University of BRISTOL

A simple guide to writing a script

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Thanks to Gwen Fernandes

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Outline

- Making a new R script
- Commenting your scripts
- What to think about before starting to script
- How the top of your script should look
- Making your code easier to read
- Saving your scripts

Making a new R script

- The usual R Studio screen has four windows:
  - CONSOLE
  - WORKPLACE AND HISTORY
  - FILES, PLOTS, PACKAGES AND HELP
  - **R SCRIPT AND DATA VIEW** (this is where you keep a record of your work. For Stata users, this would be like your do-file, for SPSS users it is like the syntax and for SAS users, the SAS program)

RStudio

R script example.R

```r
install.packages("forestplot")

install.packages("grid")
install.packages("magrittr")
install.packages("checkmate")

TAC_CMC2 <-
  structure(list(
    mean  = c(NA, NA, 3.36, 0.66, 3.94,6.45,7.96,NA, 3.72),
    lower = c(NA, NA, 0.19, 0.11, 0.17, 2.10, 1.32, NA, 0.96),
    upper = c(NA, NA, 58.19, 3.93, 89.91, 19.79, 48.09, NA,14.37)),
     Names = c("mean"  "lower"  "upper")
```

53:15 (Top Level) R Script

Console Terminal

```
R version 3.5.1 (2018-07-02) -- "Feather Spray"
Copyright (C) 2018 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin15.6.0 (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

Global Environment

Environment is empty

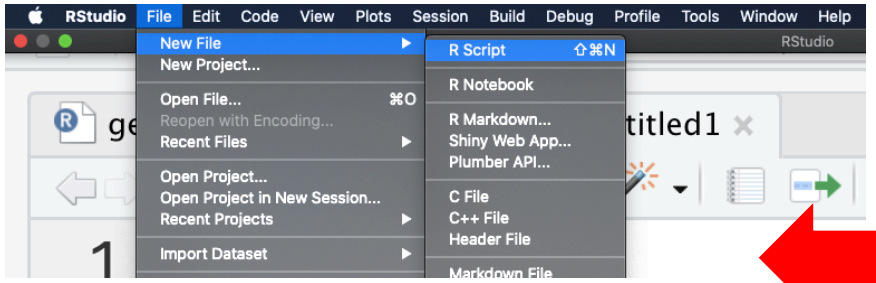
Files Plots Packages Help Viewer

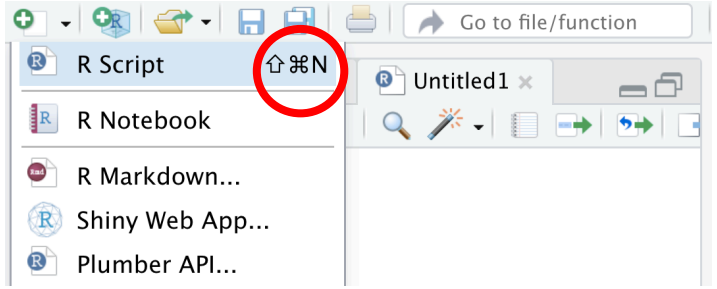
Home

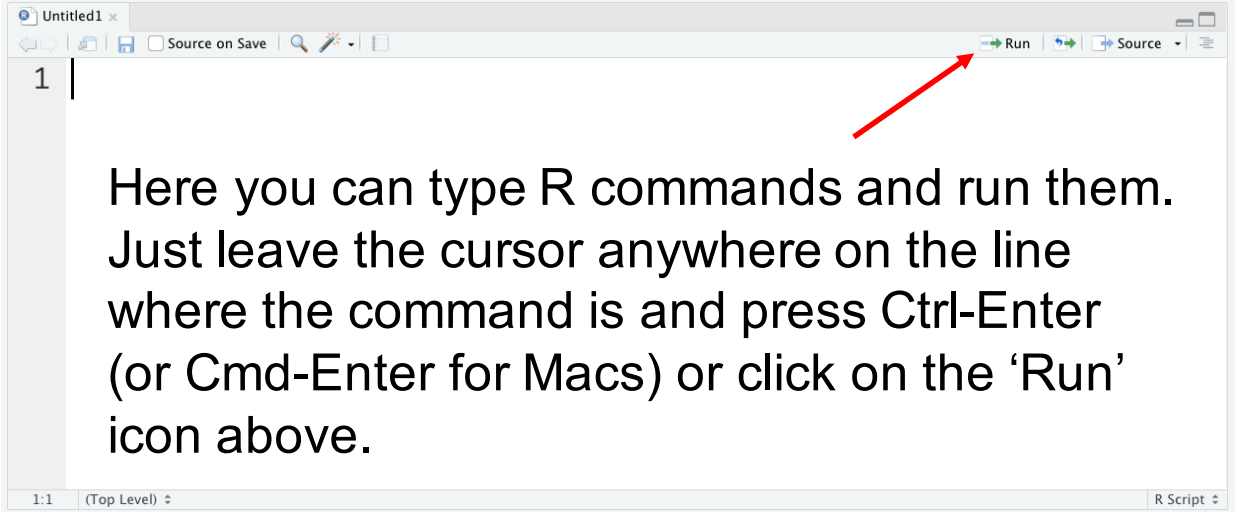
Name	Size	Modified
.Rhistory	8.8 KB	Jul 8, 2020, 4:57 PM
Applications		
cveda		
Desktop		
Documents		
Downloads		
Library		
Logs		
Movies		
Music		
Pictures		
Public		
R script example.R	2.2 KB	Oct 2, 2020, 10:46 AM
X-RAYstataoutput.docx	491.8 KB	May 4, 2016, 6:56 AM
Zotero		

Notes

Making a new R script

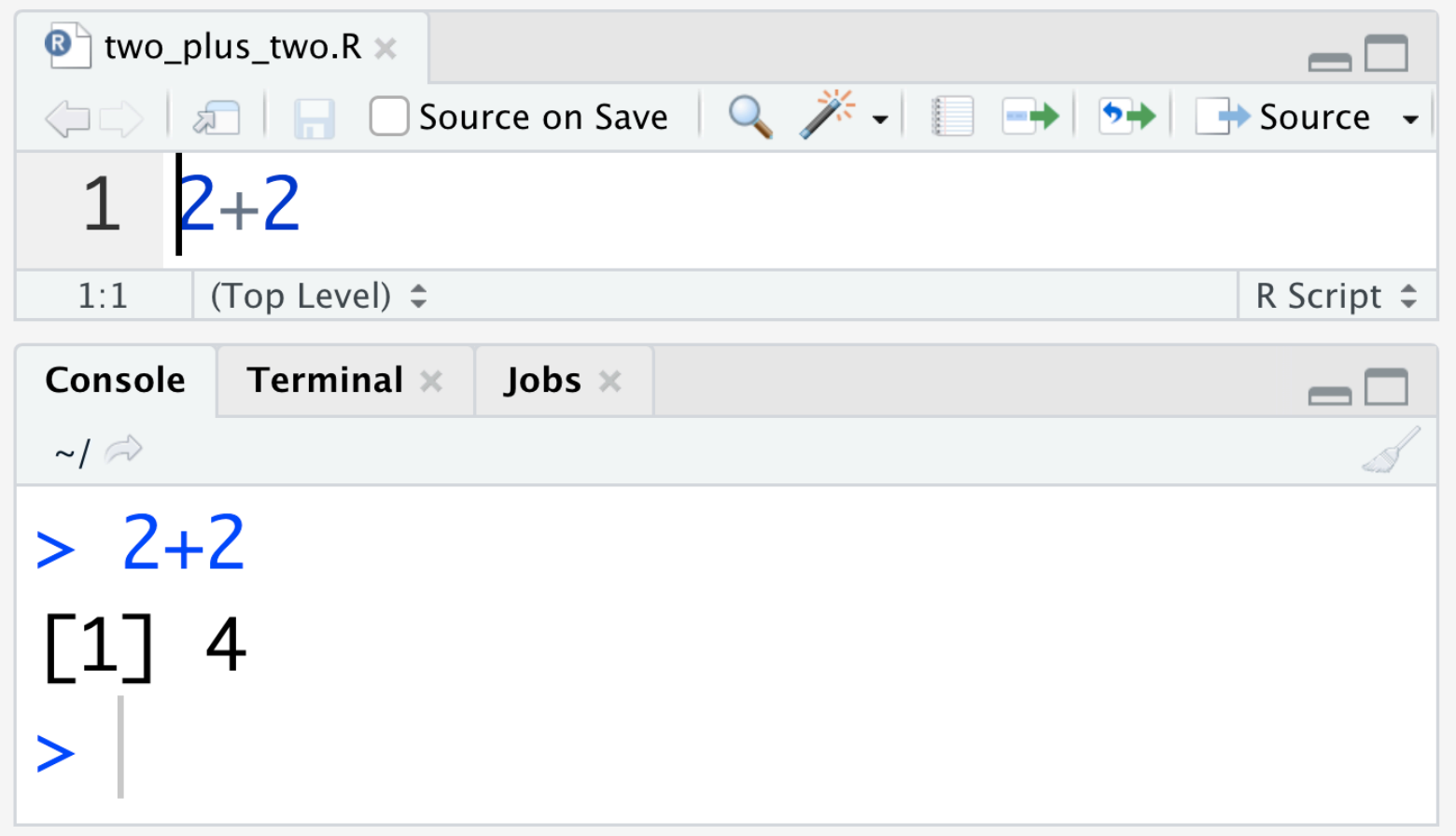






