Introduction to RStudio

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Difference between R and RStudio

R is the **programming language** and the **program** that does the actual work

- Can be use with many different programming environments (But RStudio is the best for R)

RStudio is the **integrated development environment** (IDE)

- Provides an interface to R
- Specifically built around R code
- Execute code
- Syntax highlighting
- File and project management
- ...

→ You can use R without RStudio but RStudio without R would be of little use

Difference between R and RStudio

R is like the engine

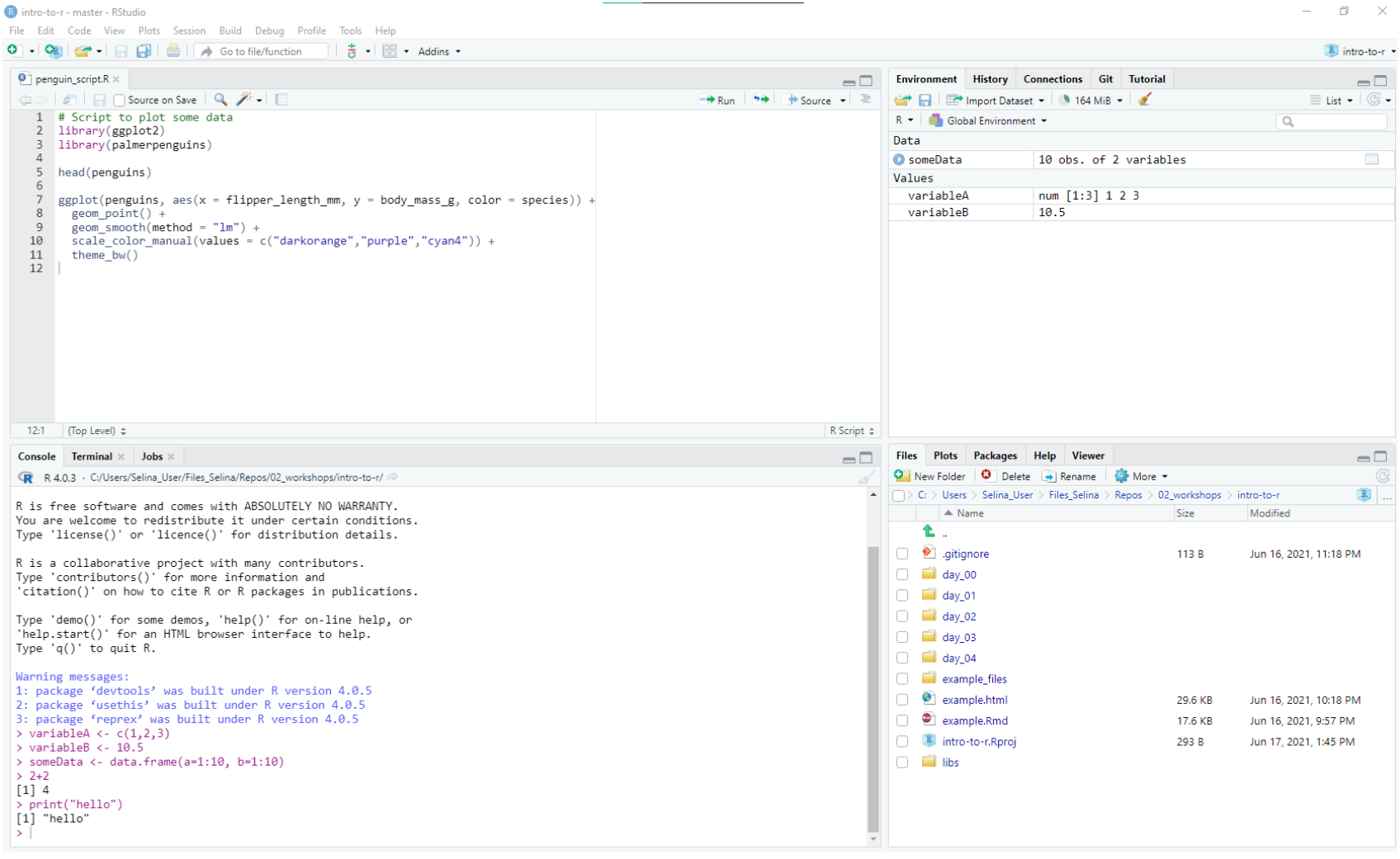
RStudio is more like the dashboard, etc.

