R Workflow Best Practices

bmRn CSM: managing code, data, and files

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R Workflow Best Practices

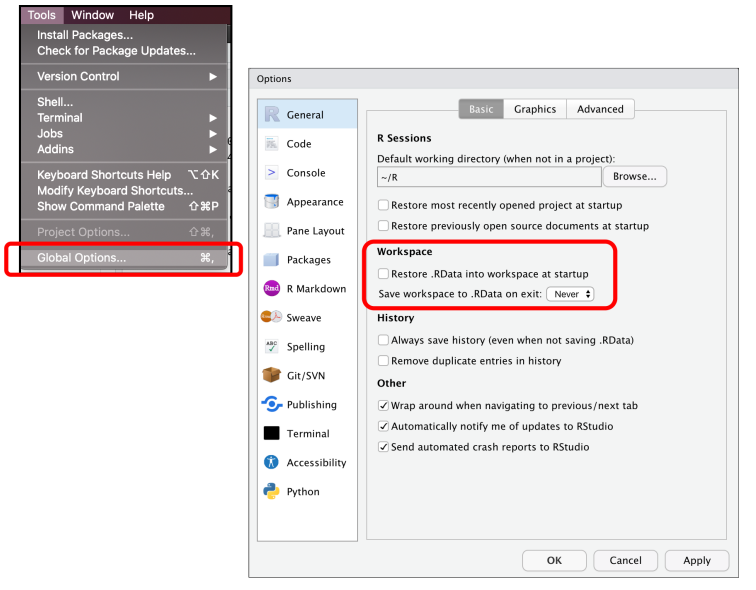
Managing your code, data, and files with RStudio

Change RStudio's Default Settings

Click on Tools > Global Options...

- We want to uncheck "*Restore .RData into work space at start up*"

- We also want to make sure we change "*Save work space to .Rdata on exit*" to "*Never*"



Customize RStudio

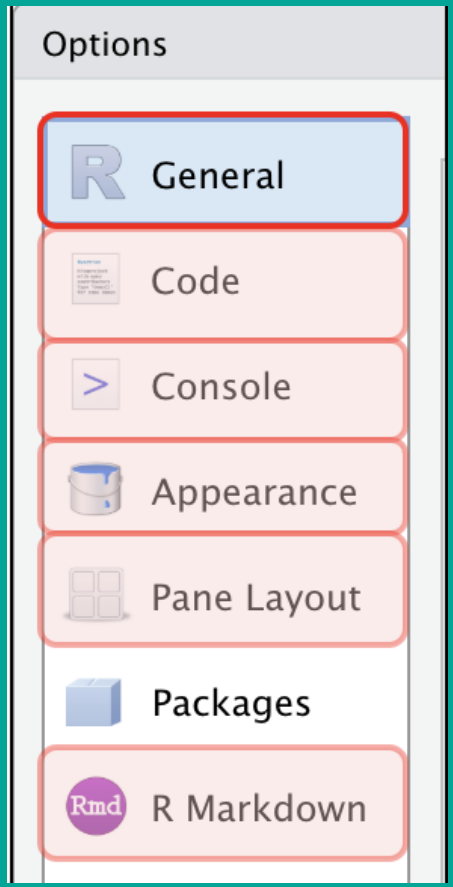
Code

Console

Appearance

Pane Layout

R Markdown

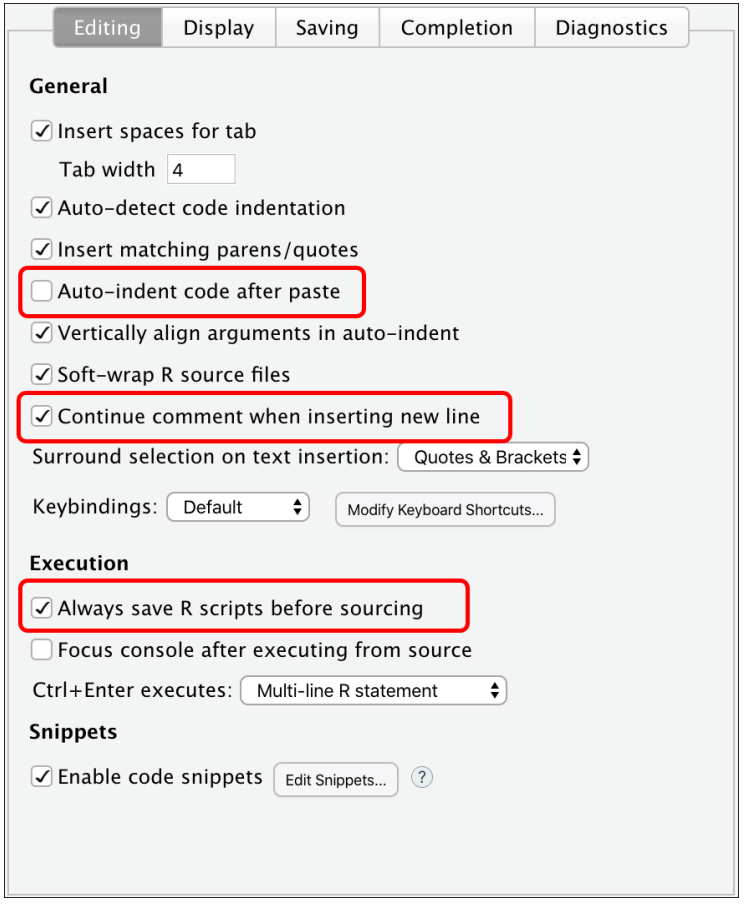


Code Editing

- Auto indent?

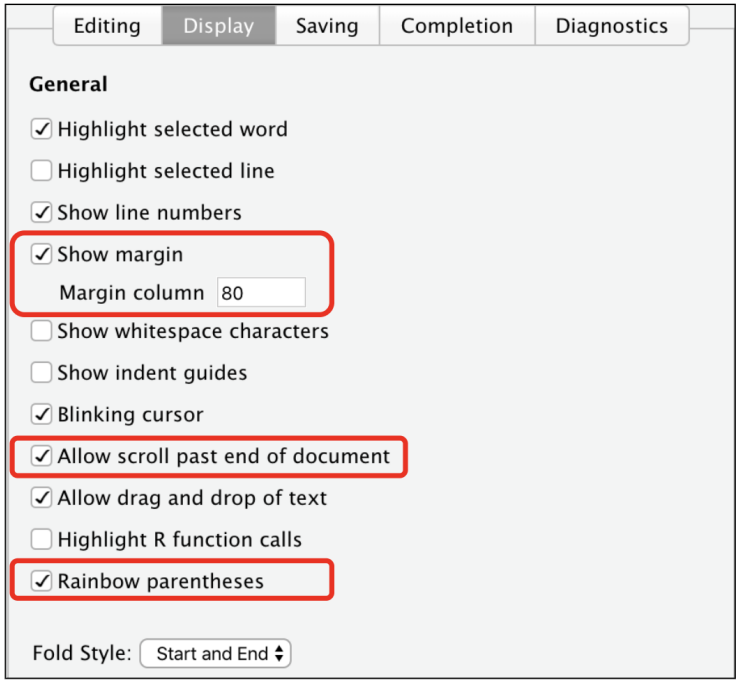
- Continue comment lines?

- Save R scripts before sourcing?