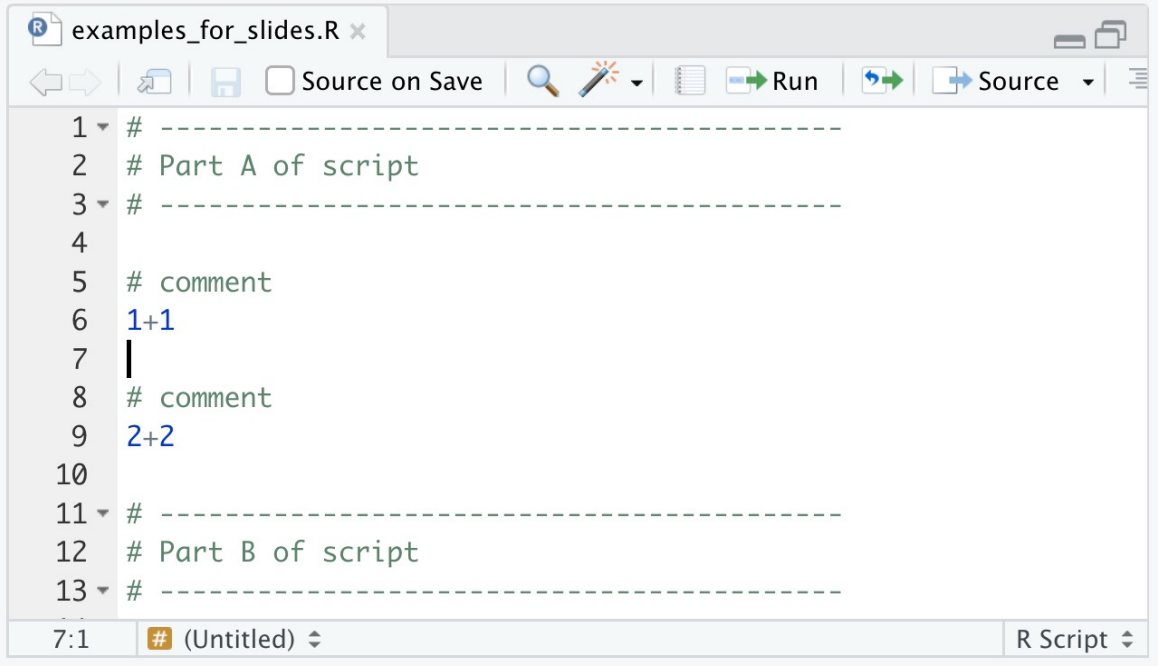
Here you can type R commands and run them. Just leave the cursor anywhere on the line where the command is and press Ctrl-Enter (or Cmd-Enter for Macs) or click on the 'Run' icon above.

Making a new R script



Commenting

- Code with a # before it does not get run
- This is useful for making your scripts much easier to read!
- Comment on WHY and WHAT (to start with)
  - Start with many comments! Also, use comments to split up the script to make it clearer



3 steps before starting

1. Why am I writing this script?

2. What do I need to write this script?

3. How am I going to write this script?

Step 1: Why am I writing this script?

- Think about it and write it down!
  - e.g. clean a dataset OR assess association between x and y
- Give the script a good name, write a descriptive title + add a couple of lines that describe the purpose of the script

generate_pack_years.R

Source on Save | Run | Source

