Introduction to RStudio

Day 1 - Introduction to Data Analysis with R

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Difference between R and RStudio

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

- Can be used with many different programming environments

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
- …

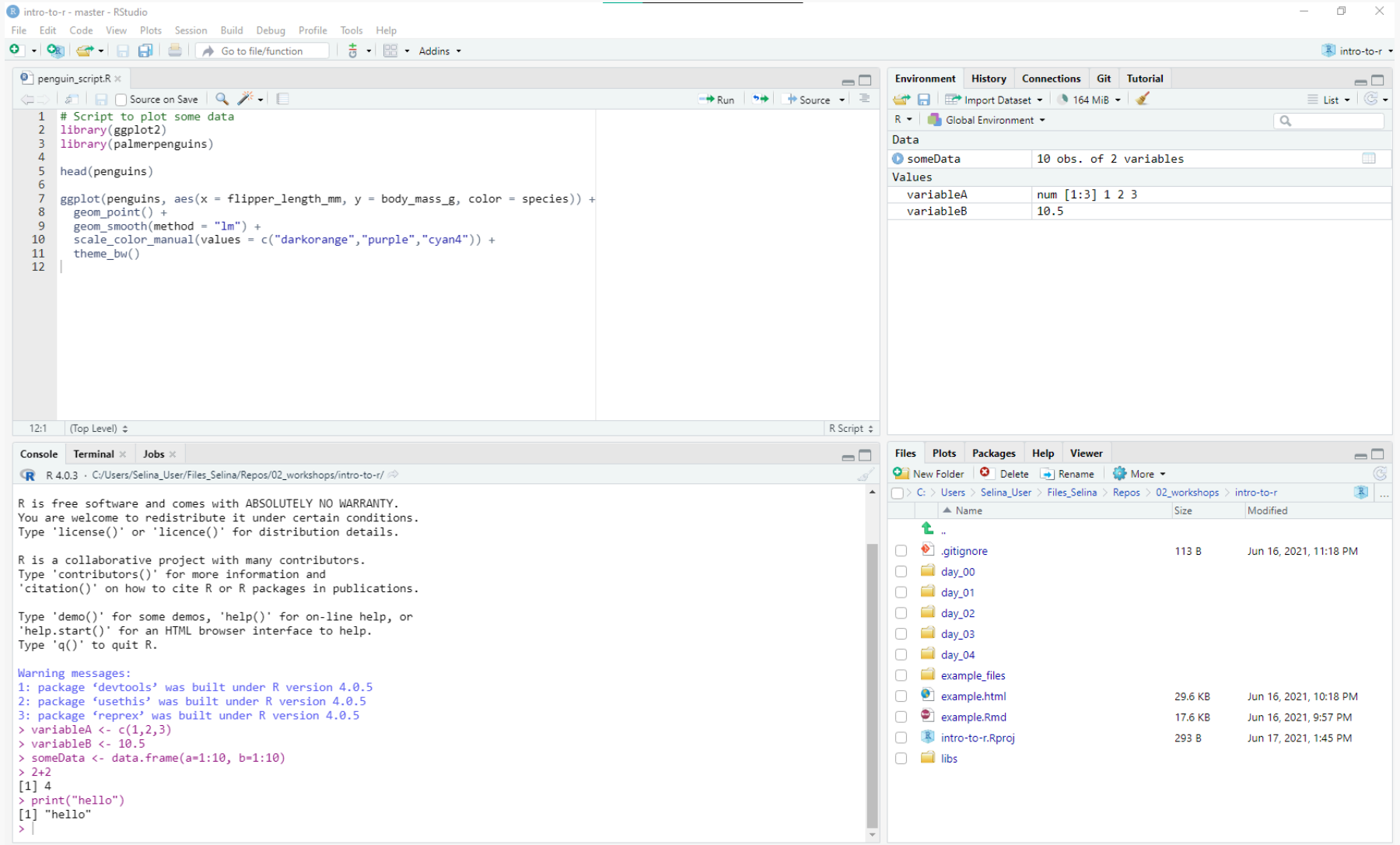
Difference between R and RStudio

Analogy and image from ModernDive Book

> **Summary**
>
> You can use R without RStudio but RStudio without R would be of little use