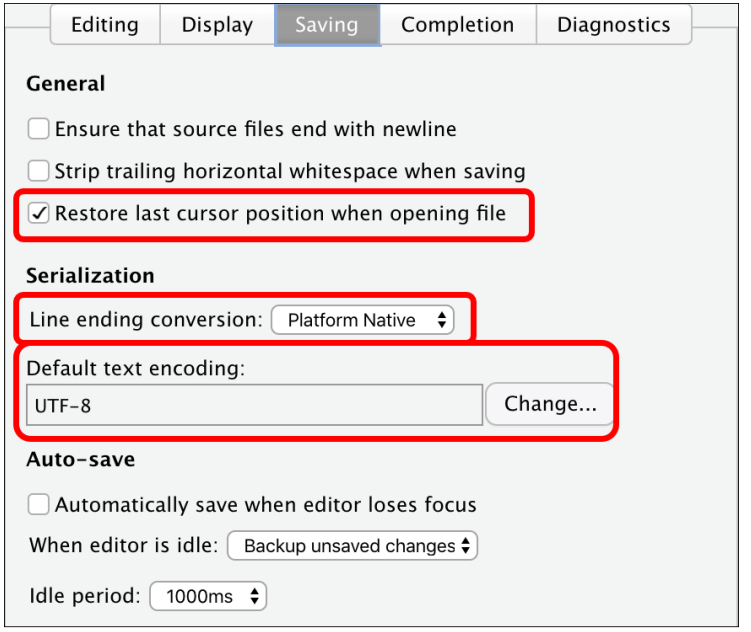
Code Display

- Margins?
- Scrolling?
- Rainbow parentheses?



Code Saving

- Cursor position?
- Line endings?
- Text encoding?

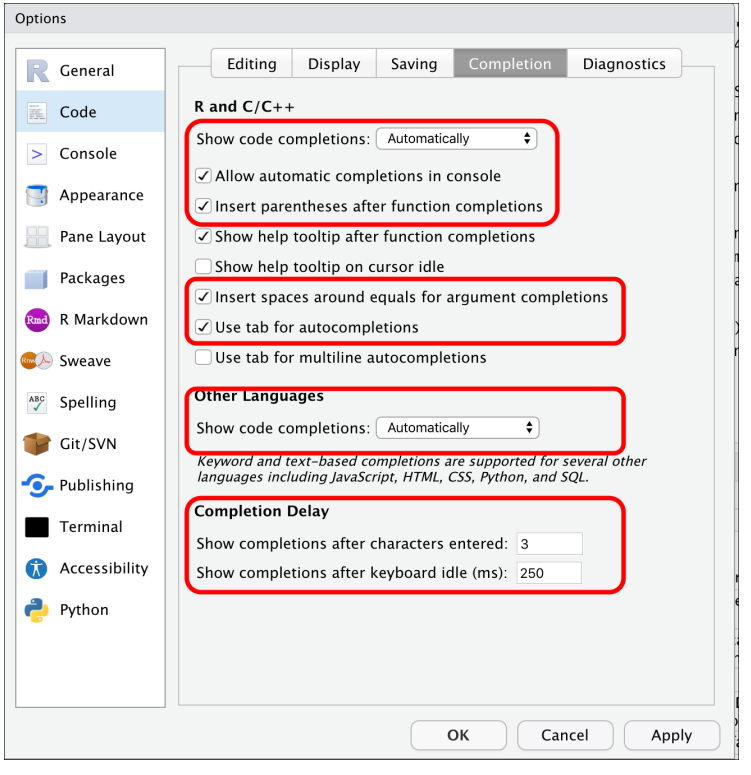


Code Completion

- Insert parentheses?

- Insert spaces?

- Completion delay setting?

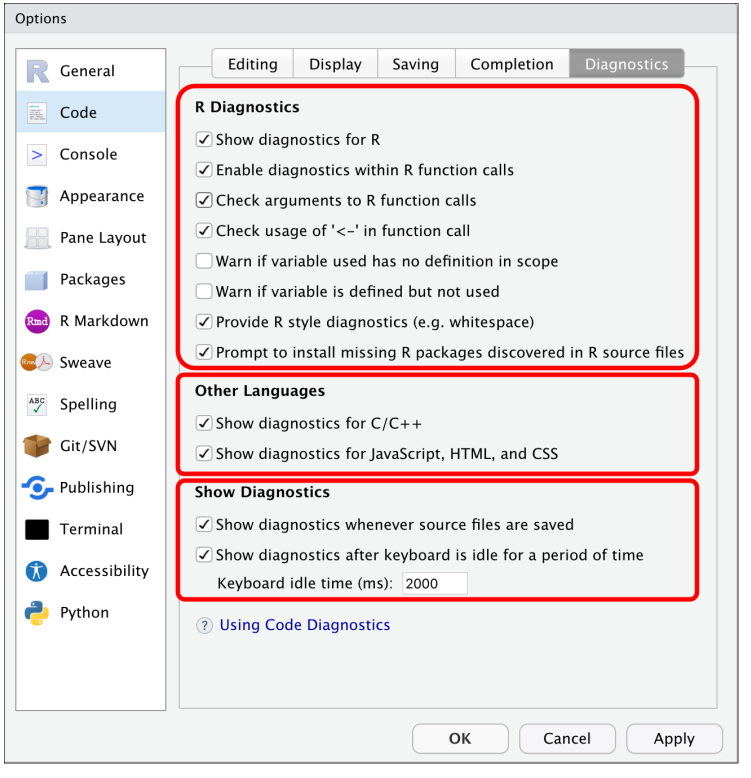


Code Diagnostics

- Check your R Code?

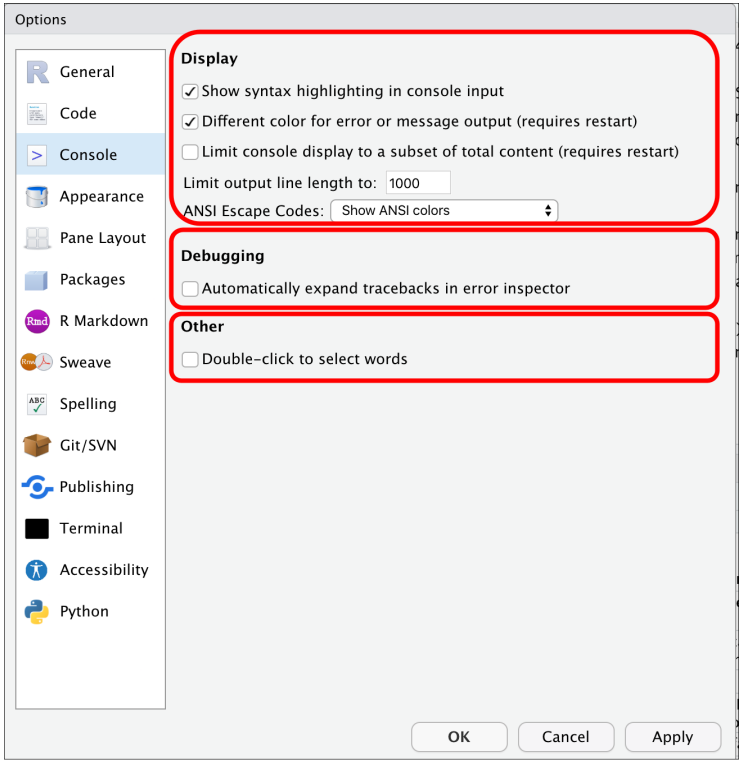
- Check other languages?

- How long?



Console

- Display?
- Debugging?
- Other?



Appearance

- RStudio theme?

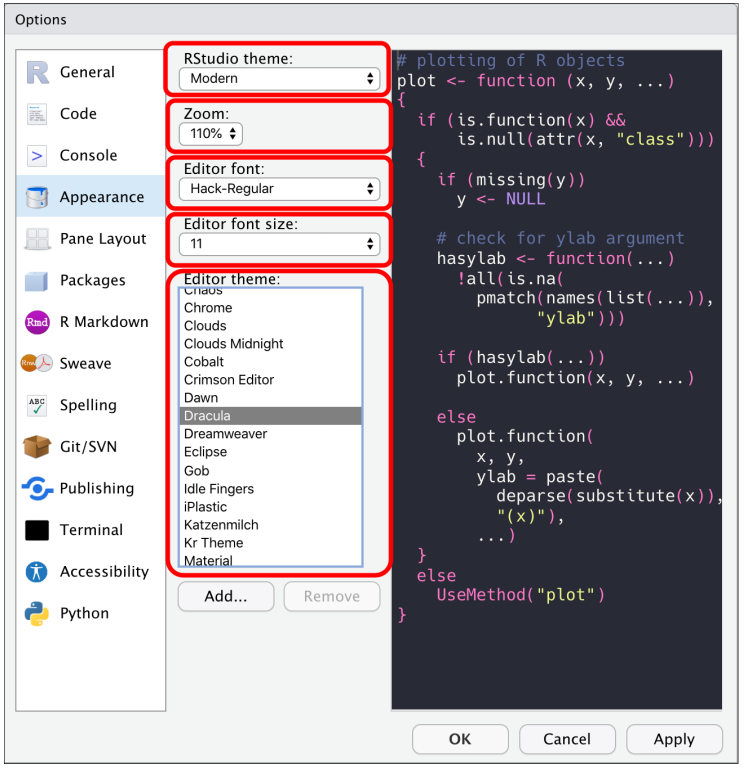
- Zoom?

