

Introduction to Rstudio

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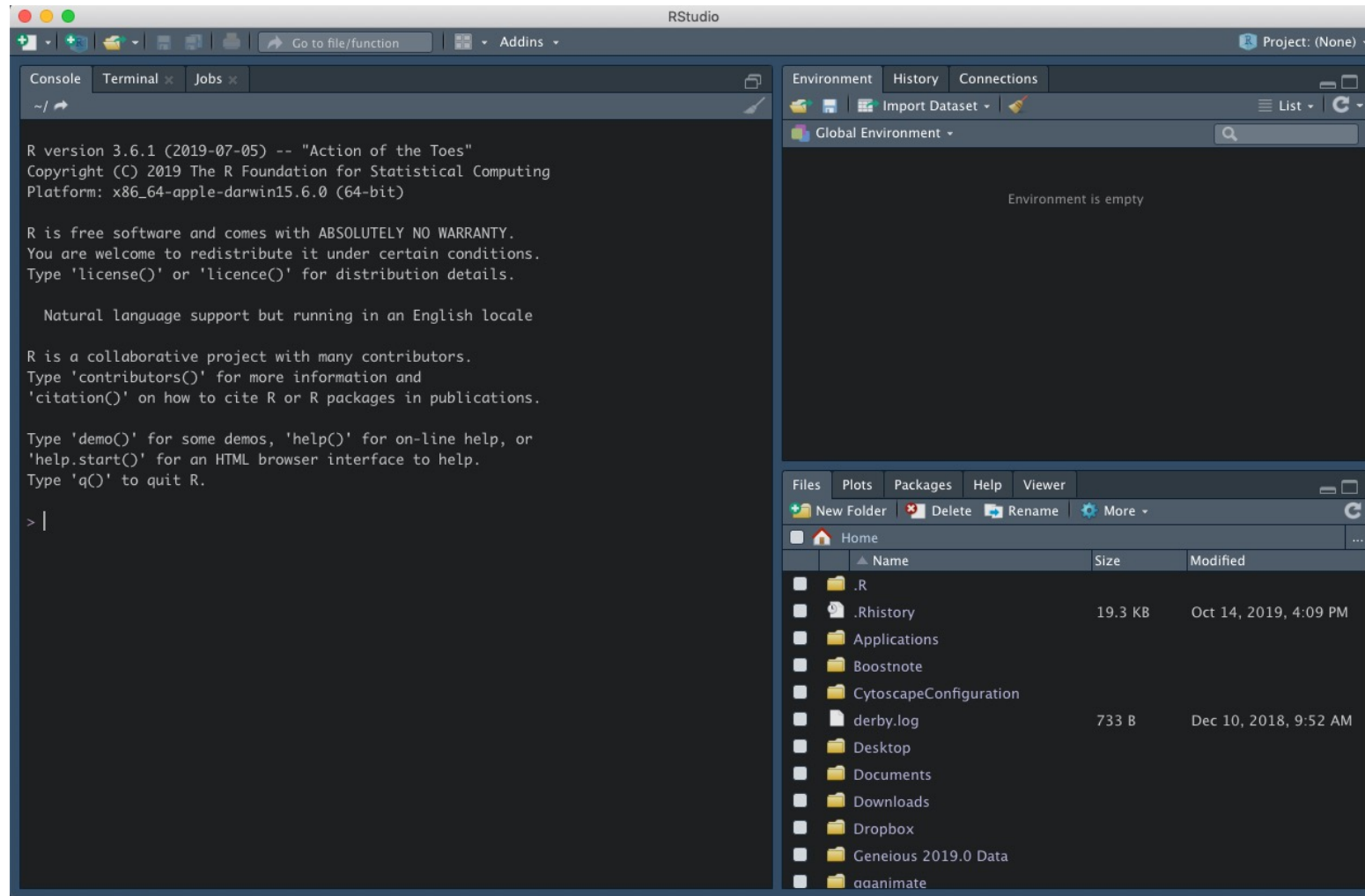
https://github.com/krabberod/UNIS_AB332_2021

