

# Introduction to R

# In this lecture

- R and RStudio
- How to
  - set the working directory
  - create an R file and save it
  - execute an R file
  - execute pieces of code

# R

- Open source programming language
- Statistical software and Data analysis tool
- Interface
  - Command line user interface
- Platforms
  - Windows, Linux and Mac OS

# RStudio

- Integrated Development Environment (IDE) for R
- Availability
  - Open source
  - Commercial
- Editions
  - Desktop
  - Server
- Platforms
  - Windows, Linux and Mac OS

# A first look of RStudio

The screenshot shows the RStudio application window. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for creating new files, opening files, saving, and other functions. The main workspace is divided into three panels:

- Console:** Located on the left, it displays the R version 3.4.0 (2017-04-21) and copyright information. It also shows the R license and a list of contributors. The prompt is `> |`.
- Environment/History:** Located on the top right, it shows the Global Environment and is currently empty.
- Files/Plots/Packages/Help:** Located on the bottom right, it shows a file explorer view of the Home directory. The files listed are:
 

Name	Size	Modified
(Heat and Mass Transfer) Prof. Dipl.-...	5.8 MB	May 17, 2016, 10:40 AM
(Oxford Applied Mathematics and C...	2.9 MB	Jul 21, 2016, 2:32 PM
.Rhistory	439 B	May 29, 2017, 3:47 PM
0513.pdf	82.1 KB	Jun 24, 2016, 10:48 AM
Book1.xlsx	14 KB	Jun 21, 2016, 11:10 AM
BOOK6.pdf	5.3 MB	Jul 21, 2016, 2:57 PM
Criterion Games		
Custom Office Templates		

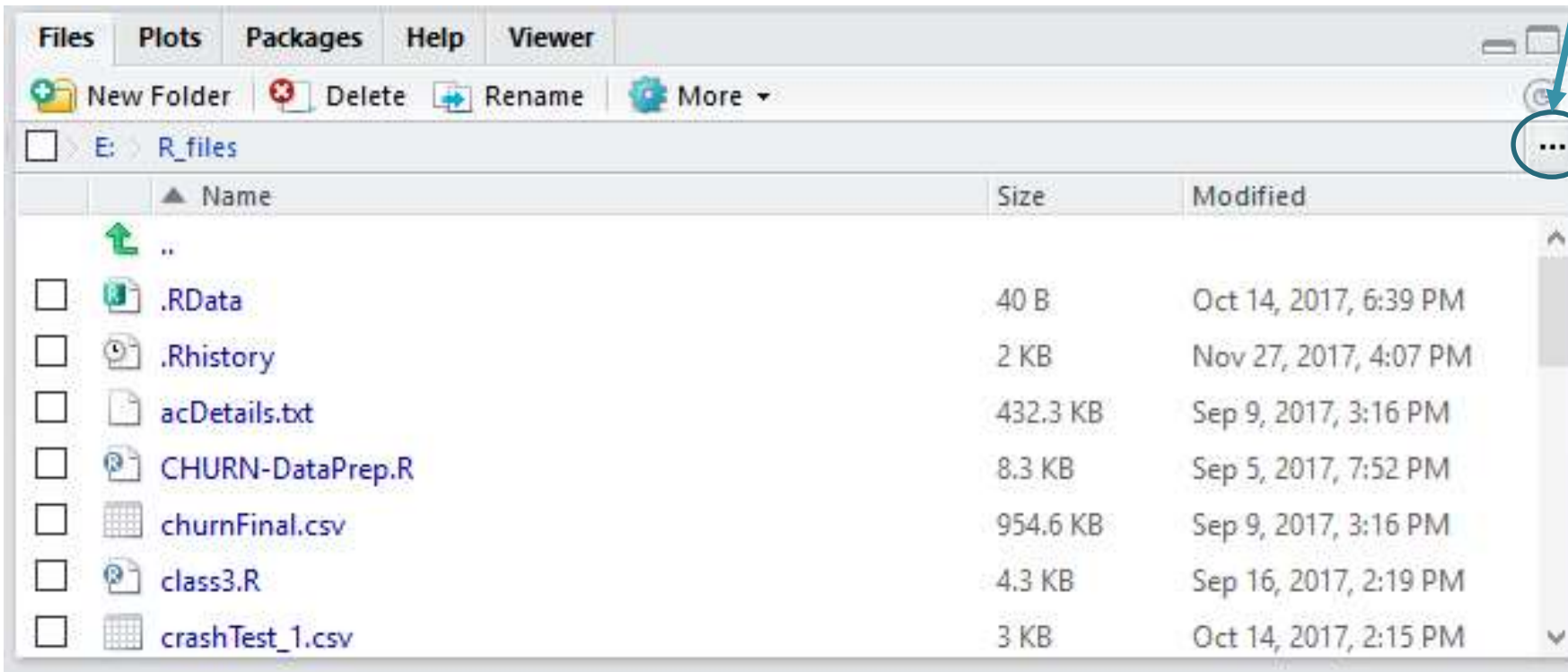
# Set the working directory

Enter in the console : `setwd(“directorypath”)`

(OR)