A quick tour around RStudio

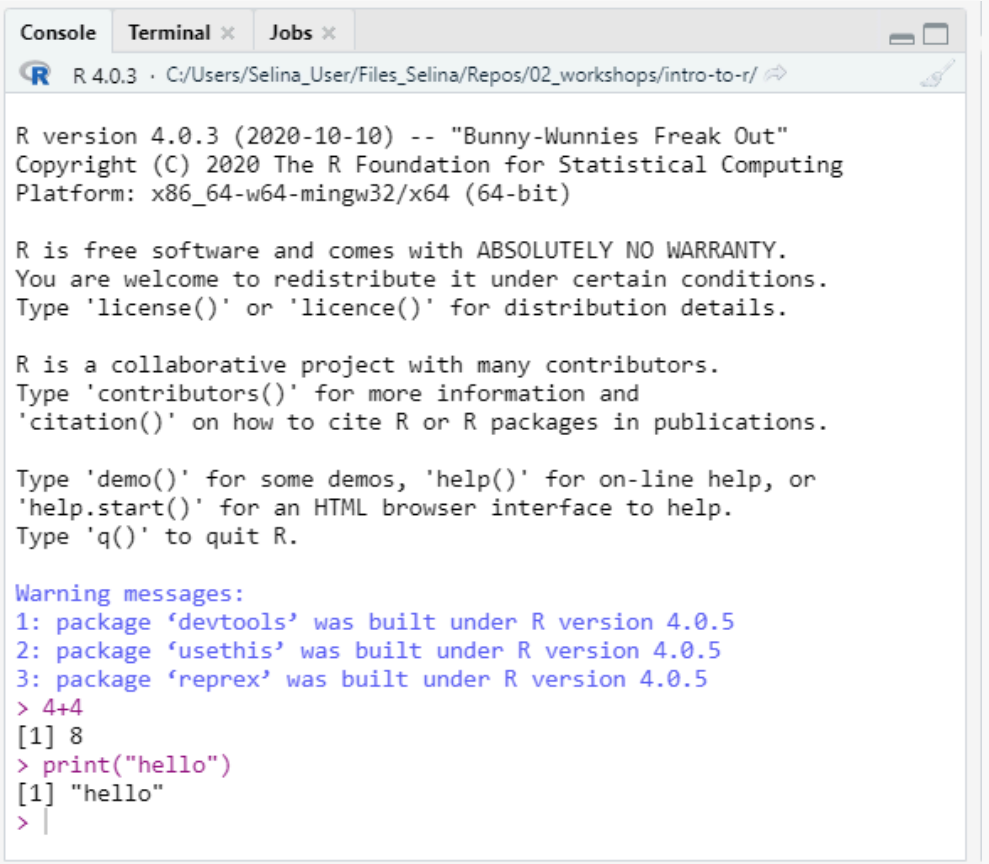
A quick tour around RStudio



Console pane

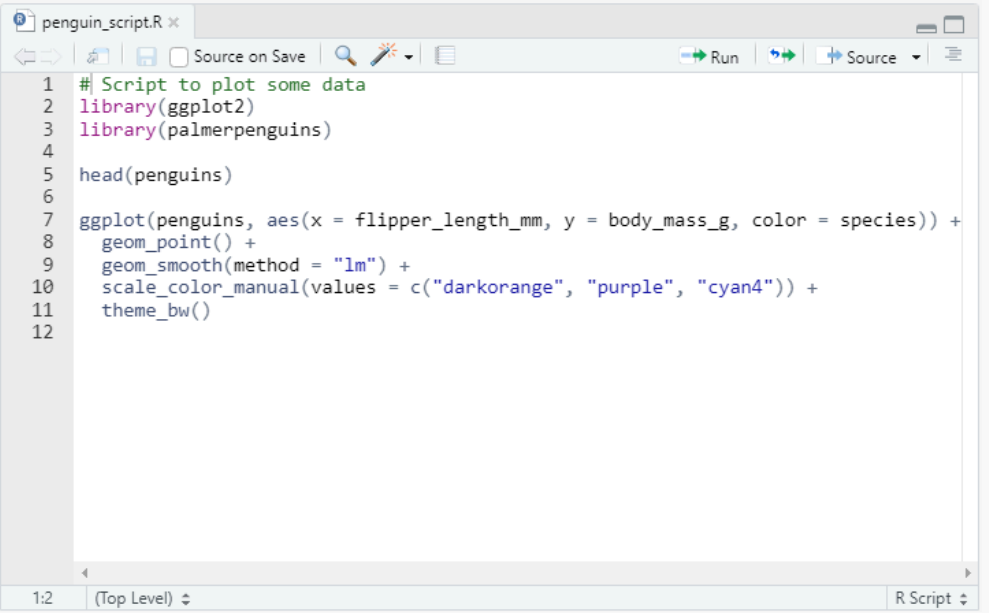
- Execute R code
- Output from R code in scripts is printed there
- Type a command into the console and execute with `Enter/Return`