UNIS - AB332 - 2021

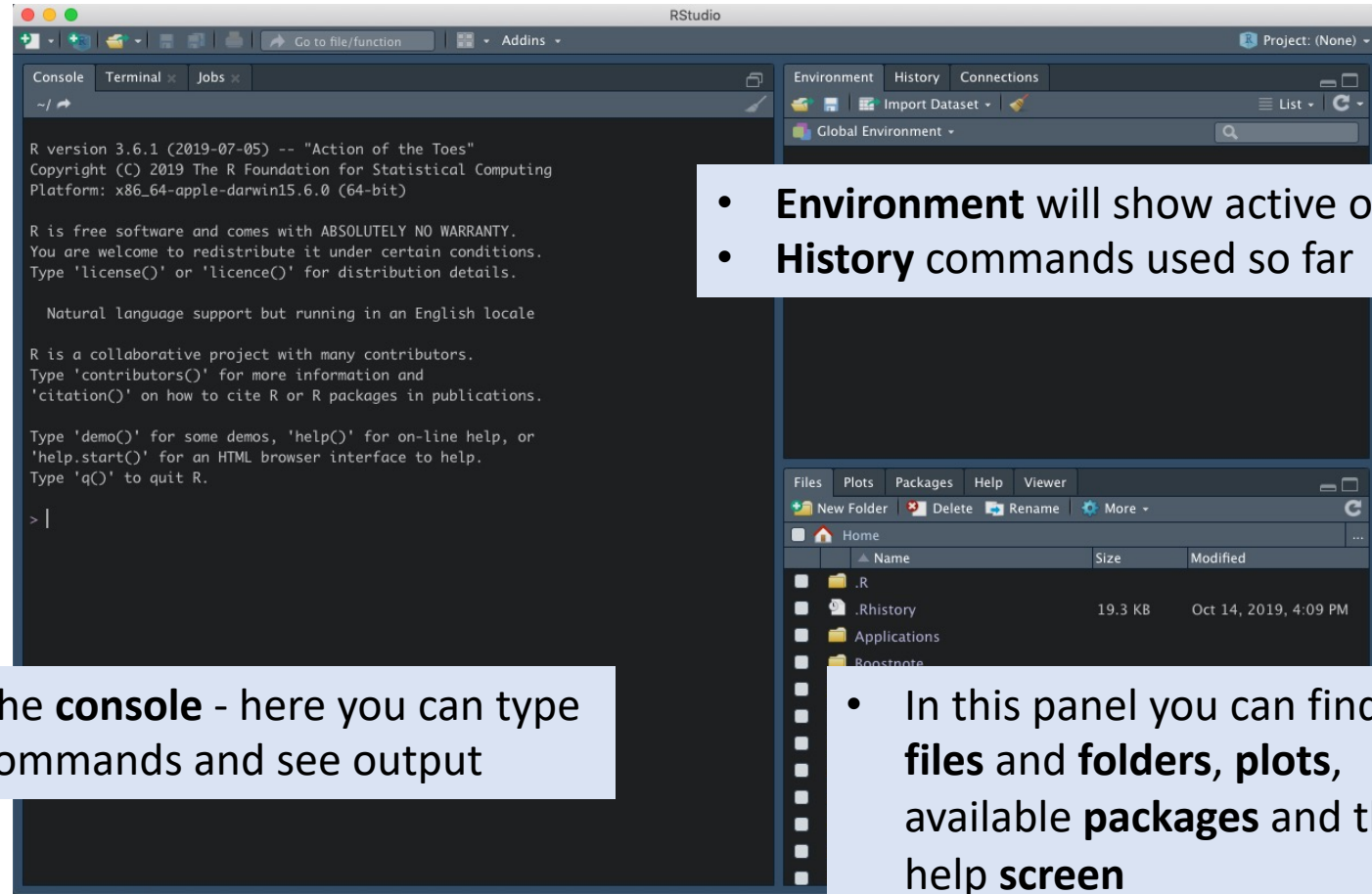
Rstudio

- RStudio is an Integrated Development Environment (IDE) for R, a programming language for statistical computing and graphics.
- Customizable workbench with all of the tools required to work with R in one place (console, source, plots, workspace, help, history, etc.).
- Syntax highlighting editor with code completion.
- Execute code directly from the source editor (line, selection, or file).
- Runs on Windows, Mac, and Linux, and has a community-maintained FreeBSD port.
- Can also be run as a server, enabling multiple users to access the RStudio IDE using a web browser.
- (Source <https://github.com/rstudio/rstudio>)

Rstudio - Graphical interface



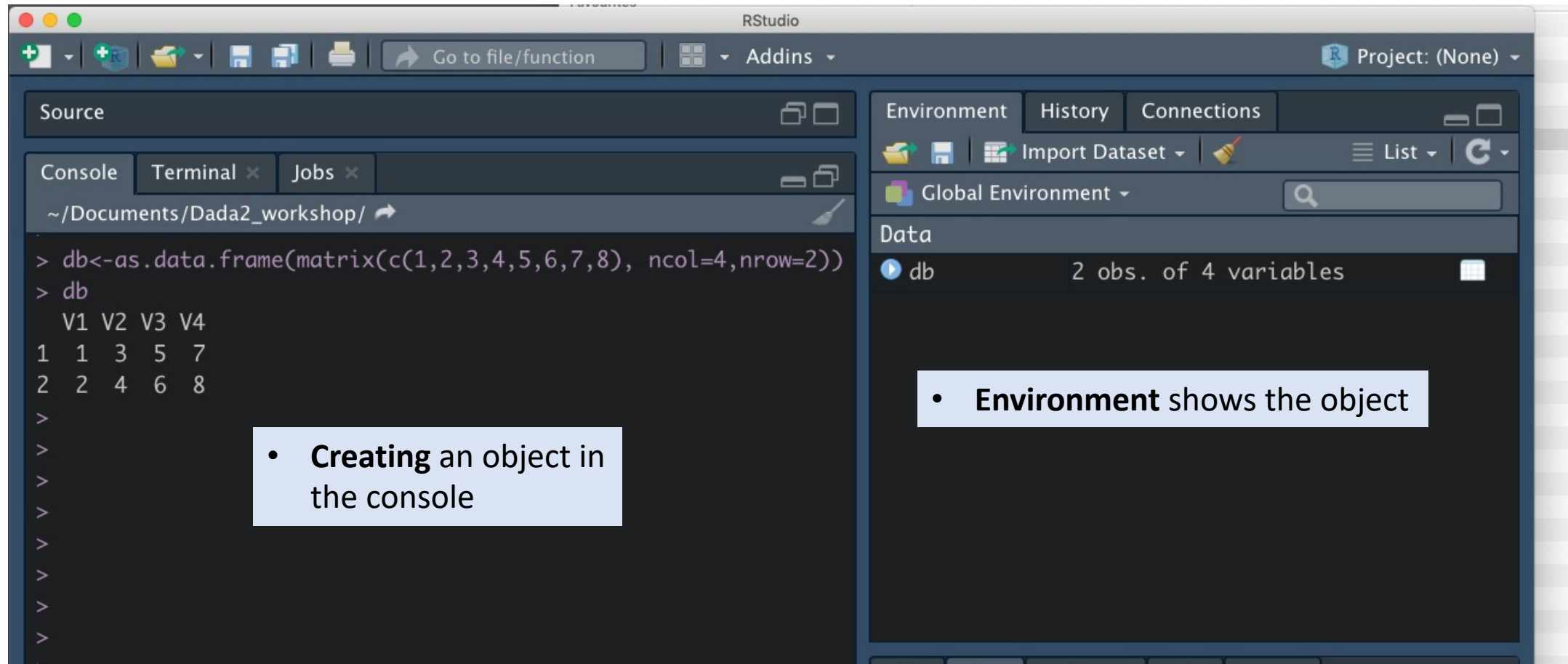
Rstudio



- **Environment** will show active objects
- **History** commands used so far

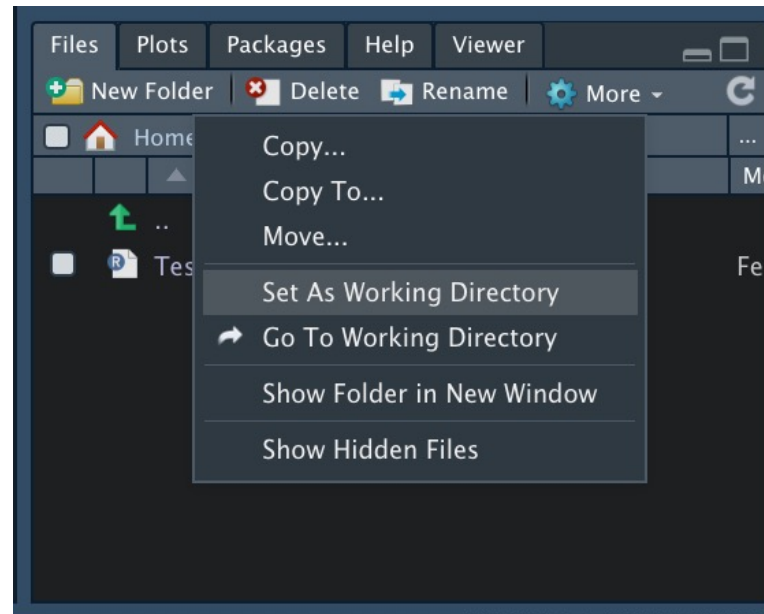
The **console** - here you can type commands and see output

