



R - PACKAGES

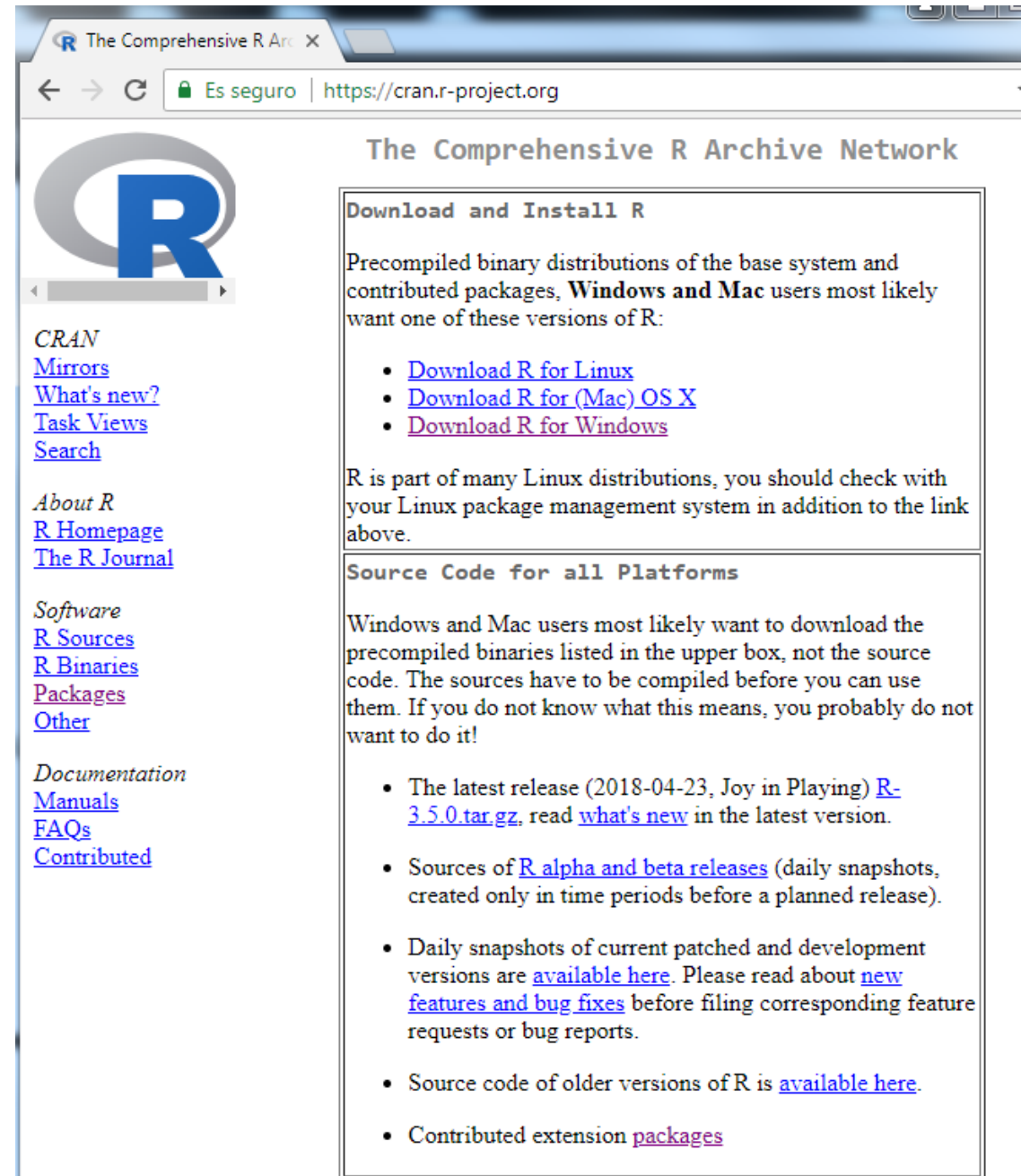
M.SC. SOFIA GIL-CLAVEL

- ❖ Cran R
- ❖ Help and Documentation
- ❖ R-studio as a tool for creating packages
- ❖ Use of “devtools” to compile, build and distribute a package.
- ❖ Use of “roxygen” for writing manuals.



CRAN is a network of files and web servers around the world that store identical, up-to-date, versions of code and documentation for R.

<https://cran.r-project.org/>

A screenshot of the CRAN website in a web browser. The browser's address bar shows 'https://cran.r-project.org' with a green lock icon and the text 'Es seguro'. The page title is 'The Comprehensive R Archive Network'. The main content area is divided into two columns. The left column contains a large blue 'R' logo and several links: 'CRAN', 'Mirrors', 'What's new?', 'Task Views', 'Search', 'About R', 'R Homepage', 'The R Journal', 'Software', 'R Sources', 'R Binaries', 'Packages', 'Other', 'Documentation', 'Manuals', 'FAQs', and 'Contributed'. The right column has a section titled 'Download and Install R' which describes precompiled binary distributions for Windows and Mac, followed by three bullet points linking to download instructions for Linux, Mac OS X, and Windows. Below this is a section titled 'Source Code for all Platforms' which explains that source code must be compiled and provides five bullet points detailing the availability of the latest release, alpha and beta releases, daily snapshots, older versions, and contributed extension packages.

The Comprehensive R Archive Network

Download and Install R

Precompiled binary distributions of the base system and contributed packages, **Windows and Mac** users most likely want one of these versions of R:

- [Download R for Linux](#)
- [Download R for \(Mac\) OS X](#)
- [Download R for Windows](#)

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

Source Code for all Platforms

Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2018-04-23, Joy in Playing) [R-3.5.0.tar.gz](#), read [what's new](#) in the latest version.
- Sources of [R alpha and beta releases](#) (daily snapshots, created only in time periods before a planned release).
- Daily snapshots of current patched and development versions are [available here](#). Please read about [new features and bug fixes](#) before filing corresponding feature requests or bug reports.
- Source code of older versions of R is [available here](#).
- Contributed extension [packages](#)

FIRST STEP

For compiling a package created by us, it is necessary to install *Rtools*, it can be downloaded here:

<https://cran.rstudio.com/bin/>

Index of /bin

1

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
 Parent Directory		-	
 linux/	23-Jan-2008 18:47	-	
 macos/	19-Apr-2005 07:45	-	
 macosx/	11-May-2018 13:02	-	
 windows/	29-Sep-2017 09:35	-	

Subdirectories:

[base](#)

[contrib](#)

[old contrib](#)

[Rtools](#)

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Rtools Downloads

Some of the tools are incompatible with obsolete versions of R. We maintain one actively updated version of the tools, and other "frozen" snapshots of them. We recommend that users use the latest release of Rtools with the latest release of R.