- Also hold ⌘ and press + on macOS

- Also hold `ctrl` and press + on Windows

- Font?

- Editor theme?



Pane layout

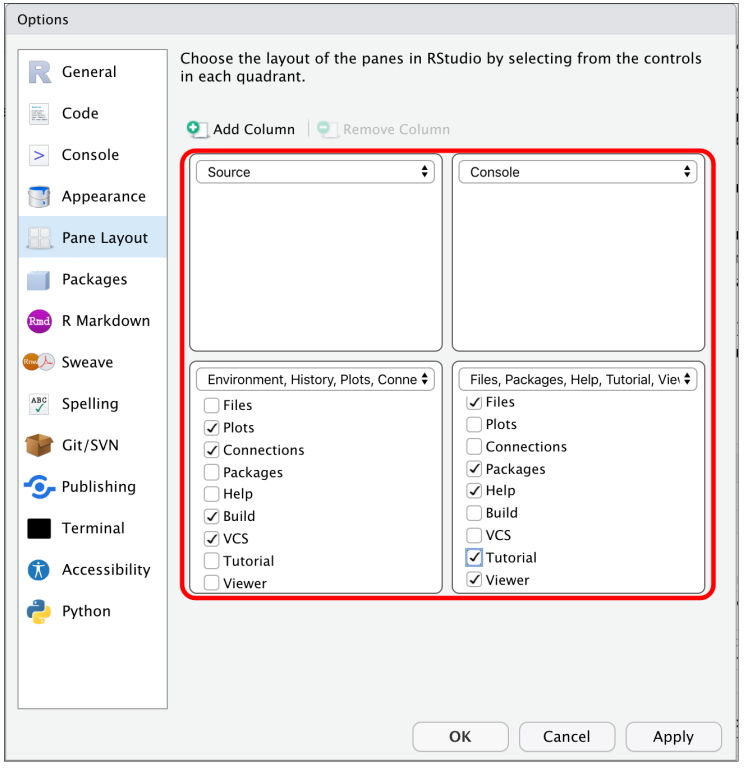
- Source?

- Console?

Combining pane elements?

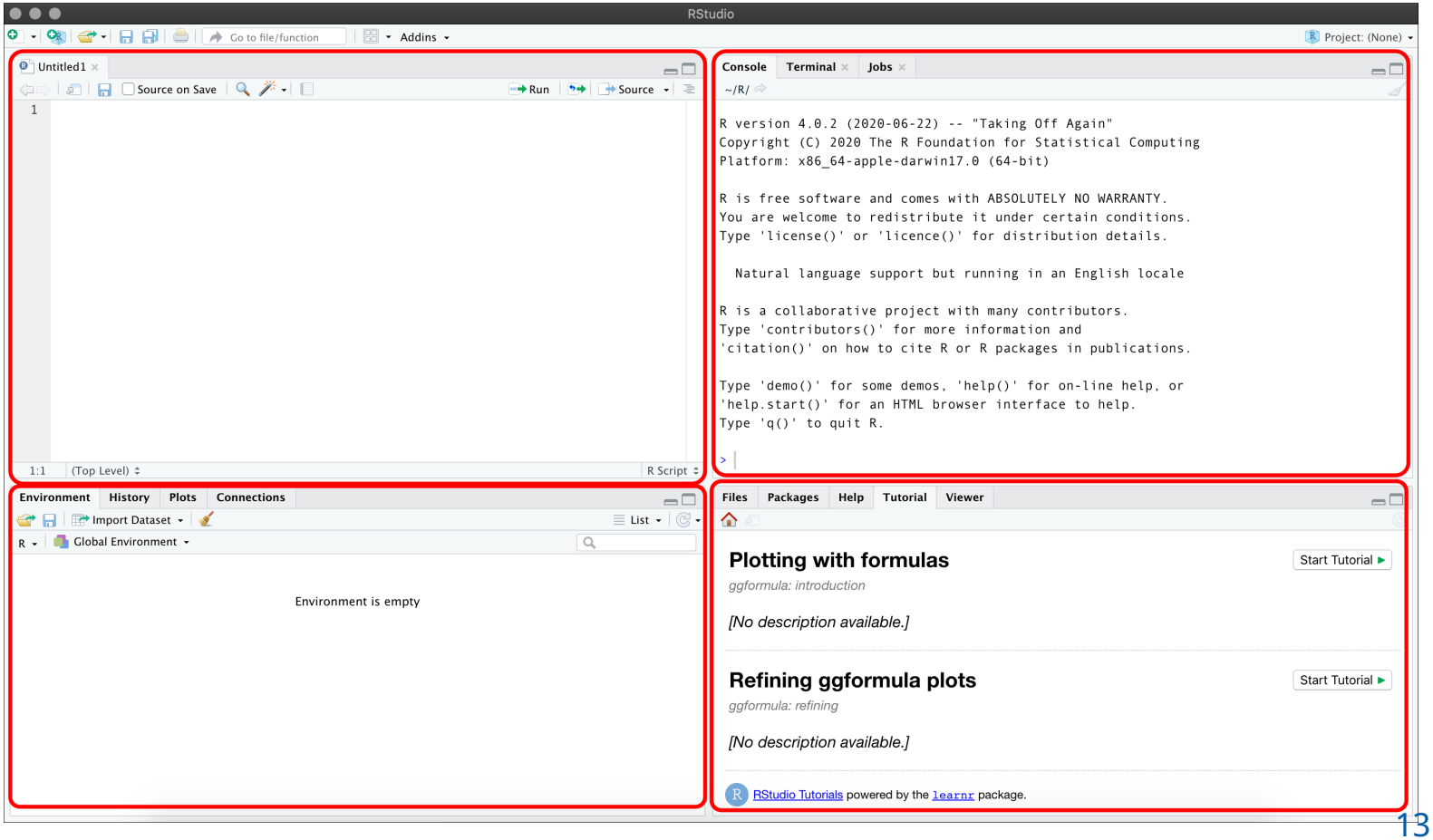
- Plots, Connections, Build, VCS, Presentation

