

香港中文大學
The Chinese University of Hong Kong

ENGG1004N/K

Digital Literacy and Computational Thinking

Installation Guide of R/RStudio

Term 2, 2024-25

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Background

- Some of our lab exercises requires you to use the R language
- To use R in your computer, you need to install two software tools
 - R <https://cloud.r-project.org/>
 - RStudio Desktop <http://www.rstudio.com/>
- The following slides illustrate the detailed setup steps for both Windows ([p.3–15](#)) and macOS ([p.16–28](#)) platforms

Install R on Windows

- Go to: <https://cloud.r-project.org>
 - Click “[Download R for Windows](#)”
 - Click “[base](#)”

R-4.2.2 for Windows

 [Download R-4.2.2 for Windows](#) (76 megabytes, 64 bit)[README on the Windows binary distribution](#)[New features in this version](#)

This build requires UCRT, which is part of Windows since Windows 10 and Windows Server 2016. On older systems, UCRT has to be installed manually from [here](#).

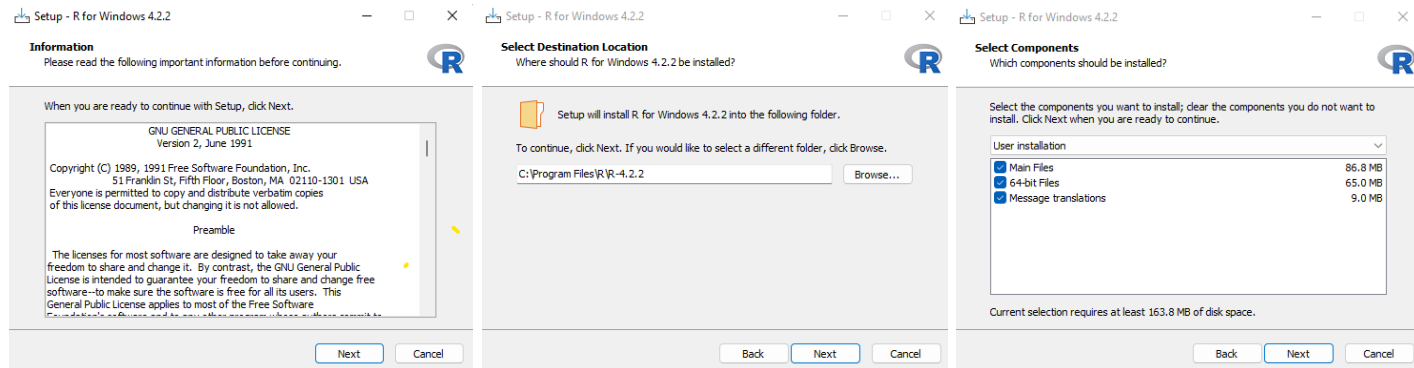
If you want to double-check that the package you have downloaded matches the package distributed by CRAN, you can compare the [md5sum](#) of the .exe to the [fingerprint](#) on the master server.

Frequently asked questions

- [Does R run under my version of Windows?](#)
- [How do I update packages in my previous version of R?](#)

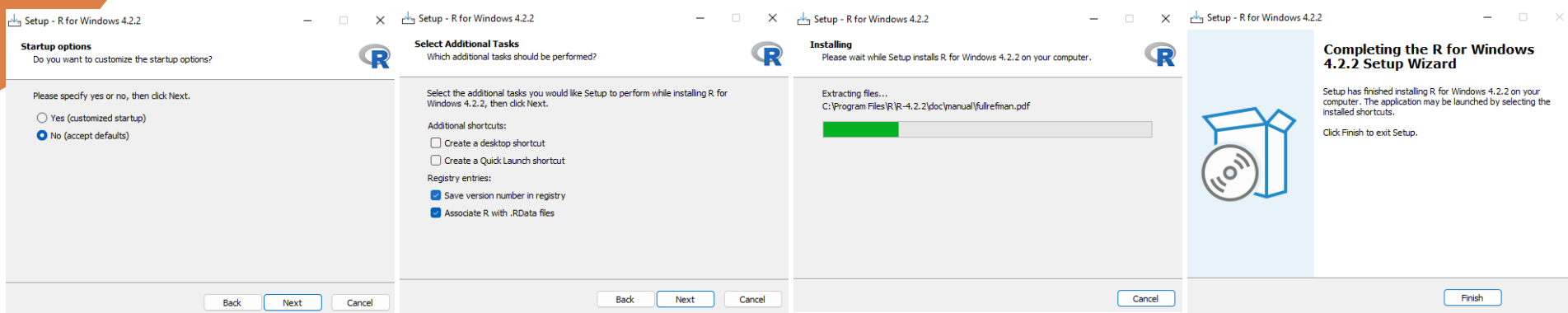
Install R on Windows

- Open the downloaded exe file
- Install: Press next



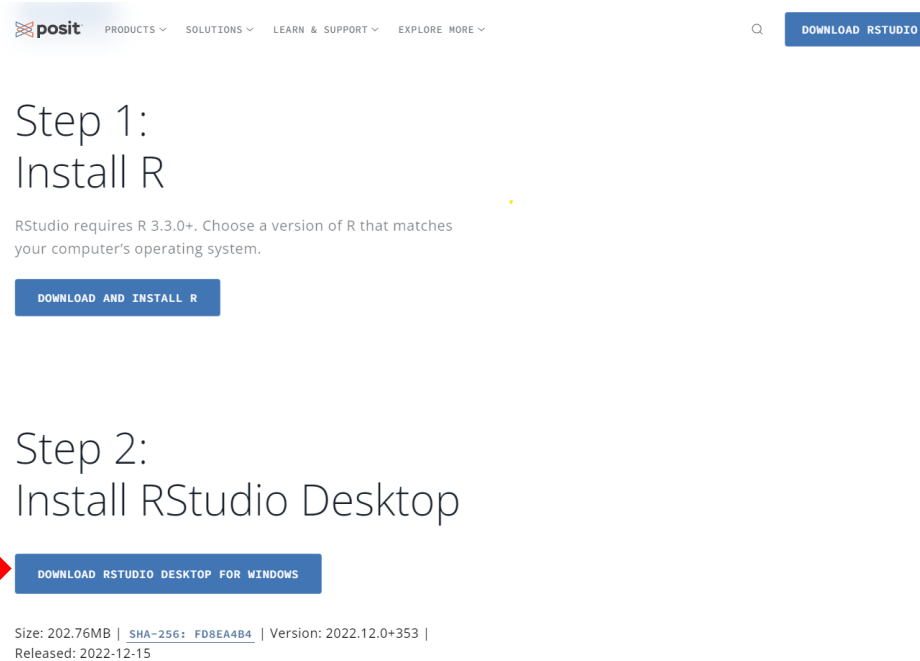
Install R on Windows

- Install: Press next



Install RStudio on Windows

- Go to: <http://www.rstudio.com/download>



The screenshot shows the RStudio website's download page. At the top, there is a navigation bar with the 'posit' logo and links for 'PRODUCTS', 'SOLUTIONS', 'LEARN & SUPPORT', and 'EXPLORE MORE'. A search icon and a 'DOWNLOAD RSTUDIO' button are also present. The main content area is divided into two sections. The first section, 'Step 1: Install R', includes a note that 'RStudio requires R 3.3.0+'. Below this is a blue button labeled 'DOWNLOAD AND INSTALL R'. The second section, 'Step 2: Install RStudio Desktop', features a large red arrow pointing to a blue button labeled 'DOWNLOAD RSTUDIO DESKTOP FOR WINDOWS'. At the bottom of the page, technical details are provided: 'Size: 202.76MB | SHA-256: FD8EA4B4 | Version: 2022.12.0+353 | Released: 2022-12-15'.