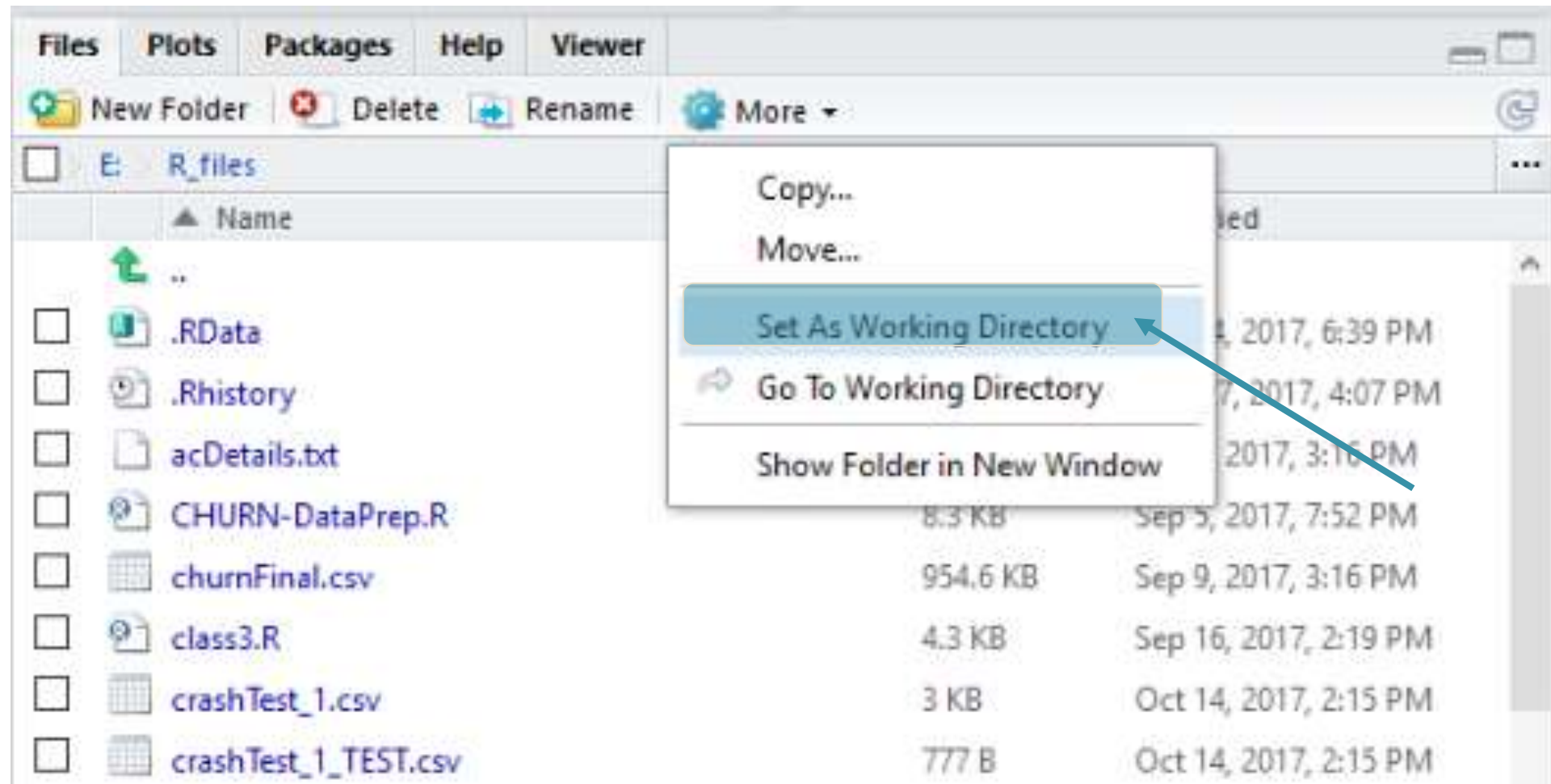
*To choose Working  
directory*

**STEP 1: Choose a suitable location by clicking on the indicated icon**

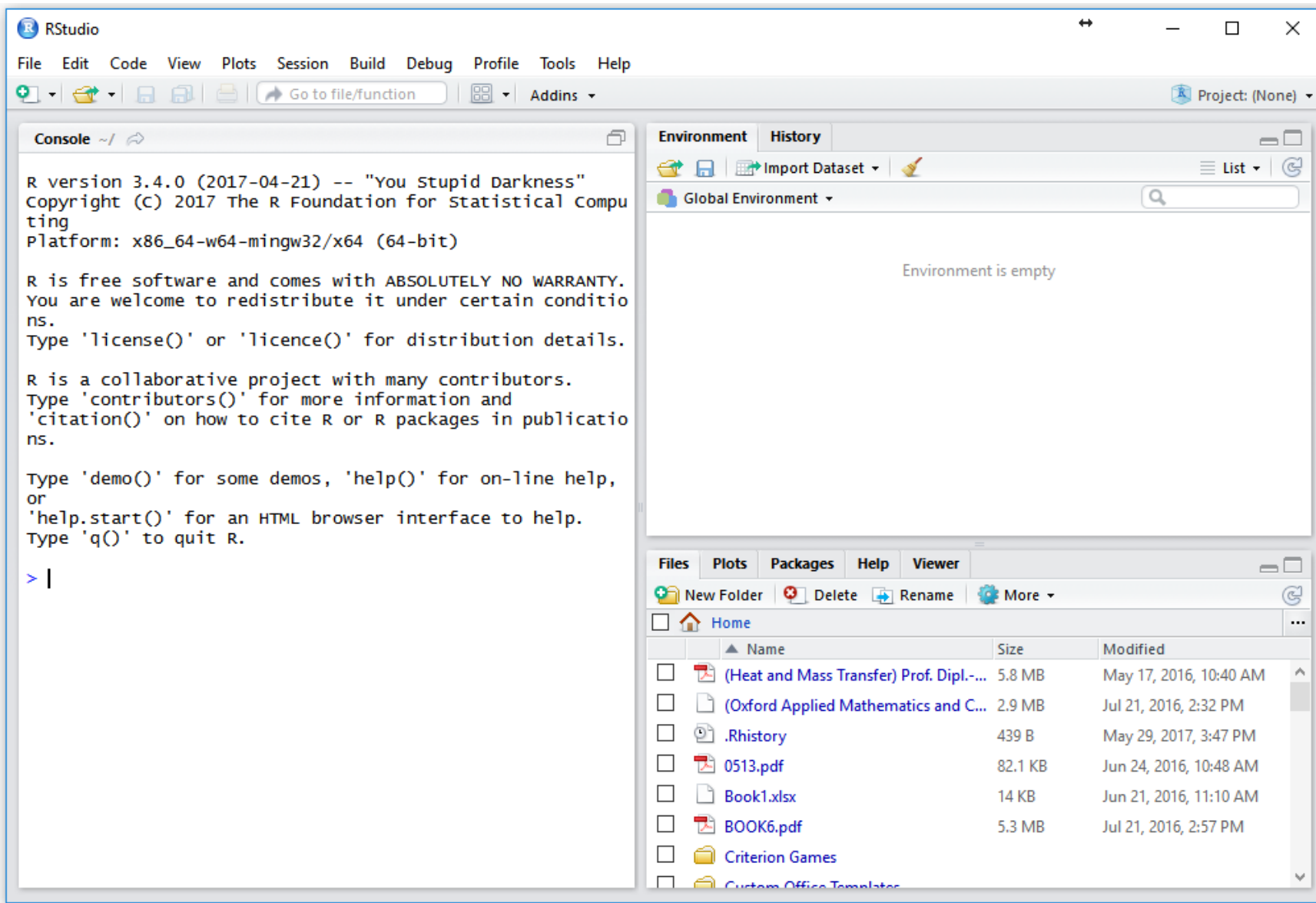


# Set the working directory

**STEP 2:** Once directory is chosen, select the more icon and choose “Set as Working Directory”



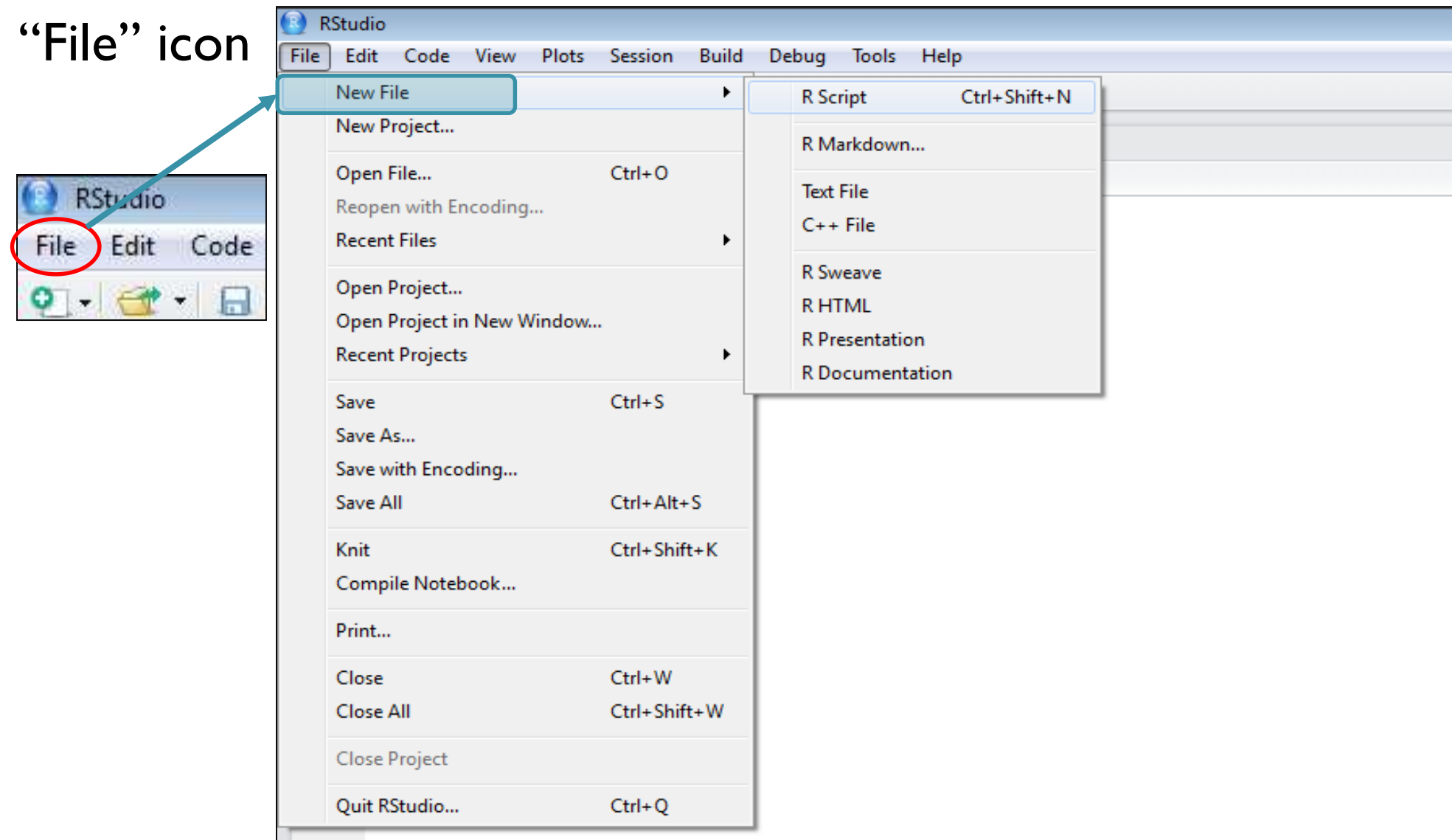
# RStudio





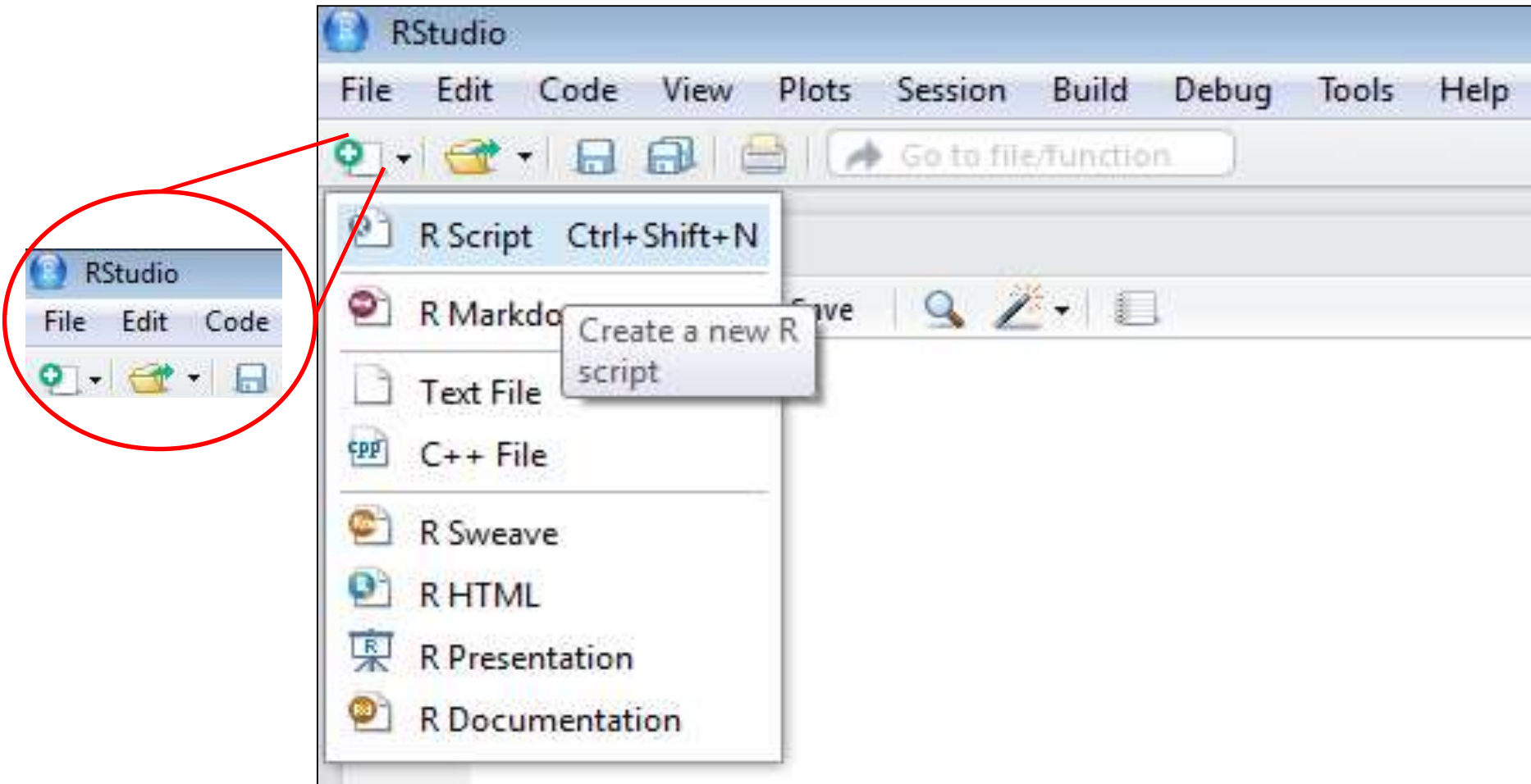
# Create an R file

“File” icon



# Create an R file

By clicking the icon “  ”below the toolbar



# RStudio with script file open

The screenshot shows the RStudio IDE interface with the following components highlighted:

- Scripts:** The top-left pane, labeled "Untitled1", contains a single line of code: `1`.