> **Tip**
>
> Use arrow keys to bring back last commands



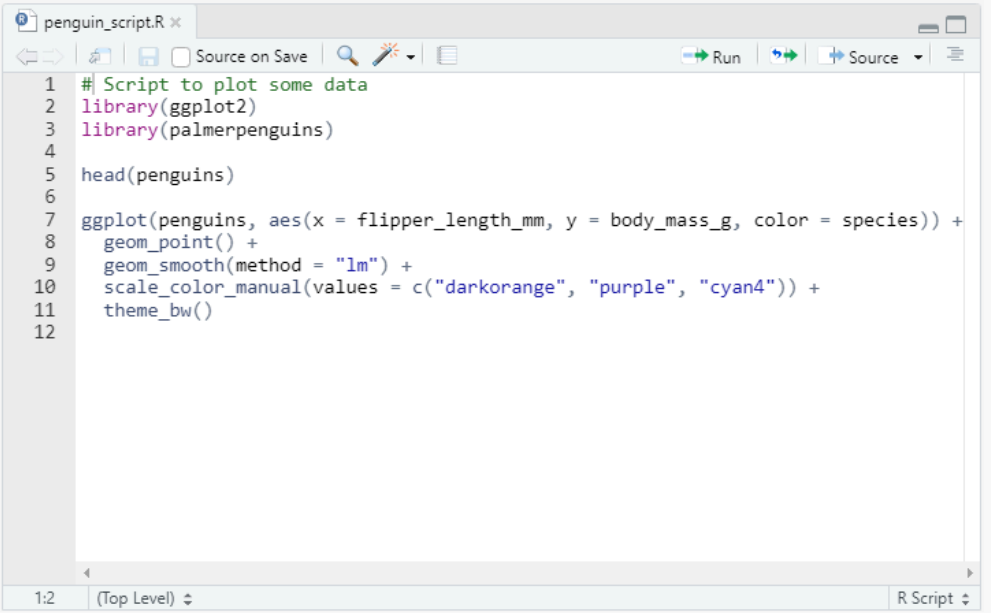
Script pane

- 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

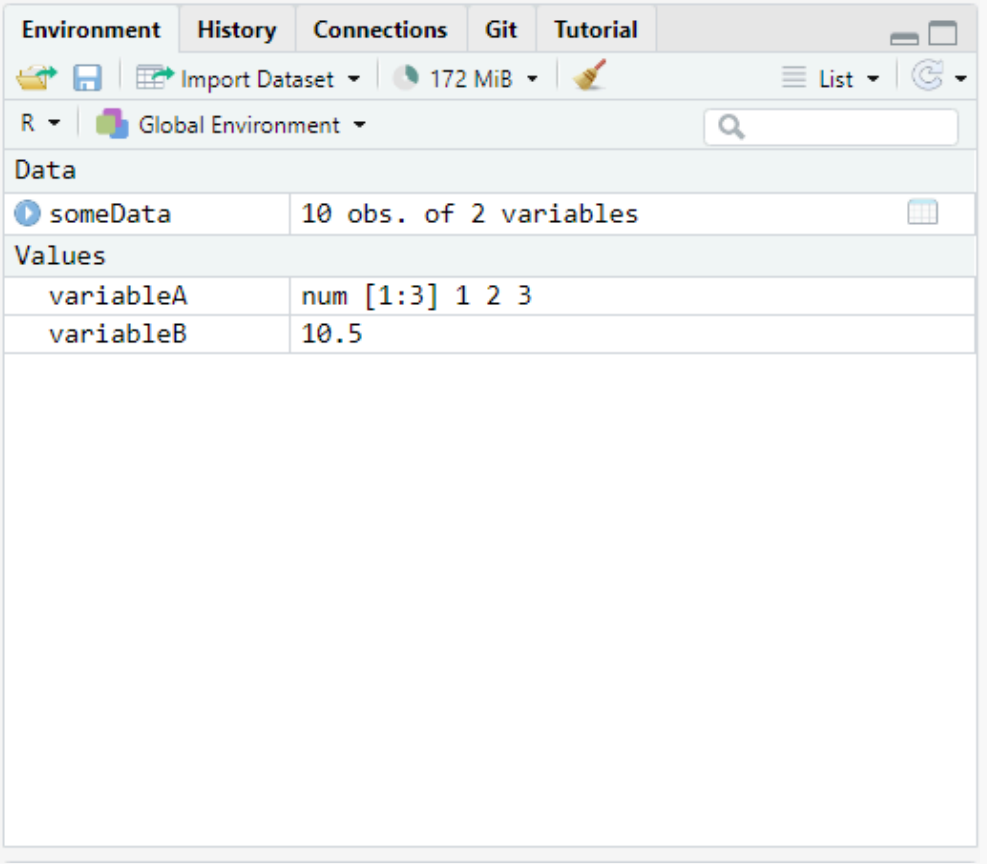


Summary

Use **scripts** for all your analysis and for commands that you want to save.
Use **console** for temporary commands, e.g. to test something.