- Files, Packages, Help, Tutorial, Viewer



Pane layout view

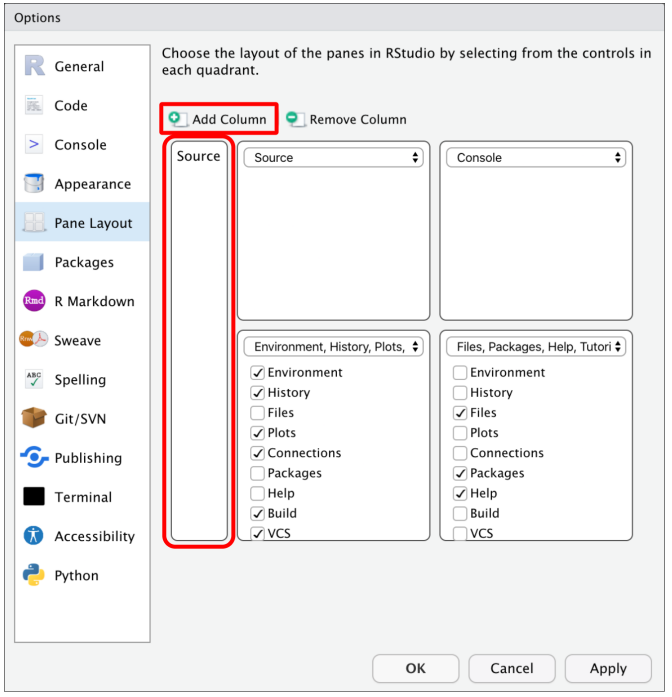
Standard layout options

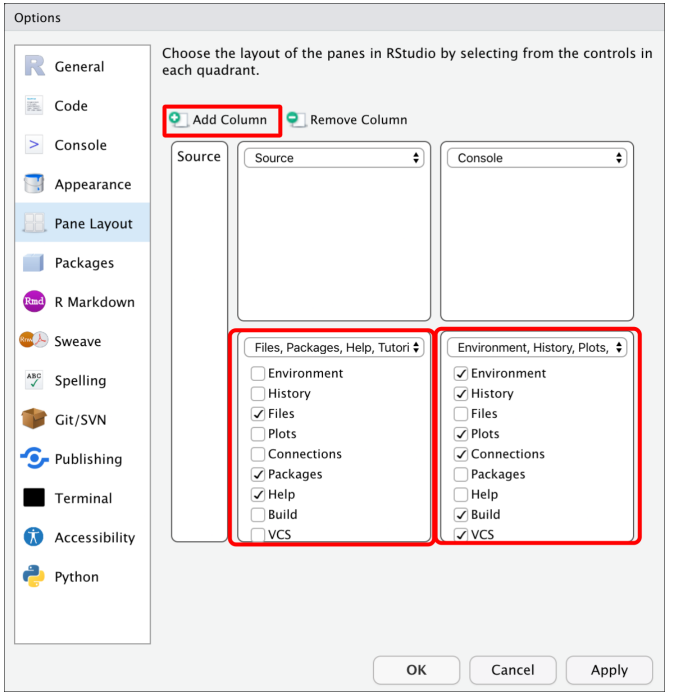


Pane layout: add column

Two screens?

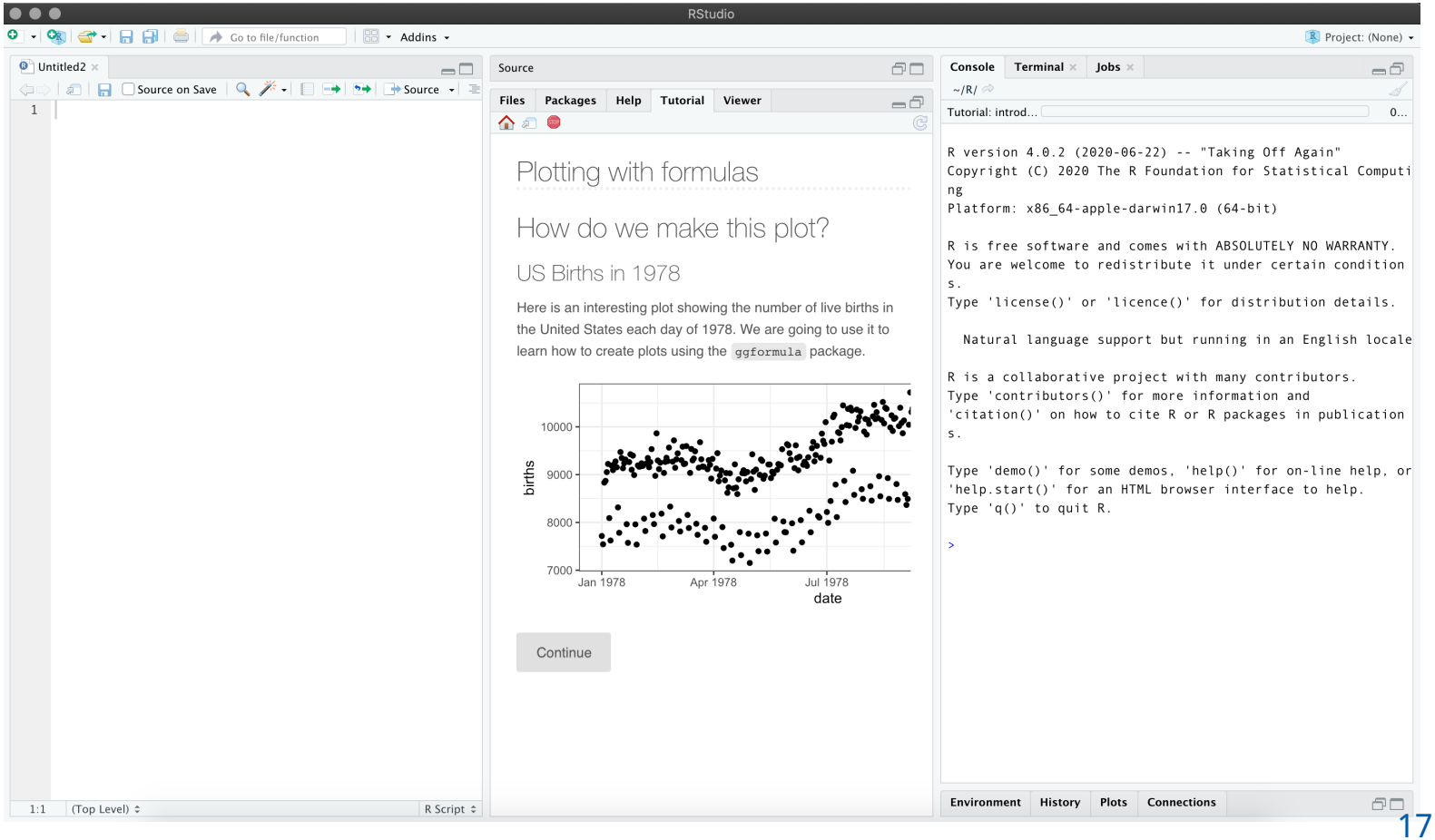
- add a Source column and rearrange the panes





Pane layout: add column view

Now you see **Source**, **Tutorial**, and **Console** panes on a single screen!



RStudio Projects

Why RStudio Projects?

Keep track of all your files with RStudio project files (`.Rproj`).

Self contained

Using R projects keeps track or your current working directory!

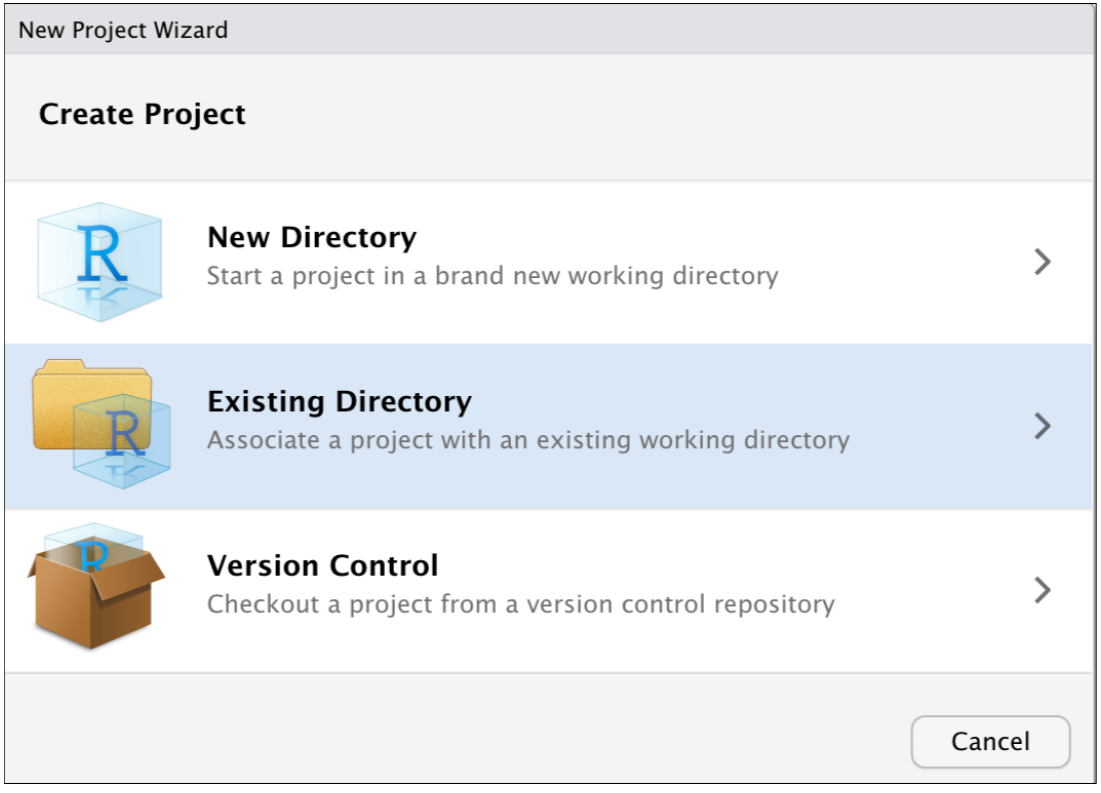
Project orientated

.Rproj files make bundling and shipping files and folders easier!