- Environment/History:** The top-right pane, labeled "Environment", shows "Global Environment" and "Environment is empty".
- Files/plots/packages/Help:** The bottom-right pane, labeled "Files", shows a file explorer view of the "Home" directory. It contains a table of files:
- Console:** The bottom-left pane, labeled "Console", displays the R version information and a welcome message.

**Files/plots/packages/Help** pane content:

Name	Size	Modified
(Heat and Mass Transfer) Prof. Dipl.-Ing. Dr. Hans-J...	5.8 MB	May 17, 2016, 10:40 AM
(Oxford Applied Mathematics and Computing Scie..	2.9 MB	Jul 21, 2016, 2:32 PM
.Rhistory	439 B	May 29, 2017, 3:47 PM
0513.pdf	82.1 KB	Jun 24, 2016, 10:48 AM
Book1.xlsx	14 KB	Jun 21, 2016, 11:10 AM
BOOK6.pdf	5.3 MB	Jul 21, 2016, 2:57 PM
Criterion Games		

**Console** content:

```
R version 3.4.0 (2017-04-21) -- "You Stupid Darkness"
Copyright (C) 2017 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.
```

# Writing scripts

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 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 'Untitled1\*' with the following code:

```
1
2 a = 11
3 b = a*10
4 print(c(a,b))
```

The status bar at the bottom of the editor indicates '4:14 (Top Level)' and 'R Script'.

On the right side, the 'Environment' pane shows 'Global Environment' and 'Environment is empty'. Below it, the 'Files' pane shows a directory listing for 'E:\R\_files'.

