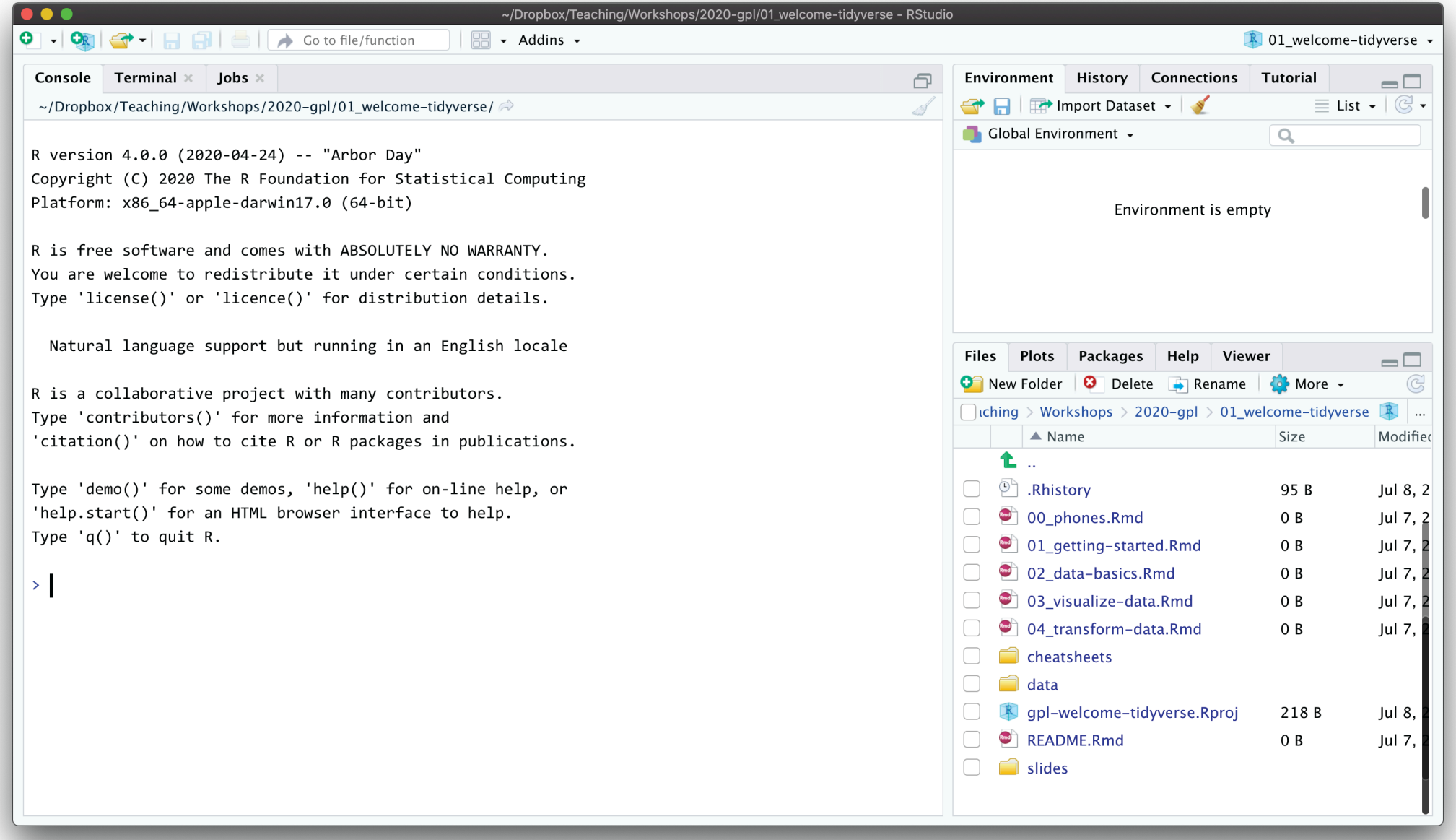
Getting started with R and RStudio

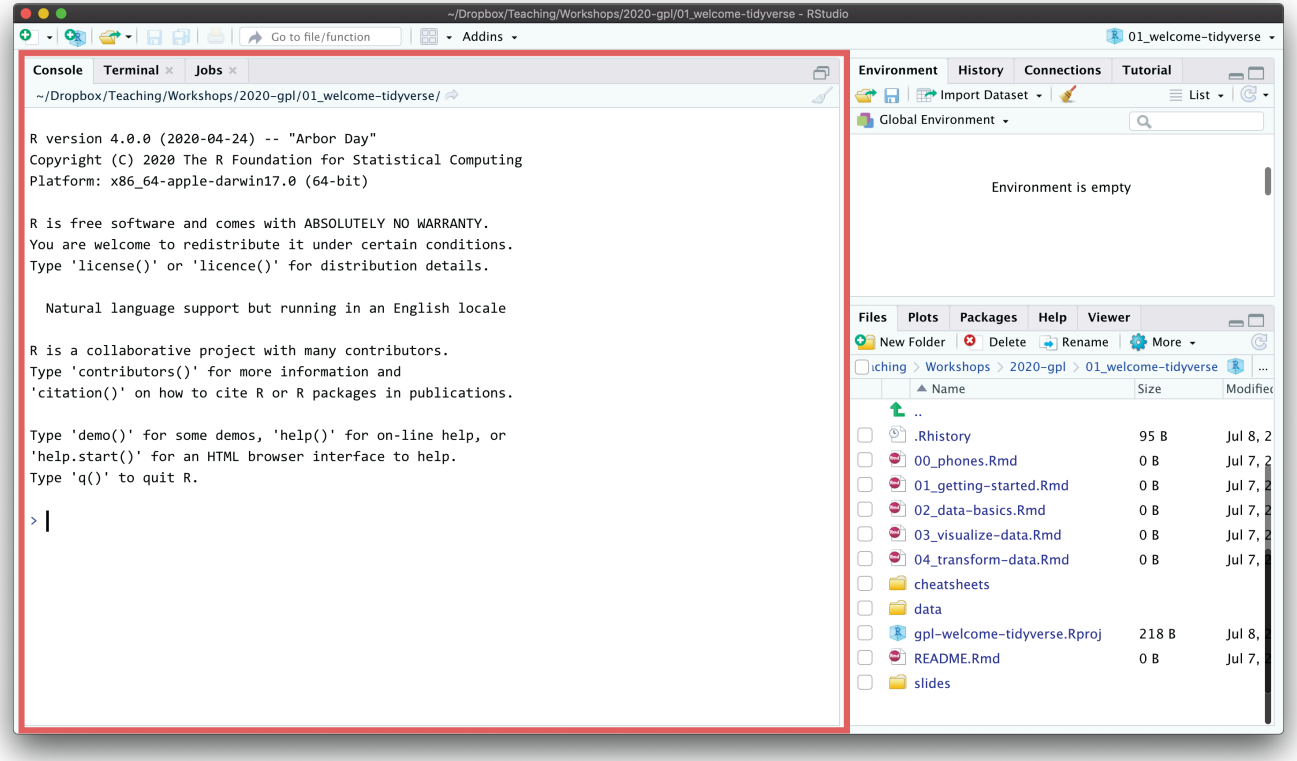
The engine

The dashboard

A tour of RStudio


~/Dropbox/Teaching/Workshops/2020-gpl/01_welcome-tidyverse - RStudio
Go to file/function
Addins
01_welcome-tidyverse
Console
Terminal
Jobs
~/Dropbox/Teaching/Workshops/2020-gpl/01_welcome-tidyverse/
R version 4.0.0 (2020-04-24) -- "Arbor Day"
Copyright (C) 2020 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin17.0 (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.
Natural language support but running in an English locale
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.
>
Environment
History
Connections
Tutorial
Import Dataset
List
Global Environment
Environment is empty
Files
Plots
Packages
Help
Viewer
New Folder
Delete
Rename
More
Workshops
2020-gpl
01_welcome-tidyverse
Name
Size
Modified
..
.Rhistory 95 B Jul 8, 2
00_phones.Rmd 0 B Jul 7, 2
01_getting-started.Rmd 0 B Jul 7, 2
02_data-basics.Rmd 0 B Jul 7, 2
03_visualize-data.Rmd 0 B Jul 7, 2
04_transform-data.Rmd 0 B Jul 7,
cheatsheets
data
gpl-welcome-tidyverse.Rproj 218 B Jul 8,
README.Rmd 0 B Jul 7,
slides