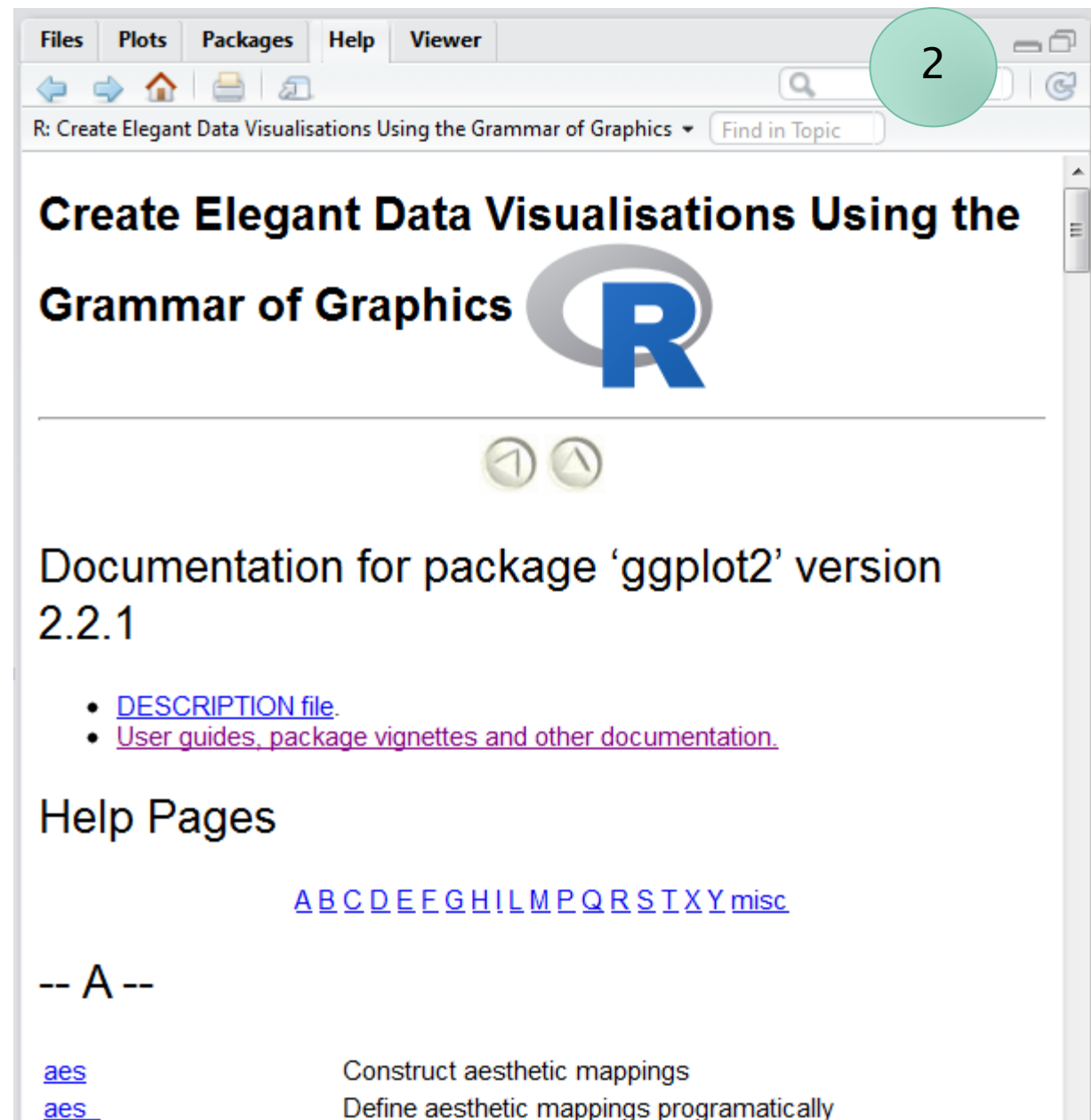
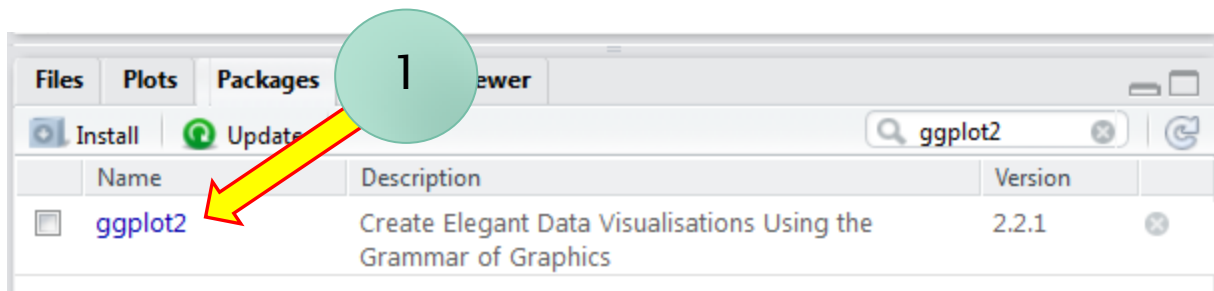
The current version of this file is recorded here: [VERSION.txt](#).

Download	R compatibility	Frozen
Rtools35.exe	R 3.3.x and later	No
Rtools34.exe	R 3.3.x and later	Yes

3

❖ HELP AND DOCUMENTATION

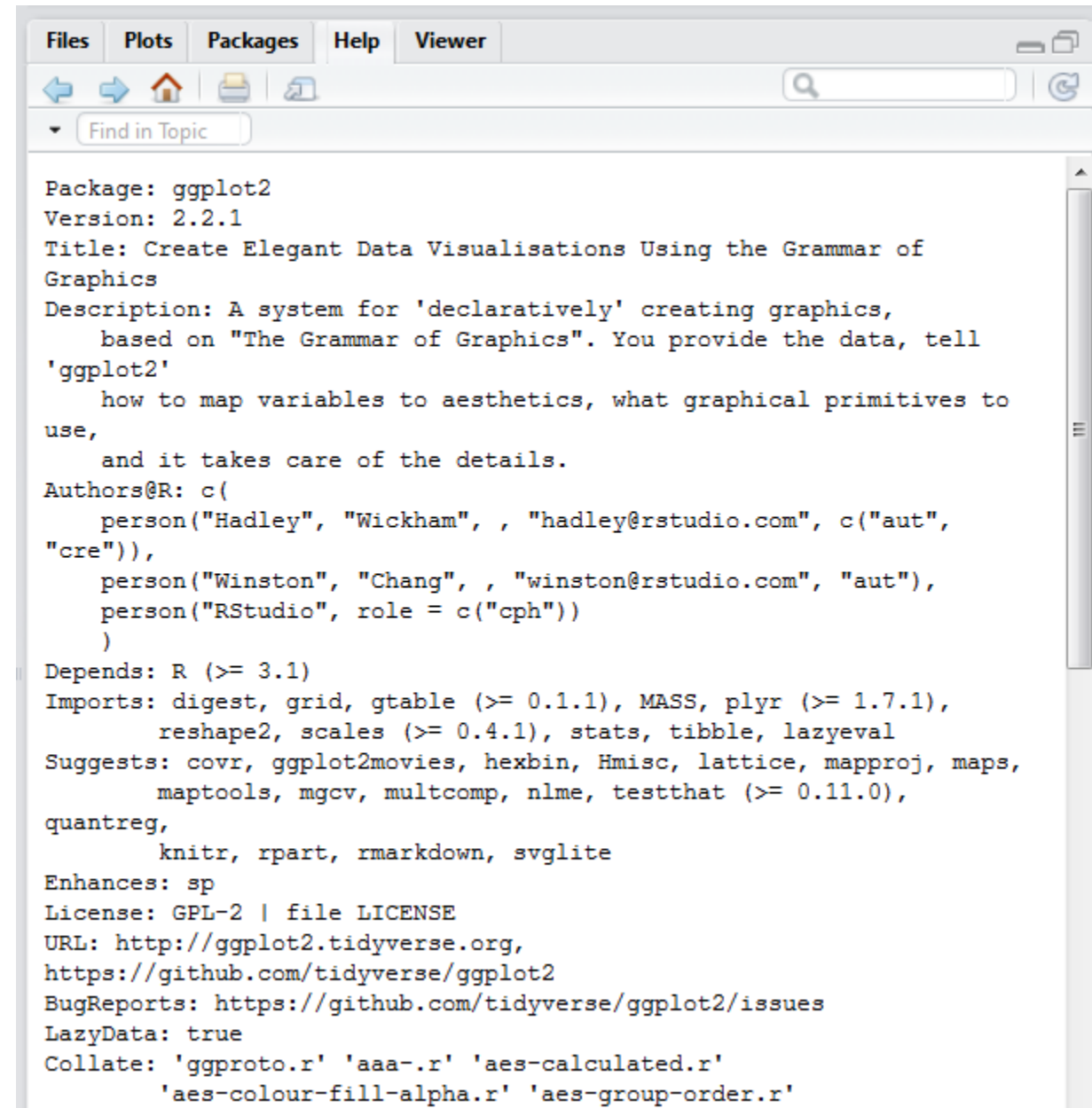
Let's check the next example:



DESCRIPTION FILE

The *Description file* has the basic information of the package:

- The name of the package
- The version of the package
- The description of the package
- The authors and their emails
- Under what R version it was built
- Its required packages
- Type of license under which it is distributed
- Etc...


A screenshot of an R package's DESCRIPTION file, specifically for the 'ggplot2' package. The window has a menu bar with 'Files', 'Plots', 'Packages', 'Help', and 'Viewer'. Below the menu is a toolbar with navigation icons and a search bar labeled 'Find in Topic'. The main content area displays the text of the DESCRIPTION file in a monospaced font. The file contains metadata such as the package name, version, title, description, authors, dependencies, and license information.


```
Package: ggplot2
Version: 2.2.1
Title: Create Elegant Data Visualisations Using the Grammar of
Graphics
Description: A system for 'declaratively' creating graphics,
             based on "The Grammar of Graphics". You provide the data, tell
             'ggplot2'
             how to map variables to aesthetics, what graphical primitives to
             use,
             and it takes care of the details.
Authors@R: c(
  person("Hadley", "Wickham", , "hadley@rstudio.com", c("aut",
"cre")),
  person("Winston", "Chang", , "winston@rstudio.com", "aut"),
  person("RStudio", role = c("cph"))
)
Depends: R (>= 3.1)
Imports: digest, grid, gtable (>= 0.1.1), MASS, plyr (>= 1.7.1),
        reshape2, scales (>= 0.4.1), stats, tibble, lazyeval
Suggests: covr, ggplot2movies, hexbin, Hmisc, lattice, mapproj, maps,
        maptools, mgcv, multcomp, nlme, testthat (>= 0.11.0),
        quantreg,
        knitr, rpart, rmarkdown, svglite
Enhances: sp
License: GPL-2 | file LICENSE
URL: http://ggplot2.tidyverse.org,
     https://github.com/tidyverse/ggplot2
BugReports: https://github.com/tidyverse/ggplot2/issues
LazyData: true
Collate: 'ggproto.r' 'aaa-.r' 'aes-calculated.r'
        'aes-colour-fill-alpha.r' 'aes-group-order.r'
```

OTHER DOCUMENTATION

This documentation depends on the authors of the package.



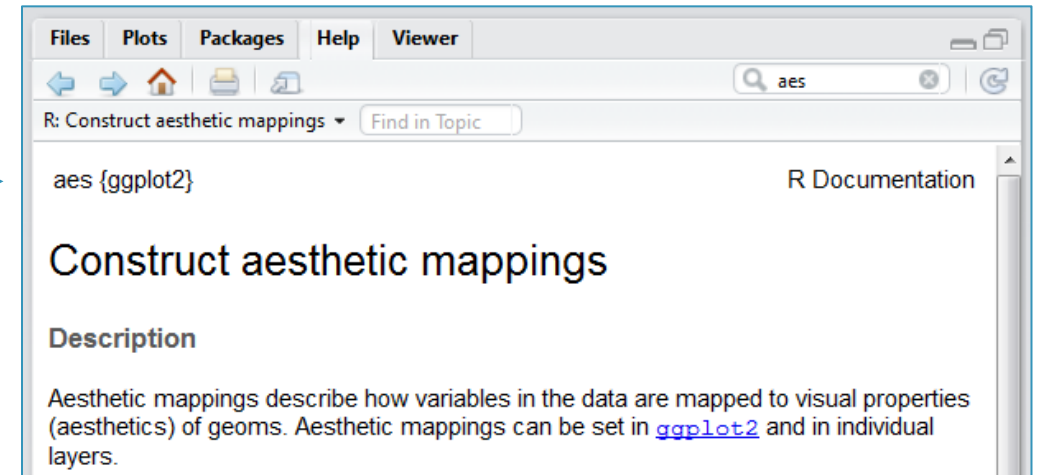
Vignettes and other documentation 



Vignettes from package 'ggplot2'

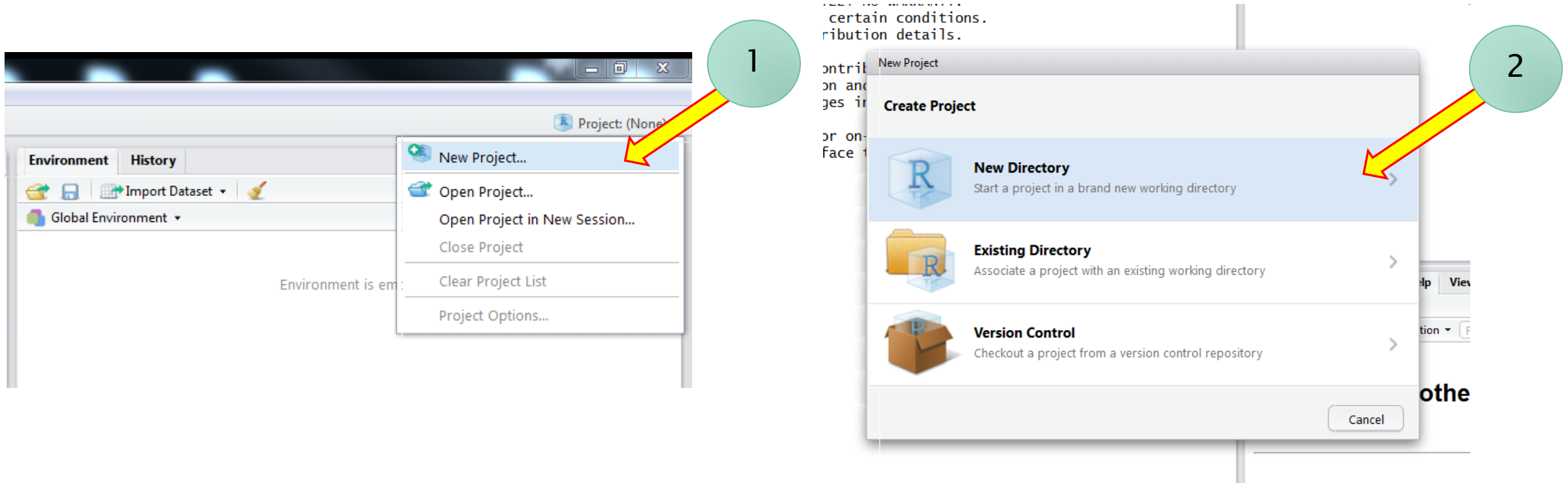
ggplot2::extending-ggplot2	Extending ggplot2	HTML source R code
ggplot2::ggplot2-specs	Aesthetic specifications	HTML source R code

