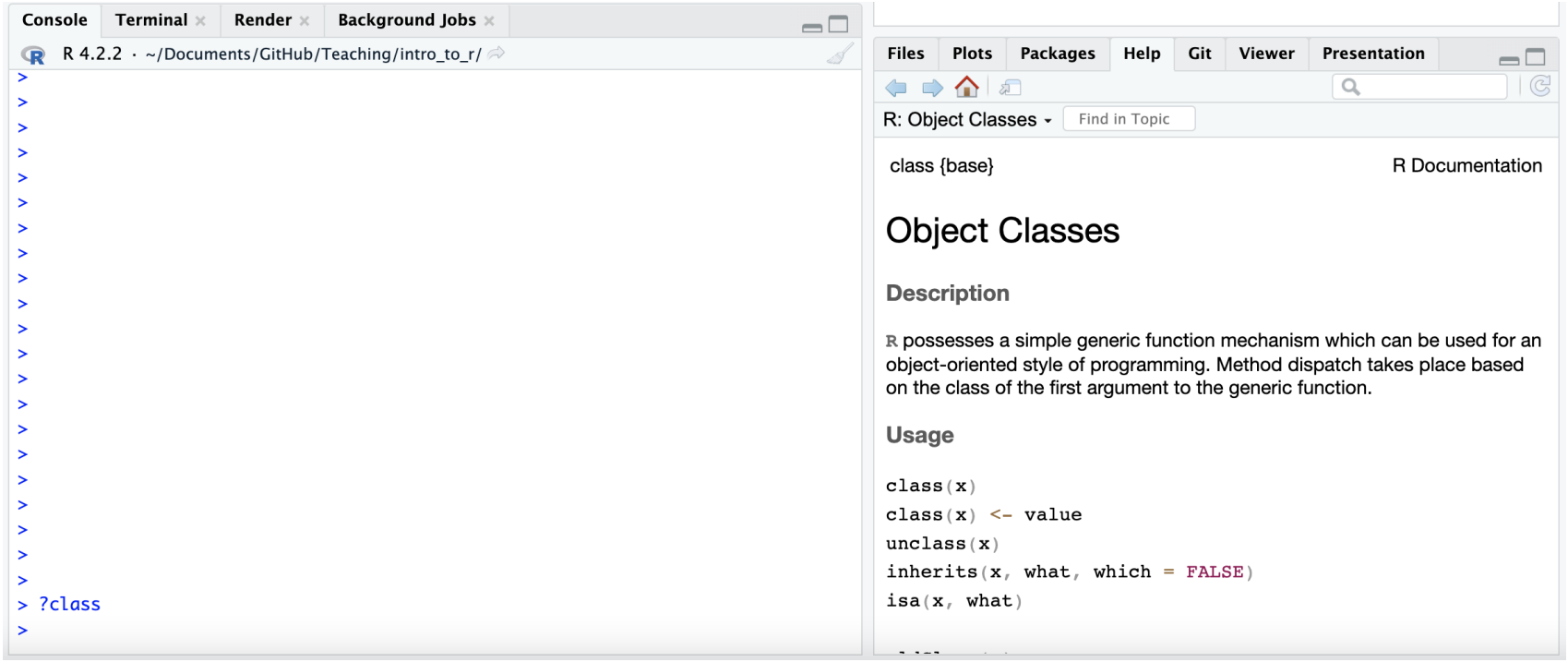


Getting Help with ?

If you know the name of a package or function:

Type `?package_name` or `?function_name` in the console to get information about packages and functions.

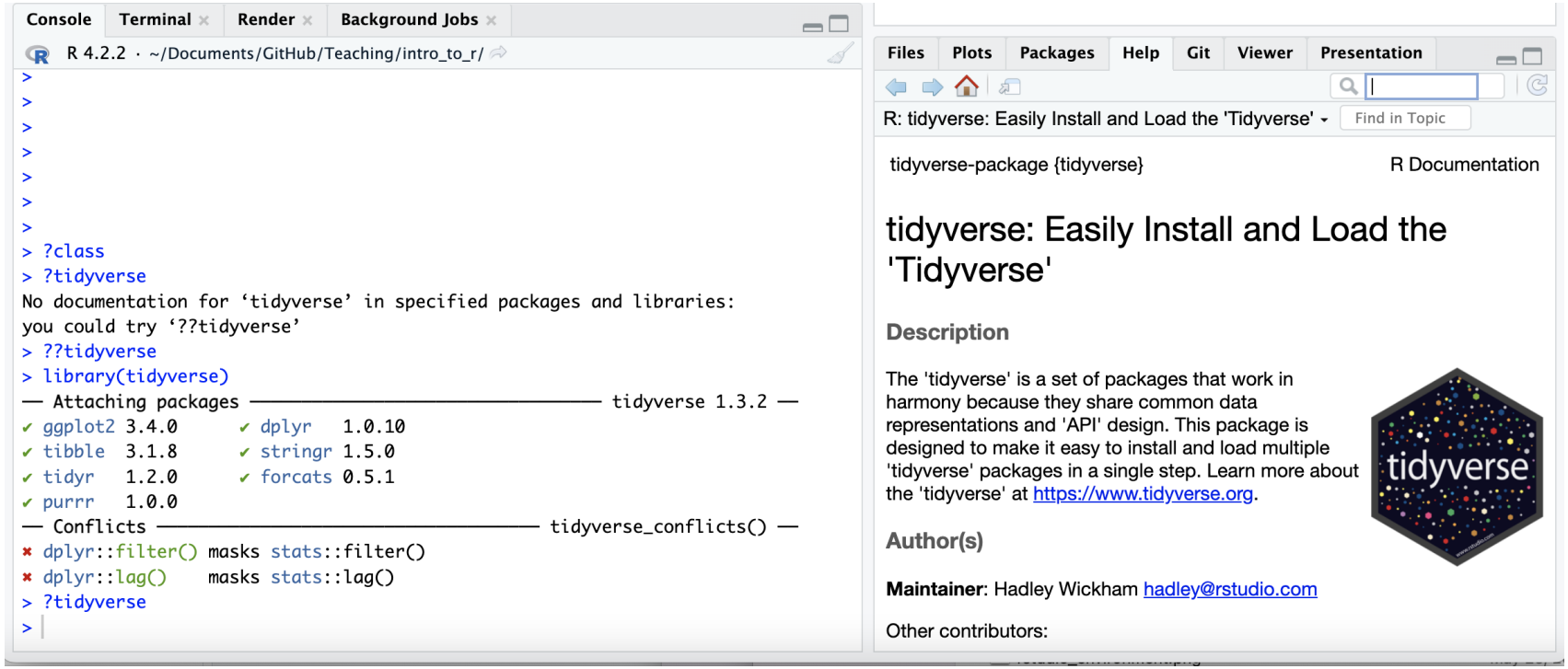
For example: `?readr` or `?read_csv`.



Double Question Mark

If you haven't loaded a package yet into R than you may get a response that there is no documentation.

Typing in `??package_name` can show you packages that you haven't loaded yet.



Summary

- RStudio makes working in R easier
- the Editor is for static code like scripts or R Markdown documents
- The console is for testing code
- R markdown documents are really helpful for lots of reasons!
- R code goes within what is called a chunk (the gray box with a green play button)
- Code chunks can be modified so that they show differently in reports

Class Website

Lab

Image by Gerd Altmann from Pixabay