Avoid removing all the files

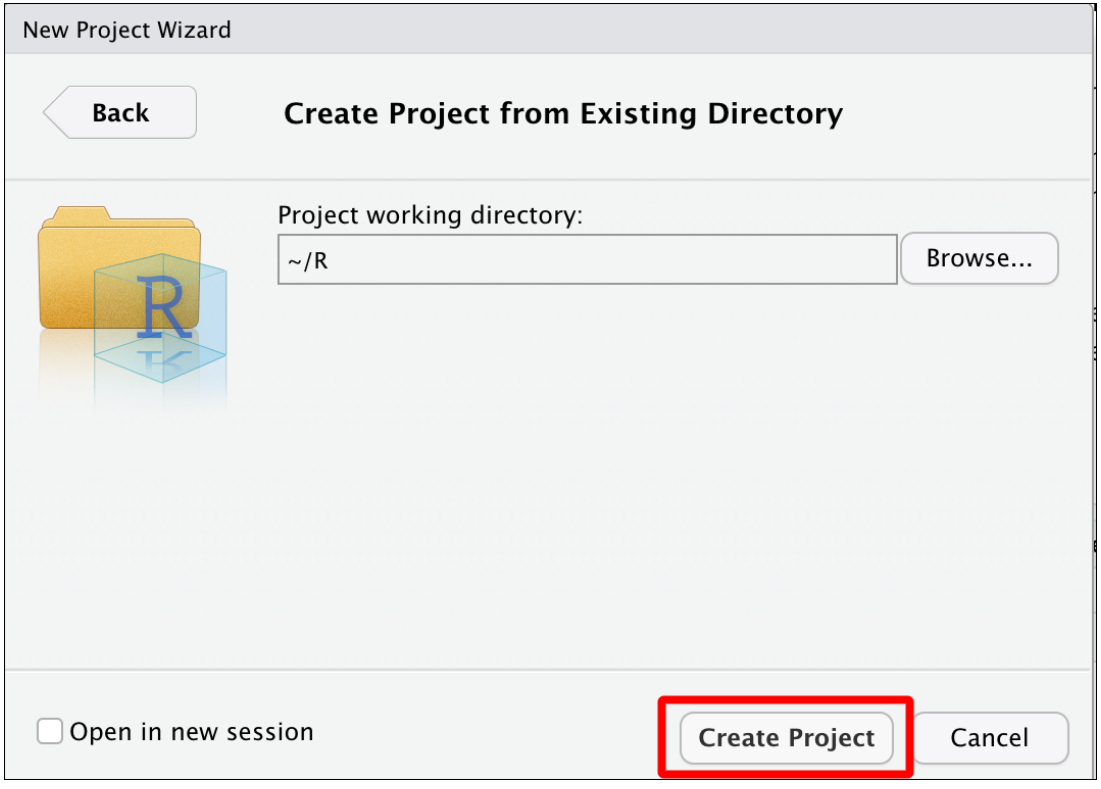
Creating RStudio project in existing folder

Click on *'Project: (None)'* > *'New Project'*



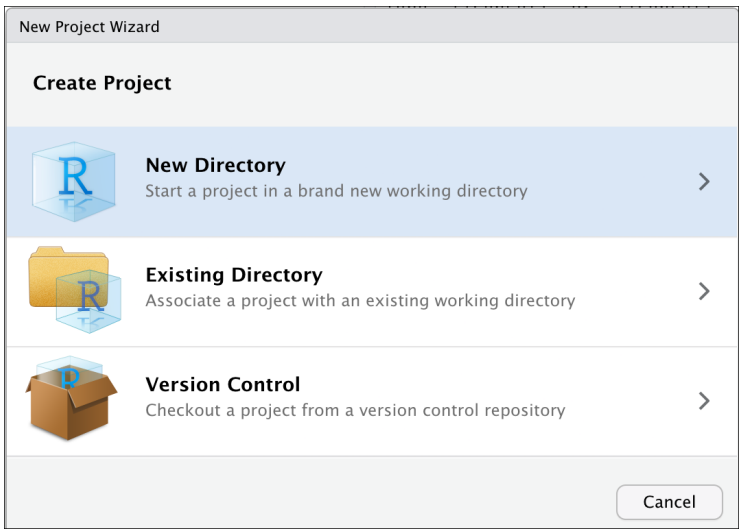
Creating RStudio project in existing folder