analogy and image from ModernDive Book

Basic idea of writing code for data analysis

- Break down your process into small steps
- Write precise instructions telling the computer what to do in each step
  - For this you can use the programming language R
- Tell R to execute these instructions
  - R will return the result of your instructions (or an error message)
- You can do all of this inside RStudio

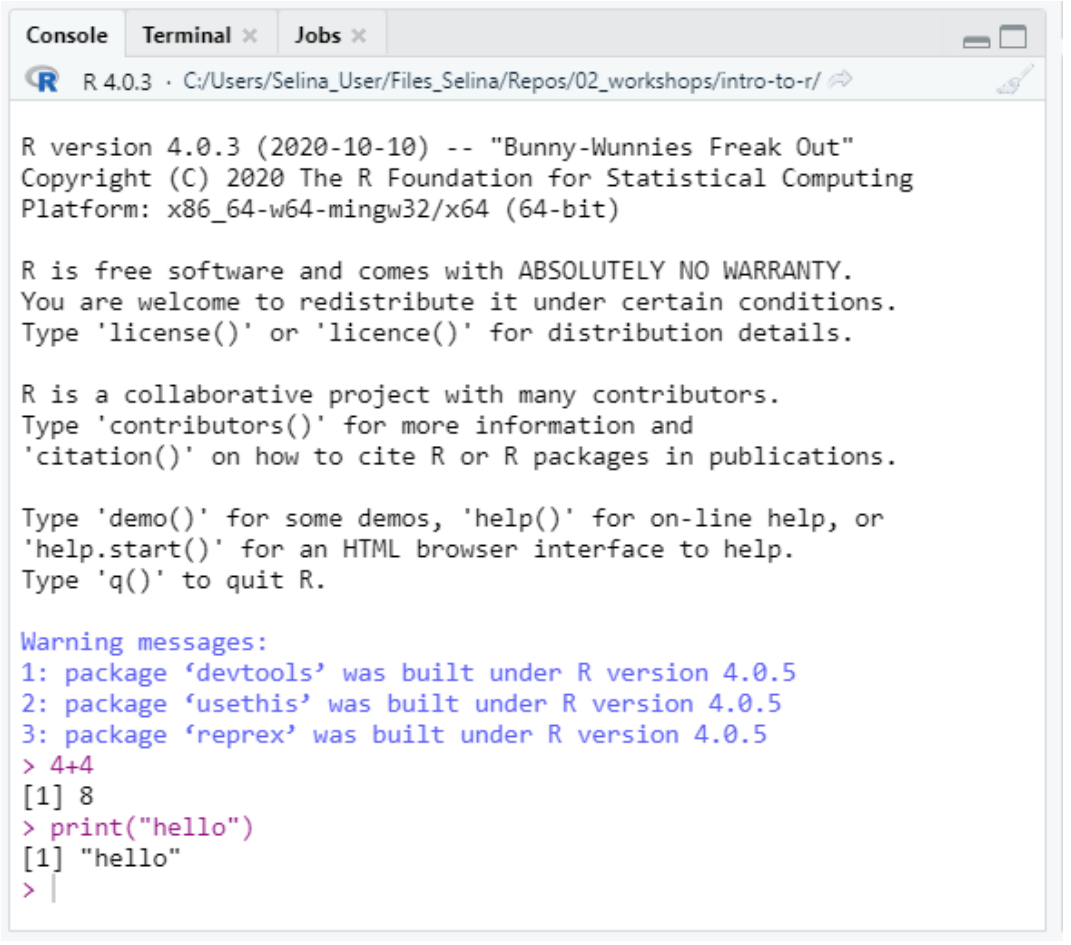
A quick tour around RStudio



Console pane

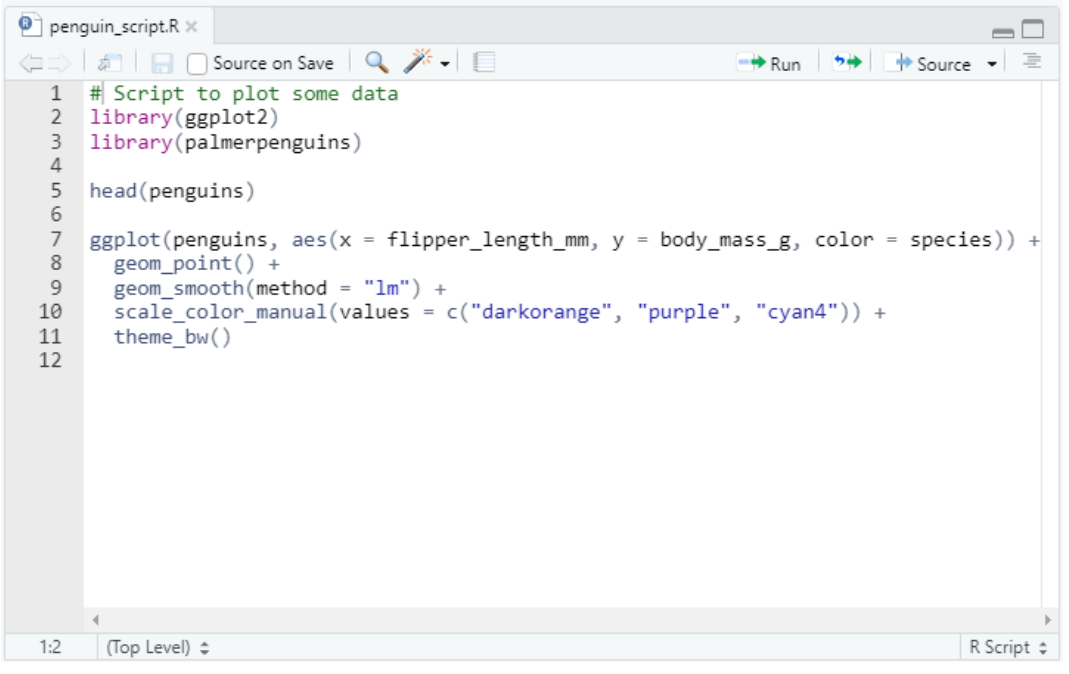
- Execute R code