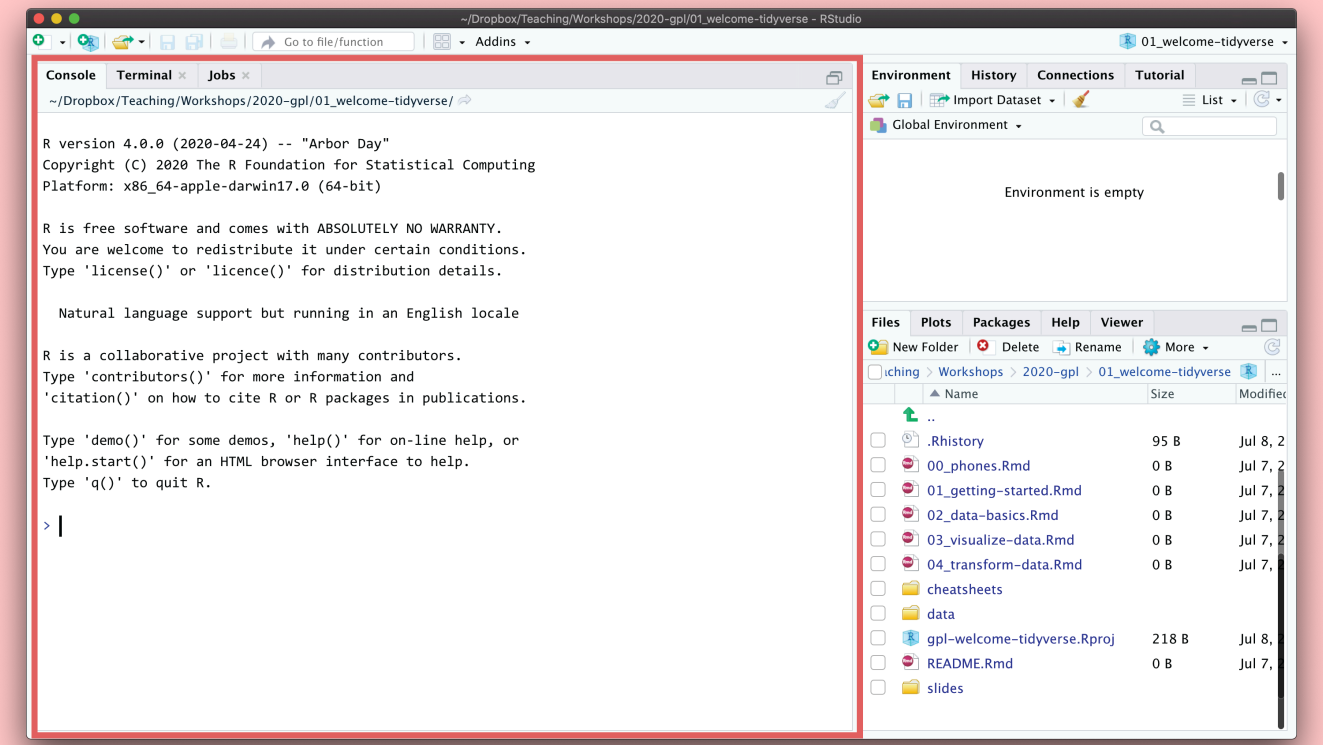
Console



R is awaiting your instructions

Type code here, press enter, and R will run it

Your turn



Type `2 + 2` in the console

Press enter

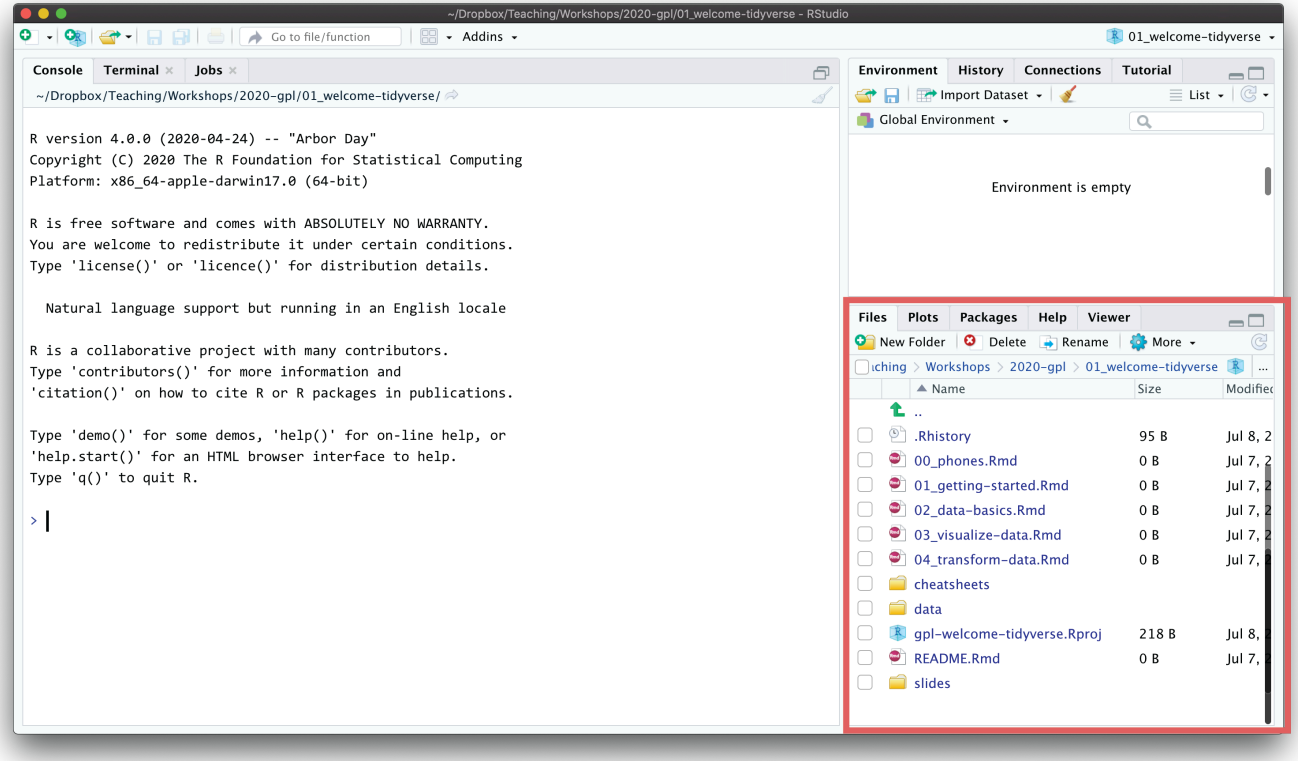
```
2 + 2
```

```
## [1] 4
```

This is ephemeral though.
If you want to run this again, you'll have to type it again.

