

Alternatives to RStudio

Workflow organisation with R

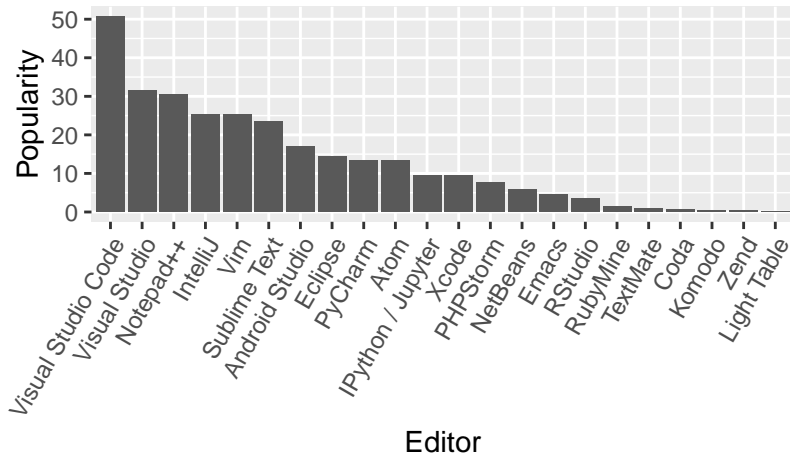
Nikita Gusarov
GAEL (UGA) - G-SCOP (Grenoble INP)

17/12/2020



Introduction

Workflow



Workflow types

- ▶ Text editor
- ▶ Notebook
- ▶ Integrated Development Environment (IDE)

```
# Running the setup first allows you to set the options of R code
# Note that if you want to load any other dependencies, you can load them here:
```

```
library(ggplot2)

# Getting Started with R

x <- 1
print (x <- x + 1)

# Graphs with RMarkdown

data <- cars
ggplot(data, aes(x = speed, y = dist)) +
  geom_point()

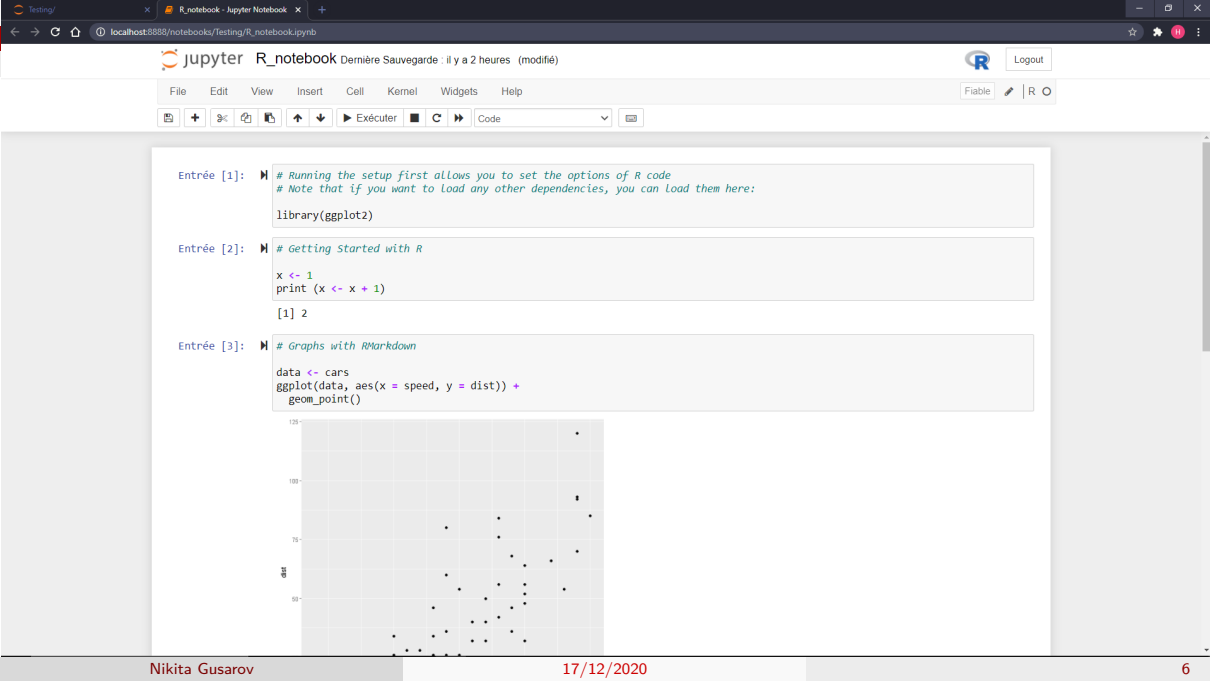
# Tables with R
## Using R Output

View(cars)

## Using grid.draw
## table with grid/gridExtra packages

library(grid)
library(gridExtra)

x <- tableGrob(head(cars, n=10))
grid.draw(x)
```



```

1 # Running the setup first allows you to set the options of R code
2 # Note that if you want to load any other dependencies, you can load them here:
3
4 library(ggplot2)
5
6 # Getting started with R
7
8 x <- 1
9 print(x <- x + 1)
10
11 # Graphs with RMarkdown
12
13 data <- cars
14 ggplot(data, aes(x = speed, y = dist)) +
15   geom_point()
16
17 # Tables with R
18 ## Using R Output
19
20 head(cars, n=10)
21
22 ## Using grid.draw
23 ## Table with grid/gridExtra packages
24
25 library(grid)
26 library(gridExtra)
27
28 x <- tableGrob(head(cars, n=10))
29 grid.draw(x)