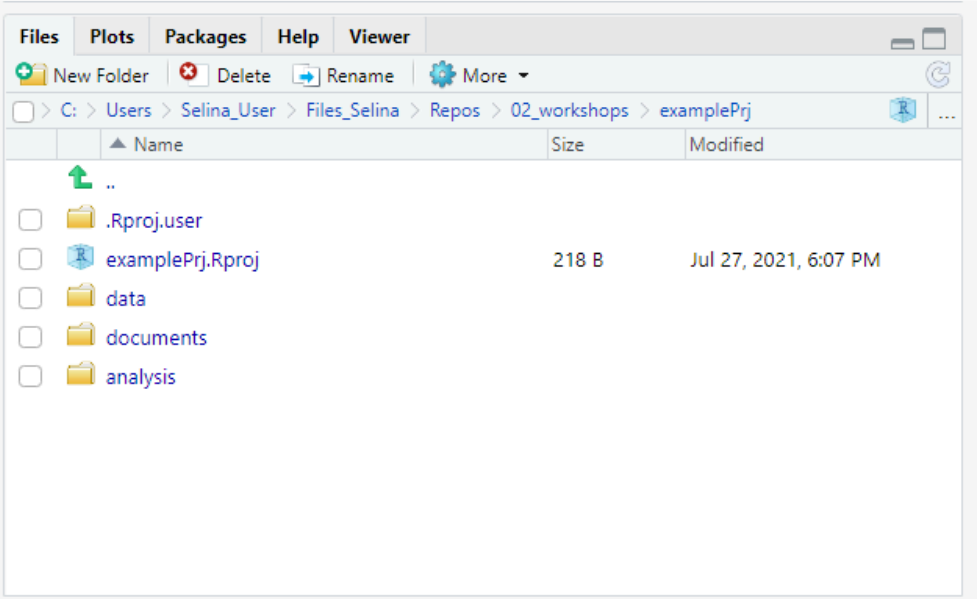
Environment pane

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



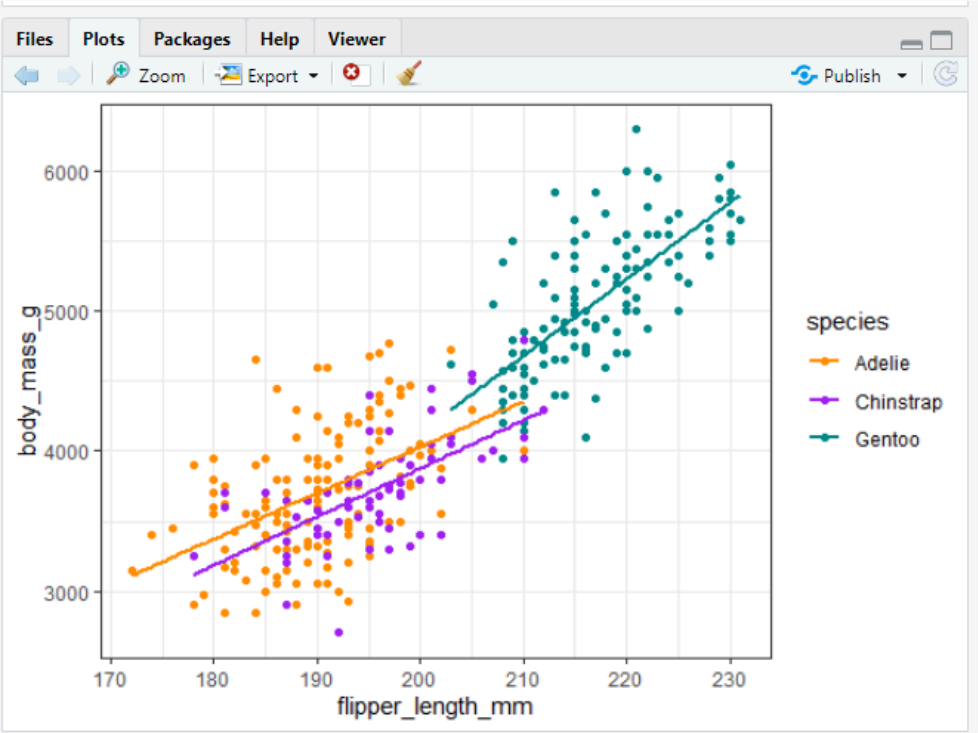
Files pane

- 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



Project oriented workflow

> How to use RStudio to organize your projects

Project oriented workflow

- One directory with all files relevant for project
  - Scripts, data, plots, documents, …

```
MyProject
|
|- data
|
|- docs
|   |
|   |- notes
|   |
|   |- reports
|
|- R
|   |
|   |- clean_data.R
|   |
|   |- statistics.R
|
|
```

Example project structure

Project oriented workflow