posit PRODUCTS SOLUTIONS LEARN & SUPPORT EXPLORE MORE

Q DOWNLOAD RSTUDIO

Step 1: Install R

RStudio requires R 3.3.0+. Choose a version of R that matches your computer's operating system.

DOWNLOAD AND INSTALL R

Step 2: Install RStudio Desktop

DOWNLOAD RSTUDIO DESKTOP FOR WINDOWS

Size: 202.76MB | SHA-256: FD8EA4B4 | Version: 2022.12.0+353 | Released: 2022-12-15

Install RStudio on Windows

Step 2: Install RStudio Desktop

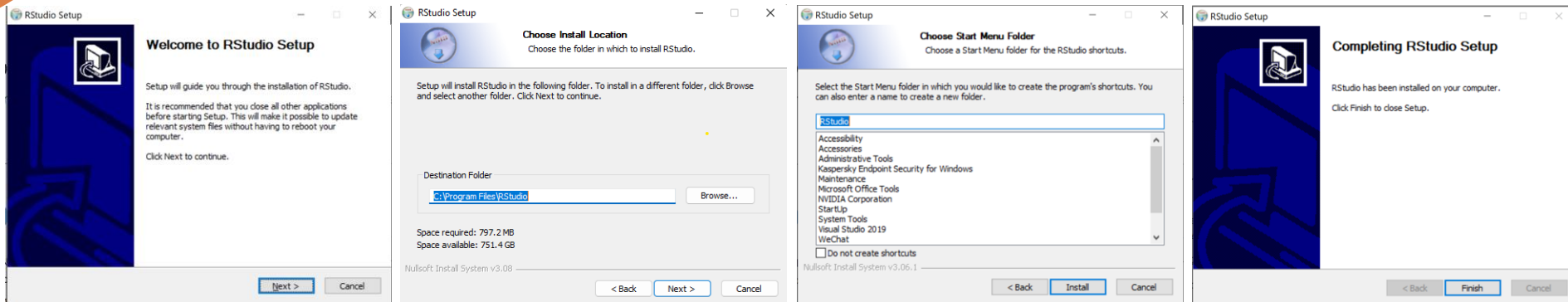


DOWNLOAD RSTUDIO DESKTOP FOR WINDOWS

Size: 202.76MB | [SHA-256: FD8EA4B4](#) | Version: 2022.12.0+353 |
Released: 2022-12-15

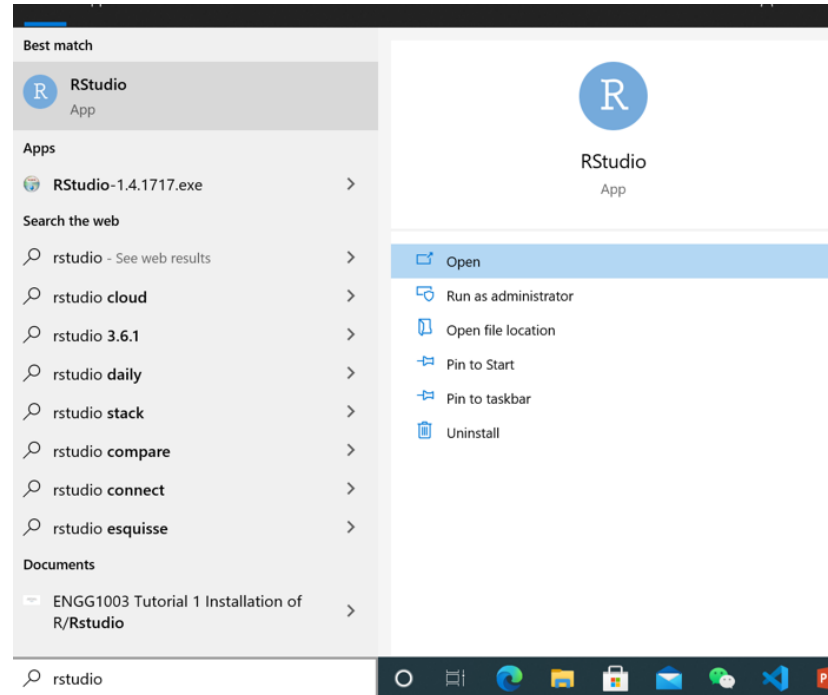
Install RStudio on Windows

- Open file:   RStudio-2022.12.0-353.exe
[Open file](#)
- Install: Press next



Install RStudio on Windows

- Open “RStudio” (Not R!)



Run RStudio on Windows

- The “>” symbol is the prompt. You can put the cursor there to type commands
- Try some toy examples:

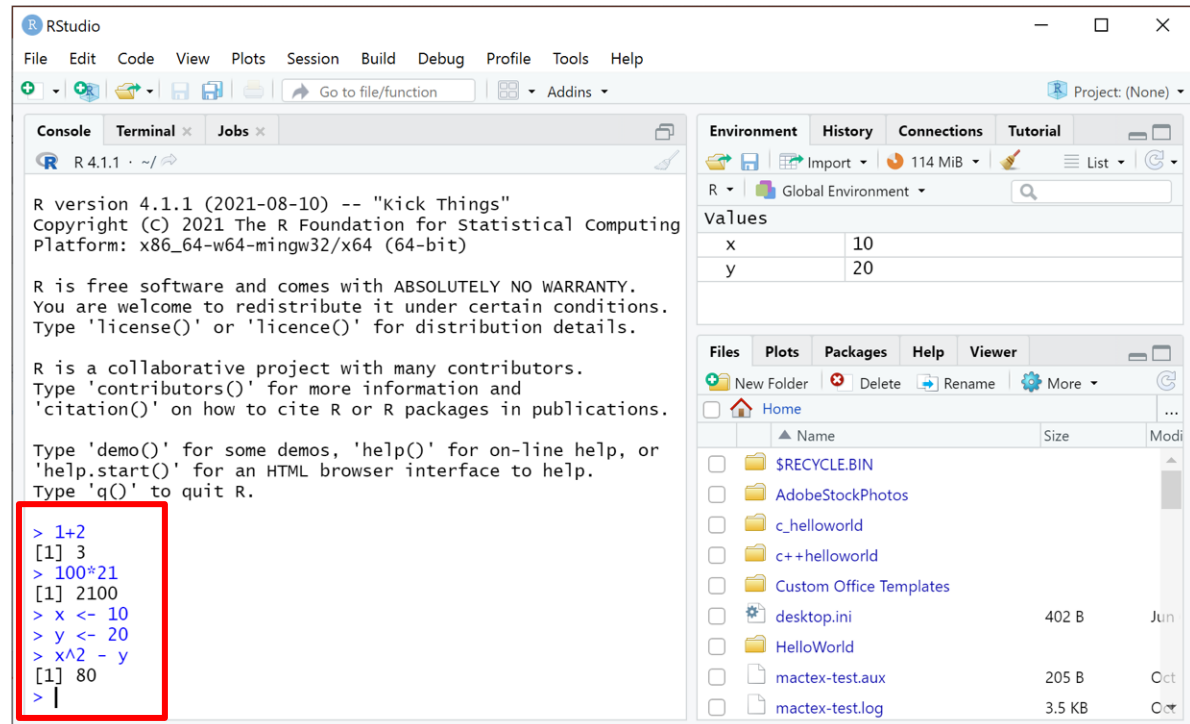
1+2

100*21

x <- 10

y <- 20

x^2 - y



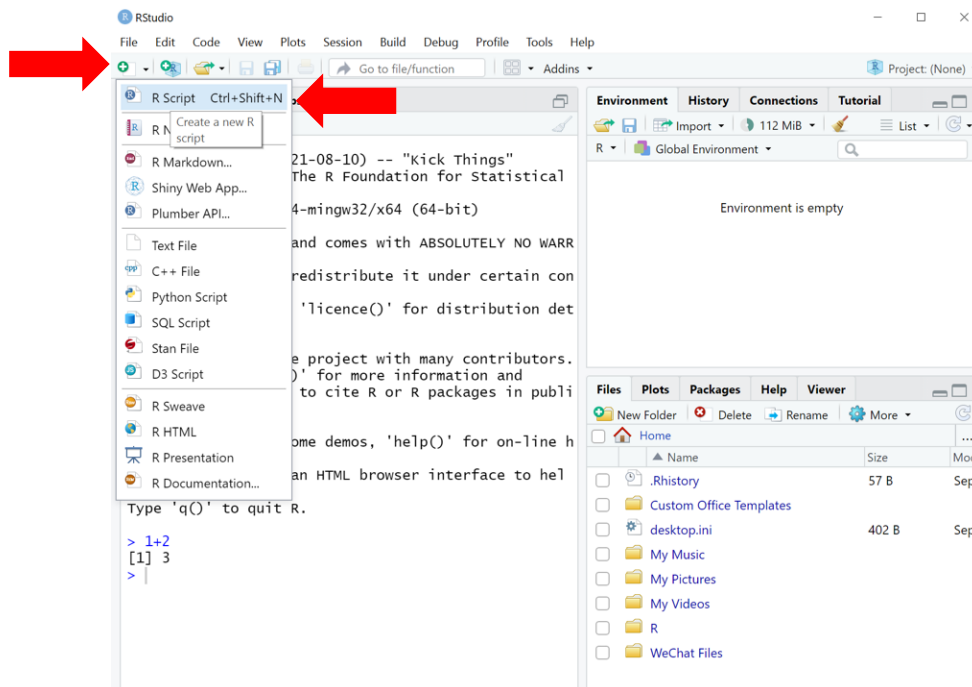
The screenshot shows the RStudio application window. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for file operations and a search bar. The main window is divided into four panes: Console, Terminal, Jobs, and Environment. The Console pane shows the R startup messages and the following commands and their outputs:

```
> 1+2
[1] 3
> 100*21
[1] 2100
> x <- 10
> y <- 20
> x^2 - y
[1] 80
> |
```

The Environment pane on the right shows the Global Environment with two variables: x (value 10) and y (value 20). The Files pane at the bottom shows a list of files and folders in the current directory, including \$RECYCLE.BIN, AdobeStockPhotos, c_helloworld, c++helloworld, Custom Office Templates, desktop.ini, HelloWorld, mactex-test.aux, and mactex-test.log.

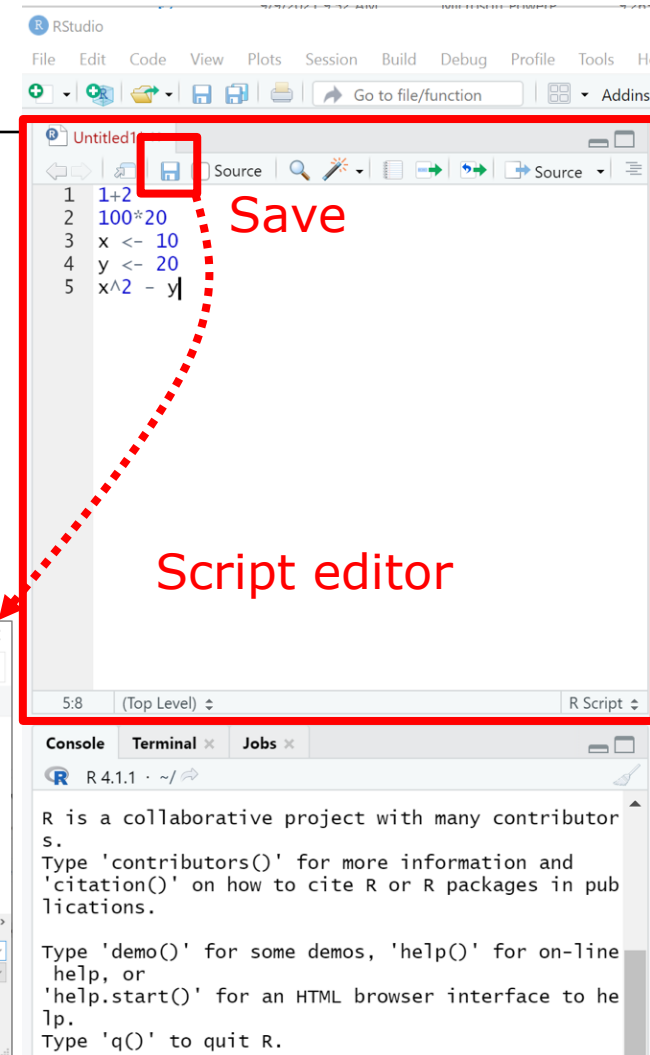
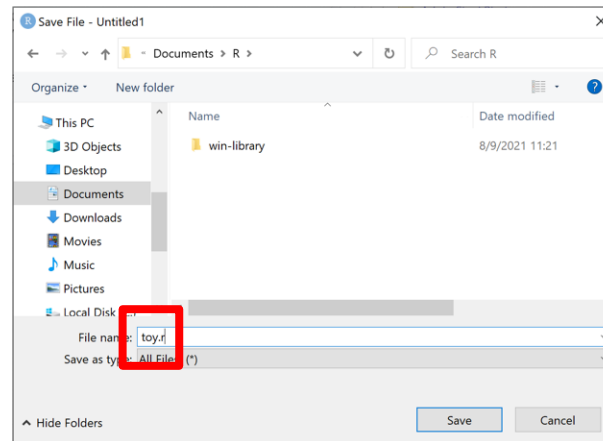
R Script