```

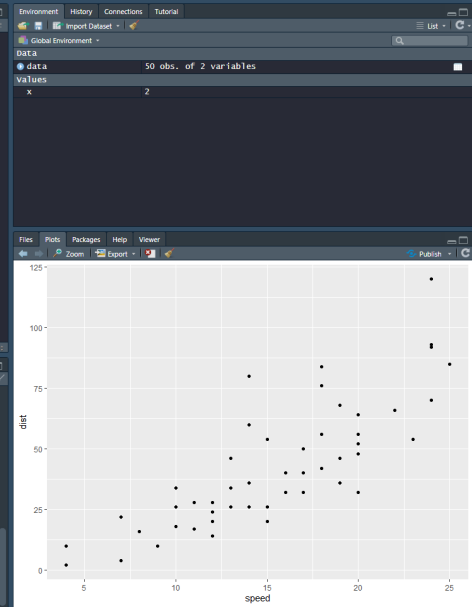
221 (Top Level) R Script

Console Terminal Jobs

```

C:/Projects/Testing_R/
> x <- 1
> print(x <- x + 1)
[1] 2
> library(ggplot2)
> x <- 1
> print(x <- x + 1)
[1] 2
> data <- cars
> ggplot(data, aes(x = speed, y = dist)) +
+   geom_point()
> head(cars, n=10)
  speed dist
1     4    2
2     4   10
3     7    4
4     7   22
5     8   16
6     9   10
7    10   18
8    10   26
9    10   34
10   11   17
>

```



What is RStudio ?

Testing_R - RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Untitled

1

Run Source

Environment History Connections Tutorial

Global Environment

Environment is empty

Files Plots Packages Help Viewer

New Folder Delete Rename More

C: > Projects > Testing_R

Name	Size	Modified
..		
Testing_R	0 B	Dec 17, 2020, 11:54 AM
Testing_R.Rproj	217 B	Dec 17, 2020, 1:58 PM

1:1 (Top Level) R Script

Console Terminal Jobs

C:\Projects\Testing_R

R version 4.0.2 (2020-06-22) -- "Taking Off Again"
Copyright (c) 2020 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R est un logiciel libre livré sans AUCUNE GARANTIE.
Vous pouvez le redistribuer sous certaines conditions.
Tapez 'license()' ou 'licence()' pour plus de détails.

R est un projet collaboratif avec de nombreux contributeurs.
Tapez 'contributors()' pour plus d'information et
'citation()' pour la façon de le citer dans les publications.

Tapez 'demo()' pour des démonstrations, 'help()' pour l'aide
en ligne ou 'help.start()' pour obtenir l'aide au format HTML.
Tapez 'q()' pour quitter R.