The 'Console' pane at the bottom left displays the R version information and license details:

```
R version 3.4.0 (2017-04-21) -- "You Stupid Darkness"
Copyright (C) 2017 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

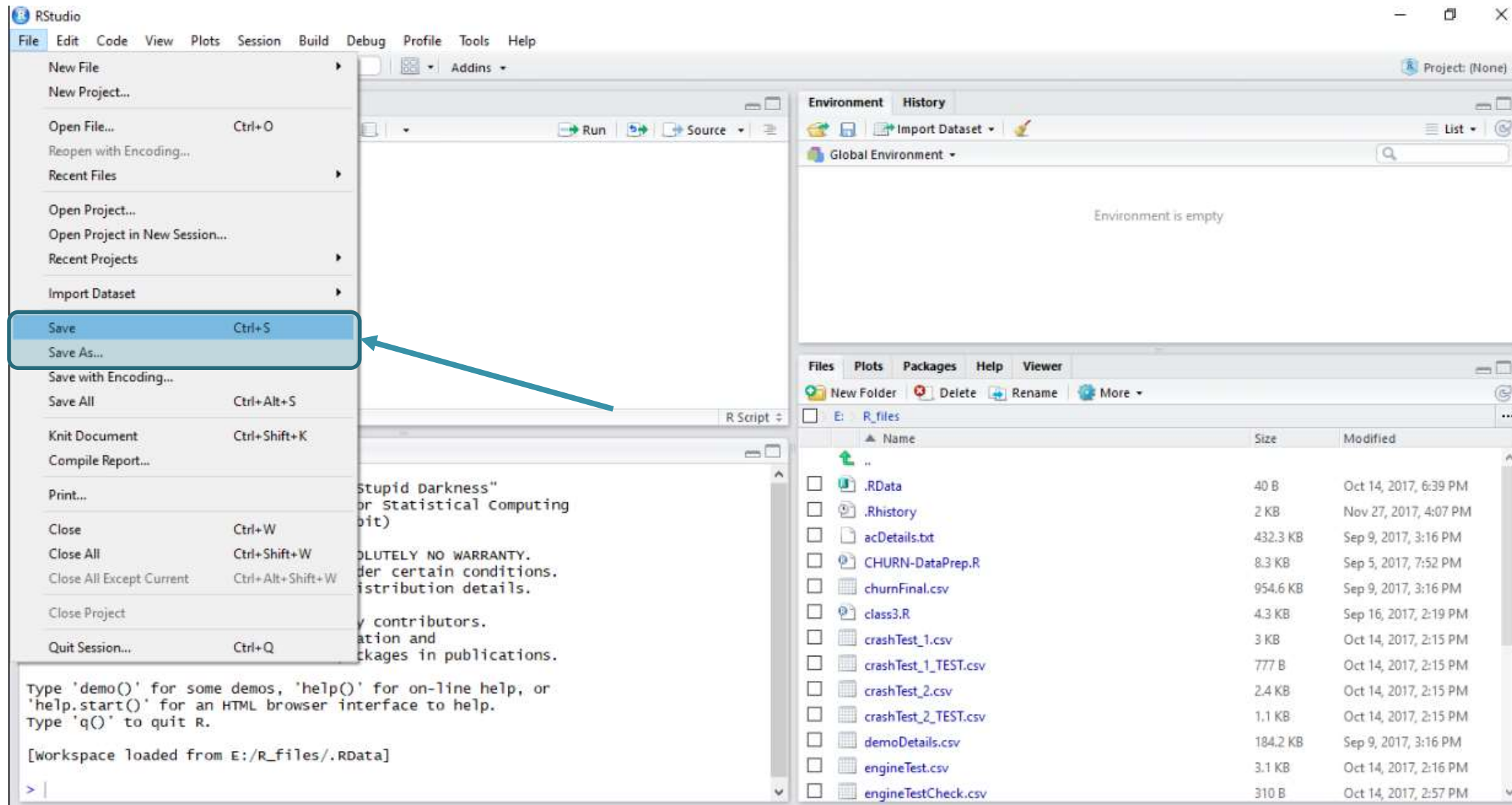
R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

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.
```

The 'Files' pane shows a directory listing for 'E:\R\_files' with the following files and folders:

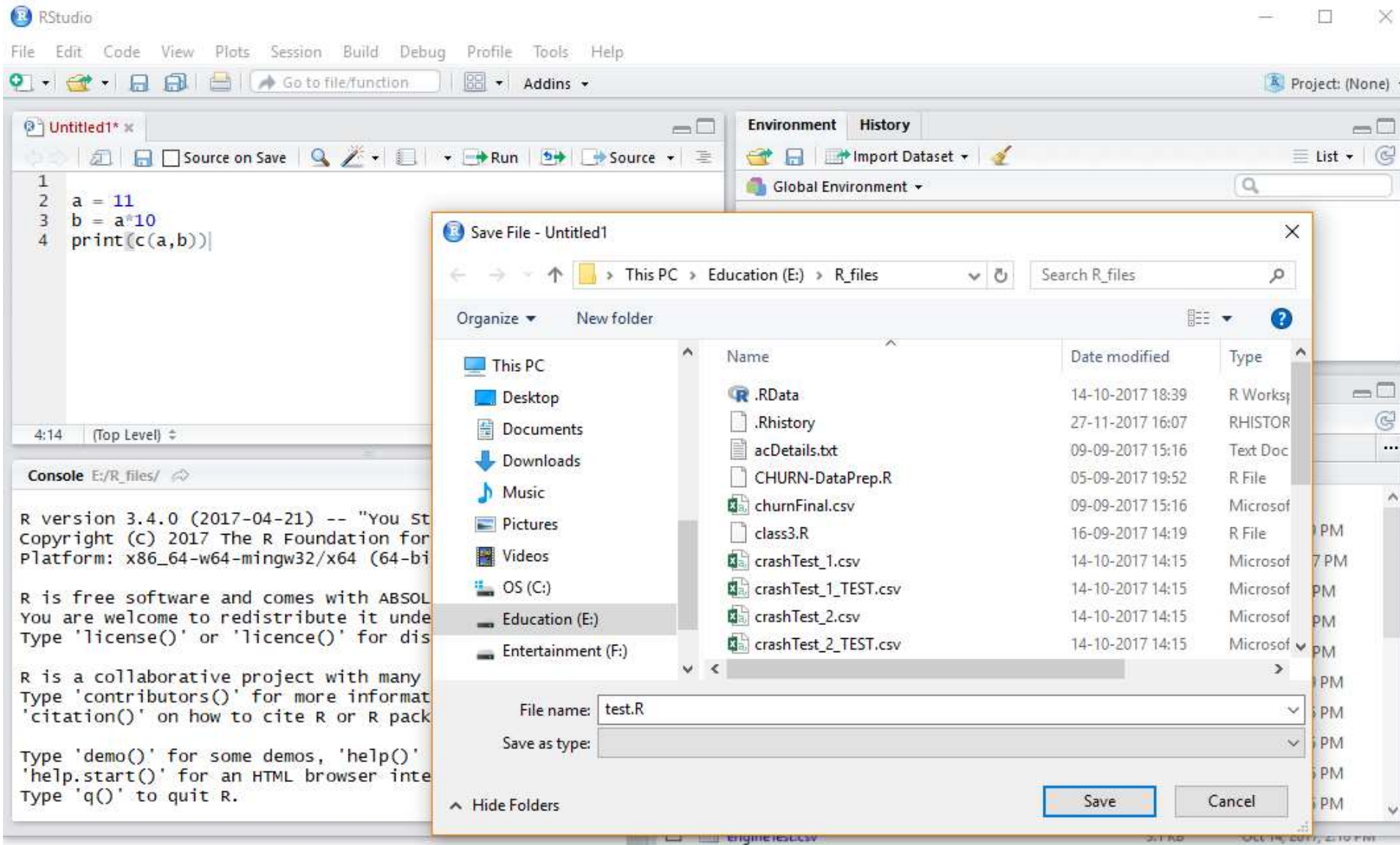
Name	Size	Modified
..		
.RData	40 B	Oct 14, 2017, 6:39 PM
.Rhistory	2 KB	Nov 27, 2017, 4:07 PM
acDetails.txt	432.3 KB	Sep 9, 2017, 3:16 PM
CHURN-DataPrep.R	8.3 KB	Sep 5, 2017, 7:52 PM
churnFinal.csv	954.6 KB	Sep 9, 2017, 3:16 PM
class3.R	4.3 KB	Sep 16, 2017, 2:19 PM
crashTest_1.csv	3 KB	Oct 14, 2017, 2:15 PM
crashTest 1 TEST.csv	777 B	Oct 14, 2017, 2:15 PM