Click on *'Browse* > *'Create Project'*

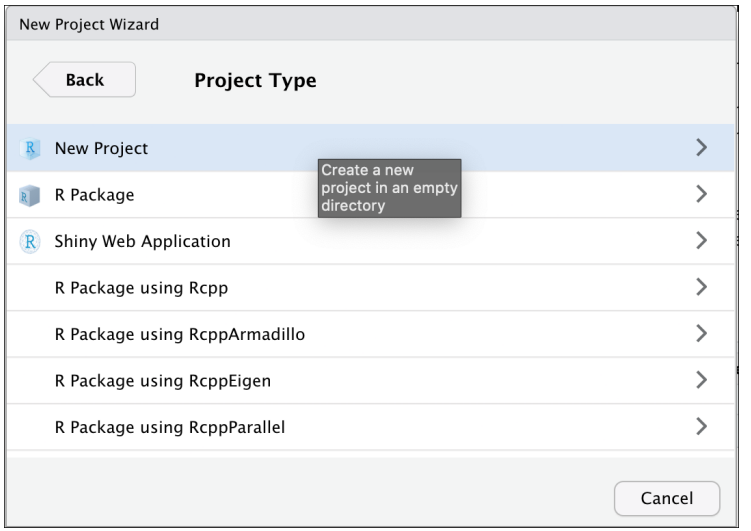


Creating RStudio projects in new folder

Click on *'Project: (None)' > 'New Project'*

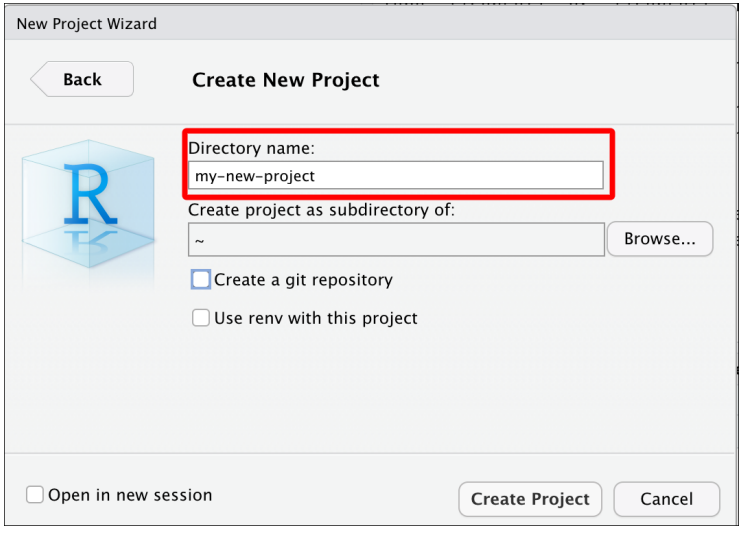


Select project type

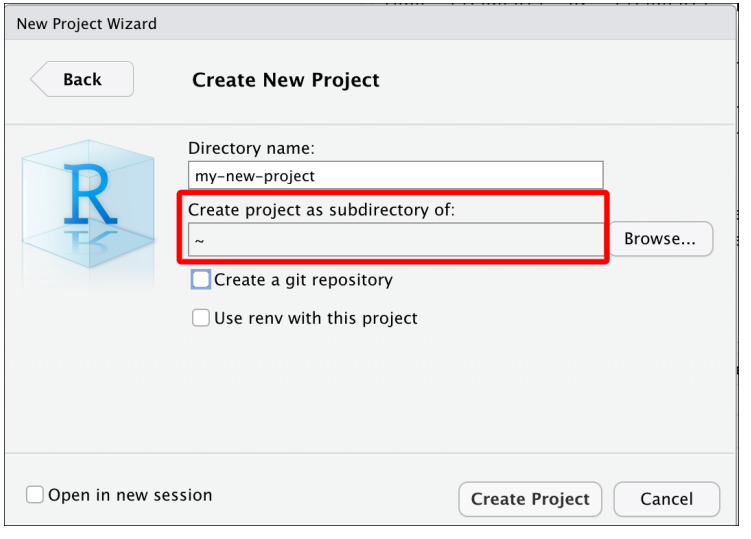


Creating RStudio projects in new folder

Create new folder name

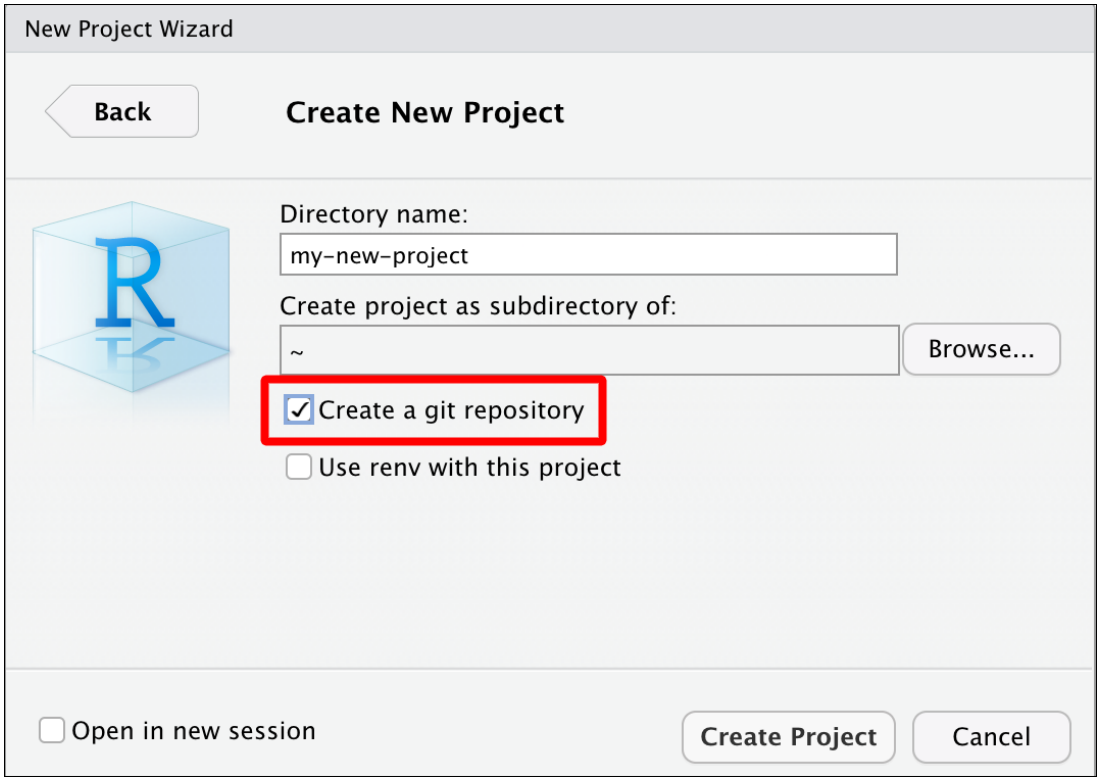


Choose parent folder



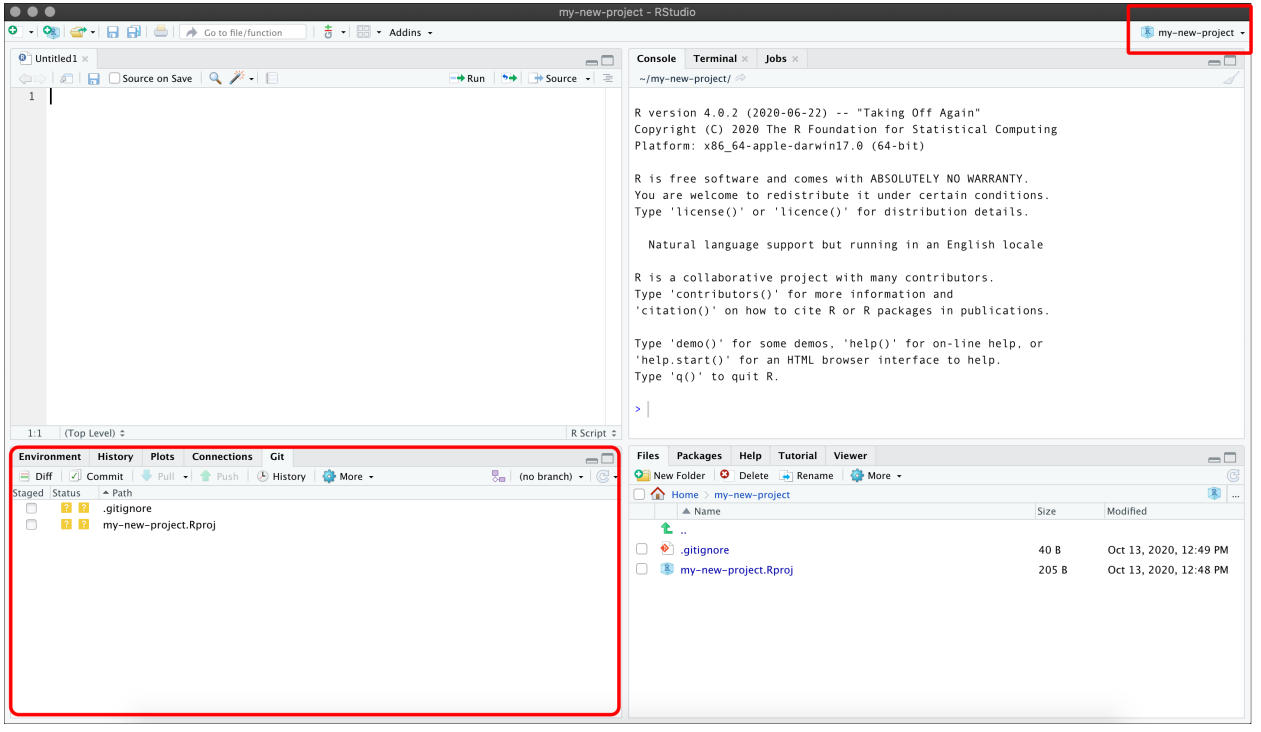
Creating RStudio projects in new folder

If you have Git installed, select *'Create a git repository'*



Creating RStudio projects in new folder

Check for new project name & *Git* pane



Folder Structure

- separate raw and cleaned data
- keep documents and code separate
- keep figures separate
- name files appropriately (preferably 2 digit prefix)
- structure is reusable and easy to understand

Adapted from from 'Good enough practices in scientific computing'

```
project-name/
             |-- CITATION
             |-- project-name.Rproj
             |-- README.md
             |-- LICENSE
             |-- requirements.txt
             |--data/
                    |--raw/
                          |--raw-birds-data.csv
                    |--processed/
                                |--processed-birds-data.csv
             |--doc/
                   |-- notebook.Rmd
                   |-- manuscript.Rmd
                   |-- changelog.txt
             |-- results/
                   |-- summarized-results.csv
             |-- code/
                   |-- 01-sightings-import.R
                   |-- 02-sightings-wrangle.R
                   |-- 03-sightings-model.R
                   |-- runall.R
```