- As you get more and more commands, it's better to save all your commands in a *script file*
- Click “New File” → “R Script”



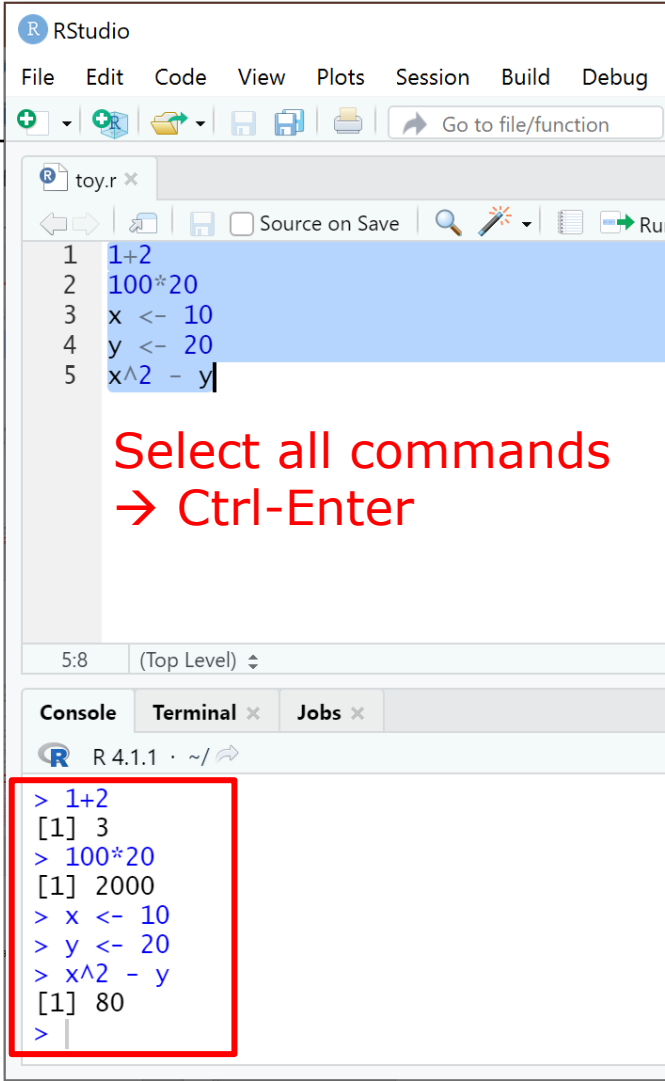
R Script

- You can now put all your commands into the script editor
- To save your commands, click the “Save” icon
 - Name your script file **toy.R**
 - Remember the folder that you save the file in



Running R Script

- To run an R script:
 - Select all commands in the script editor → Control-Enter



The screenshot shows the RStudio environment. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, and Debug. Below the menu is a toolbar with icons for file operations and a search bar labeled 'Go to file/function'. The main editor window, titled 'toy.r', contains five lines of R code: `1 1+2`, `2 100*20`, `3 x <- 10`, `4 y <- 20`, and `5 x^2 - y`. The entire code block is highlighted in blue. To the right of the code, red text reads 'Select all commands → Ctrl-Enter'. Below the editor is a status bar showing '5:8 (Top Level)'. At the bottom, there are three tabs: 'Console', 'Terminal', and 'Jobs'. The 'Console' tab is active, displaying the output of the script: `> 1+2`, `[1] 3`, `> 100*20`, `[1] 2000`, `> x <- 10`, `> y <- 20`, `> x^2 - y`, `[1] 80`, and `>`. The console output is enclosed in a red rectangular box.

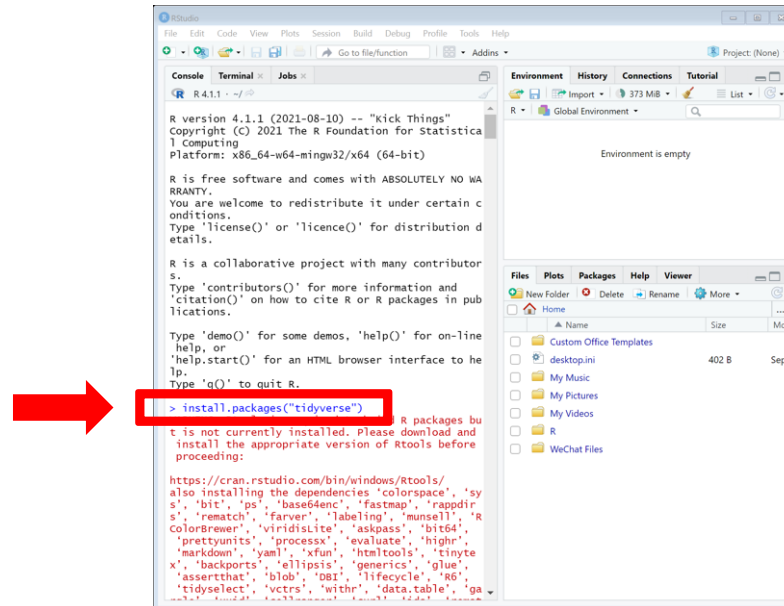
```
RStudio
File Edit Code View Plots Session Build Debug
+ + + + + + + + + + Go to file/function
toy.r
1 1+2
2 100*20
3 x <- 10
4 y <- 20
5 x^2 - y

Select all commands
→ Ctrl-Enter

5:8 (Top Level)
Console Terminal Jobs
R 4.1.1 ~/
> 1+2
[1] 3
> 100*20
[1] 2000
> x <- 10
> y <- 20
> x^2 - y
[1] 80
>
```