If we only need some information regarding how to use the functions, we can check their information in the help section.

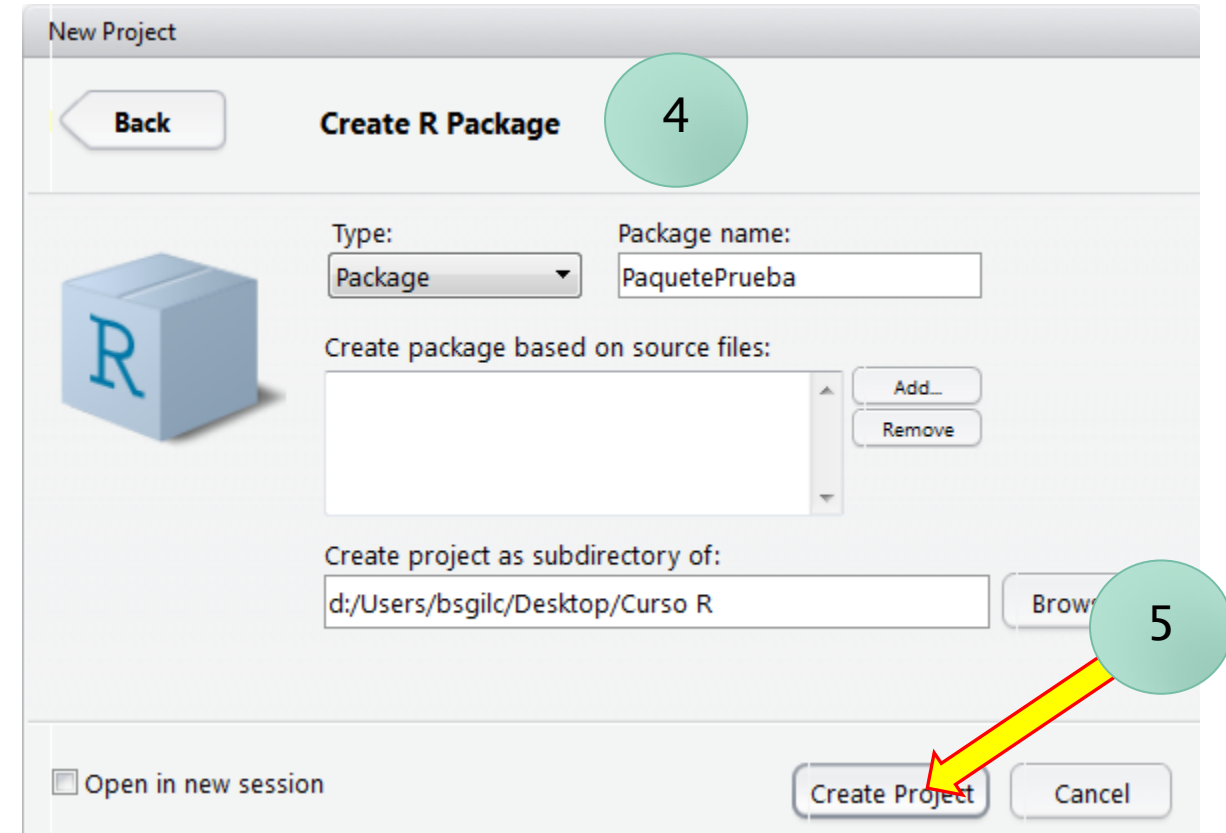
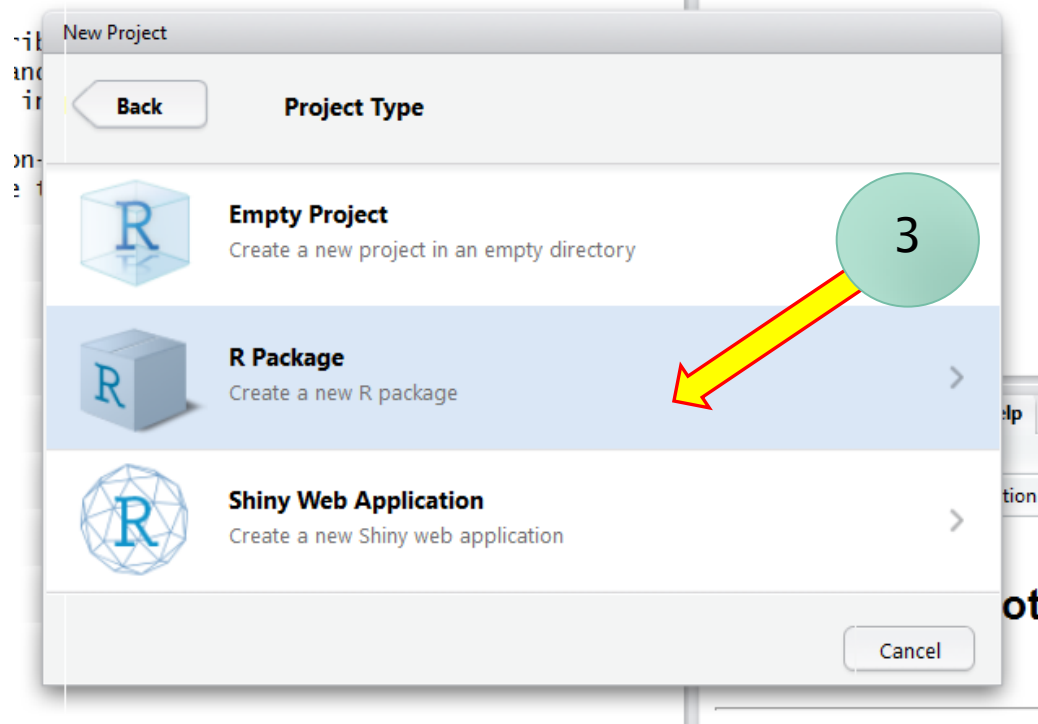


The screenshot shows the R Studio Help Viewer window. The title bar includes 'Files', 'Plots', 'Packages', 'Help', and 'Viewer'. The 'Help' tab is active, showing a search bar with 'aes' and a 'Find in Topic' button. The main content area displays the documentation for 'aes {ggplot2}'. The title 'Construct aesthetic mappings' is prominent. Below it, the 'Description' section explains that aesthetic mappings describe how variables in the data are mapped to visual properties (aesthetics) of geoms, and that they can be set in `ggplot2` and in individual layers.