- One directory with all files relevant for project
  - Scripts, data, plots, documents, …
- An RStudio project is just a normal directory with an **.Rproj** file

```
MyProject
|
|- data
|
|- docs
|   |
|   |- notes
|   |
|   |- reports
|
|- R
|   |
|   |- clean_data.R
|   |
|   |- statistics.R
|
|- MyProject.RProj
```

Example RStudio project structure

Project oriented workflow

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

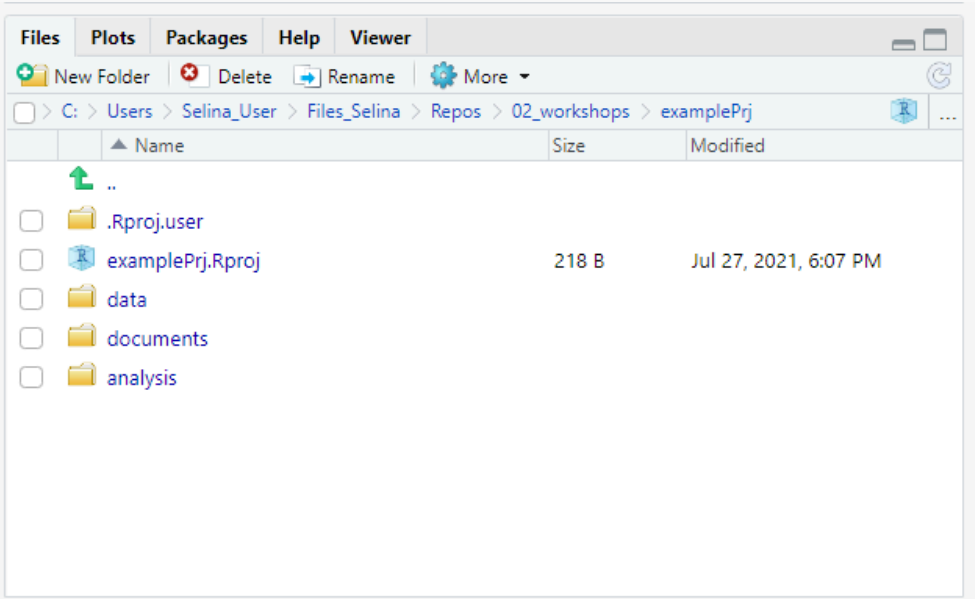
```
MyProject
|
|- data
|
|- docs
|   |
|   |- notes
|   |
|   |- reports
|
|- R
|   |
|   |- clean_data.R
|   |
|   |- statistics.R
|
|- *.RProj
```