- Output from R code in scripts is printed there
- Type a command into the console and execute with `Enter/Return`

Use arrow keys to bring back last commands



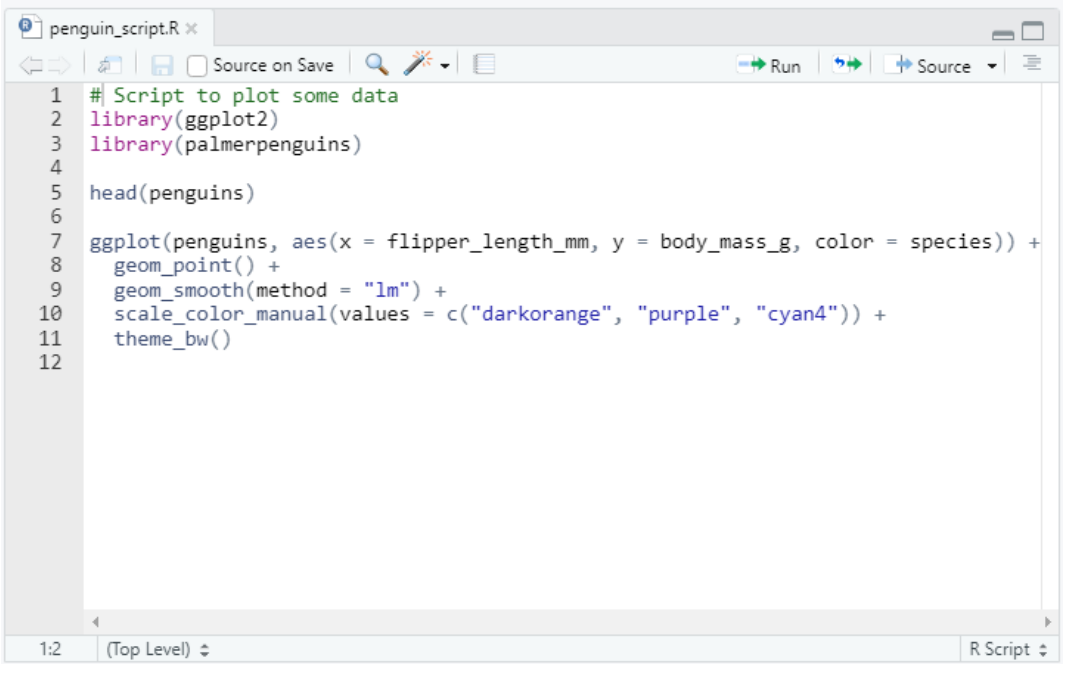
Script pane

- Write scripts with R code
  - Scripts are text files with R commands (file ending `.R`)
  - Use scripts to save commands for reuse



Script pane

- Create a new R script:
  `File -> New File -> R Script`
- Save an R script:
  `File -> Save` (`Ctrl/Cmd + S`)
- Run code line by line with `Run` button (`Ctrl + Enter/Cmd + Return`)
- You can open multiple scripts at the same time