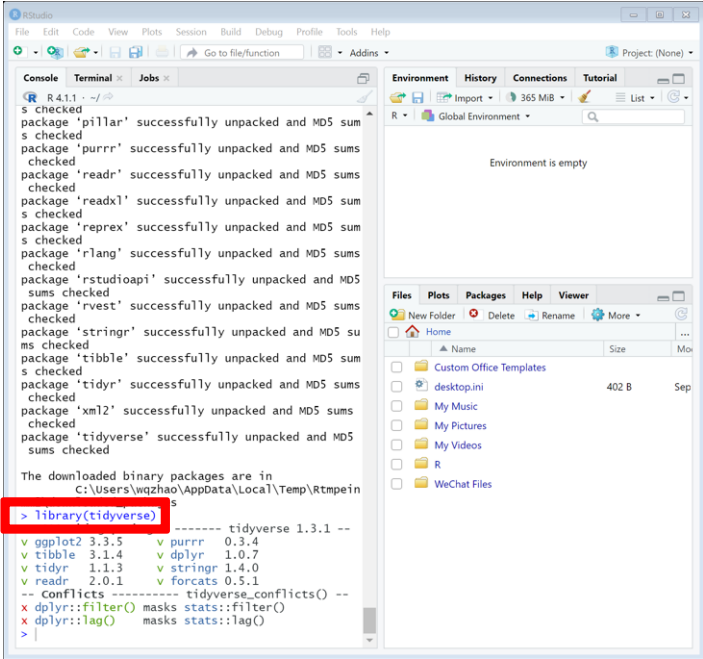
Install R Packages

- Other than the basic R, we sometimes need to use more R tools called *packages*
- Some packages have to be installed separately
- Try to install an R package:
 - Type in: `install.packages("tidyverse")`



Load R Packages

- After installing the package, we need to load the package to use it
 - Type in: `library(tidyverse)`



The screenshot shows the RStudio interface. The Console pane on the left displays the output of installing several R packages, including 'tidyverse'. A red arrow points to the command `> library(tidyverse)` in the console. The Environment pane on the right shows 'Global Environment' and 'Environment is empty'. The Files pane at the bottom shows the file explorer.

```
RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function Addins Project: (None)

Console Terminal Jobs
R 4.1.1 ~ /
s checked
package 'pillar' successfully unpacked and MD5 sums checked
package 'purrr' successfully unpacked and MD5 sums checked
package 'readr' successfully unpacked and MD5 sums checked
package 'readxl' successfully unpacked and MD5 sums checked
package 'reprex' successfully unpacked and MD5 sums checked
package 'rlang' successfully unpacked and MD5 sums checked
package 'rstudioapi' successfully unpacked and MD5 sums checked
package 'rvest' successfully unpacked and MD5 sums checked
package 'stringr' successfully unpacked and MD5 sums checked
package 'tibble' successfully unpacked and MD5 sums checked
package 'tidyr' successfully unpacked and MD5 sums checked
package 'xml2' successfully unpacked and MD5 sums checked
package 'tidyverse' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
C:\Users\wqzhao\AppData\Local\Temp\Rtmpein

> library(tidyverse)
tidyverse 1.3.1 --
v ggplot2 3.3.5 v purrr 0.3.4
v tibble 3.1.4 v dplyr 1.0.7
v tidyr 1.1.3 v stringr 1.4.0
v readr 2.0.1 v forcats 0.5.1
-- Conflicts ---- tidyverse_conflicts() --
x dplyr::filter() masks stats::filter()
x dplyr::lag() masks stats::lag()
>
```

Install R on Mac

○ Go to: <https://cloud.r-project.org> → Click “[Download R for macOS](#)”
Latest release:

→ [R-4.2.2-arm64.pkg](#) (notarized and signed)
SHA1-hash: c3bb657ca6912b9b98e254f6343a365da26848f
(ca. 86MB) for M1 and higher Macs only!

Choose this if
your Mac uses
Apple silicon

→ [R-4.2.2.pkg](#) (notarized and signed)
SHA1-hash: 99b8d184f855e630ac950ca4e62cb7fc9a1f7b2e
(ca. 87MB) for Intel Macs

Choose this if you use
Intel-Mac (or if you
don't know what Mac
you're using)

R 4.2.2 binary for macOS 11 (**Big Sur**) and higher, **Apple silicon arm64** build, signed and notarized package.
Contains R 4.2.2 framework, R.app GUI 1.79 for Apple silicon Macs (M1 and higher), Tcl/Tk 8.6.12 X11 libraries and Texinfo 6.8.

Important: this version does **NOT** work on older Intel-based Macs - see below for Intel version.

Note: the use of X11 (including `tcltk`) requires [XQuartz](#) (version 2.8.1 or later). Always re-install XQuartz when upgrading your macOS to a new major version.

This release uses Xcode 13.1 and experimental GNU Fortran 12 arm64 fork. If you wish to compile R packages which contain Fortran code, you may need to download GNU Fortran for arm64 from <https://mac.R-project.org/tools>. Any external libraries and tools are expected to live in `/opt/R/arm64` to not conflict with Intel-based software and this build will not use `/usr/local` to avoid such conflicts (see the [tools page](#) for more details).

R 4.2.2 binary for macOS 10.13 (**High Sierra**) and higher, **Intel 64-bit** (older Macs) build, signed and notarized package.
Contains R 4.2.2 framework, R.app GUI 1.79 in 64-bit for Intel Macs, Tcl/Tk 8.6.6 X11 libraries and Texinfo 6.7. The latter two components are optional and can be omitted when choosing "custom install", they are only needed if you want to use the `tcltk` R package or build package documentation from sources.

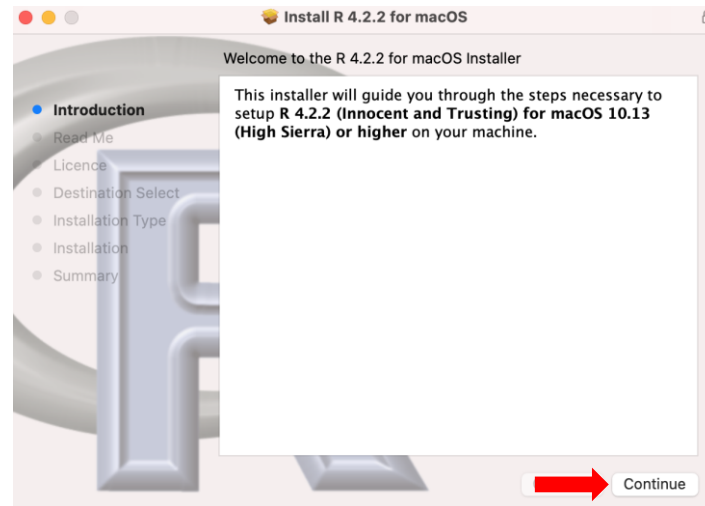
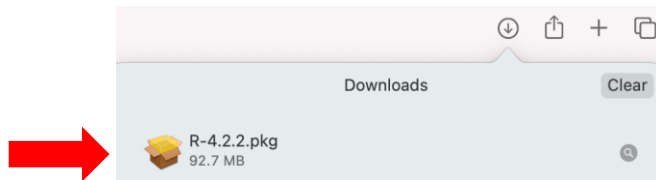
Note: the use of X11 (including `tcltk`) requires [XQuartz](#) to be installed (version 2.7.11 or later) since it is no longer part of macOS. Always re-install XQuartz when upgrading your macOS to a new major version.