Example RStudio project structure

Create an RStudio project

Create a project from scratch:

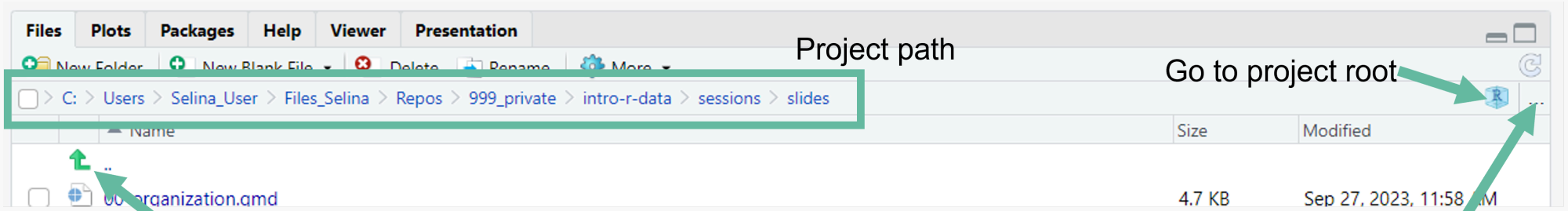
1. **File -> New Project -> New Directory -> New Project**
2. Enter a directory name (this will be the name of your project)
3. Choose the Directory where the project should be initiated
4. **Create Project**



Example RStudio project structure in the Files pane

RStudio will now create and open the project for you.