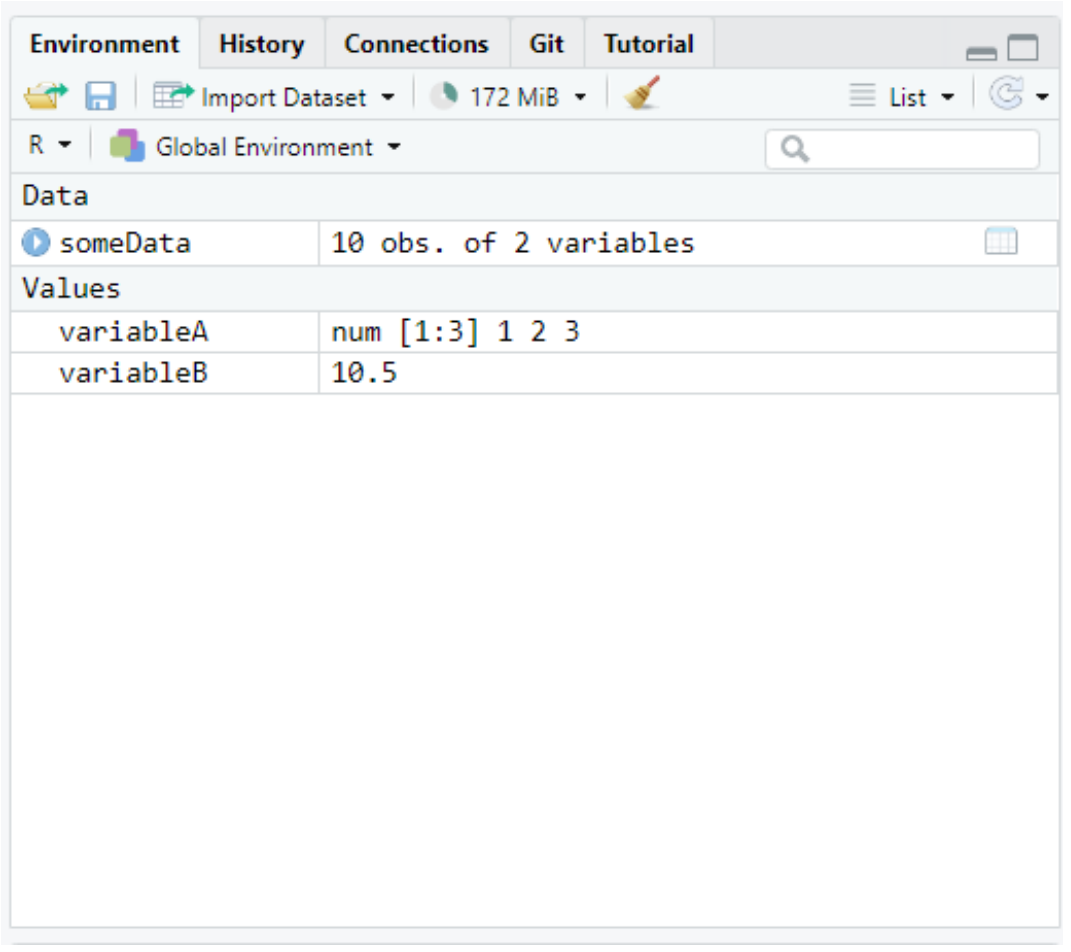


Use **scripts** for all your analysis and for commands that you want to save.

Use **console** for temporary commands, e.g. to test something.