This release supports Intel Macs, but it is also known to work using Rosetta2 on M1-based Macs. For native Apple silicon arm64 binary see above.

Important: this release uses Xcode 12.4 and GNU Fortran 8.2. If you wish to compile R packages from sources, you may need to download GNU Fortran 8.2 - see the [tools](#) directory.

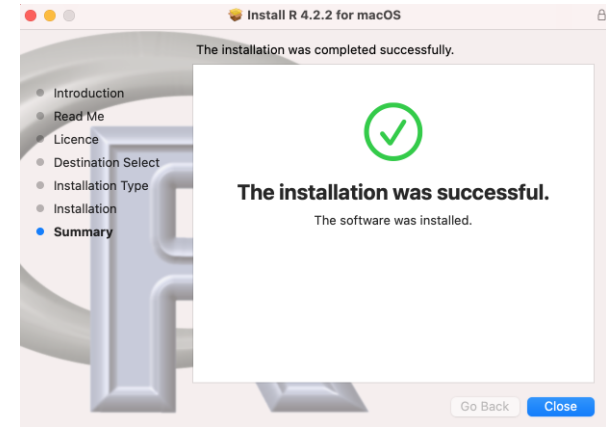
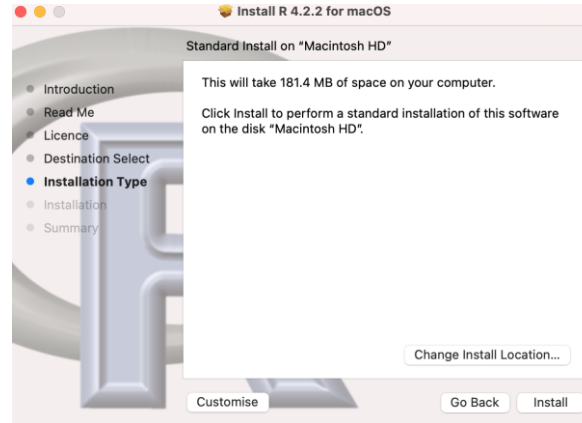
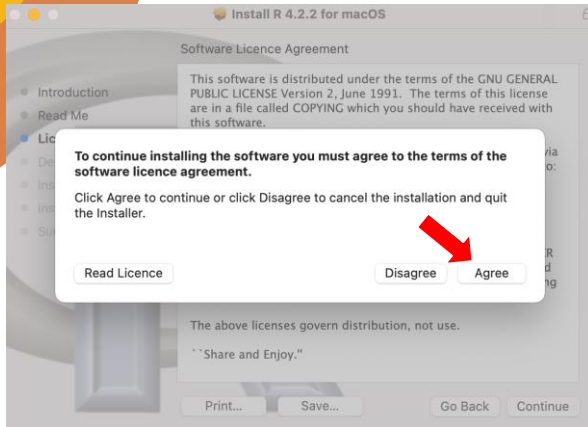
Install R on Mac

○ Install R:



Install R on Mac

- Press continue and agree



Install RStudio on Mac

- Go to: <http://www.rstudio.com/download>



Step 1: Install R

RStudio requires R 3.3.0+. Choose a version of R that matches your computer's operating system.

DOWNLOAD AND INSTALL R

Step 2: Install RStudio Desktop

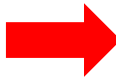


DOWNLOAD RSTUDIO DESKTOP FOR MAC

Size: 365.70MB | [SHA-256: FD48EBB5](#) | Version: 2022.12.0+353 |
Released: 2022-12-15

Install RStudio on Mac

Step 2: Install RStudio Desktop

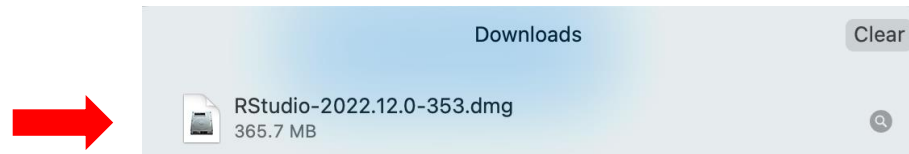


DOWNLOAD RSTUDIO DESKTOP FOR MAC

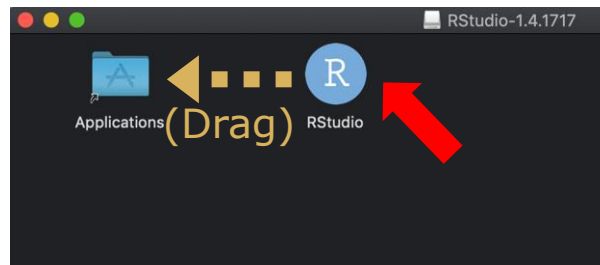
Size: 365.70MB | [SHA-256: FD4BEBB5](#) | Version: 2022.12.0+353 |
Released: 2022-12-15

Install RStudio on Mac

- Install RStudio

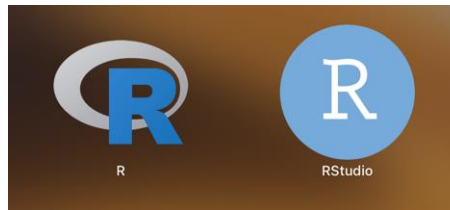


- Drag the “RStudio” icon to “Applications”

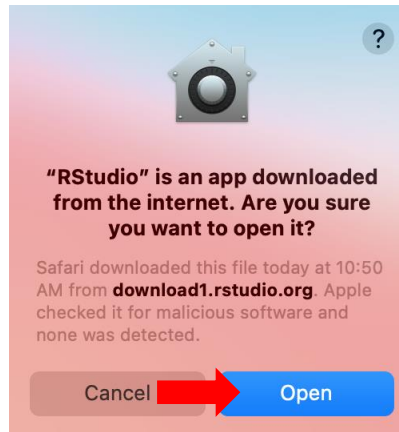


Install RStudio on Mac

- You can now see both R and RStudio in the Launchpad



- Open “RStudio” (Not R!)