Navigate an RStudio project



Project path

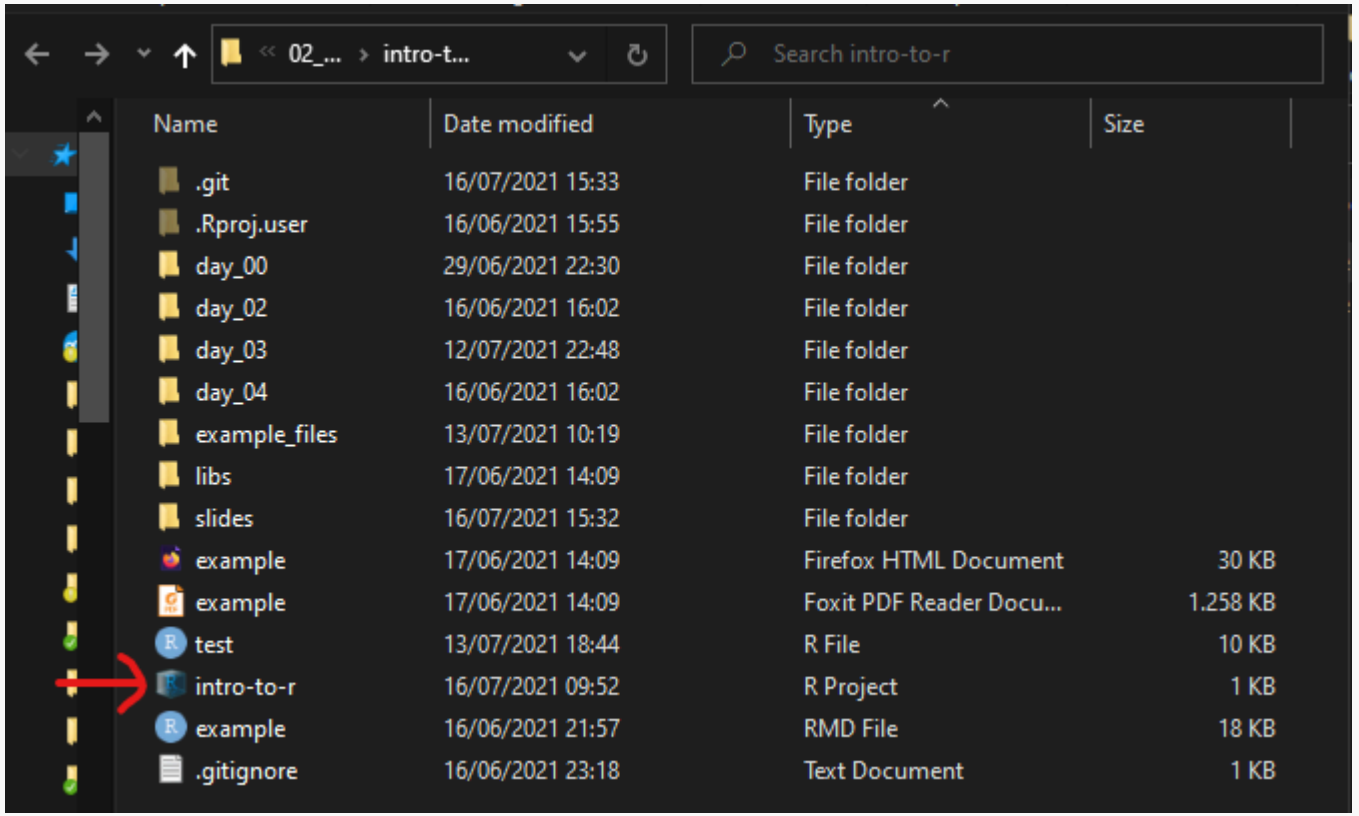
Go to project root

Navigate one level up

Open project in file explorer

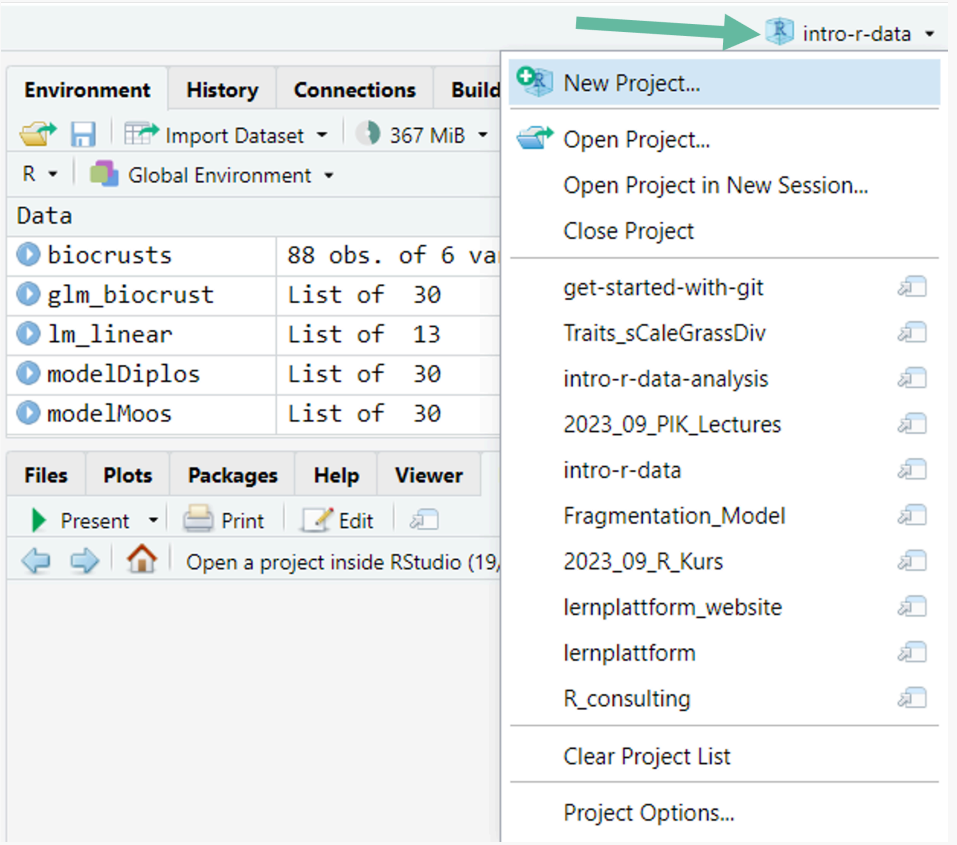
Open a project from outside RStudio

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.



A tip before we get started

Learn the most important keyboard shortcuts of R Studio.

Find all shortcuts under **Tools -> Keyboard Shortcuts Help**

- Save active file: Ctrl/Cmd + S
- Run current line: Ctrl/Cmd + Enter
- Create new R Script: Ctrl/Cmd + N
- Undo: Ctrl/Cmd + Z
- Redo: Ctrl/Cmd + Y
- Copy/Paste: Ctrl/Cmd + C/V

Now you

Task 1 (20 min)

Set up your own RStudio project for this workshop

Find the task description here