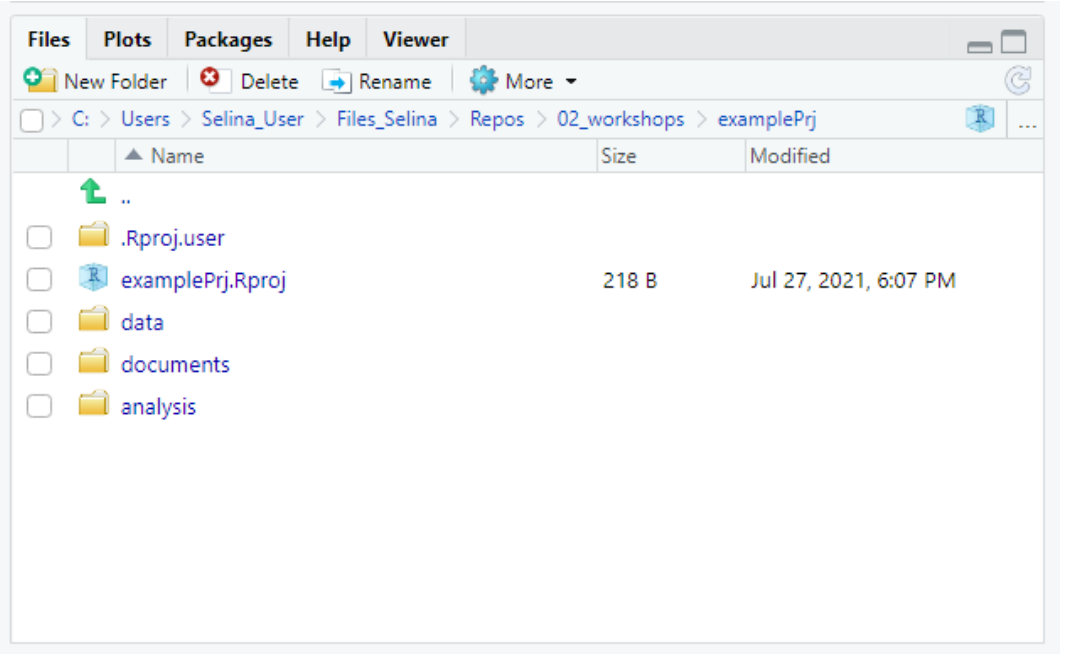
Environment pane

- Shows objects currently present in the R session
- Is empty if you start R



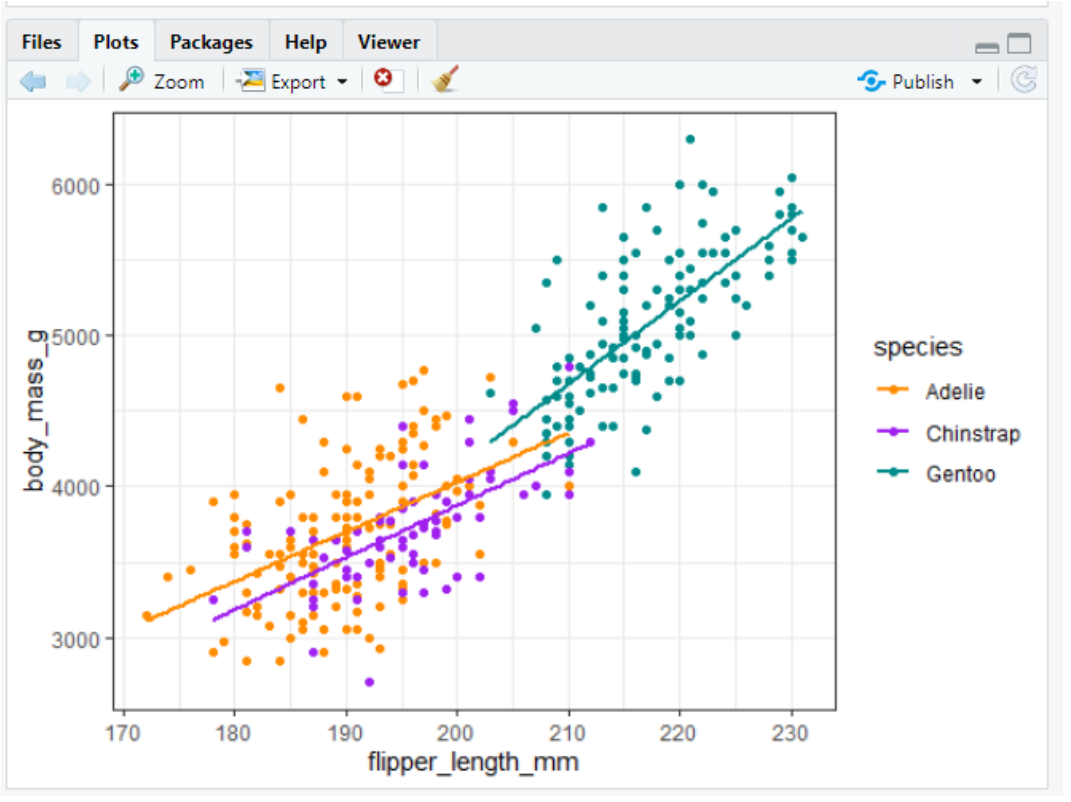
Files pane

- Similar to Explorer/Finder
- Browse project structure and files
  - Find and open files
  - Create new folders
  - Delete files
  - Rename files
  - ...
- Practical if you don't want to switch between File Explorer and RStudio all the time



Plot pane

- Plots that are created with R will be shown here



How to organize an R project?