Naming things

Naming files*

File names should be:

1. human readable -> (makes sense) **2020-10-12-270-301-central-lab-metrics.csv**

2. machine readable -> (regex) **2020-10-12-270-301-central-lab-metrics.csv**

3. sort/order well -> (ISO 8601 date) **2020-10-12-270-301-central-lab-metrics.csv**

We can perform regular expression searches for files like this:

Find 270-301 files

```
grepl(pattern = "270-301",
      x = "2020-10-12-270-301-central-lab-metrics.csv")
```

```
## [1] TRUE
```

> *Adapted from Jenny Byran's slides

Naming files*

Also acceptable:

Logical order and underscores _

```
files
```

```
## [1] "01.0-import_270-301_central-lab-metrics.R"
## [2] "02.0-wrangle_270-301_central-lab-metrics.R"
## [3] "03.0-eda_270-301_central-lab-metrics.R"
## [4] "04.0-model_270-301_central-lab-metrics.R"
```

```
stringr::str_split_fixed(string = files, pattern = "_", 3)
```

```
##      [,1]           [,2]      [,3]
## [1,] "01.0-import"  "270-301" "central-lab-metrics.R"
## [2,] "02.0-wrangle" "270-301" "central-lab-metrics.R"
## [3,] "03.0-eda"     "270-301" "central-lab-metrics.R"
## [4,] "04.0-model"   "270-301" "central-lab-metrics.R"
```

> *Adapted from Jenny Byran's slides

File paths

Use relative rather than absolute file paths

Absolute paths are specific to a system

`/project-name/data` -> absolute path in macOS

`\\project-name\\data` -> absolute path in Windows

Relative paths are specific to a folder

`project-name/data` -> relative path in macOS

`project-name\\data` -> relative path in Windows

Or use the `here` package

The `here::set_here()` function solves a lot of file path problems (*especially if you're not using R projects*)

```
library(here)
here::set_here(".")
list.files(all.files = TRUE, pattern = "here")
```

```
## [1] ".here"
```

This creates a `.here` file (similar to `.Rproj` files)

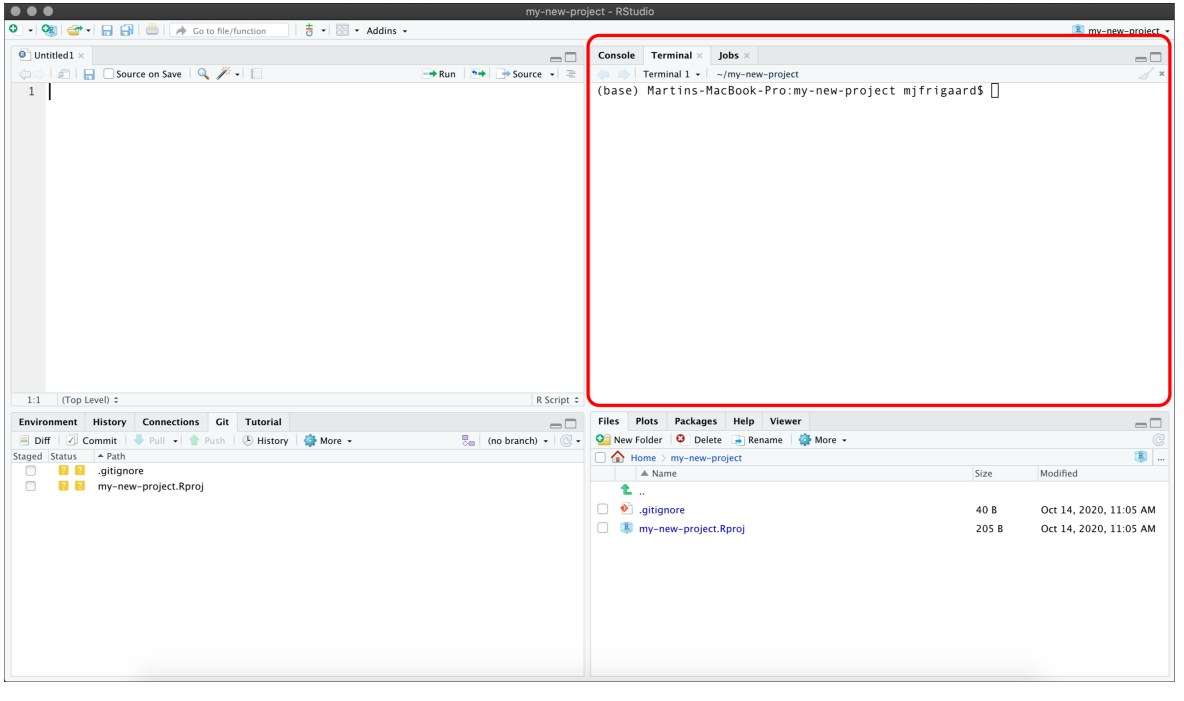
As long as the `.here` file stays in the referenced folder, you can include simply include `here::here()` in the top of your code files.

Terminal pane

Learn a handful of command-line tools to make life easier

`cd`, `pwd`, `mkdir`, `rm`, `ls`, etc.

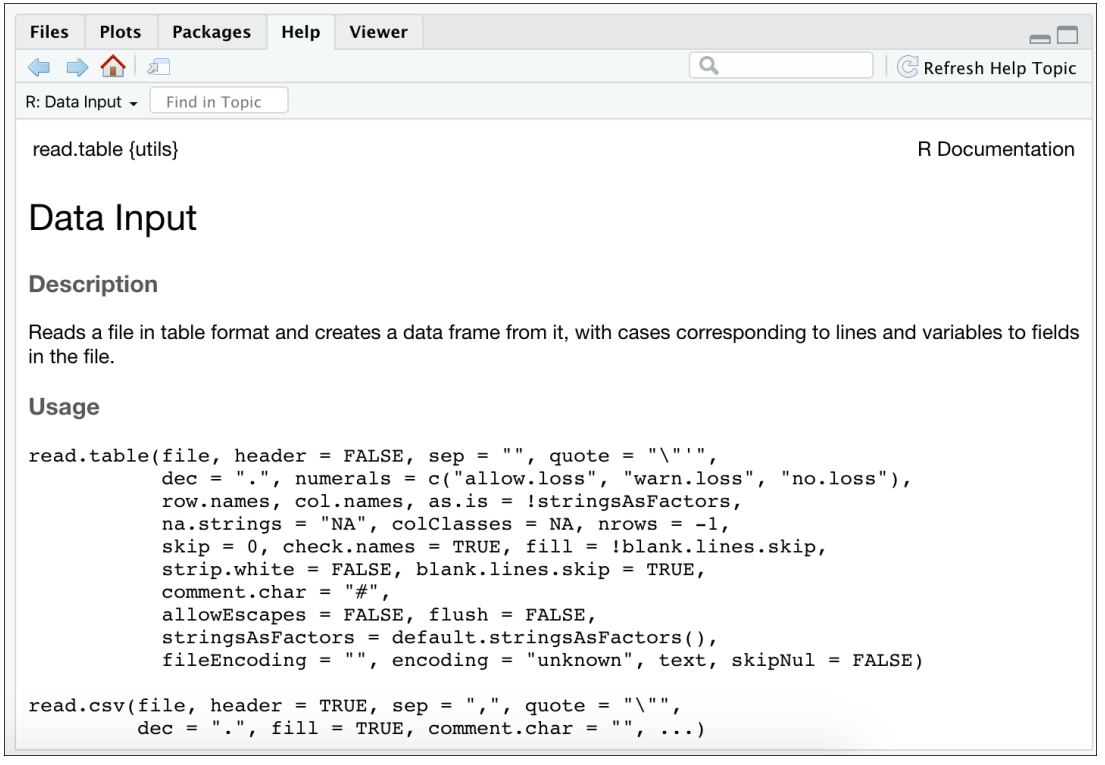
RStudio comes with a Terminal pane for quick access to the command-line



Getting help

R comes with a *ton* of accessible help files

```
?read.csv
```



Getting help online

R also help an incredible community! Click on the links below to see some of the common places for Q & A.