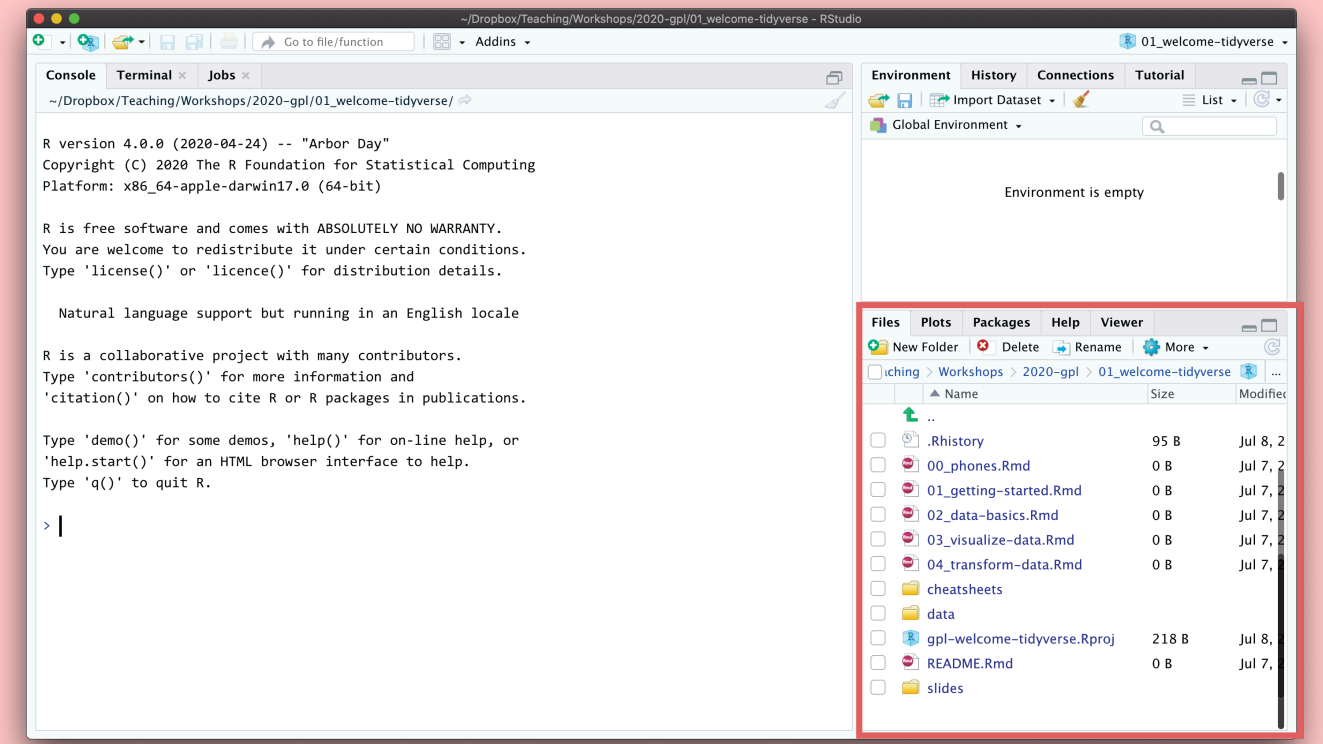
Store R code in a document instead

Files pane



All the files in your current working directory

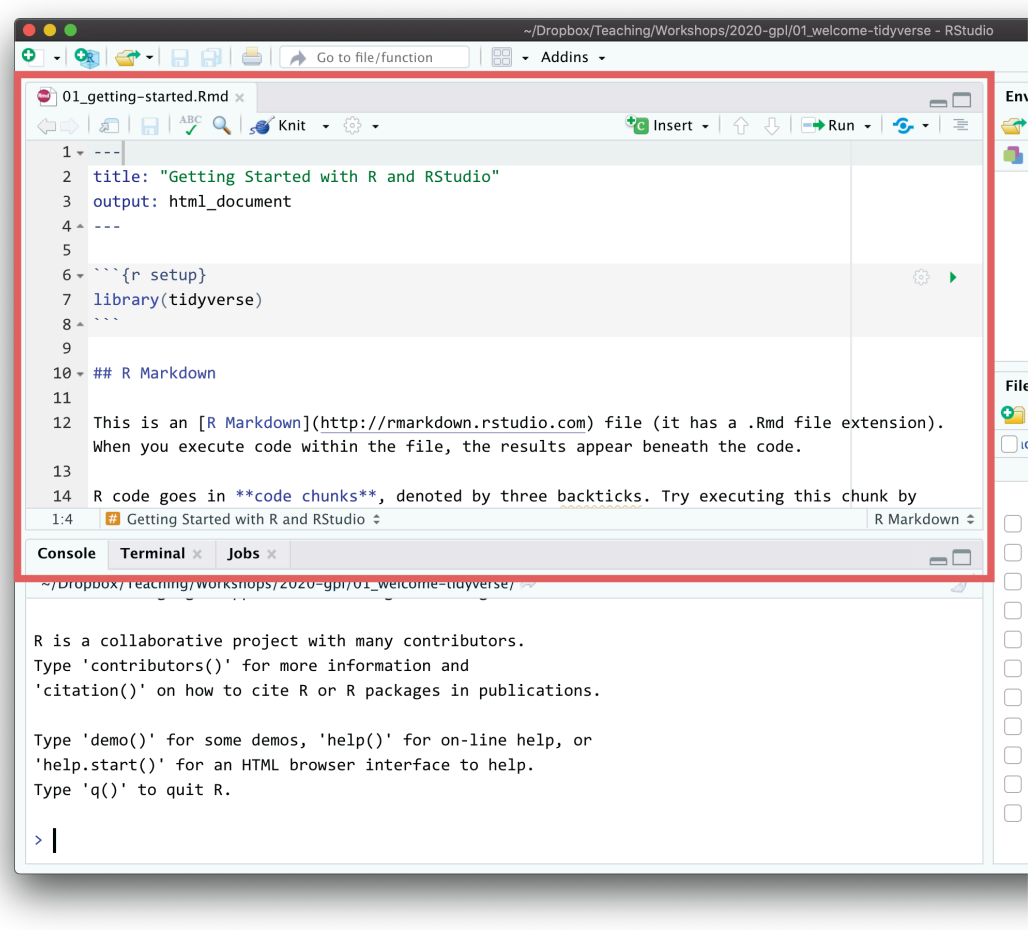
Your turn



Find `01_getting-started.qmd`

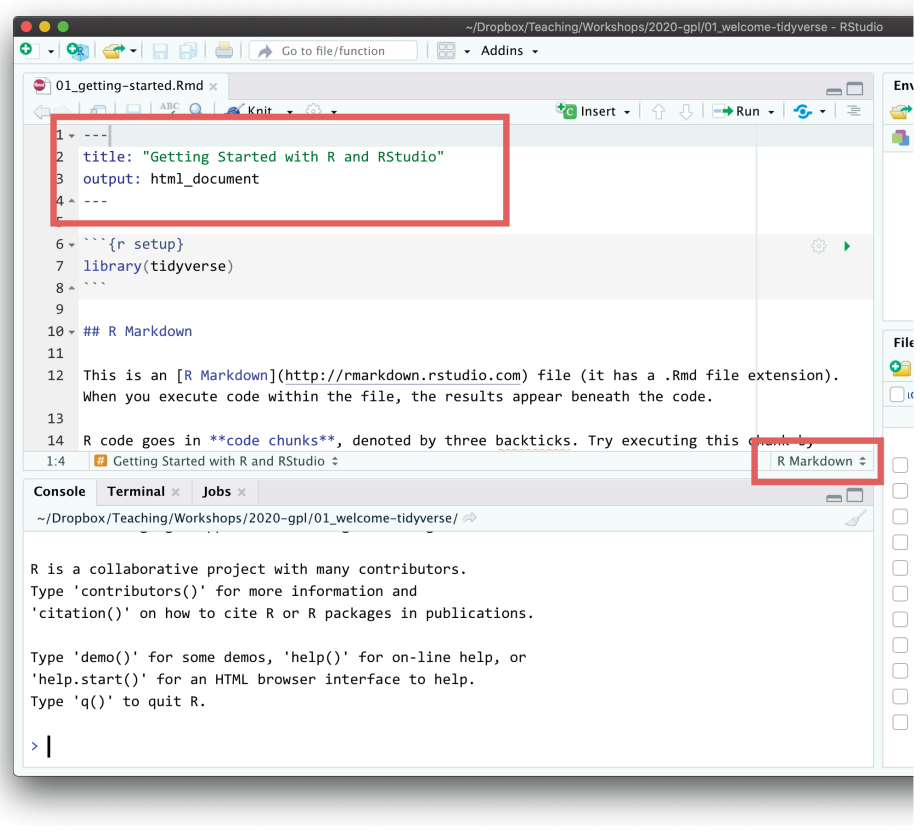
Click on its name to open the file

Source pane



Documents open here

Quarto



Document format that combines text and code

Acts like a notebook for your analysis

Quarto


01_getting-started.Rmd
Knit
Insert
Run
10 ## R Markdown
11
12 This is an [R Markdown](http://rmarkdown.rstudio.com) file (it has a .Rmd file extension).
When you execute code within the file, the results appear beneath the code.
13
14 R code goes in **code chunks**, denoted by three backticks. Try executing this chunk by
clicking the *Run* button (a small green triangle) within the chunk or by placing your cursor
inside it and pressing *Ctrl+Shift+Enter* (or *Cmd+Shift+Enter* on Mac).
15
16 ```{r}
17 ggplot(data = mpg) +
18 geom_point(mapping = aes(x = cty, y = hwy), alpha = 0.2)
19 ```
40
30
hwy