I recommend a **project oriented workflow** with RStudio

- One directory with all files relevant for project
  - Scripts, data, plots, documents, ...
- An RStudio project is just a normal directory with an `*.Rproj` file
- Advantages of using RStudio projects
  - Easy to navigate in R Studio (`File` pane)
  - Easy to find and access scripts and data in RStudio
  - Project root is working directory
  - Open multiple projects simultaneously in separate RStudio instances

```
Project
|
|- data
|
|- documents
|    |
|    |- notes
|    |
|    |- reports
|
|- analysis
|    |
|    |- clean_data.R
|    |
|    |- statistics.R
|
|- *.RProj
```

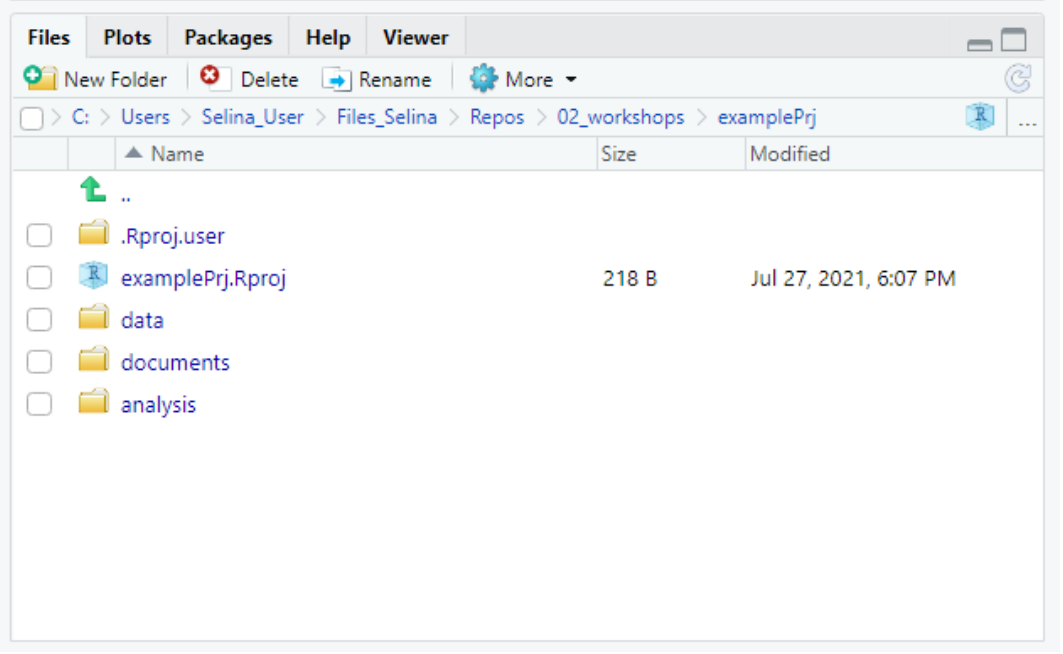
Example project structure

Create an RStudio project

Create a project from scratch:

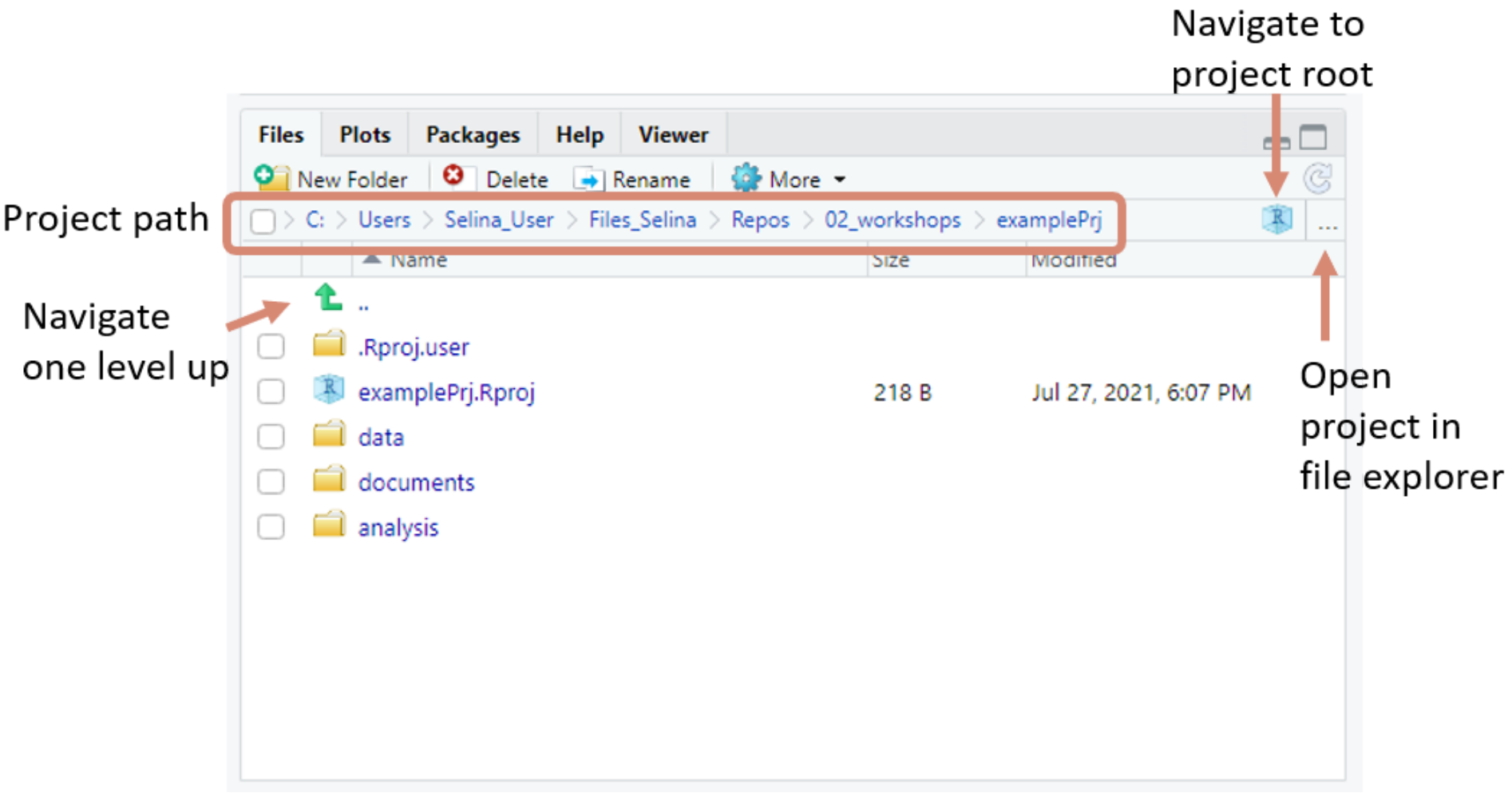
1. `File -> New Project -> New Directory -> New Project`
2. Enter a directory name (this will be the name of your project)
3. Choose the Directory where the project should be initiated
4. `Create Project`

RStudio will now create and open the project for you.