- In this panel you can find **files** and **folders**, **plots**, available **packages** and the **help screen**



Setting working directory

- Navigate to correct folder under the “files” tab
- Click “Set As Working Directory” (under *More*)



Setting working directory

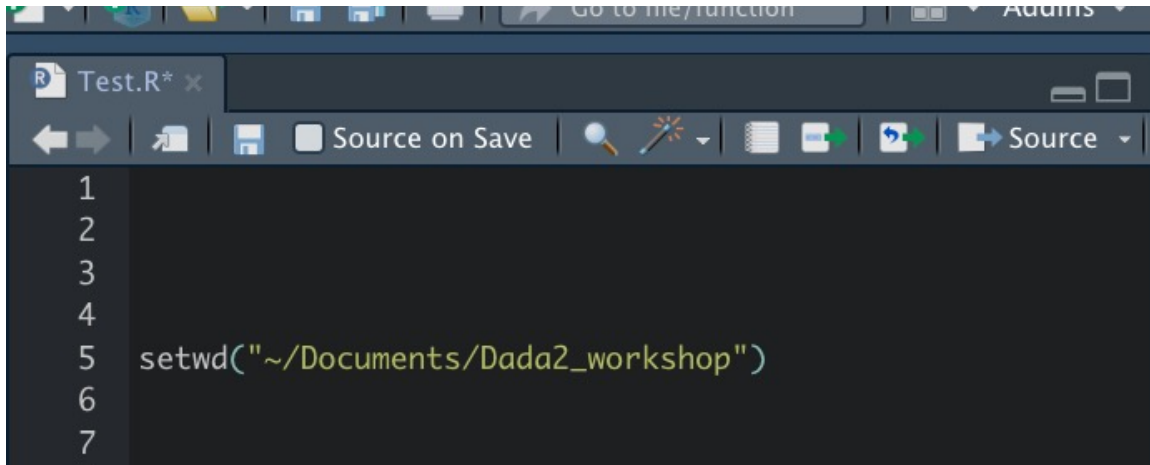
- Alternatively write

MAC:

```
setwd("~/path/to/my/folder")
```

WINDOWS

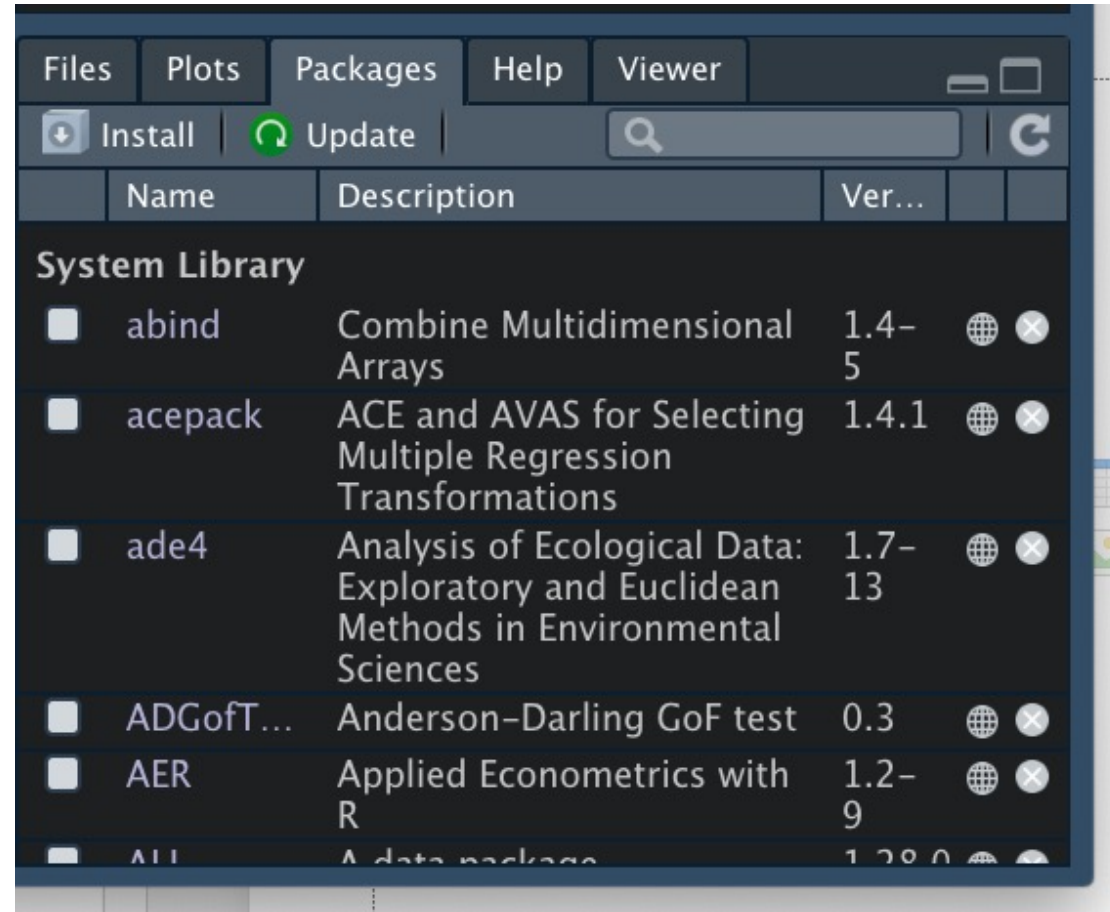
```
setwd("C:/path/to/my/folder")
```



The screenshot shows the RStudio IDE interface. The top toolbar includes icons for navigation and execution, with a 'Source on Save' button highlighted. The main editor window, titled 'Test.R*', displays a script with line numbers 1 through 7 on the left margin. Line 5 contains the R code `setwd("~/Documents/Dada2_workshop")`, which is highlighted in yellow.