# Saving R script file

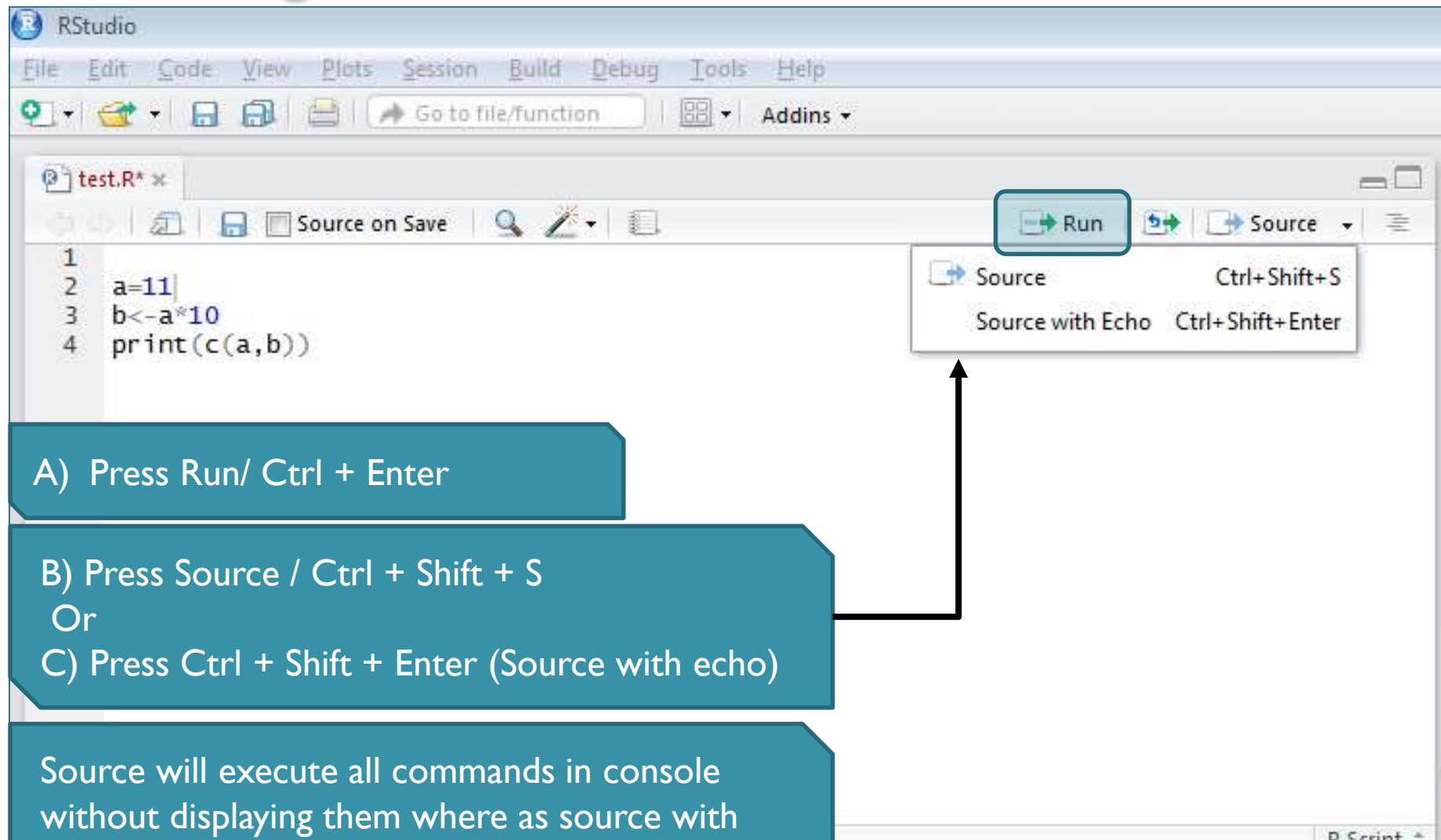




# Saving R script file



# Executing an R file



# Executing an R file: Example

The screenshot displays the RStudio environment with the following components:

- Source Editor:** Contains the R script `test.R` with the following code:
 

```
1
2 a = 11
3 b = a*10
4 print(c(a,b))
```
- Environment:** Shows the Global Environment with the following values:
 

values	
a	11
b	110
- Files:** Shows a directory listing for `E:/R_files` with the following files:
 

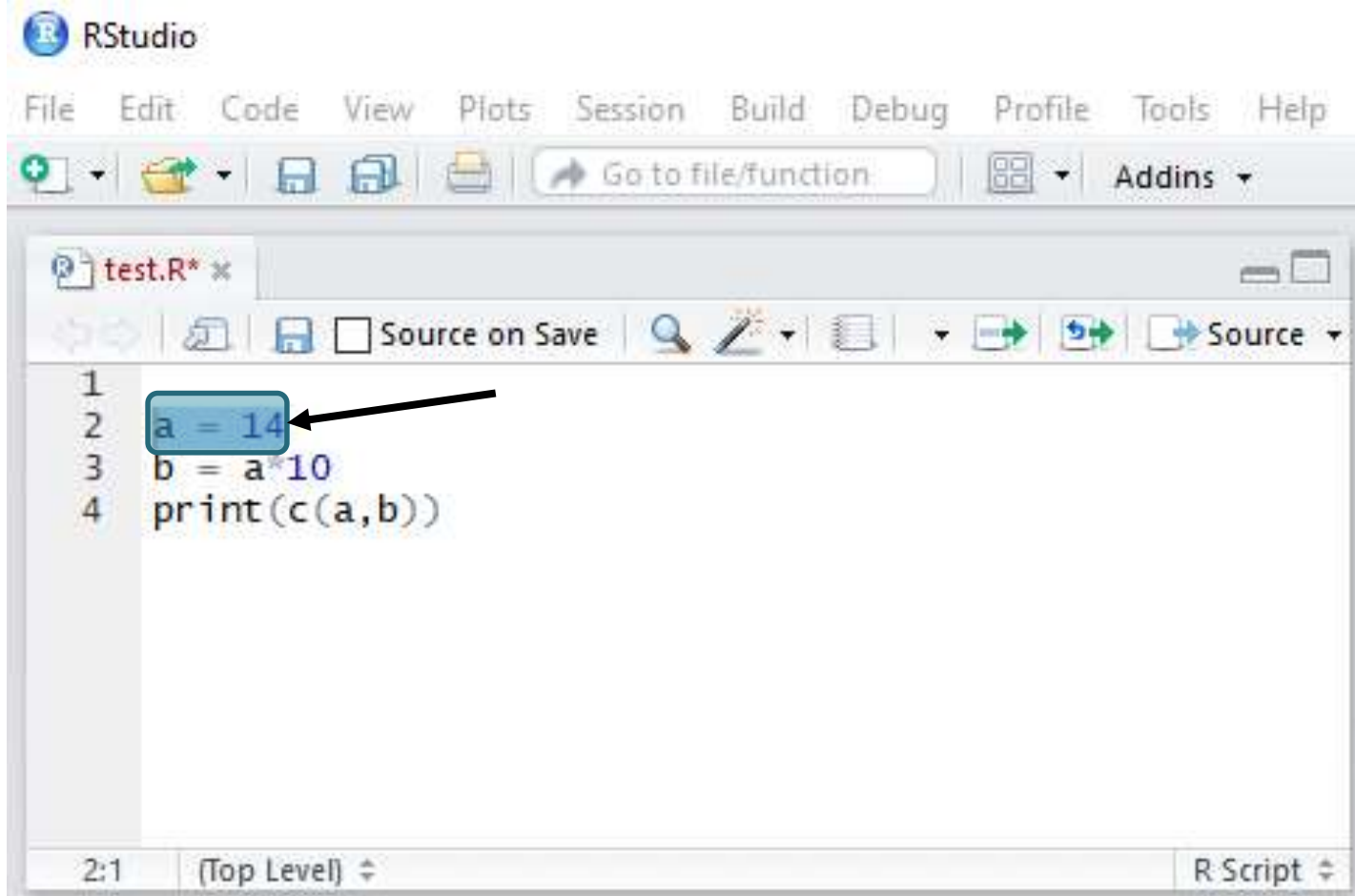
Name	Size	Modified
..		
.RData	40 B	Oct 14, 2017, 6:39 P
.Rhistory	2 KB	Nov 27, 2017, 4:07
acDetails.txt	432.3 KB	Sep 9, 2017, 3:16 P
CHURN-DataPrep.R	8.3 KB	Sep 5, 2017, 7:52 P
churnFinal.csv	954.6 KB	Sep 9, 2017, 3:16 P
class3.R	4.3 KB	Sep 16, 2017, 2:19 P
crashTest_1.csv	3 KB	Oct 14, 2017, 2:15 P
crashTest_1_TEST.csv	777 B	Oct 14, 2017, 2:15 P
crashTest_2.csv	2.4 KB	Oct 14, 2017, 2:15 P
- Console:** Shows the execution of the script with the following output:
 

```
[workspace loaded from E:/R_files/.RData]
> source('E:/R_files/test.R', echo=TRUE)
> a = 11
> b = a*10
> print(c(a,b))
[1] 11 110
>
```