> |

“An IDE that was built for R”

- ▶ Syntax highlighting, code completion, and smart indentation
- ▶ Execute R code directly from the source editor
- ▶ Quickly jump to function definitions

“Helps bring your workflow together”

- ▶ Integrated R help and documentation
- ▶ Easily manage multiple working directories using projects
- ▶ Workspace browser and data viewer

“Powerful authoring and debugging”

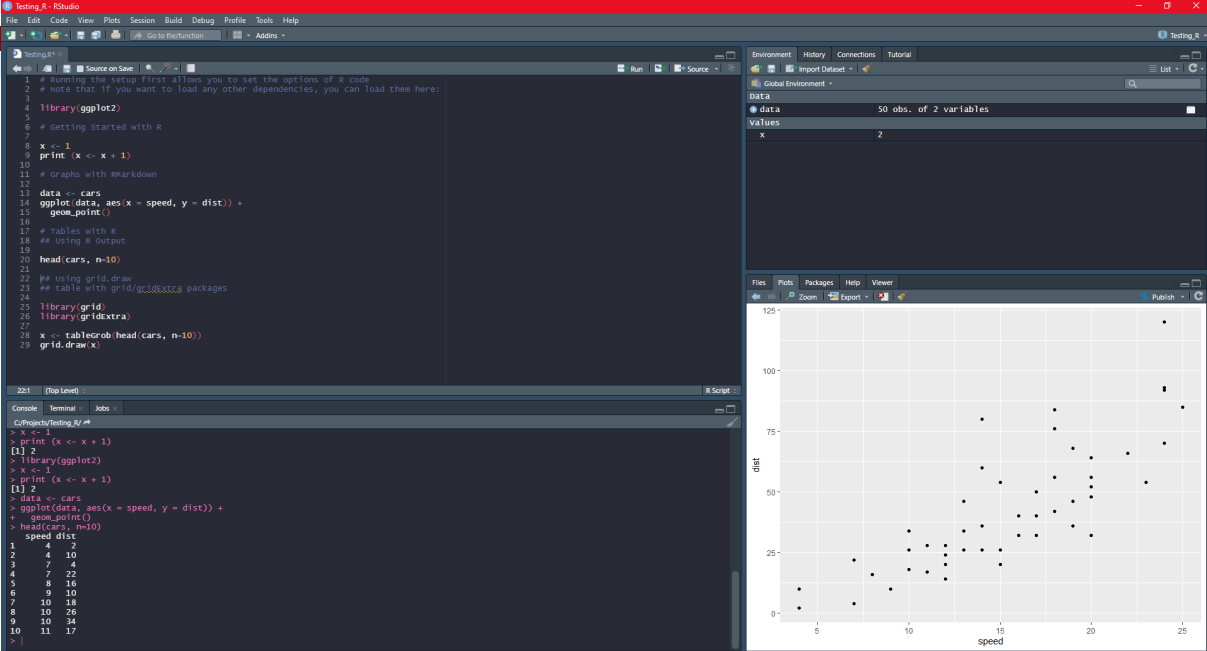
- ▶ Interactive debugger to diagnose and fix errors quickly
- ▶ Extensive package development tools
- ▶ Authoring with Sweave and R Markdown

And more . . .

- ▶ Runs on most desktops or on a server and accessed over the web
- ▶ Integrates the tools you use with R into a single environment
- ▶ Includes powerful coding tools designed to enhance your productivity
- ▶ Enables rapid navigation to files and functions

And more . . .

- ▶ Makes it easy to start new or find existing projects
- ▶ Has integrated support for Git and Subversion
- ▶ Supports authoring HTML, PDF, Word Documents, and slide shows
- ▶ Supports interactive graphics with Shiny and ggvis