❖ R-STUDIO AS A TOOL FOR CREATING PACKAGES



ation details.



The screenshot displays the RStudio IDE interface. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu bar is a toolbar with icons for file operations and a search bar labeled 'Go to file/function'. The main editor window shows a script named 'hello.R' with the following content:

```
1 # Hello, world!
2 #
3 # This is an example function named 'hello'
4 # which prints 'Hello, world!'.
5 #
6 # You can learn more about package authoring with RStudio at:
7 #
8 # http://r-pkgs.had.co.nz/
9 #
10 # Some useful keyboard shortcuts for package authoring:
11 #
12 #   Build and Reload Package: 'Ctrl + Shift + B'
13 #   Check Package:           'Ctrl + Shift + E'
14 #   Test Package:            'Ctrl + Shift + T'
15 #
16 hello <- function() {
17   print("Hello, world!")
18 }
19
```

The right-hand pane is divided into two sections. The top section, titled 'Environment', shows 'Global Environment' and indicates 'Environment is empty'. The bottom section, titled 'Files', shows the file explorer for the directory 'd:\Users\bsgilc\Desktop\Curso R\PaquetePrueba'. The files listed are:

Name	Size	Modified
..		
.Rbuildignore	30 B	Jun 4, 2018, 10:25 AM
DESCRIPTION	384 B	Jun 4, 2018, 10:25 AM
man		
NAMESPACE	32 B	Jun 4, 2018, 10:25 AM
PaquetePrueba.Rproj	375 B	Jun 4, 2018, 10:25 AM
R		

The bottom pane is the 'Console', showing the R startup message and help text:

```
R version 3.4.4 (2018-03-15) -- Someone to Lean on
Copyright (C) 2018 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

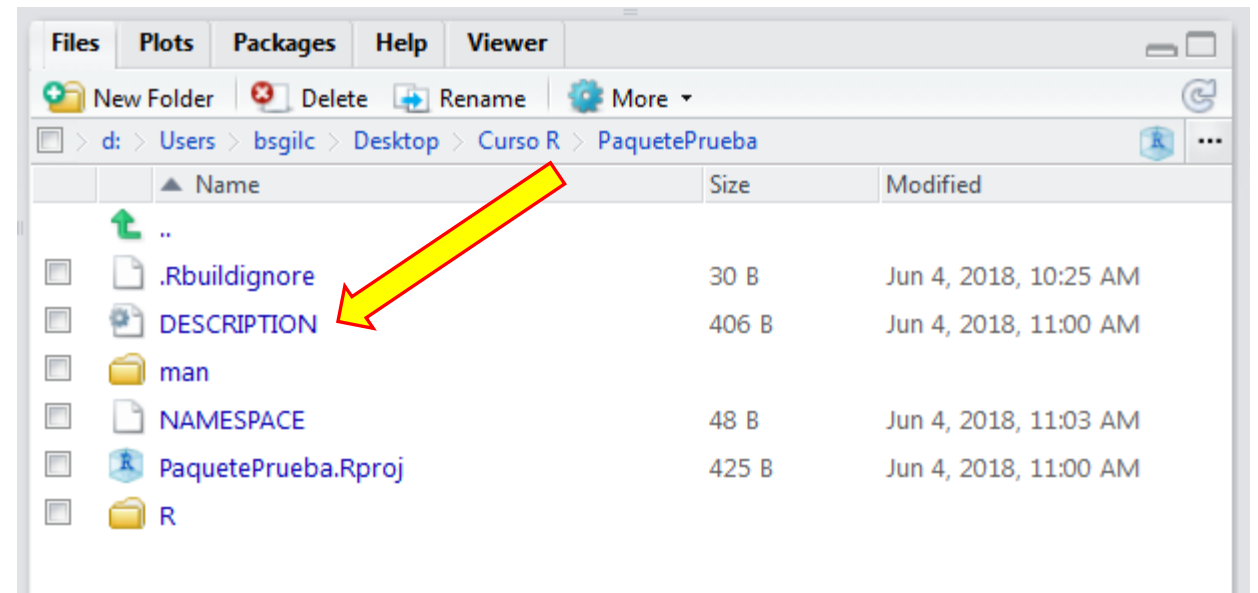
R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

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.

> |
```

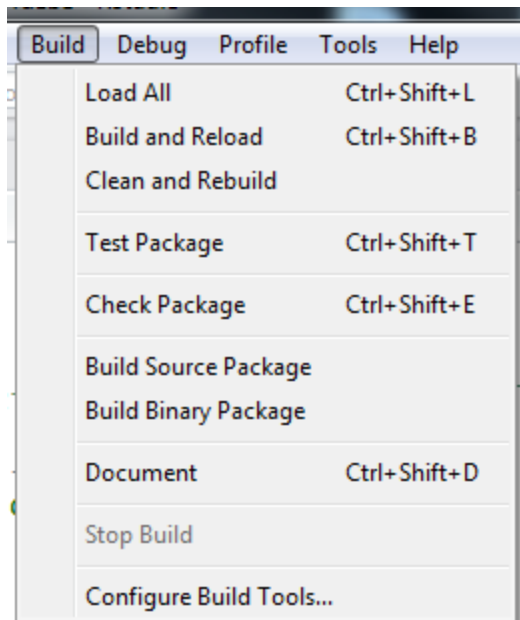
Modifying the Description file of our package.