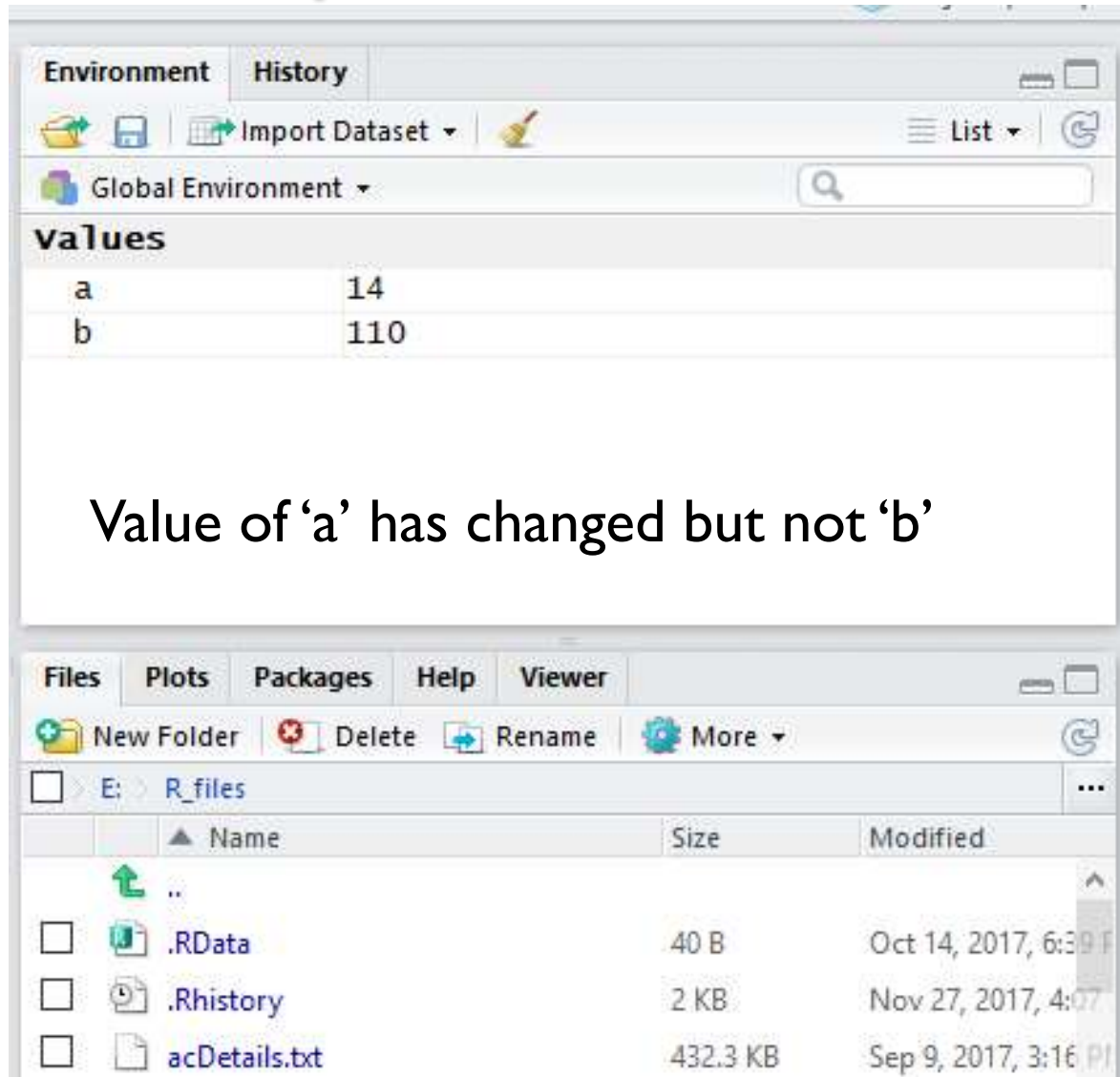
A large blue arrow points from the word **RESULT** to the console output `[1] 11 110`.



# Execute pieces of code – Run



# Execute pieces of code – Run



The screenshot shows the R Studio interface. The top pane, titled 'Environment', displays the 'Global Environment' with a search bar and a table of values. The bottom pane, titled 'Files', shows the file explorer for the 'R\_files' directory.

**Environment Pane:**

values	
a	14
b	110

**Files Pane:**

Name	Size	Modified
..		
.RData	40 B	Oct 14, 2017, 6:39 PM
.Rhistory	2 KB	Nov 27, 2017, 4:07 PM
acDetails.txt	432.3 KB	Sep 9, 2017, 3:16 PM

Value of 'a' has changed but not 'b'

# Executing R files – Summary

- Run can be used to execute selected lines
- Source/ Source with echo is for a whole file
- Advantages – using Run :
  - troubleshooting/debugging
- Disadvantages – using Run :
  - For large section, console will be over populated and messy