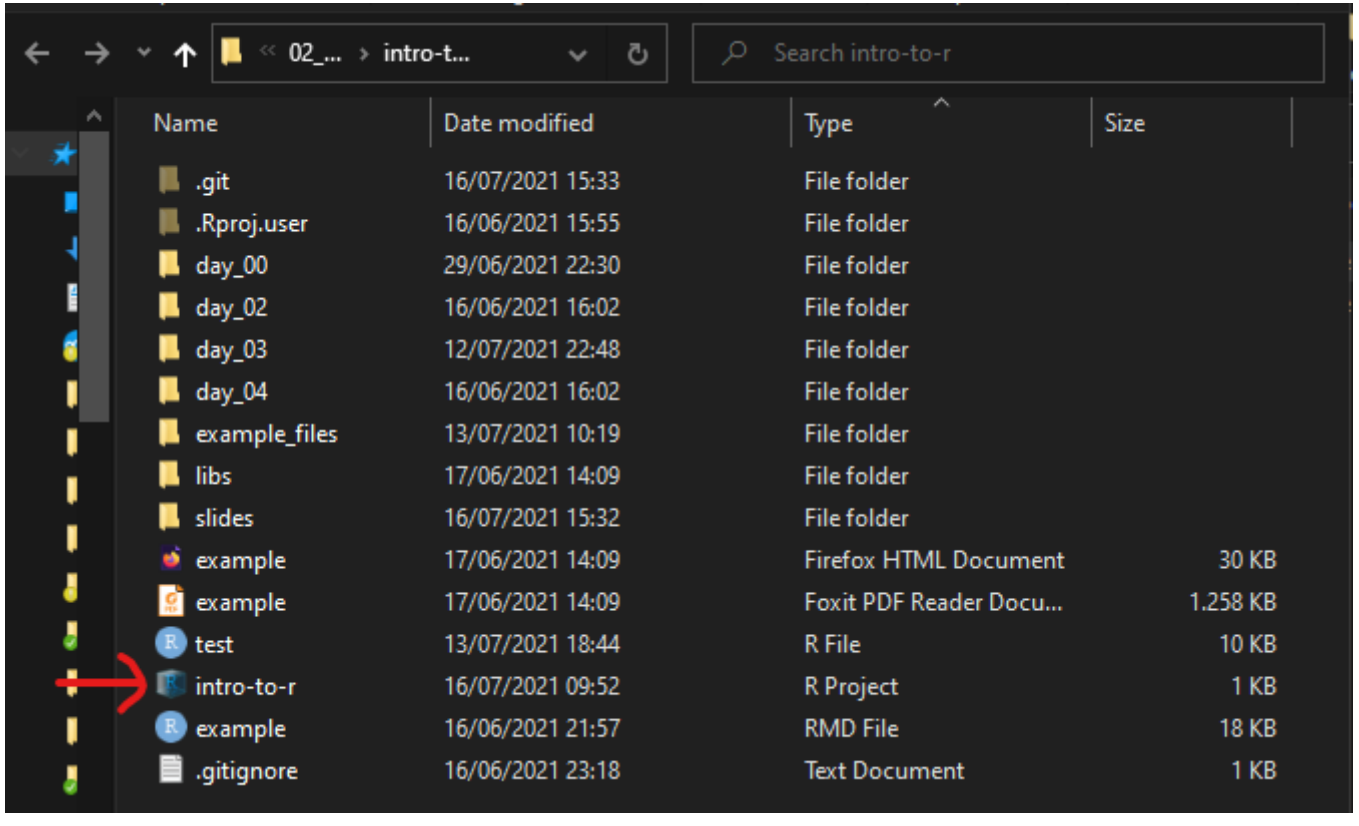
Example project structure in RStudio

Navigate an RStudio project



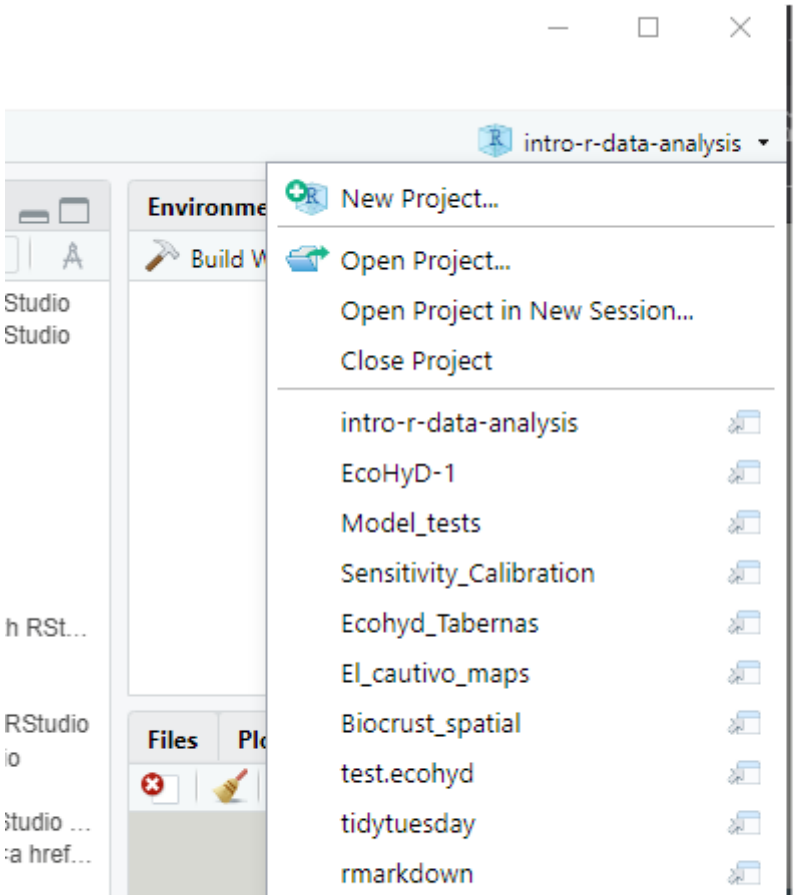
Open a project from outside RStudio

To open an RStudio project from your file explorer/finder, just double click on the `*.Rproj` file



Open a project inside RStudio

To open an RStudio project from RStudio, click on the project symbol on the top right of R Studio and select the project from the list.



Now you

Task 1: Set up your own RStudio project for this workshop (25 min)

Find the task description here