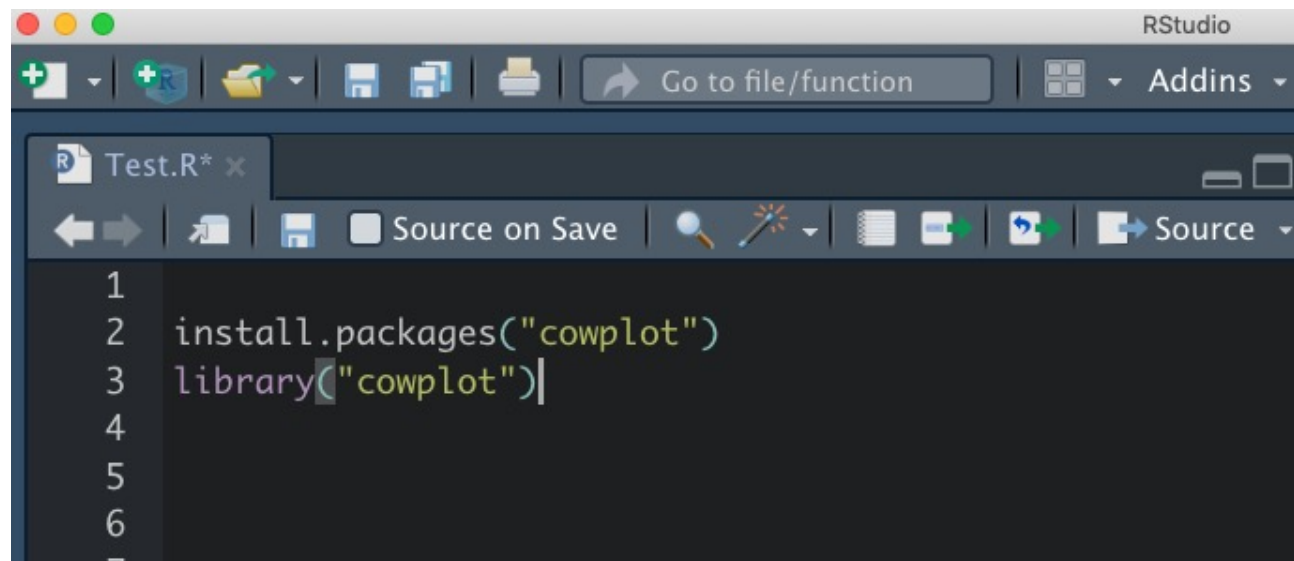
```
1  
2  
3  
4  
5 setwd("~/Documents/Dada2_workshop")  
6  
7
```

Installing packages



Installing packages 2

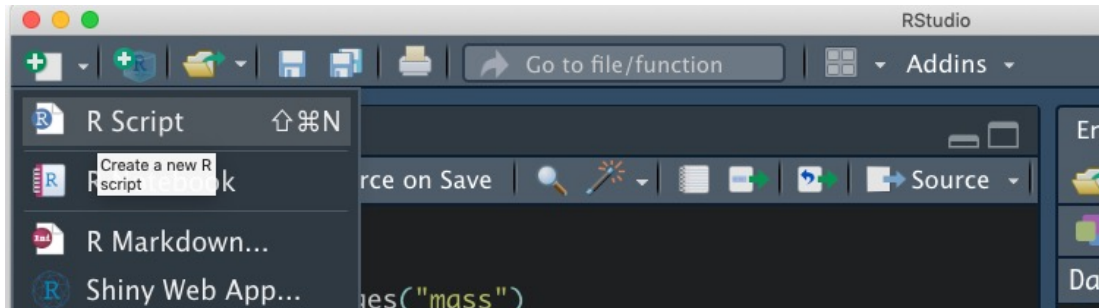
- Or use the command (with cowplot as example)
 - `install.packages("cowplot")`
- Installed packages can be loaded with the command
 - `library("cowplot")`

A screenshot of the RStudio IDE interface. The title bar at the top says "RStudio". Below it is a toolbar with icons for file operations and a search bar labeled "Go to file/function". The next toolbar contains icons for running code, saving, and other functions, with a label "Source on Save". The main editor window shows a script file named "Test.R*" with the following R code:

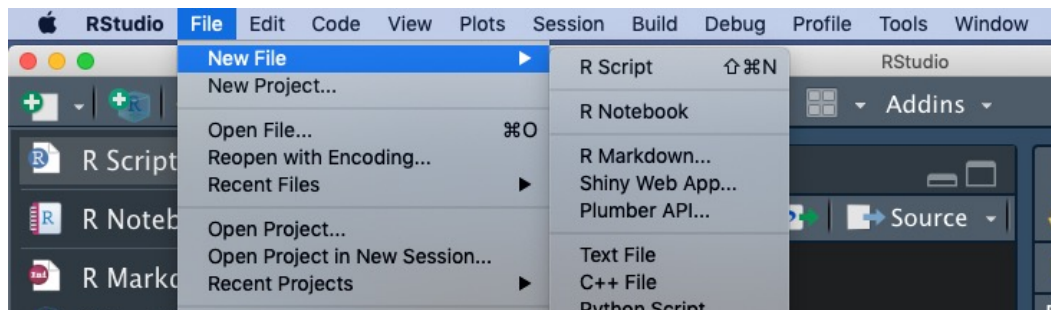
```
1  
2 install.packages("cowplot")  
3 library("cowplot")  
4  
5  
6
```