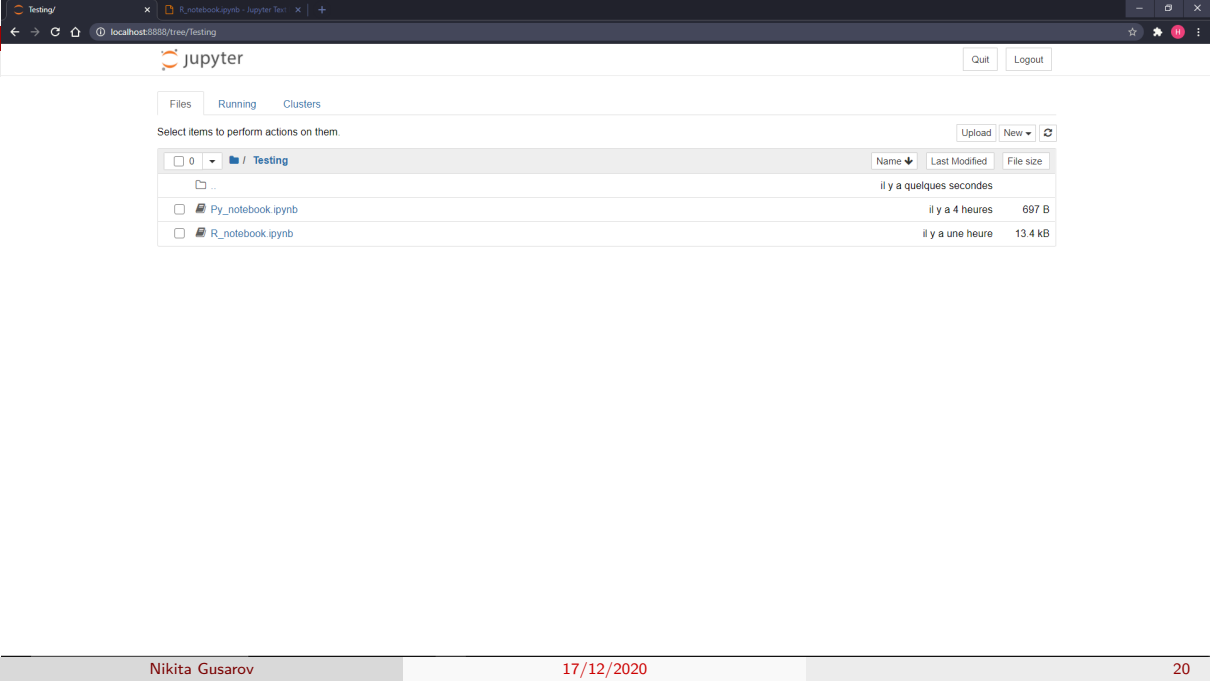


What RStudio is not ...

The screenshot displays the RStudio IDE interface. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. The left sidebar shows the File menu with options like New File, New Project, Open File, Recent Files, Open Project, Open Project in New Session, Recent Projects, Import Dataset, Save, Save As..., Save All, Print..., Close, Close All, Close All Except Current, Close Project, and Quit Session. The main editor area shows R code: `x <- 1`, `print(x <- x + 1)`, `library(ggplot2)`, `x <- 1`, `print(x <- x + 1)`, `data <- cars`, `ggplot(data, aes(x = speed, y = dist)) +`, `geom_point()`, and `head(cars, n=10)`. The bottom pane shows the console output: `1 4 2`, `2 4 10`, `3 7 4`, and `4 7 22`. The right sidebar shows the Environment pane with a table of variables: `data` (50 obs. of 2 variables) and `Values` (x: 2). The bottom right pane shows a scatter plot of `dist` vs `speed` from the `cars` dataset.

What about alternatives ?

