



École d'Ingénierie Digitale  
et d'Intelligence Artificielle

# R Programming

Starting with R



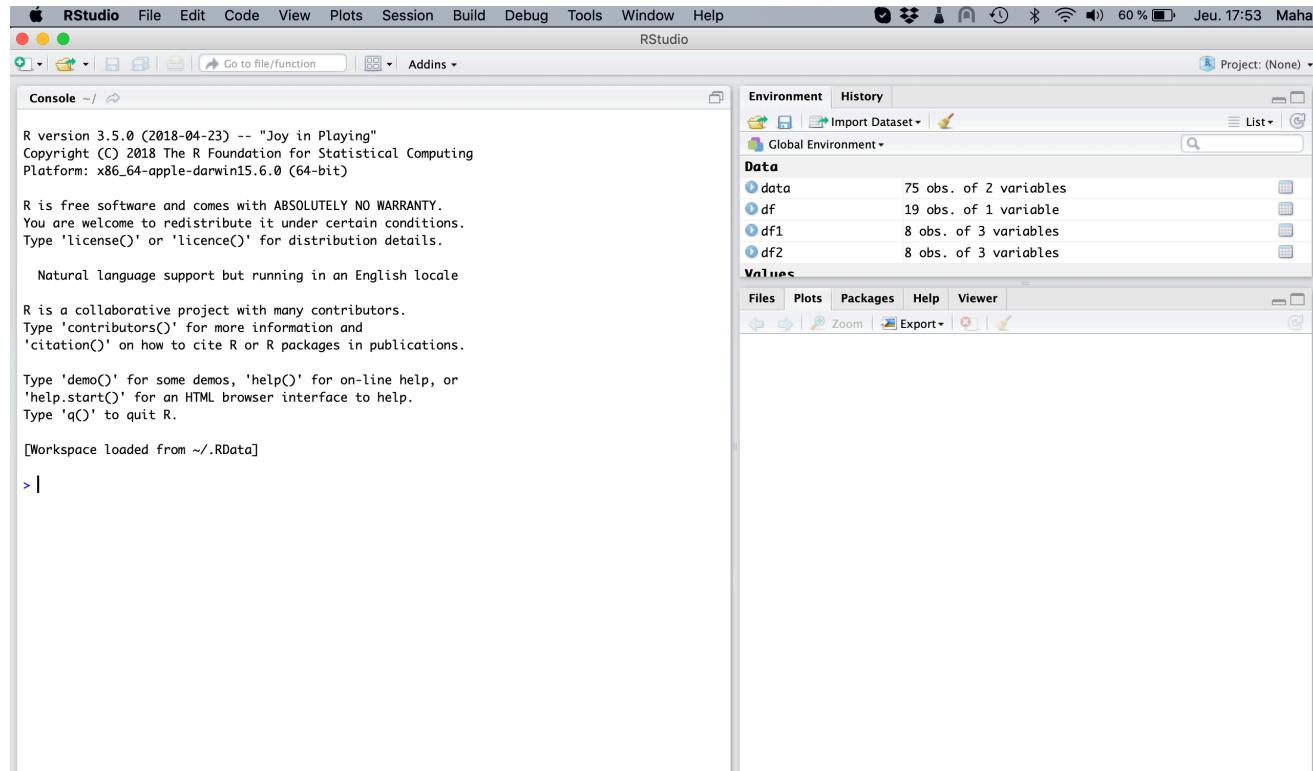
جامعة الأورومتوسطية بفاس  
EUROMED UNIVERSITY OF FES  
UNIVERSITÉ EUROMED DE FÈS

# First steps to install R

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- Download R from the Comprehensive R Archive Network (CRAN)
  - Do a quick search for CRAN on your browser
  - Install the base subdirectory
  - The latest version
  - Choose default choices
  - You can use the R console, however, I highly recommend you to use an editor developed for coding, such as R Studio
- Install R Studio

# First steps to install R Studio



- Search RStudio in the Browser
  - Choose the free version (if you want 😊)
  - Choose Yes for all the default

You see 3 panes :