Using Scripts

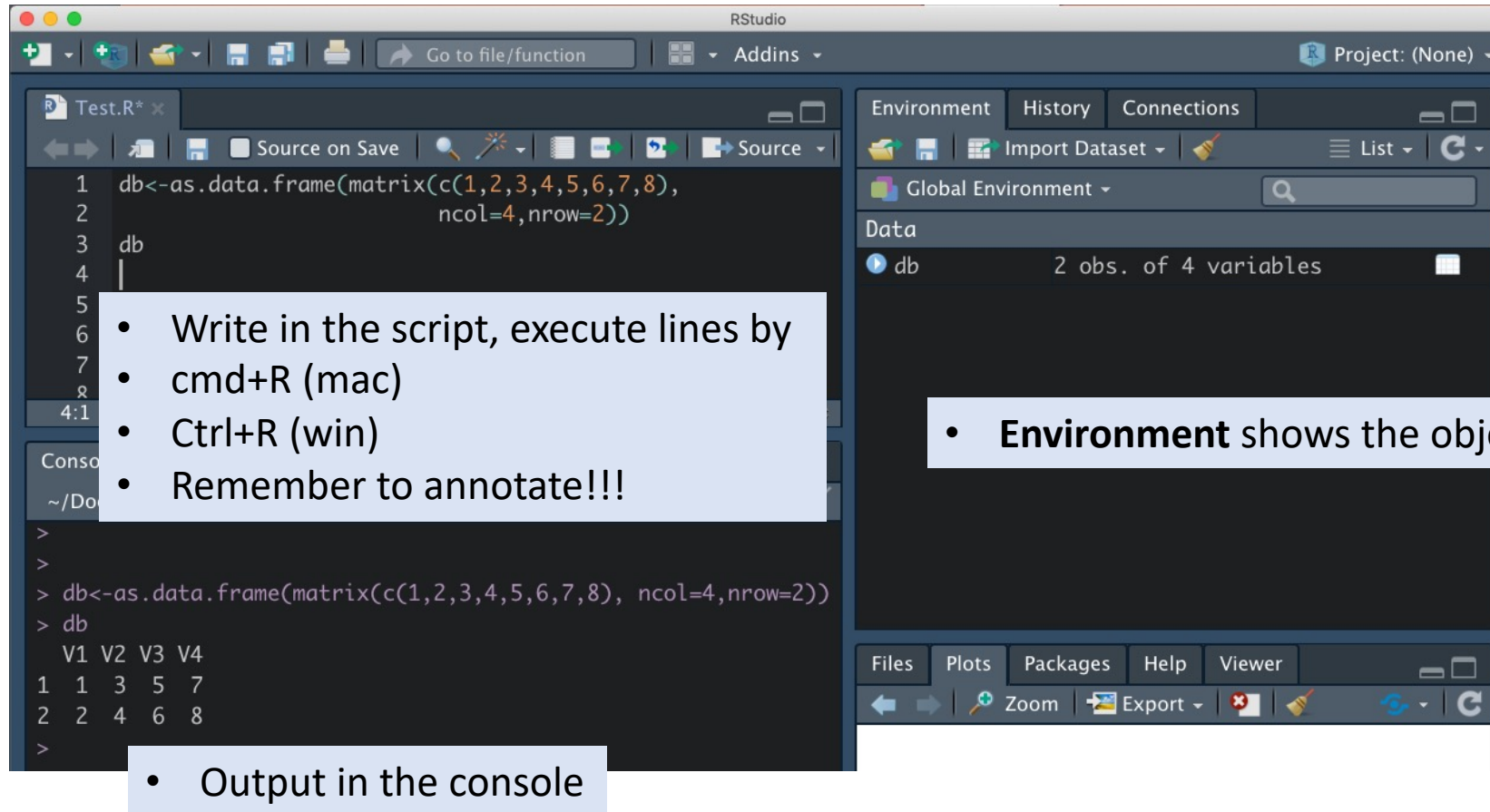
Click icon with a document and a + sign



OR click File -> New File -> R Script



Using Scripts



The screenshot shows the RStudio interface with a script named 'Test.R' open in the Source pane. The script contains the following R code:

```
1 db<-as.data.frame(matrix(c(1,2,3,4,5,6,7,8),
2                             ncol=4,nrow=2))
3 db
4 |
5
6
7
8
9 4:1
```

The Environment pane on the right shows the object 'db' with 2 observations and 4 variables. The console at the bottom shows the output of the script:

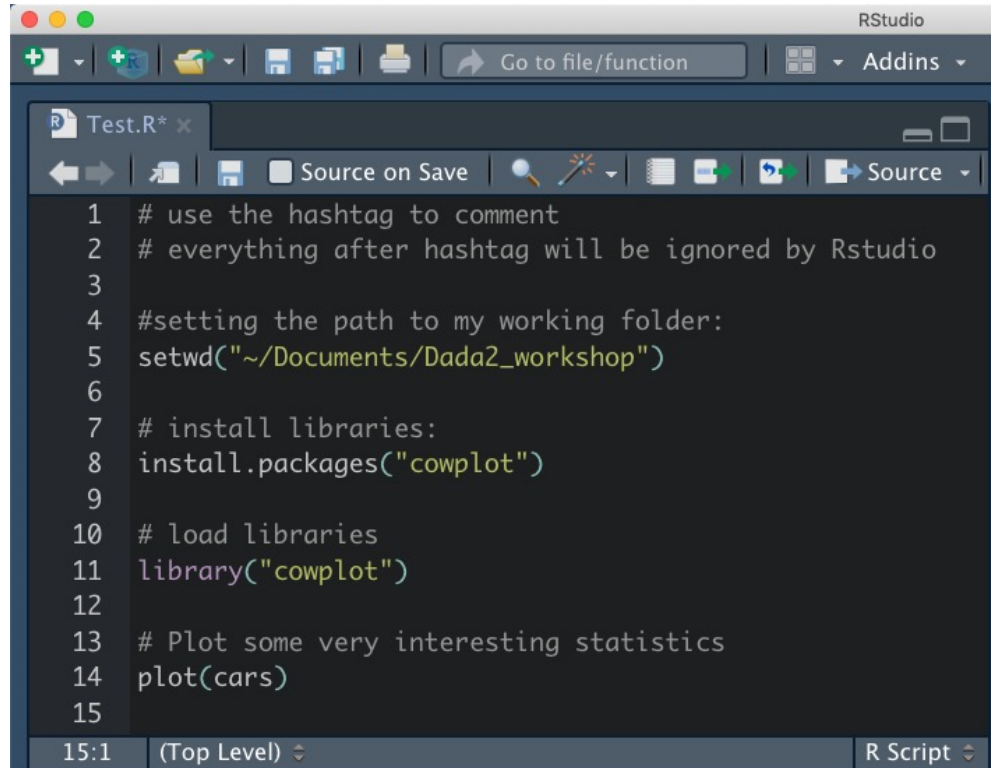
```
>
>
> db<-as.data.frame(matrix(c(1,2,3,4,5,6,7,8), ncol=4,nrow=2))
> db
  V1 V2 V3 V4
1  1  3  5  7
2  2  4  6  8
>
```

- Write in the script, execute lines by
- cmd+R (mac)
- Ctrl+R (win)
- Remember to annotate!!!

- **Environment** shows the object

- Output in the console

Comment and annotate your script!!!



The screenshot shows the RStudio interface with a script editor window titled 'Test.R*'. The script contains the following R code with comments:

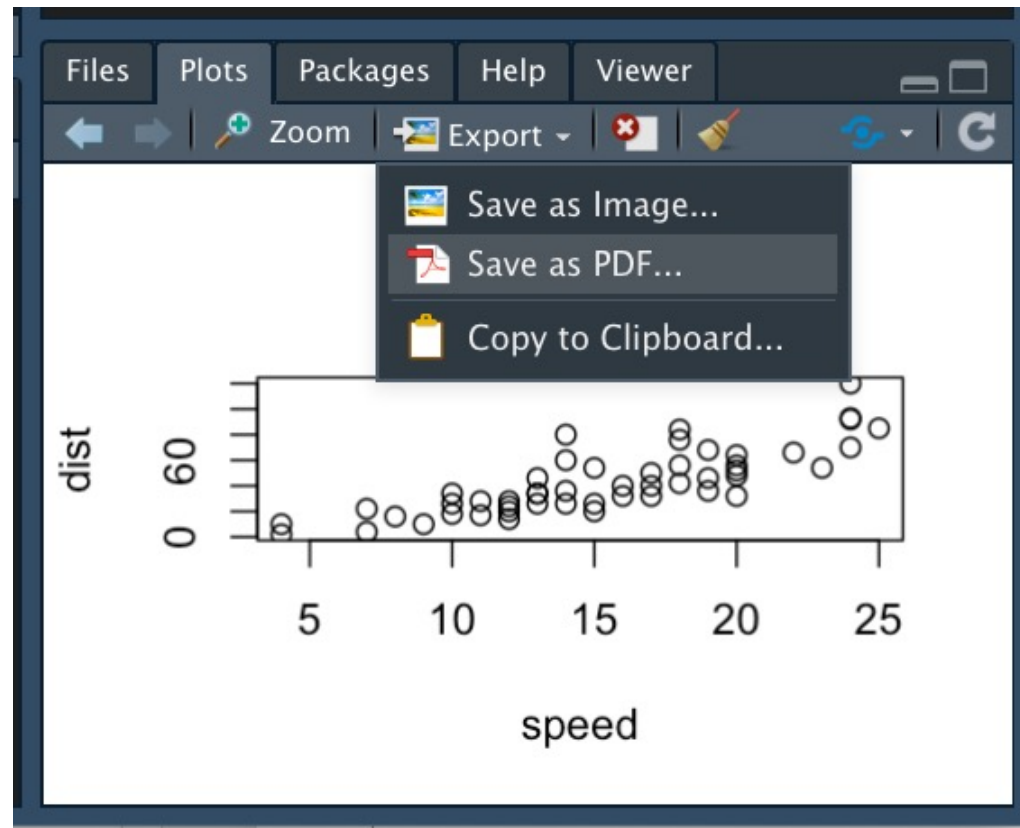
```
1 # use the hashtag to comment
2 # everything after hashtag will be ignored by Rstudio
3
4 #setting the path to my working folder:
5 setwd("~/Documents/Dada2_workshop")
6
7 # install libraries:
8 install.packages("cowplot")
9
10 # load libraries
11 library("cowplot")
12
13 # Plot some very interesting statistics
14 plot(cars)
15
```

The status bar at the bottom indicates the cursor is at line 15, column 1, at the 'Top Level' of an 'R Script'.

- What the code does
- How the code does it
- How to use the code

Plotting plots and other dots

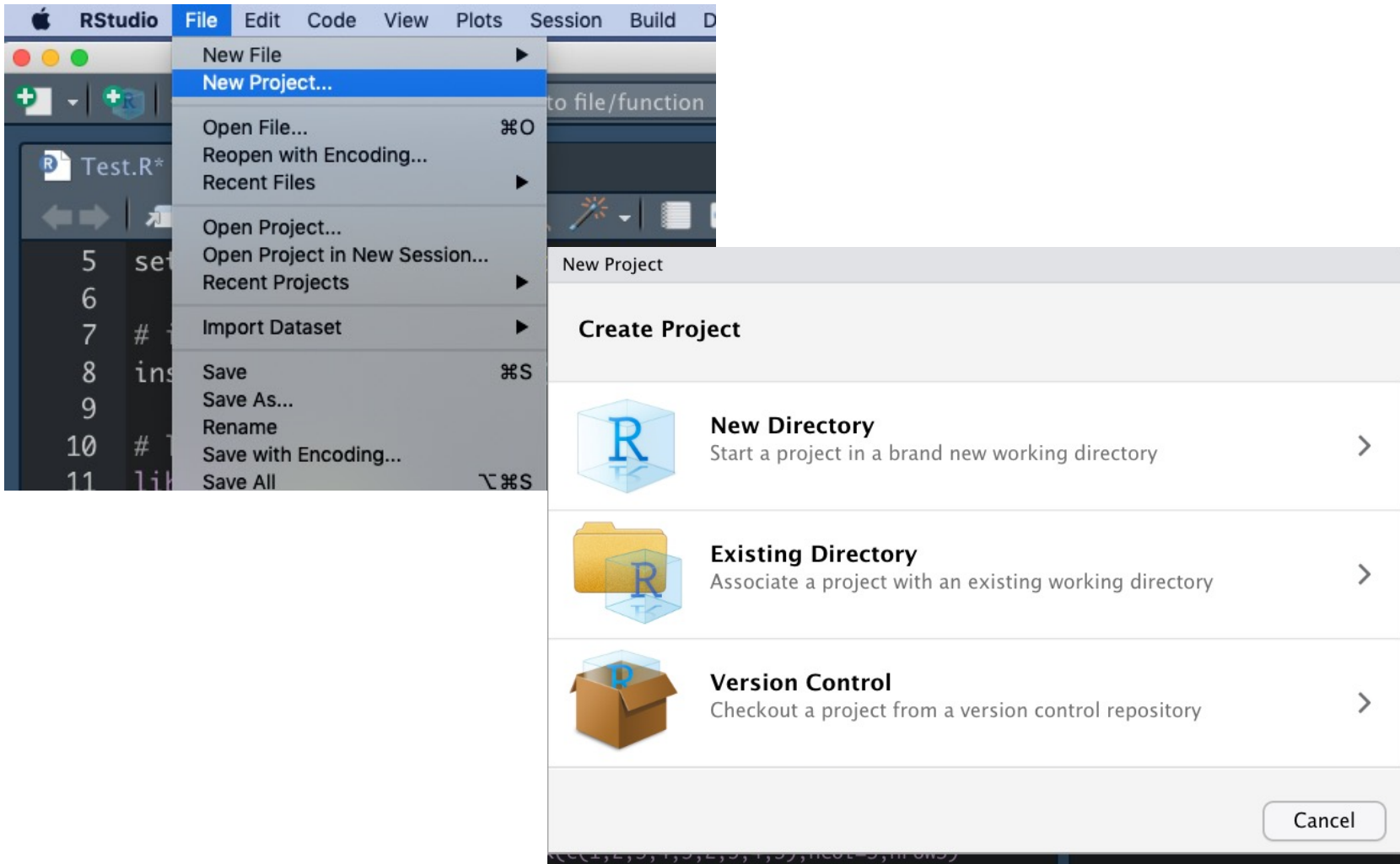
- Plots will appear in the *plots* tab and can be exported in various formats