Jupyter



Key advertising factors

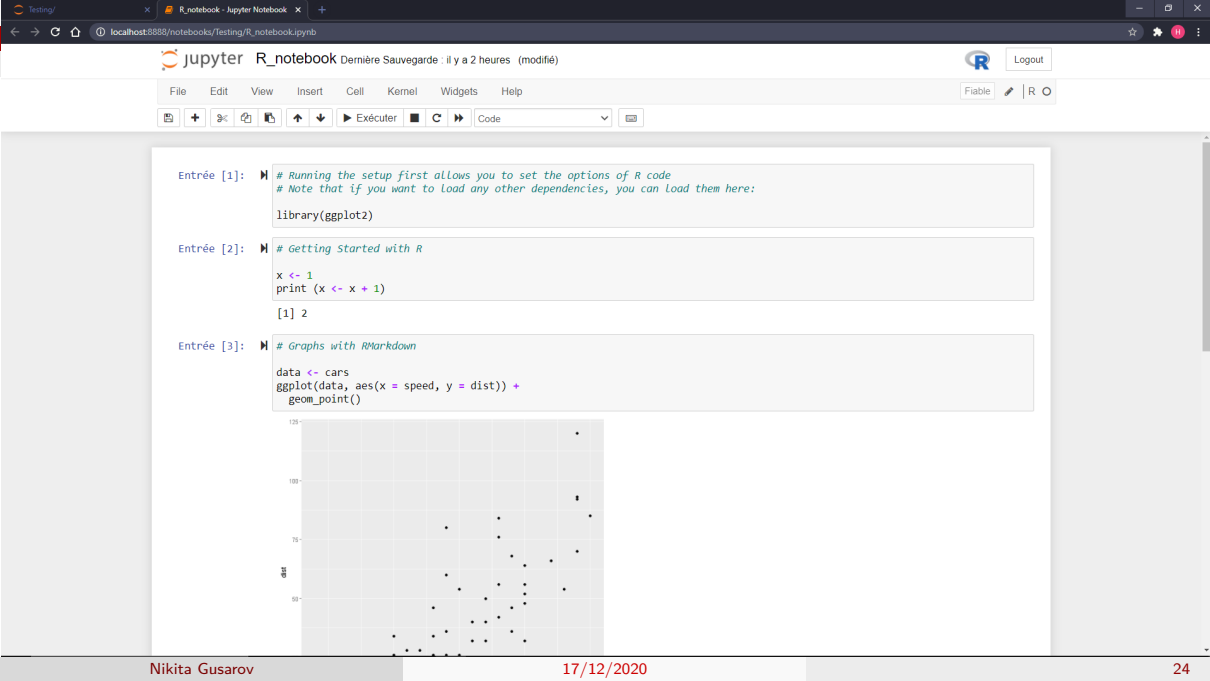
- ▶ A web application
- ▶ Notebook documents

Features

- ▶ In-browser editing for code
- ▶ Automatic syntax highlighting, indentation, and tab completion
- ▶ The ability to execute code from the browser
- ▶ Results of computations is attached to the code which generated them

Features

- ▶ Displaying the result of computation using rich media representations (HTML, LaTeX, PNG, SVG, etc)
- ▶ In-browser editing for rich text using the Markdown markup language
- ▶ Commentary for the code is not limited to plain text
- ▶ Include mathematical notation within markdown cells using LaTeX, and rendered natively by MathJax.



Drawbacks

Version control

The .ipynb Jupyter Notebook files are blobs of JSON that also store cell output as well as metadata.

Testing/

R_notebook.ipynb - Jupyter Text

localhost:8888/edit/Testing/R_notebook.ipynb

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jupyter

R_notebook.ipynb

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Logout

File

Edit

View

Language

Plain Text

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{

2

"cells": [

3

{

4

"cell_type": "code",

5

"execution_count": 1,

6

"metadata": {},

7

"outputs": [],

8

"source": [

9

"# Running the setup first allows you to set the options of R code\n",

10

"# Note that if you want to load any other dependencies, you can load them here:\n",

11

"\n",

12

"library(ggplot2)"

13

]

14

},

15

{

16

"cell_type": "code",

17

"execution_count": 2,

18

"metadata": {},

19

"outputs": [

20

{

21

"name": "stdout",

22

"output_type": "stream",

23

"text": [

24

"[1] 2\n"

25

]

26

}

27

],

28

"source": [

29

"# Getting Started with R\n",

30

"\n",

31

"x <- 1 \n",

32

"print (x <- x + 1)"

33

]

34

},

35

{

36

"cell_type": "code",

37

"execution_count": 3,

38

"metadata": {},

39

"outputs": [

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Inline Code Rendering

In Jupyter Notebooks, it is impossible to use the inline expressions without additional markdown modules.

VS Code

File

Edit

Selection

View

Go

Run

Terminal

Help

testing_R.R - Untitled (Workspace) - Visual Studio Code

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EXPLORER

...

OPEN EDITORS

UNTITLED (WORKSPACE)

> literature_behavioural

> projet_doctoral

> simulator

> bayes_r

> rstudio_alternatives

script.md

testing_R.R X

rstudio_alternatives > testing_R.R > ...