Text

Quarto

Text

Code

Quarto

Text

Code

Output

Your turn

Read the instructions

Run the code chunk by clicking the play button

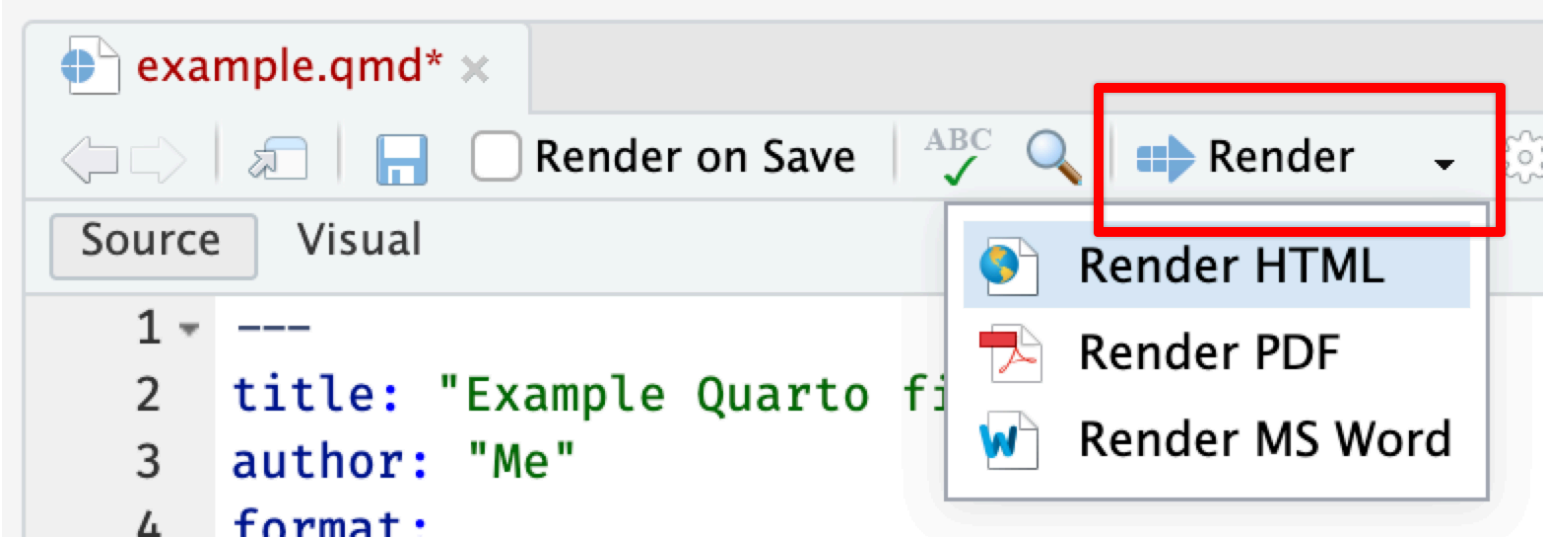
Your turn

Add a new chunk

Put `2 + 2` in the chunk and run it

Render

Render a Quarto document into a standalone shareable file



Quarto

The best way to combine R code and narrative

We'll use it throughout the class:

I'll provide starter code

You'll complete "Your turns"

In the end, you'll have an annotated record for yourself

Your turn

Spot the difference:

```
filter(mtcars, cyl == 4)
```

```
four_cyls <- filter(mtcars, cyl == 4)
```

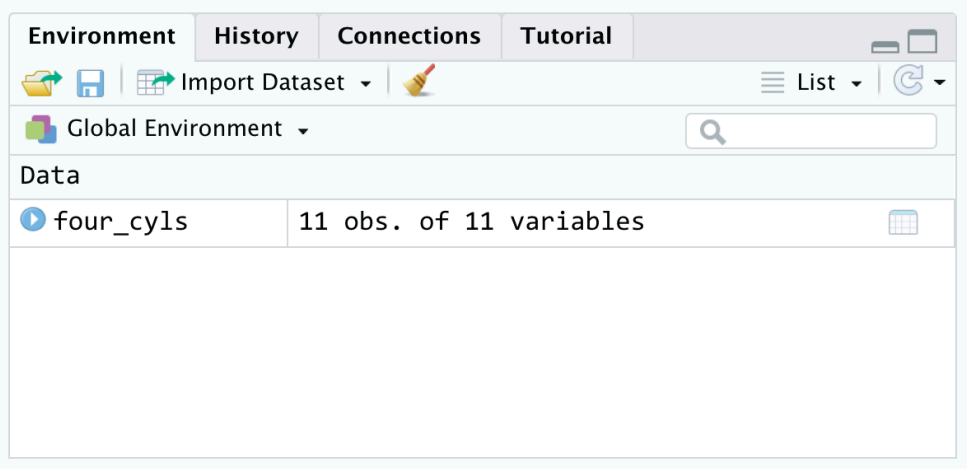
Find these chunks in the notebook and run them. What's different about what happens?