Run RStudio on Mac

- The “>” symbol is the prompt. You can put the cursor there to type commands
- Try some toy examples:

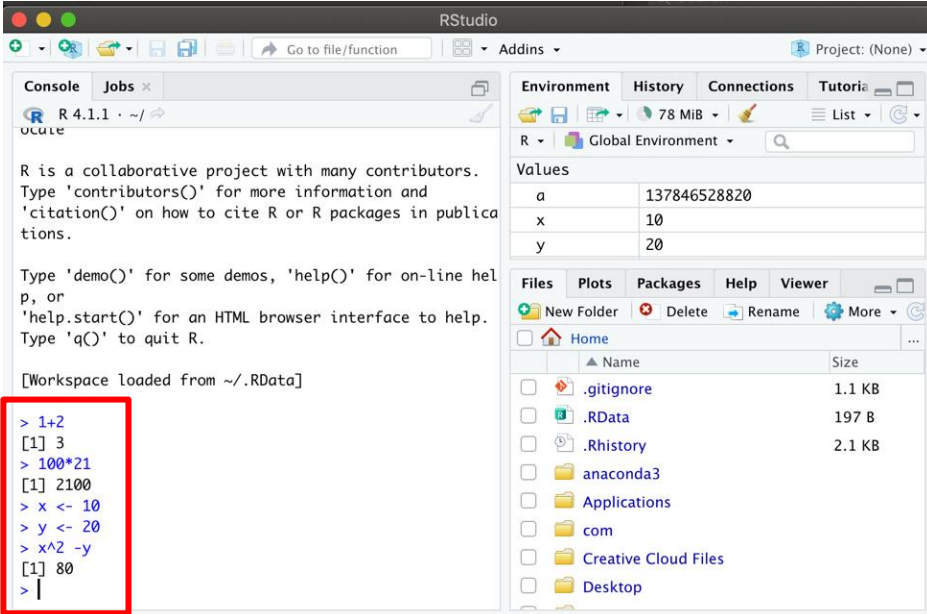
1+2

100*21

x <- 10

y <- 20

x^2 - y



```
RStudio
R 4.1.1 · ~/
ucule

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publica
tions.

Type 'demo()' for some demos, 'help()' for on-line hel
p, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

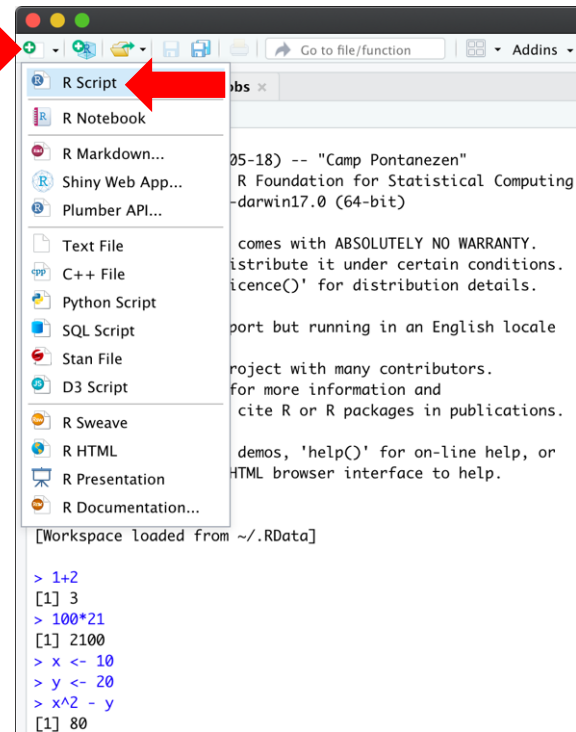
> 1+2
[1] 3
> 100*21
[1] 2100
> x <- 10
> y <- 20
> x^2 - y
[1] 80
> |
```

Values	
a	137846528820
x	10
y	20

Name	Size
.gitignore	1.1 KB
.RData	197 B
.Rhistory	2.1 KB
anaconda3	
Applications	
com	
Creative Cloud Files	
Desktop	

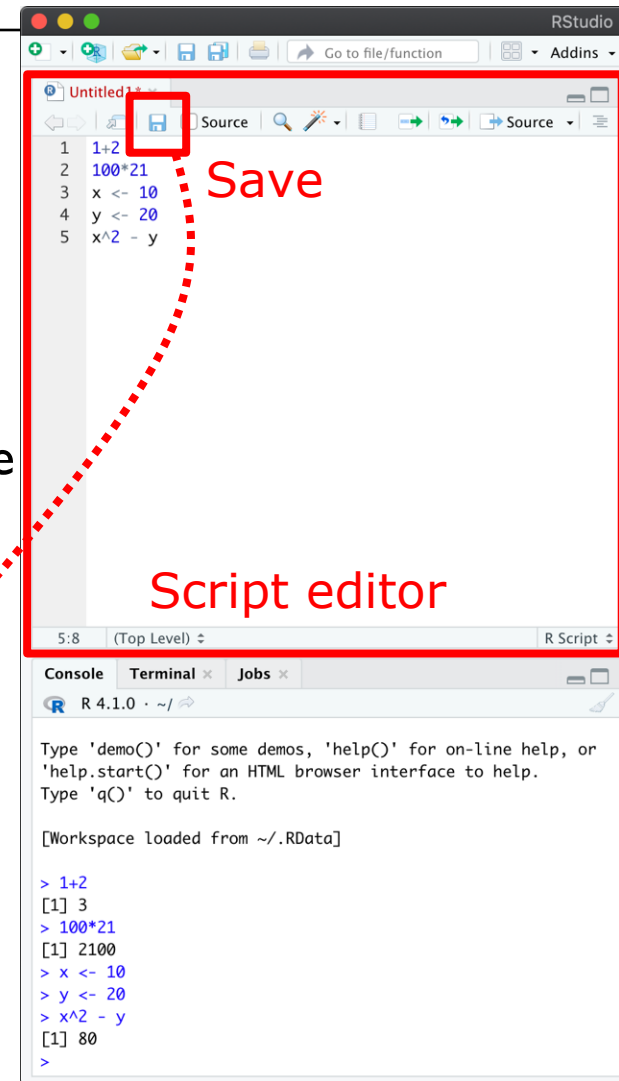
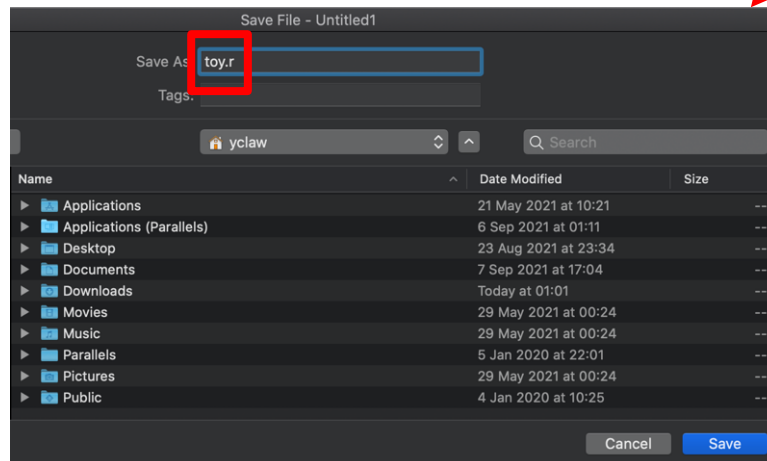
R Script