These sections
shouln't be
modified

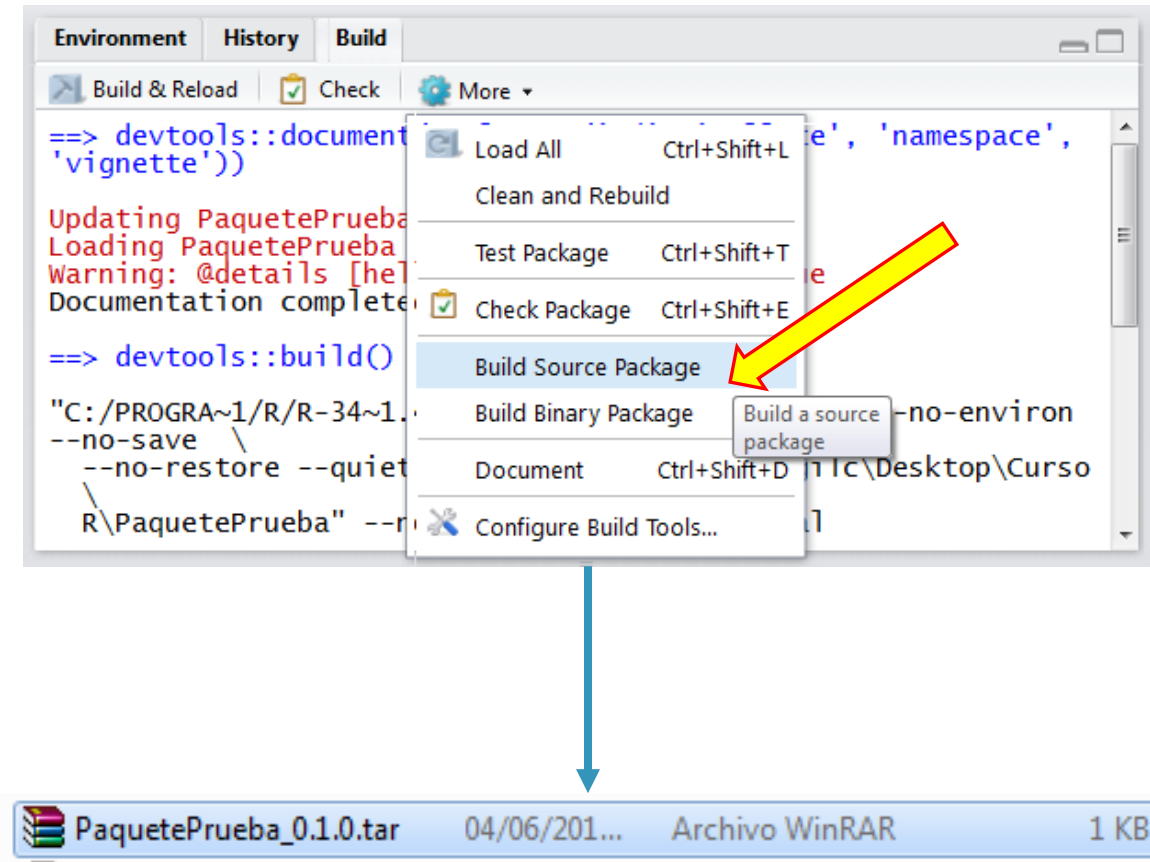
```
1 Package: PaquetePrueba
2 Type: Package
3 Title: What the Package Does (Title Case)
4 Version: 0.1.0
5 Author: Who wrote it
6 Maintainer: The package maintainer <yourself@somewhere.net>
7 Description: More about what it does (maybe more than one line)
8               Use four spaces when indenting paragraphs within the Description.
9 License: What license is it under?
10 Encoding: UTF-8
11 LazyData: true
12 RoxygenNote: 6.0.1
13
```

❖ USE OF “DEVTOOLS” FOR COMPILING, BUILDING AND DISTRIBUTING A PACKAGE.

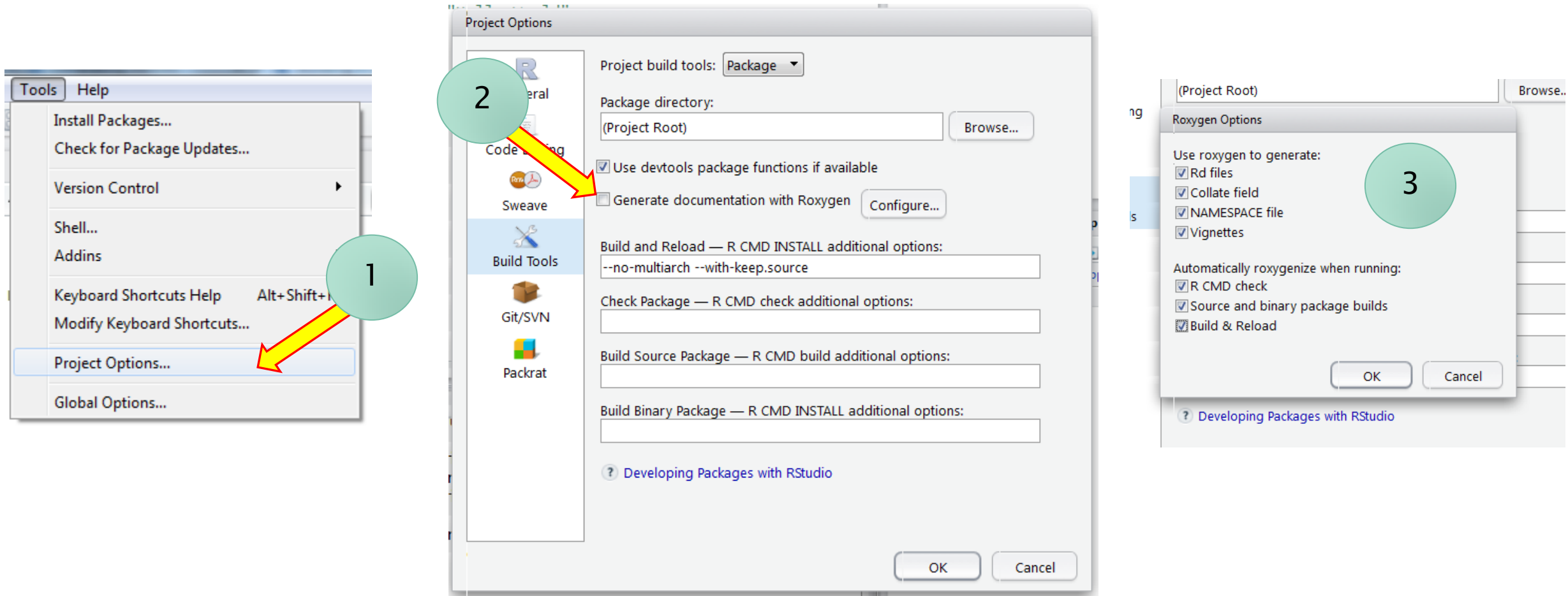


Commands to
load, build and
clean the
package.
These only
appear when
you have loaded
the package
devtools in R.