Assignment

<- assigns the output from the righthand side to a variable with the name on the lefthand side

```
four_cyls <- filter(mtcars, cyl == 4)
```

Environment pane



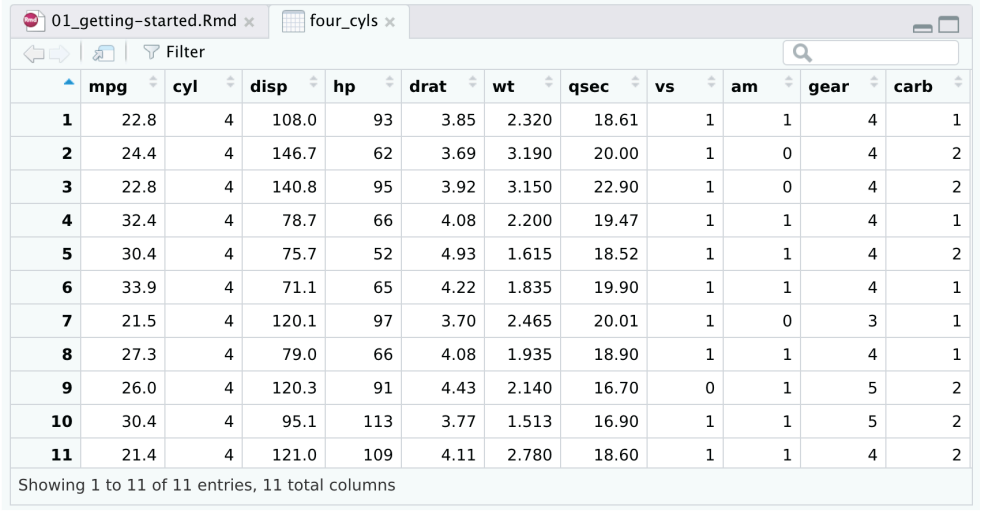
List of all the variables you've created

Your turn

Find `four_cyls` in the environment pane.
Click on the name `four_cyls`

What happens?

Viewer



	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
1	22.8	4	108.0	93	3.85	2.320	18.61	1	1	4	1
2	24.4	4	146.7	62	3.69	3.190	20.00	1	0	4	2
3	22.8	4	140.8	95	3.92	3.150	22.90	1	0	4	2
4	32.4	4	78.7	66	4.08	2.200	19.47	1	1	4	1
5	30.4	4	75.7	52	4.93	1.615	18.52	1	1	4	2
6	33.9	4	71.1	65	4.22	1.835	19.90	1	1	4	1
7	21.5	4	120.1	97	3.70	2.465	20.01	1	0	3	1
8	27.3	4	79.0	66	4.08	1.935	18.90	1	1	4	1
9	26.0	4	120.3	91	4.43	2.140	16.70	0	1	5	2
10	30.4	4	95.1	113	3.77	1.513	16.90	1	1	5	2
11	21.4	4	121.0	109	4.11	2.780	18.60	1	1	4	2

Showing 1 to 11 of 11 entries, 11 total columns

Clicking on an object in the environment panel opens it an interactive viewer tab