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25

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28

29

Running the setup first allows you to set the options of R code

Note that if you want to load any other dependencies, you can load them here:

library(ggplot2)

Getting Started with R

x <- 1

print(x <- x + 1)

Graphs with RMarkdown

data <- cars

ggplot(data, aes(x = speed, y = dist)) +

geom_point()

Tables with R

Using R Output

head(cars, n=10)

Using grid.draw

table with grid/gridExtra packages

library(grid)

library(gridExtra)

x <- tableGrob(head(cars, n=10))

grid.draw(x)

main*

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4

R: 6632

Ln 29, Col 13

Spaces: 4

UTF-8

CRLF

R

🔊 [off]

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🔄

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30

VS Code selling features

- ▶ Simplicity of a source code editor
- ▶ Powerful developer tooling (IntelliSense, code completion and debugging)

Available for macOS, Linux, and Windows

Visual Studio Code supports macOS, Linux, and Windows - so you can hit the ground running, no matter the platform.

“Edit, build, and debug with ease”

- ▶ Lightning fast source code editor
- ▶ Support for hundreds of languages
- ▶ Intuitive keyboard shortcuts, easy customization and community-contributed mappings
- ▶ Interactive debugger
- ▶ Build and scripting tools to perform common tasks
- ▶ Support for Git so you can work with source control without leaving the editor including viewing pending changes diffs

“Make it your own”

- ▶ Customization through extensions
- ▶ Open-source project

FileEditSelectionViewGoRunTerminalHelp

EXPLORER

OPEN EDITORS

UNTITLED (WORKSPACE)

litterature_behavioural

projet_doctoral

simulator

bayes_r

rstudio_alternatives

OUTLINE

TIMELINE

NPM SCRIPTS

script.md

testing_R.R

1# Running the setup

2# Note that if you

3

4library(ggplot2)

5

6# Getting Started with

7

8x <- 1

9print(x <- x + 1)

10

11# Graphs with RMark

12

13data <- cars

14ggplot(data, aes(x

15geom_point()

16

17# Tables with R

18## Using R Output

19

20head(cars, n=10)

21

22## Using grid.draw

23## table with grid/gridExtra packages

24

25library(grid)

26library(gridExtra)

27

28x <- tableGrob(head(cars, n=10))

29grid.draw(x)

R: Create R terminal

Preferences: Open Workspace Settings

Preferences: Language Extensions

Git: Clone

Preferences: Open Keyboard Shortcuts

Merge Conflict: Compare Current Conflict

Git: Undo Last Commit

View: Reset Zoom

Add Browser Breakpoint

Add Cursor Above

Add Cursor Below

Add Cursors To Bottom

Add Cursors to Line Ends

Add Cursors To Top

recently used

Ctrl + K

Ctrl + S

other commands

Ctrl + Alt + UpArrow

Ctrl + Alt + DownArrow

Shift + Alt + I

main*

0004

R: 6632Ln 29, Col 13Spaces: 4UTF-8CRLFRR[off]

FileEditSelectionViewGoRunTerminalHelp

script.mdtesting_R.R X

rstudio_alternatives > testing_R.R > ...

```
1 # Running the setup first allows you to set the options of R code
2 # Note that if you want to load any other dependencies, you can load them here:
3
4 library(ggplot2)
5
6 # Getting Started with R
7
8 x <- 1
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11 # Graphs with RMarkdown
12
13 data <- cars
14 ggplot(data, aes(x = speed, y = dist)) +
15   geom_point()
16
17 # Tables with R
18 ## Using R Output
19
20 head(cars, n=10)
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22 ## Using grid.draw
23 ## table with grid/gridExtra packages
24
25 library(grid)
26 library(gridExtra)
27
28 x <- tableGrob(head(cars, n=10))
29 grid.draw(x)
```

PROBLEMS 4

TERMINAL ...

1: R Interactive

R version 4.0.2 (2020-06-22) -- "Taking Off Again"
Copyright (C) 2020 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

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Tapez 'demo()' pour des démonstrations, 'help()' pour l'aide
en ligne ou 'help.start()' pour obtenir l'aide au format HTML.
Tapez 'q()' pour quitter R.