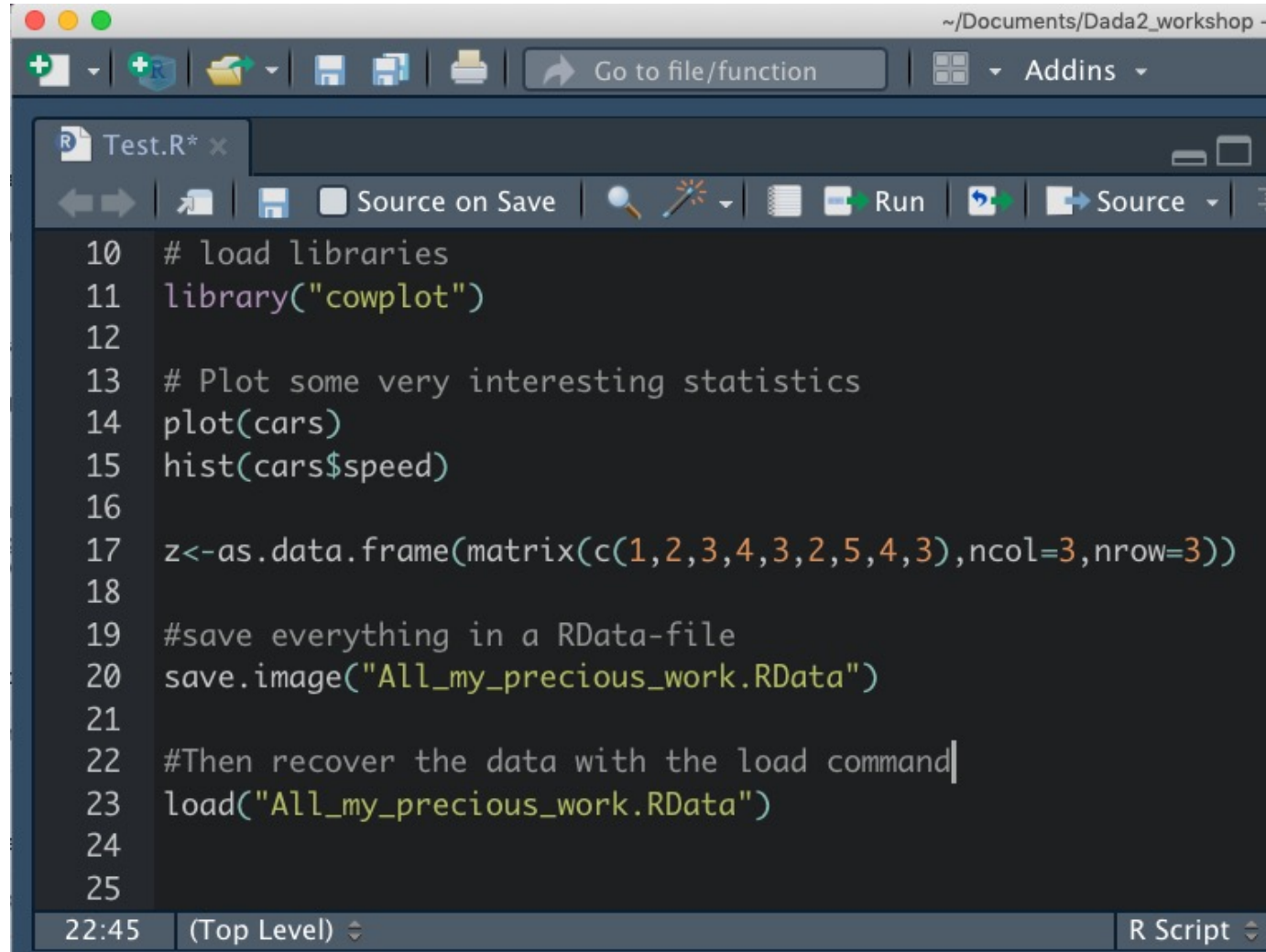
Use R-projects!

- This will set the default working directory for the particular project, and makes it easy to save everything in the same folder.
- Very helpful when working on several different projects
- Also very easy to integrate with *github* and version control with the option to push and pull repositories (not covered in this lecture)
- Or for sharing all data with somebody else using RStudio

Use R-projects



Use R-projects



The screenshot shows the RStudio interface with a script editor open. The window title is `~/Documents/Dada2_workshop -`. The script editor has a toolbar with icons for file operations, a search bar labeled "Go to file/function", and a dropdown menu labeled "Addins". The script content is as follows:

```
10 # load libraries
11 library("cowplot")
12
13 # Plot some very interesting statistics
14 plot(cars)
15 hist(cars$speed)
16
17 z<-as.data.frame(matrix(c(1,2,3,4,3,2,5,4,3),ncol=3,nrow=3))
18
19 #save everything in a RData-file
20 save.image("All_my_precious_work.RData")
21
22 #Then recover the data with the load command
23 load("All_my_precious_work.RData")
24
25
```

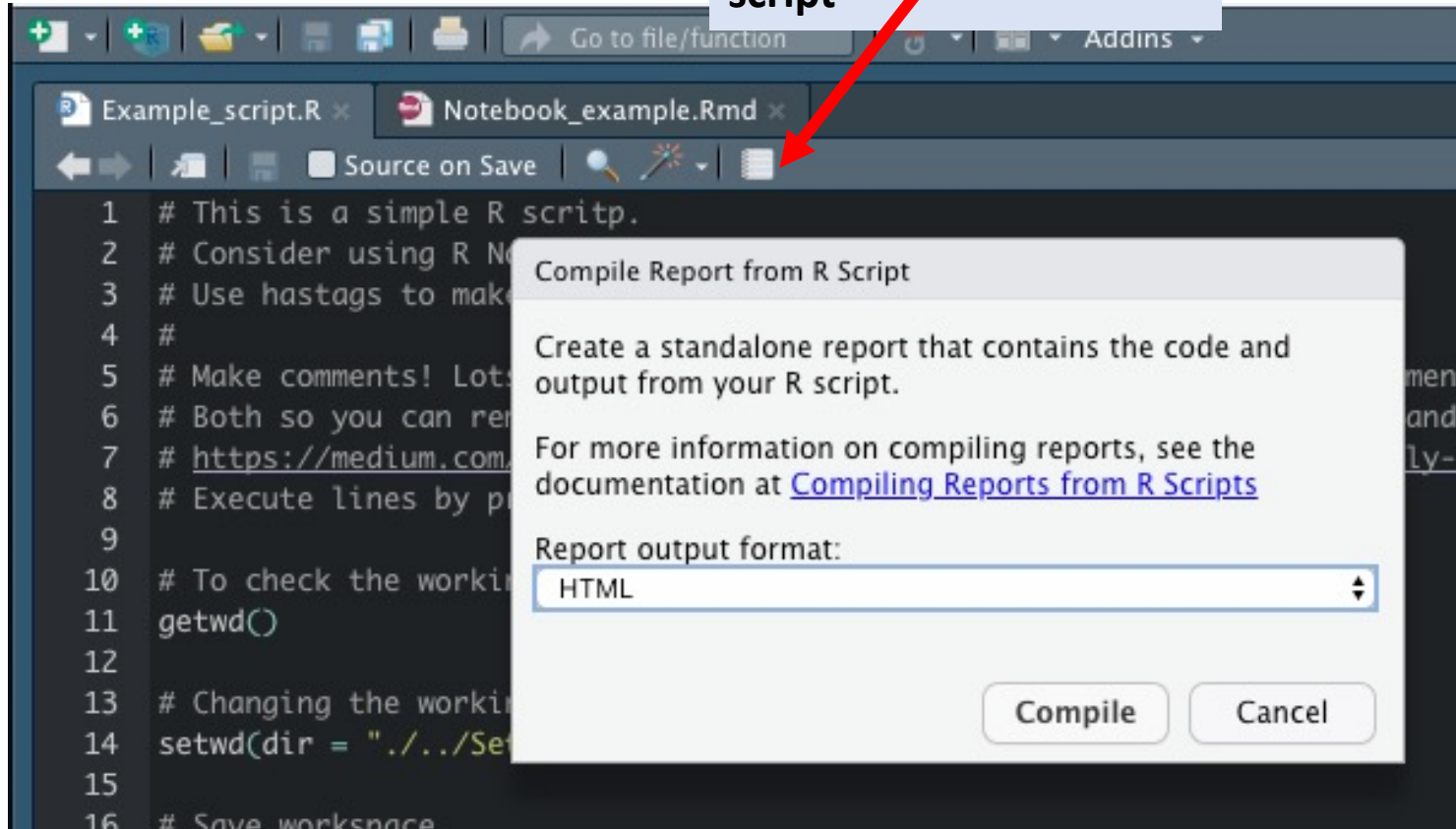
The status bar at the bottom shows the time `22:45`, the environment `(Top Level)`, and the file type `R Script`.