1. R console
2. Environment
3. Visualization

# R Console

Pr. Maha Gmira, Ph.D.

```
R version 3.3.2 (2016-10-31) -- "Sincere Pumpkin Patch"  
Copyright (C) 2016 The R Foundation for Statistical Computing  
Platform: x86_64-apple-darwin13.4.0 (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.

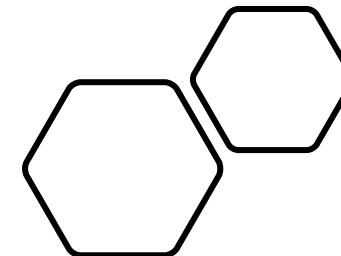
Natural language support but running in an English locale

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.

THIS BLOCK ( MAY OR MAY NOT BE FLASHING ) IS THE CURRENT COMMAND LINE.  
YOUR TYPING WILL APPEAR HERE.

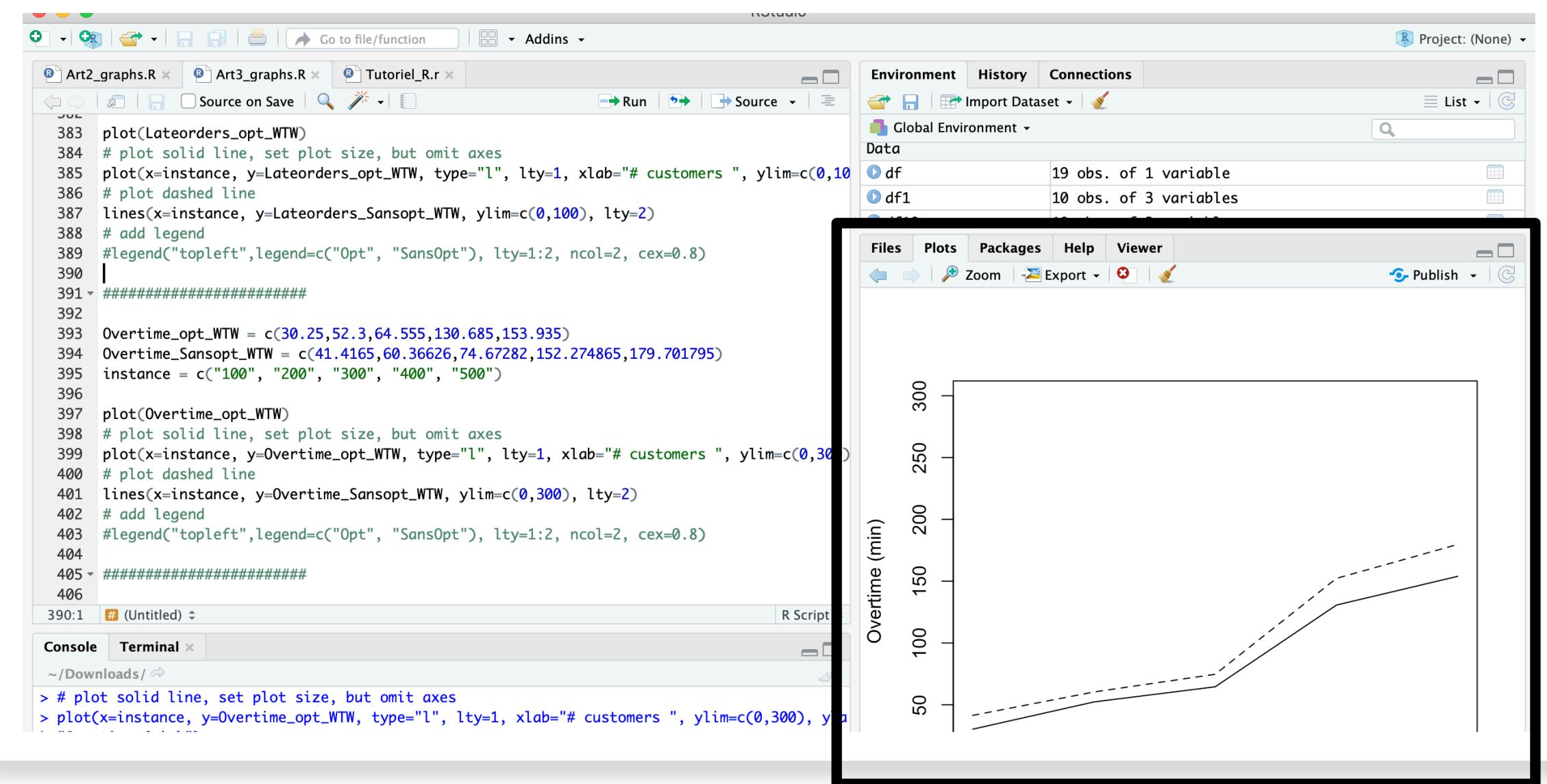
THIS “GREATER THAN” SIGN IS THE PROMPT.  
R IS WAITING FOR YOU TO TYPE A COMMAND.



The screenshot shows the RStudio interface with the following details:

- Editor Pane:** Displays R code in the `Art2\_graphs.R` file. The code includes plotting functions for `Lateorders\_opt\_WTW` and `Overtime\_opt\_WTW` data, setting plot sizes, axes, and legends.
- Environment Pane:** Shows the global environment with the following objects and their descriptions:

Object	Description
df	19 obs. of 1 variable
df1	10 obs. of 3 variables
df10	10 obs. of 3 variables
df11	10 obs. of 3 variables
df12	10 obs. of 3 variables
df2	10 obs. of 3 variables
df3	15 obs. of 3 variables
df4	df3 (data.frame, 2560 bytes)
df5	15 obs. of 3 variables
df6	15 obs. of 3 variables
df7	15 obs. of 3 variables
df8	15 obs. of 3 variables
df9	10 obs. of 3 variables
p1	List of 9
p10	List of 9
p11	List of 9
p12	List of 9
p2	List of 9



R version 3.5.0 (2018-07-20) -- "Versatile"  
Copyright (C) 2018 The R Foundation for Statistical Computing  
Platform: x86\_64-apple-darwin15.6.0 (64-bit)

R is free software.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for details.

Natural language support is available. See ?locale.

R is a collaborative project with many contributors.  
Type 'contributors()' or 'citation()' for more information.  
Type 'demo()' to see some示例, or help.start() to get help, or lp.

Close All Except Current

Print...

sh locale

s.

lications.

Close Project

Quit Session...

[Workspace loaded from ~/.RData]

>

New File ►

R Script  N

R Markdown... 

Shiny Web App... 

Text File 

C++ File 

R Sweave 

R HTML 

R Presentation 

R Documentation 

Environment History

Import Dataset 

Global Environment 

Data

data	75 obs. of 2 variables
df	19 obs. of 1 variable
df1	8 obs. of 3 variables
df2	8 obs. of 3 variables

Values

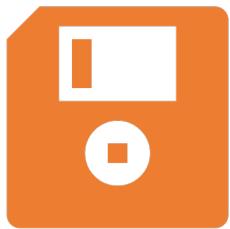
Files Plots Packages Help Viewer

Zoom Export



Create a  
Script

# Other tips



You can save your script (This is how)



Large community of R users



You can install packages directly from the console `install.packages ("name of the package")`

# Explore Data

## 1- Define an object

An object in R may be :

- Numerical variable
- Array
- Vector
- Statistical model adjusted to a set of data, etc.

In [2]: # We can define the variable x = 2 following 2 ways:

x <-2

x=2

## 2- Define a vector or a list of values

In [3]: # we use the command c()

y = **c**(10,56,34)

# Explore Data

## 3- Display the variable value

In [4]: # Just write the name of the variable and launch the cell, the result appears below.