```
# ----------------------------------------
# Generating pack years in ALSPAC
# ----------------------------------------

# This script extracts smoking variables from
# the mothers within ALSPAC and uses this to
# generate pack years.
# Authors: Thomas Battram, Gwen Fernandes.
# Date: 2020/02/15
```

Step 2: What do I need to write this script?

- Datasets!
- Using only base R can make things difficult… Packages!
- Packages are made by others and are there to make your life easier

For example, reading data into R can be tricky depending on how the data is stored, but packages can make this easier!

```
install.packages("packagename")
```

Reading data into R

Depending on what form the data is in, you have to use different functions to read in the data. Data you get may be in:

- excel spreadsheets
- comma seperated value (csv) files
- text separated value (tsv) files
- spss files
- stata files
- images (e.g. .png files)

```
# load packages
library(haven)

# read in data
df <- read_dta("my_data.dta")
```

These need different functions to read them in, some of which are only available with certain packages.

Step 3: How am I going to write this script?

- Linked to why you are writing it and what you need to write it!

- Write out each step

```
# structure of the script:
# 1. Extract the smoking variables
# 2. Exclude individuals with withdrawn
#    consent and too much missing data
# 3. Generate pack years variable
# 4. Check for outliers
# 5. Write out a table with identifiers
#    and pack years variables
```

Top of the script

generate_pack_years.R

```r
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# Generating pack years in ALSPAC
# ----------------------------------------

# This script extracts smoking variables from
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# 5. Write out a table with identifiers and pack years variables
```

Make your code easy to read

1. Use a consistent style when writing code

```
a_var <- c(1, 2, 3)
a.var <- c(1, 2, 3)
aVar <- c(1, 2, 3)
```

2. Use spaces appropriately

```
x <-c(1,2,51,124,4124)
x <- c(1, 2, 51, 124, 4124)
x   <-        c(1   ,2    ,   51,124    , 4124)
```

3. Use indents appropriately

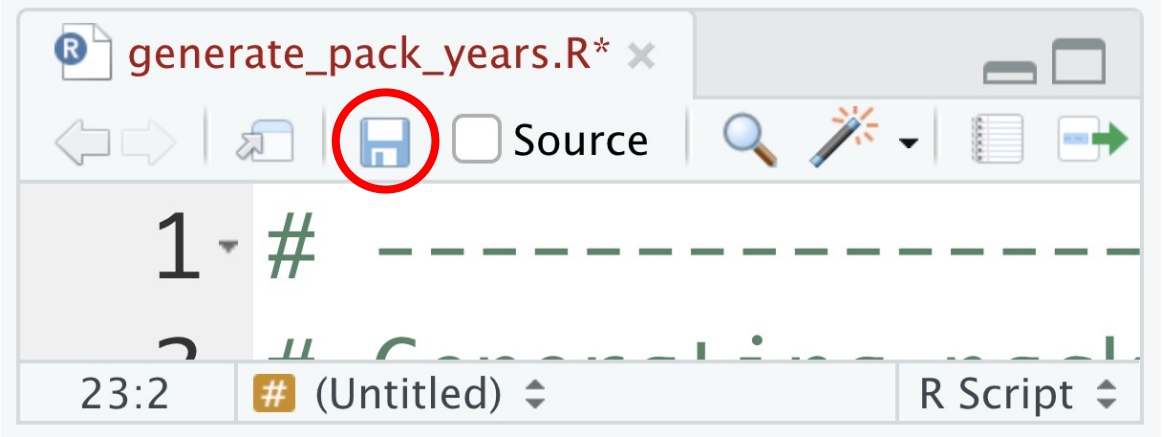
```
my_plot <- plot(x = my_data$x, y = mydata$y, xlab = "I

my_plot <- plot(x = my_data$x,
                y = my_data$y,
                xlab = "My X-axis label",
                ylab = "My Y-axis label",
                main = "My plot title")
```

Saving scripts

- It's important to save scripts as you go and you can always come back to them and send them to other people.

- Give the script a good name and save it regularly!



CTRL (or CMD) + S

Summary

3 questions to think about before writing a script:

1. Why am I writing this script?
2. What do I need to write this script?
3. How am I going to write this script?

- Comment your code a lot (using #)
- Make your code easy to read
- Save your scripts regularly

Git

- One way to share scripts with the world (or just your collaborators) is through GitHub.

- Slides are available here: https://github.com/thomasbattram/how_to_write_a_script

- For the curious:
  - Rationale for github: https://guides.github.com/introduction/git-handbook/
  - Quickstart guide: https://guides.github.com/activities/hello-world/

Any questions?

On to the practical!!

- Bad script

- Good script

Things to consider for the bad script:

a. What is the point of this script?
b. What is it about? Can you tell by the commands? Could you infer, if you had to?
c. How could you make this script better?
d. Is this something you could share with a new user/researcher/analyst?