R Markdown and R notebooks

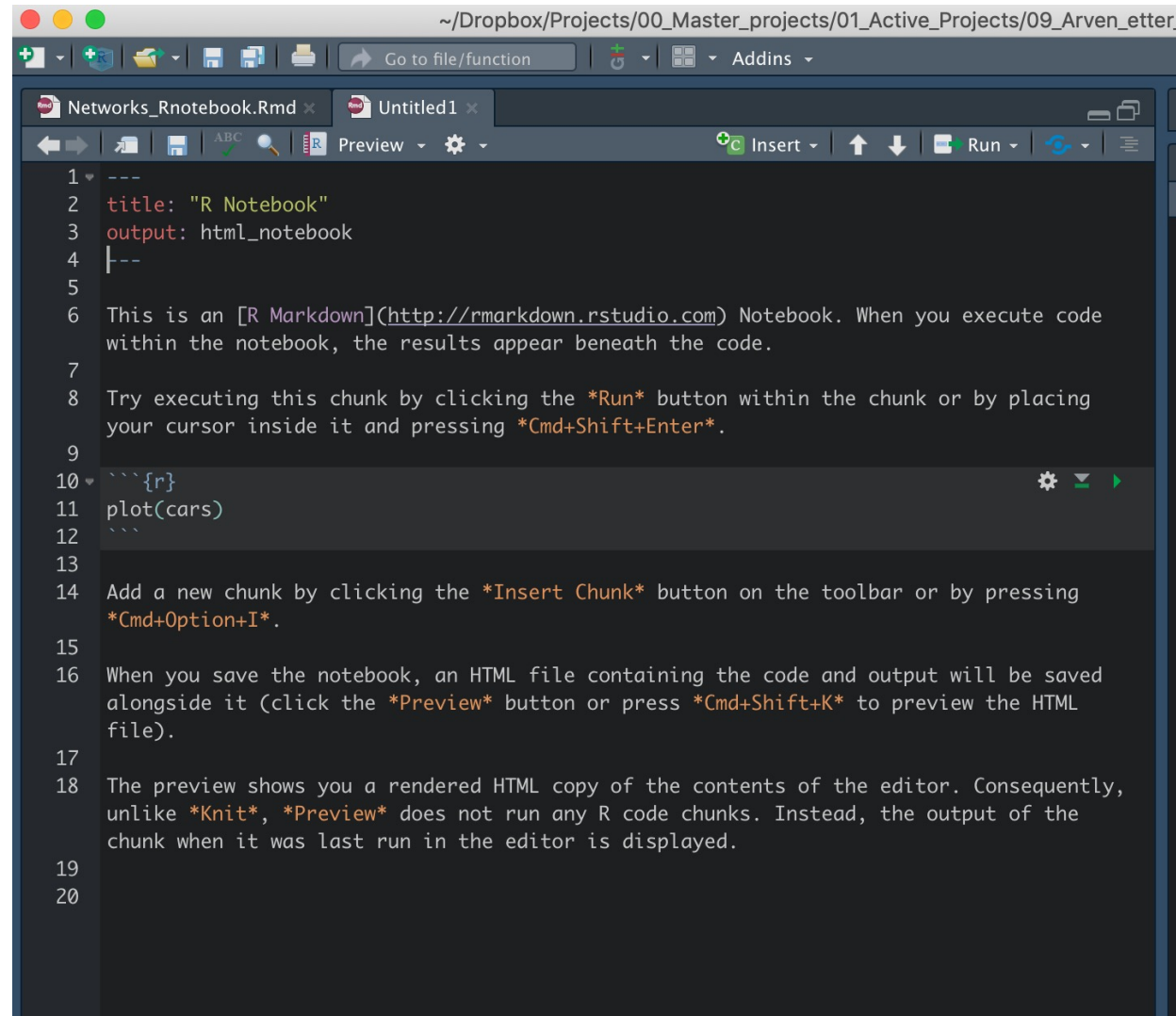
- An alternative to “simple” script in Rstudio.
- Advantage: easy to export in other easy-to-read formats (i.e. html, pdf, word, presentations).
- Markdown language is an easy way of formatting using plain text
- R Notebook is somewhat more powerful with additional options for formatting.
- Can run chunks of code from other languages *within* Rstudio
- **Disadvantage:** Not compatible with (standalone aka. vanilla) R, which is often used on clusters and servers.

Export a report

This button will help to generate a pdf, html, or word document of your script



R Notebook



The screenshot shows the RStudio interface with an R Notebook open. The notebook is titled "Networks_Rnotebook.Rmd" and contains the following content:

```
1 ---
2 title: "R Notebook"
3 output: html_notebook
4 |---
5
6 This is an [R Markdown](http://rmarkdown.rstudio.com) Notebook. When you execute code
7 within the notebook, the results appear beneath the code.
8
9 Try executing this chunk by clicking the *Run* button within the chunk or by placing
10 your cursor inside it and pressing *Cmd+Shift+Enter*.
11
12 ```{r}
13 plot(cars)
14 ```
15
16 Add a new chunk by clicking the *Insert Chunk* button on the toolbar or by pressing
17 *Cmd+Option+I*.
18
19 When you save the notebook, an HTML file containing the code and output will be saved
20 alongside it (click the *Preview* button or press *Cmd+Shift+K* to preview the HTML
  file).

The code chunk is highlighted in a dark grey box with a toolbar on the right containing a gear icon, a green checkmark, and a green right arrow. The rest of the notebook content is in a dark blue editor background.


```