- As you get more and more commands, it's better to save all your commands in a *script file*
- Click “New File” → “R Script”



R Script

- You can now put all your commands into the script editor
- To save your commands, click the “Save” icon
 - Name your script file **toy.R**
 - Remember the folder that you save the file in



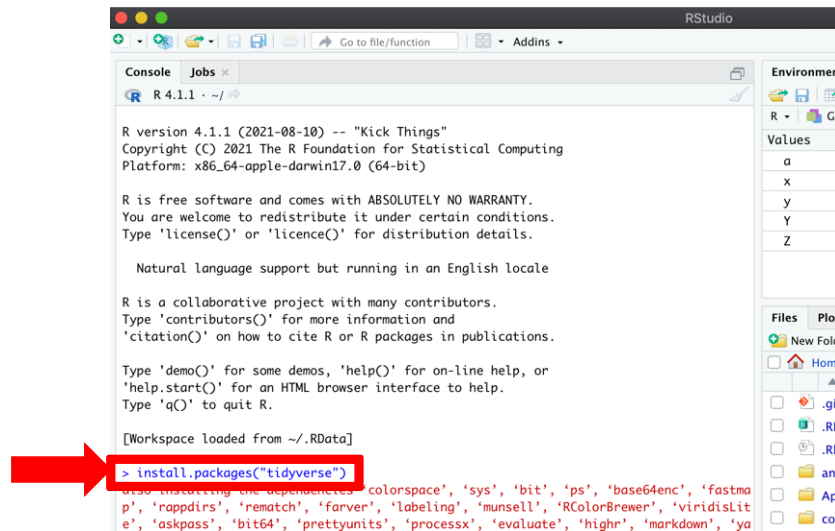
Running R Script

- To run an R script:
 - Select all commands in the script editor
→ ⌘-Enter (Command-Enter)

```
toy.r*  
1 1+2  
2 100*21  
3 x <- 10  
4 y <- 20  
5 x^2 - y  
6  
  
6:1 (Top Level) R Script  
Console Terminal Jobs  
R 4.1.0 ~/  
> y <- 20  
> x^2 - y  
[1] 80  
>  
> x^2 - y  
[1] 80  
> 1+2  
[1] 3  
> 100*21  
[1] 2100  
> x <- 10  
> y <- 20  
> x^2 - y  
[1] 80  
>
```

Install R Packages

- Other than the basic R, we sometimes need to use more R tools called *packages*.
- Some packages have to be installed separately
- Try to install a R package:
 - Type in: `install.packages("tidyverse")`
- If you are using M1/M2 series Mac, type this instead:
 - `install.packages("tidyverse", dependencies = TRUE)`



The screenshot shows the RStudio interface. The console window displays the R startup message for version 4.1.1 on a Darwin platform. A red arrow points to the command `> install.packages("tidyverse")` entered in the console. Below this command, the output shows the installation of the tidyverse package and its dependencies, including colorspace, sys, bit, ps, base64enc, fastmap, rappdirs, rematch, farver, labeling, munsell, RColorBrewer, viridisLite, askpass, bit64, prettyunits, processx, evaluate, highr, markdown, and yaml.

```
R version 4.1.1 (2021-08-10) -- "Kick Things"
Copyright (C) 2021 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin17.0 (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.

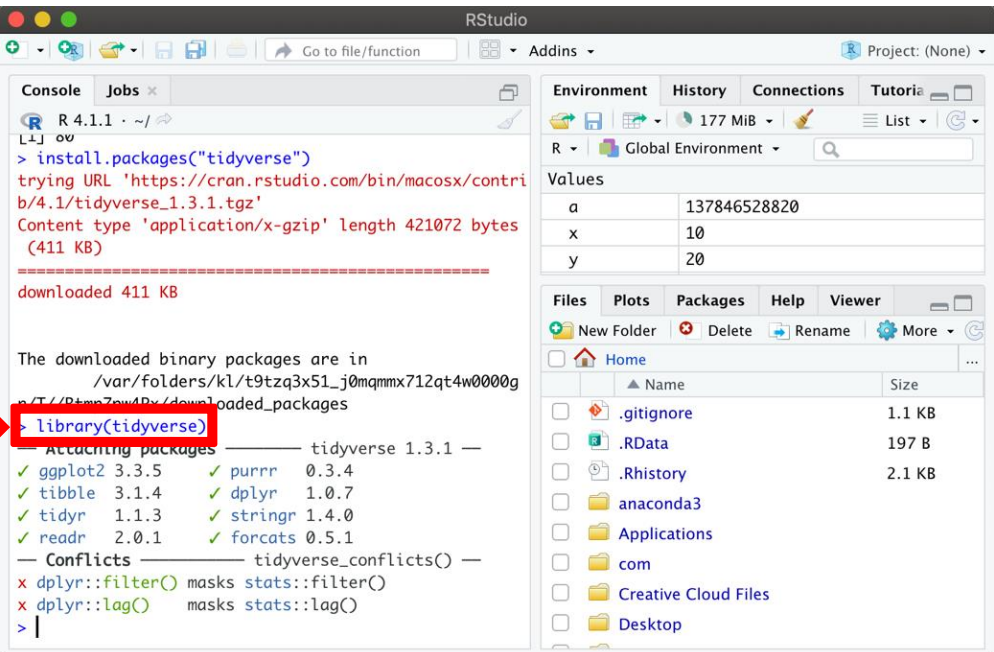
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

> install.packages("tidyverse")
also installing the dependencies 'colorspace', 'sys', 'bit', 'ps', 'base64enc', 'fastma
p', 'rappdirs', 'rematch', 'farver', 'labeling', 'munsell', 'RColorBrewer', 'viridisLit
e', 'askpass', 'bit64', 'prettyunits', 'processx', 'evaluate', 'highr', 'markdown', 'ya
```

Load R Packages

- After installing the package, we need to load the package to use it
 - Type in: `library(tidyverse)`



The screenshot shows the RStudio interface. In the Console, the command `install.packages("tidyverse")` has been executed, resulting in the installation of the tidyverse package (411 KB). Below this, the command `library(tidyverse)` is entered and highlighted with a red box and a red arrow. The right-hand pane shows the Environment tab with a table of variables:

Variable	Value
a	137846528820
x	10
y	20

The bottom pane shows the Files tab with a list of files and folders in the Home directory, including .gitignore (1.1 KB), .RData (197 B), .Rhistory (2.1 KB), anaconda3, Applications, com, Creative Cloud Files, and Desktop.



Questions?

- Next: Proceed to read the Lab 01 specification and try out the exercises!
- Thank you!