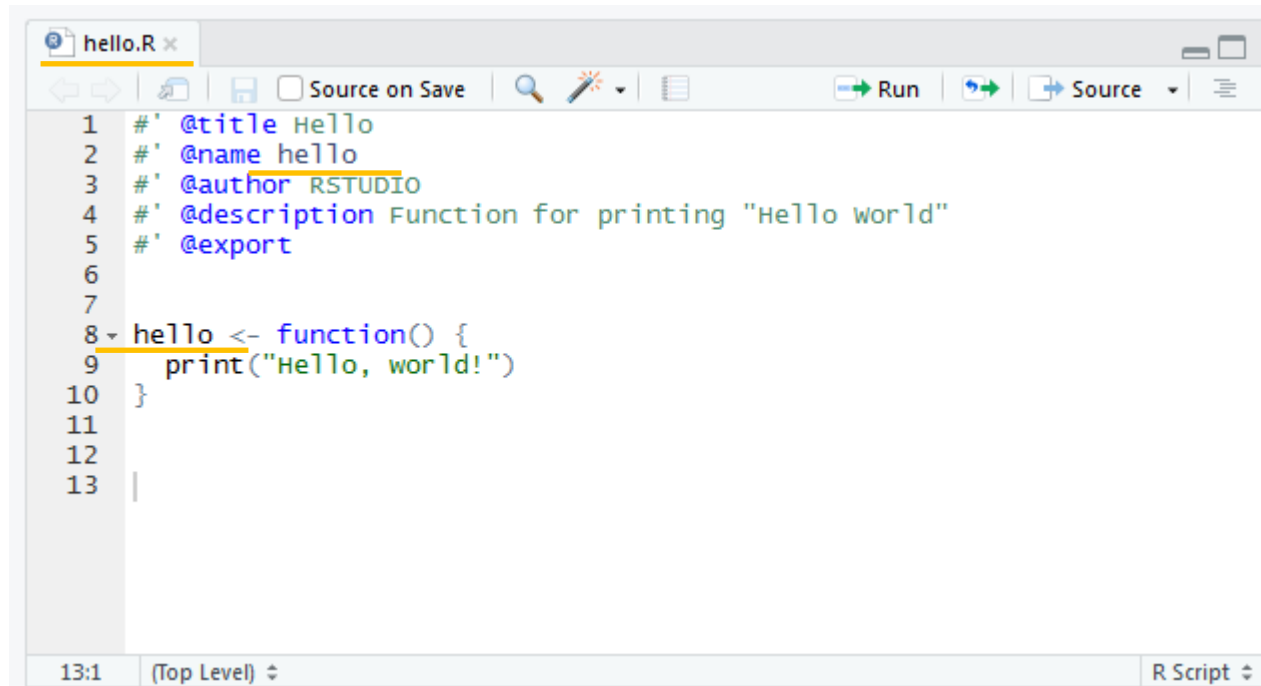
To create a package that can be distributed:



❖ USING "ROXYGEN" FOR WRITING MANUALS

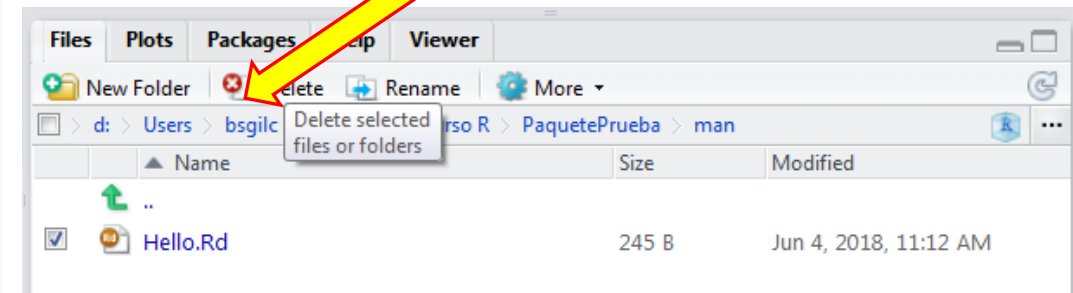


NAMING THE ELEMENTS OF THE FUNCTION

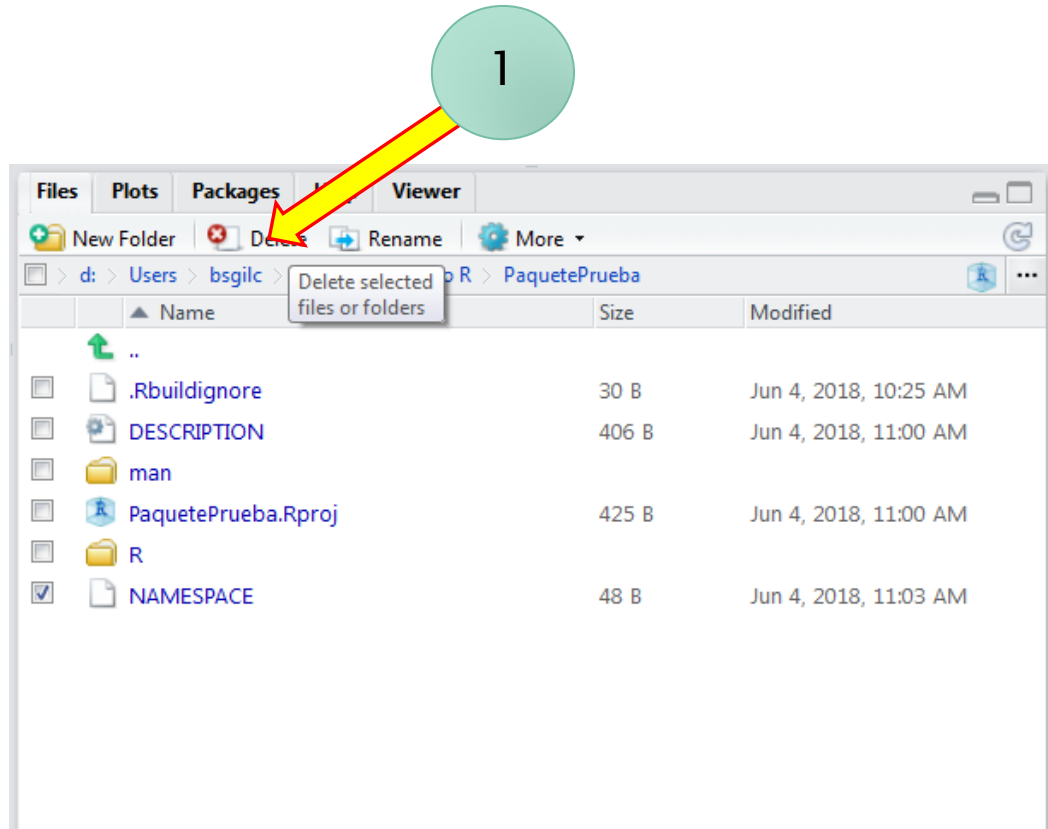


```
1 #' @title hello
2 #' @name hello
3 #' @author RSTUDIO
4 #' @description Function for printing "Hello world"
5 #' @export
6
7
8 hello <- function() {
9   print("Hello, world!")
10 }
11
12
13
```

Deleting the manual
that came by default.

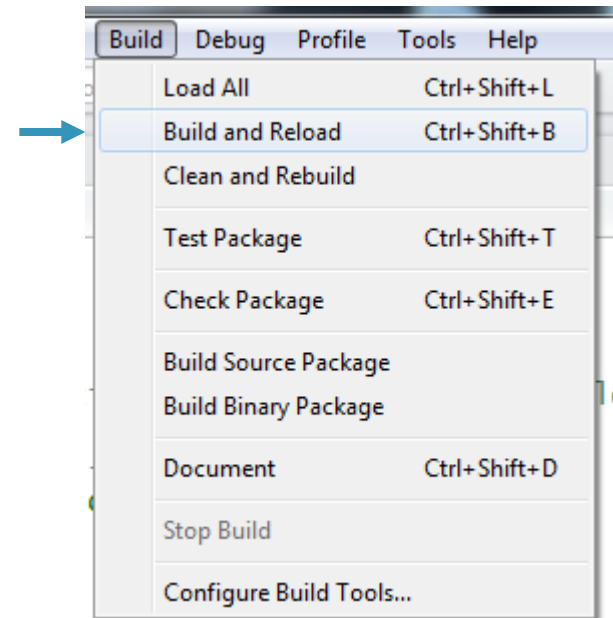


To create the manuals with *roxygen*, first it is necessary to rewrite the **NAMESPACE**, so we are going to delete it and rewrite it.