Functions

Functions do things

Functions take arguments, output results

If you want to keep the output, assign it to a variable

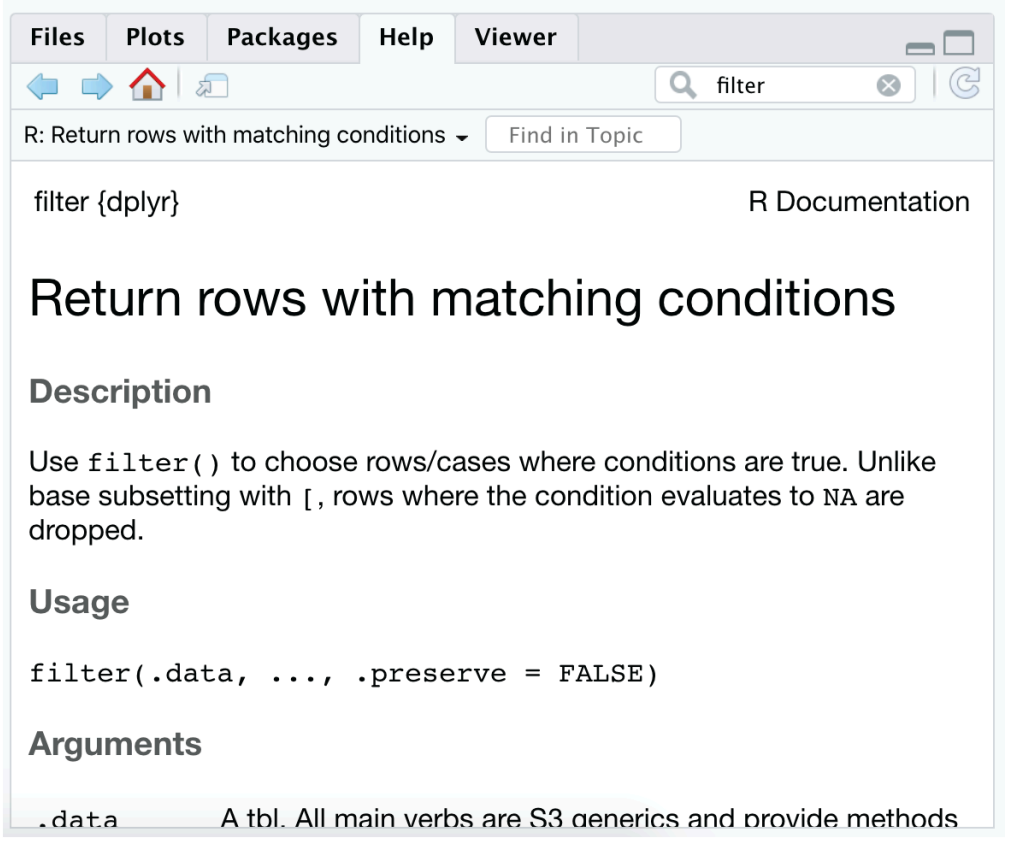
Help

To look up the help page for an R function, type this in the console:

```
?function_name
```

(Or google it!)

Help pane



These help pages prove details about the arguments you can supply a function

Often full of examples at the bottom

Your turn

Look at the help page for `seq`

Add a chunk that uses `seq()` to create a list of numbers from 5 to 100, spaced by 5 (so 5, 10, 15, 20, ...)

02:00

```r
seq(from = 5, to = 100, by = 5)
```

```
##  [1]   5  10  15  20  25  30  35  40  45  50  55  60  65  70
## [20] 100
```

Common syntax problem #1

Missing closing parentheses or quotes

```
mean(mtcars
```

```
"Oops this is wrong
```

Common syntax problem #2

Surrounding something in quotes when it should be (or vice versa)

```
mean("mtcars")
```

```
## Warning in mean.default("mtcars"): argument is not numeric or
## returning NA

## [1] NA
```

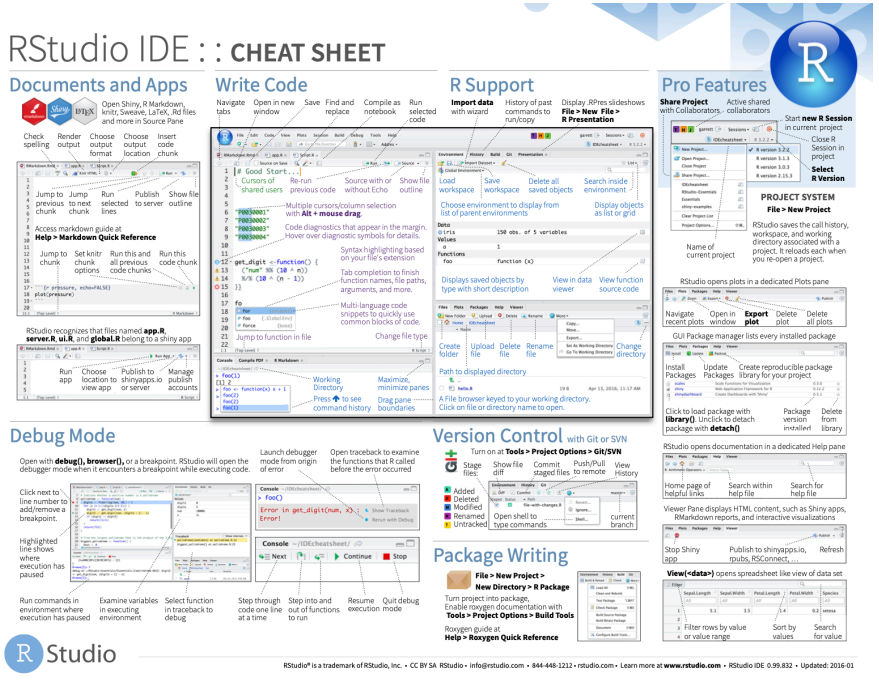
Your turn

There are three chunks under "Syntax gone wrong"

Run each, read the error message, and try to fix the syntax

Cheatsheets

Go to Help > Cheatsheets to find quick reference guides to different packages



Next up

Data basics