1) Dedicated forum on RStudio Community

2) Questions tagged R on StackOverflow

3) Twitter topics with #rstats hashtag

Asking good questions (reproducible examples)

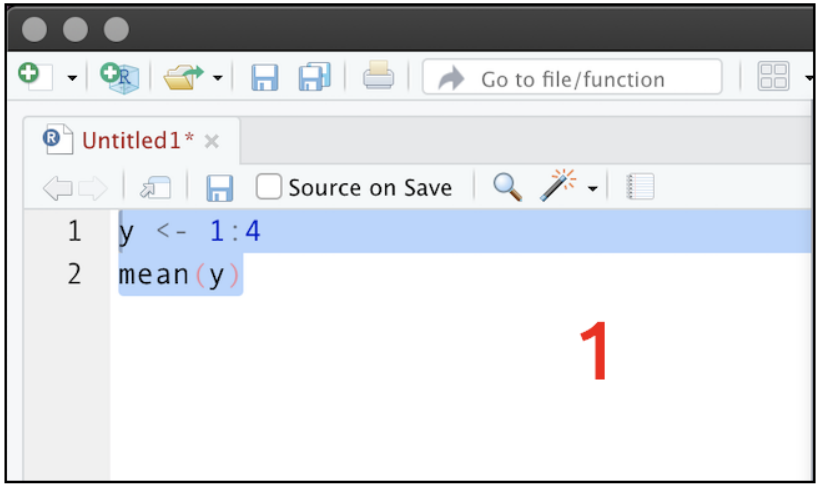
You'll get better results if you ask a question with a reproducible example. The `reprex` package was designed to help you create one!

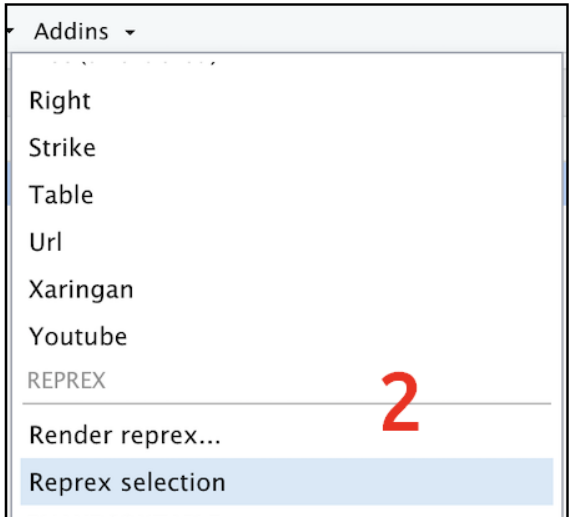
```
install.packages("reprex")
library(reprex)
```

Use the RStudio Addin to create a reproducible example from code you've copied onto your clipboard!

Reprex Addin 1

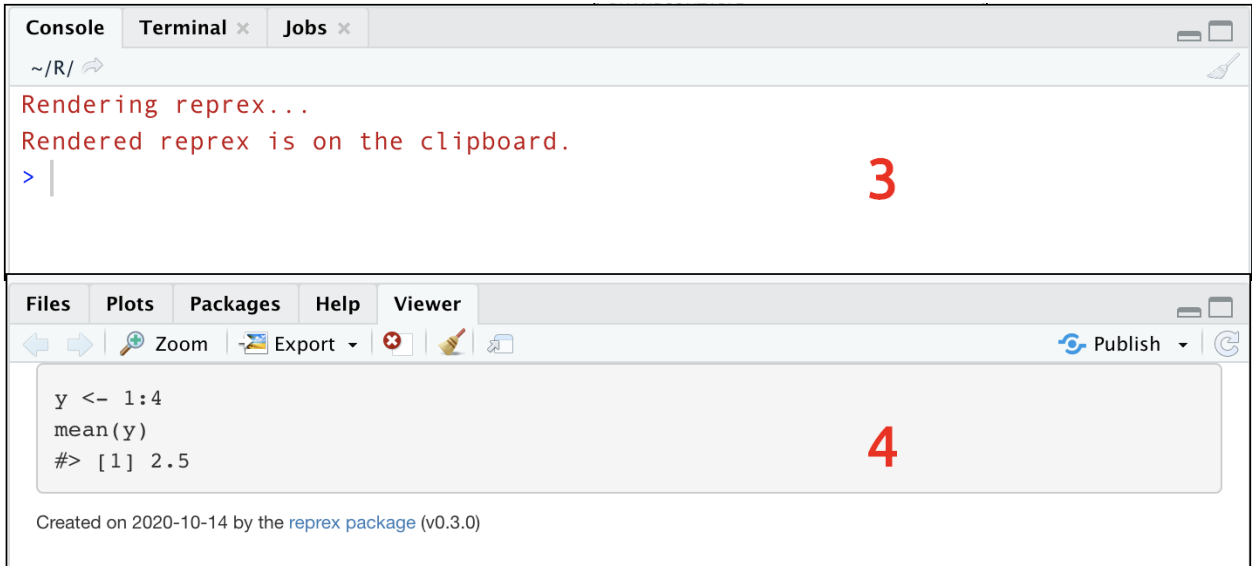
1. Copy code
2. Select *Addin* > *Render selection*





Reprex Addin 2

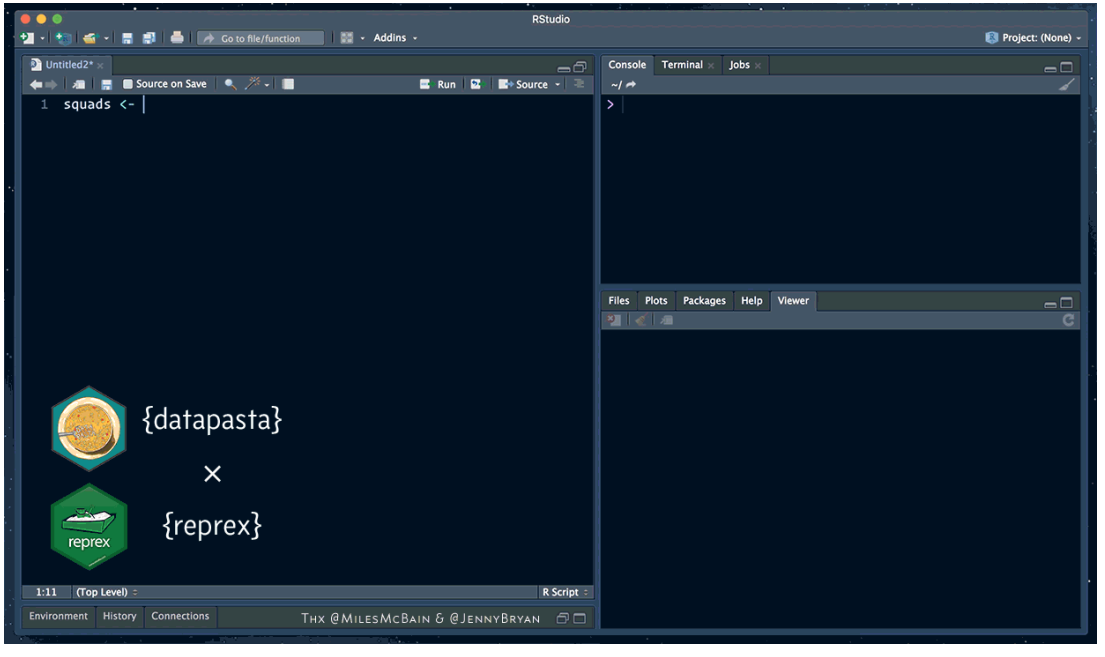
1. Copy code
2. Select *Addin* > *Render selection*
3. Wait for console
4. Paste reprex



Reprex + datapasta

To copy + paste actual data in a reproducible example, try `datapasta`!

https://reprex.tidyverse.org/articles/articles/datapasta-reprex.html



Learn more about R best practices:

1. R for Data Science
2. Tidyverse
3. RViews Community Blog

THANK YOU!

Feedback

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