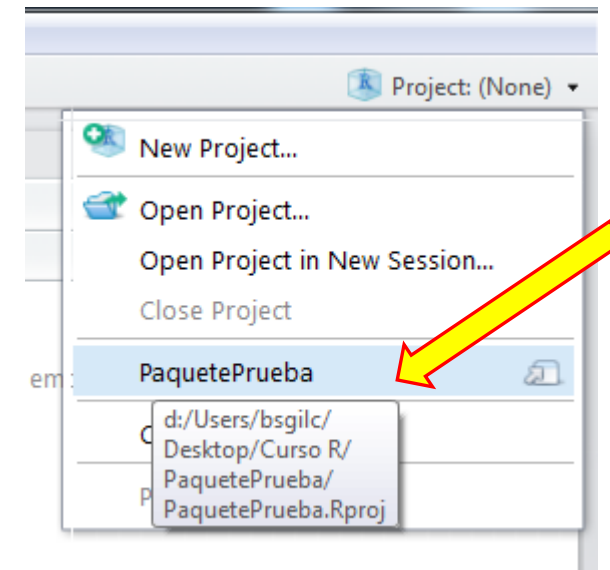
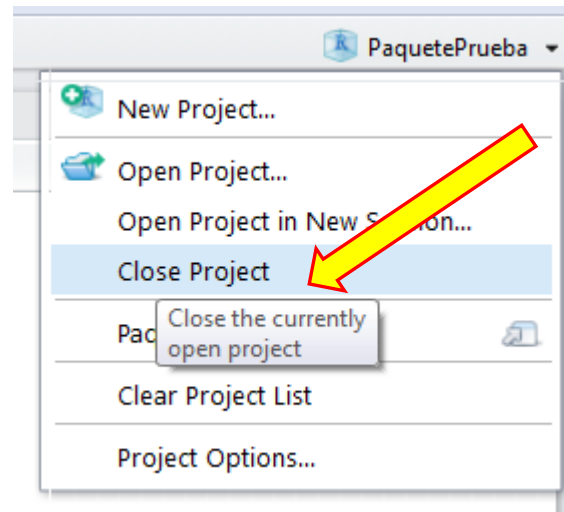
A screenshot of a terminal window showing the output of the `devtools::document()` function. The output is as follows:
> devtools::document()
Updating PaquetePrueba documentation
Loading PaquetePrueba
First time using roxygen2. Upgrading automatically...
Writing NAMESPACE
Warning message:
HELLO.Rd is missing name/title. Skipping

3 Finally,
all you have to
do is build and
reload the package.



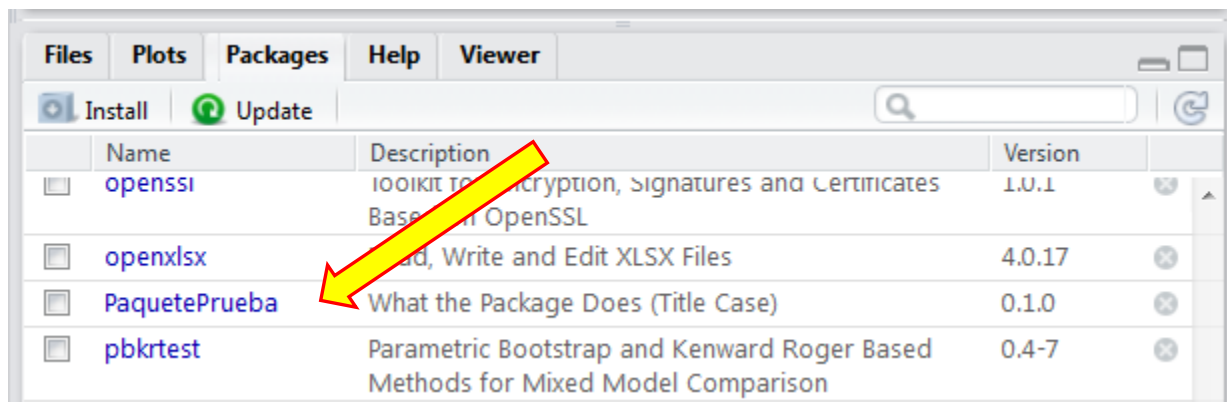
CLOSE THE PROJECT WHERE THE PACKAGE IS LOCATED

Once we have created a project, we can access it as many times as we want.



MORE ABOUT THE PACKAGE

Once a package has been created inside a computer, it will always be available for use.



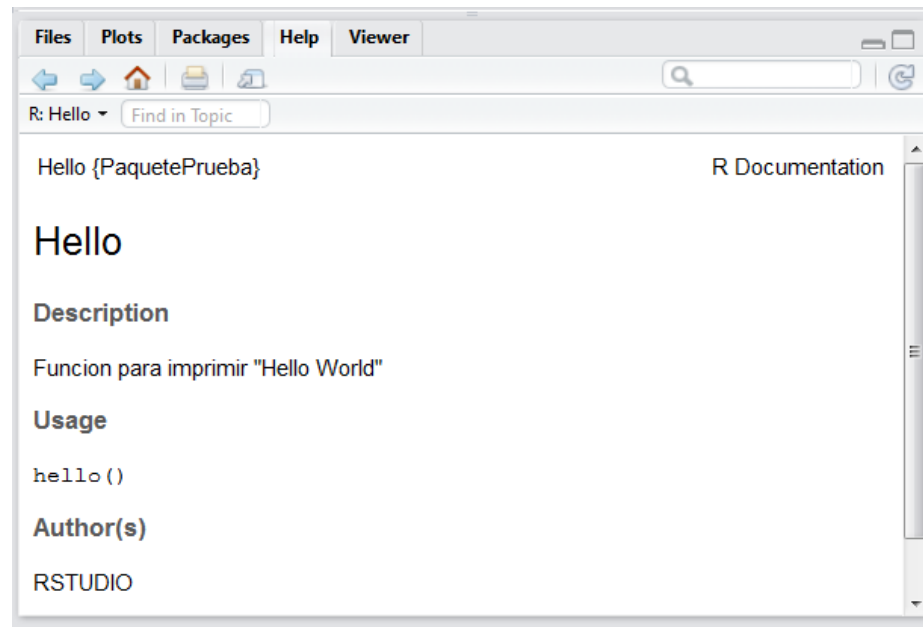
```
> library(Paquet)
```

PaquetePrueba

```
> library(PaquetePrueba)
```


FUNCTION MANUALS

Since we created the *hello()* function manual, it will be available in the help section, in case we share it or just to remind us how to use it.



INCORPORATING NEW FUNCTIONS

All functions must be saved in the **R folder** of your package. Each of them must be saved separately and the name of each of the files must match the name of your function.