>

main* 0 0 0 4

FileEditViewGoRunTerminalHelp

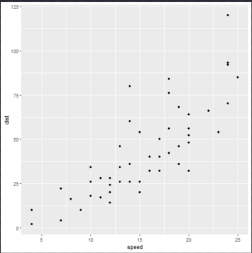
script.mdtesting_R.R X

rstudio_alternatives > testing_R.R > ...

```
10
11 # Graphs with RMarkdown
12
13 data <- cars
14 ggplot(data, aes(x = speed, y = dist)) +
15   geom_point()
16
17 # Tables with R
18 ## Using R Output
19
20 View(cars)
21
22 ## Using grid.draw
23 ## table with grid/gridExtra packages
24
25 library(grid)
26 library(gridExtra)
27
```

plot.png X

C: > Users > ngusa > AppData > Local > Temp > RtmpkzlEyX > vscode-R >



cars X

Search:

	speed	dist
1	4	2
2	4	10
3	7	4
4	7	22
5	8	16
6	9	10
7	10	18
8	10	26
9	10	34
10	11	17
11	11	28

PROBLEMS 3

TERMINAL ...

1: R Interactive

+ - X

< >

> # Note that if you want to load any other dependencies, you can load them here

>

> library(ggplot2)

> # Getting Started with R

>

> x <- 1

> print(x <- x + 1)

[1] 2

> # Graphs with RMarkdown

>

> data <- cars

> ggplot(data, aes(x = speed, y = dist)) +

+ geom_point()

> # Tables with R

> ## Using R Output

>

> head(cars, n=10)

speed dist

1 4 2

2 4 10

3 7 4

4 7 22

5 8 16

6 9 10

7 10 18

8 10 26

9 10 34

10 11 17

> ## Using grid.draw

> ## table with grid/gridExtra packages

>

> library(grid)

> ## Using grid.draw

> ## table with grid/gridExtra packages

>

> library(grid)

> library(gridExtra)

> x <- tableGrob(head(cars, n=10))

> grid.draw(x)

> # Tables with R

> ## Using R Output

>

> View(cars)

>

R: 1460 Ln 20, Col 11 Spaces: 4 UTF-8 CRLF R [off]

37

File

Edit

Selection

View

Go

Run

Terminal

Help

EXPLORER

...

presentation.Rmd

testing_R.R

testing_Rmd.Rmd

testing_XL.xlsx

OPEN EDITORS

UNTITLED (WORKSPACE)

litterature_behavioural

projet_doctoral

simulator

bayes_r

rstudio_alternatives

.vscode

captures

files

lock.testing_XL.xlsx

testing_R.R

testing_Rmd.pdf

testing_Rmd.Rmd

testing_Rmd.tex

testing_XL.xlsx

presentation

presentation.pdf

presentation.Rmd

presentation.tex

.gitignore

script.md

OUTLINE

TIMELINE

NPM SCRIPTS

terminal

presentation.Rmd

testing_R.R

testing_Rmd.Rmd

testing_XL.xlsx

rstudio_alternatives > files > testing_Rmd.Rmd > R Markdown

4 ---

5

Run Chunk | Run Above

6 ```{r setup, include=FALSE}

7 knitr::opts_chunk\$set(echo = TRUE)

8 ---

9

10 ## R Markdown

11

12 This is an R Markdown document. Markdown is a simple formatting sy

13

14 When you click the **Knit** button a document will be generated th

15

Run Chunk | Run Above

16 ```{r cars}

17 summary(cars)

18 ---

19

20 ## Including Plots

21

22 You can also embed plots, for example:

23

Run Chunk | Run Above

24 ```{r pressure, echo=FALSE}

25 plot(pressure)

26 ---

27

28 Note that the `echo = FALSE` parameter was added to the code chunk

29

testing_XL.xlsx

rstudio_alternatives > files > testing_XL.xlsx

Normal Arial 10 B I U

	A	B	C	D	E	F
1	1	2				
2	2	3				
3	3	4				
4	4	5				
5	5	6				
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12						
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16						
17						
18						
19						
20						
21						

Sheet1

main

0 0 0 12

R: 1460

References

- ▶ StackOverflow survey
- ▶ Visual Studio Code
- ▶ RStudio and features
- ▶ Discussion of editors
- ▶ Jupyter against RStudio
- ▶ VS Code against RStudio
- ▶ Starting with R in VS Code
- ▶ VS Code and Atom