```
x
```

```
2
```

## 4- Operations on vectors

To make operations on the vectors, R generally does them term by term.

In [3]: v1 = **c**(1,2,3,4,5)

```
v2 = c(10,11,12,13,14)
```

In [4]: v1 + v2

```
1. 11 2. 13 3. 15 4. 17 5. 19
```

# Explore Data

In [5]: # summing the components of a vector

```
sum(v1)
```

15

In [6]: # square all the components of a vector

```
v1^2
```

1. 1 2. 4 3. 9 4. 16 5. 25

In [8]: # product of two vectors (term to term)

```
v1*v2
```

1. 10 2. 22 3. 36 4. 52 5. 70

In [9]: # dot product of two vectors

```
v1%*%v2
```

190

# Loading Data

There are several ways to load data. The most used method is to load data saved in a csv file. We assume that the .csv is in the same folder as the notebook that imports them (otherwise, you must specify the path to the file in the `read.csv()` function).

There are several parameters to specify:

- the name of the file
- the presence of a first line with column names *header*
- the type of separation of columns *sep*
- the type of character for decimals (".") Or (",") *dec*

```
In [ ]: # Import a file  
        data <- read.csv("path/name of the file.csv", header = TRUE, sep = ";", dec = ".")
```

# Loading Data

You can also import files with the command `read.csv2()` for csv files with a comma for decimals. In this case, you must specify only the name of the file.