Análise de dados em 

Introdução ao R e RStudio

Agenda

- **Introdução ao R e Posit**
- **Conceito básicos de R**

R and Posit (ex Rstudio)

R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS

https://www.r-project.org/

Deploy everything you create in R & Python, including interactive applications (Shiny, Streamlit, Dash), documents, notebooks, and dashboards.

https://posit.co/

R - Help

Online

https://www.r-project.org/

Welcome | R for Data Science (had.co.nz)

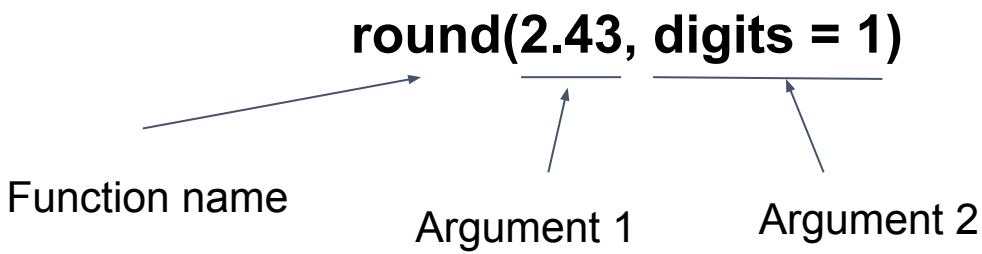
R - Objects

Objects
- Numeric
- Characters
- date
- Time
- Vectors
- Matrix

etc

R - Function

Functions - receives input objects and outputs a object



Notes:

- The arguments are separated by **commas**
- The argument 2 is a called *“named argument”*. In this example, the argument is called “digits” and the value is 1
- The arguments are between parenthesis
- Use F1 with courser in front of the function name to open the help window

R - Variables

The assignment operator “<-” allows to store some content on a variable

```
vat <- 0.2
```

The above stores the number 0.2 on a variable named *vat*

Afterwards we may use the value stored on the variable using its name

```
priceVAT <- 240 * (1 + vat)
```

This new example stores the value 288 (= 240 × (1 + 0.2)) on the variable *priceVAT*

We may thus put expressions on the right-side of an assignment

R - Packages

Created by users to enhance the R base

[Tidyverse]

install.package	Instalar a new package. Only execute first time
library	Load library everytime you open new session

Posit (ex Rstudio)

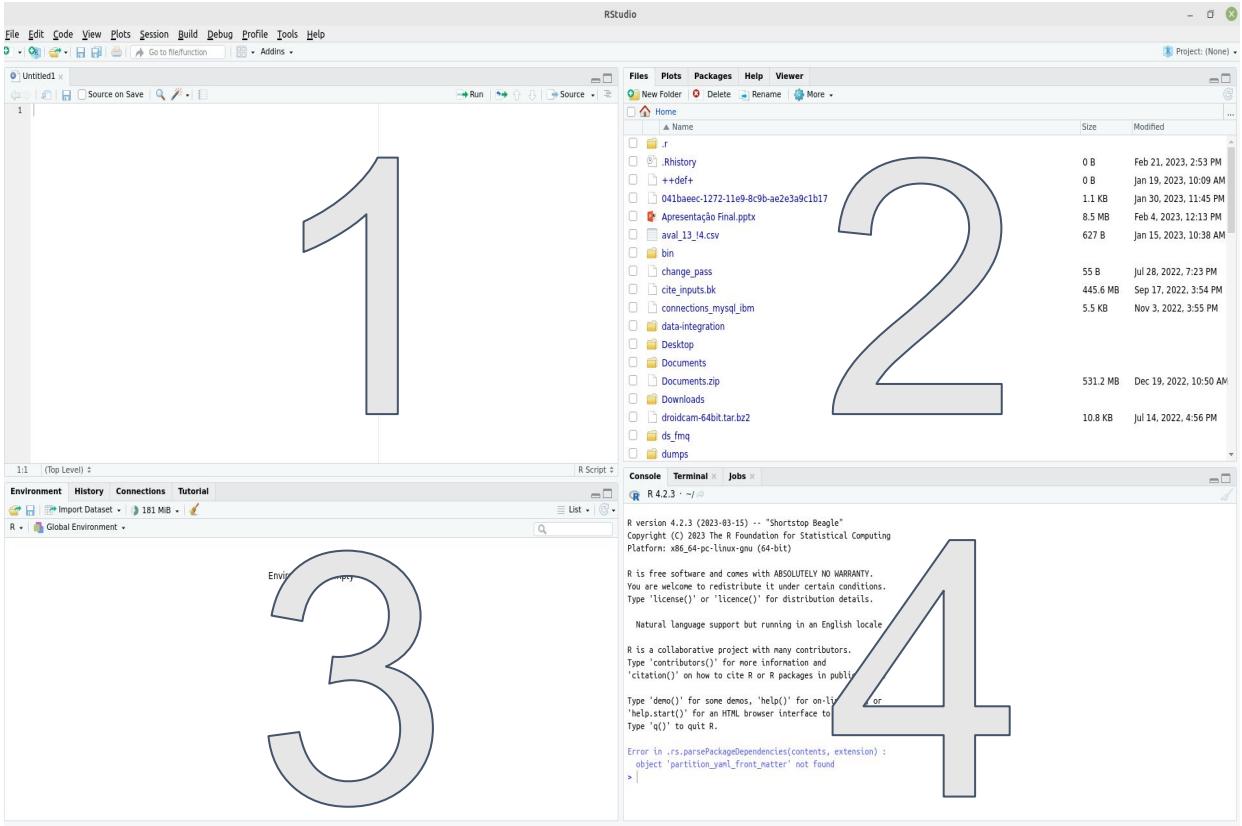
Initial setup of RStudio

1) **Source**
Editor to edit code

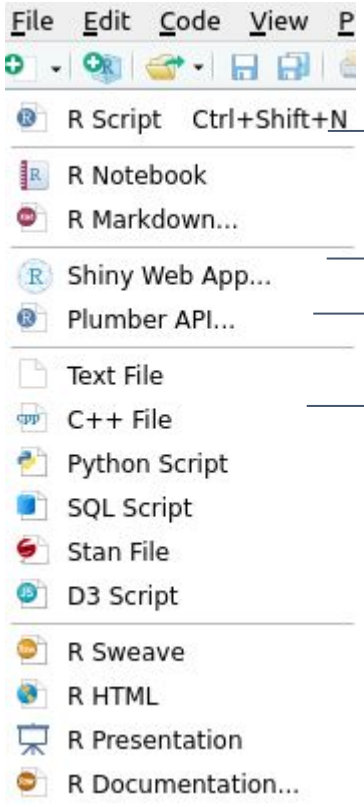
1) **Files/Plot**
Files in the folders and plots results

1) **Environment**
Workspace content (variables, data, functions, etc loaded)

1) **Console**
Code execution and results (except plots)



Posit - Type source files



A script is simply a text file containing a set of commands and comments.

An R Notebook is an R Markdown document with chunks that can be executed independently and interactively, with output visible immediately beneath the input

Shiny is an R package that makes it easy to build interactive web applications (apps) straight from R.

Plumber allows you to create a web API by merely decorating your existing R source code

Let's go to posit

Posit - R Notebooks

````
This is an [R Markdown](http://rmarkdown.rstudio.com) Notebook. When you execute code within the notebook, the
results appear beneath the code.

Try executing this chunk by clicking the *Run* button within the chunk or by placing your cursor inside it and
pressing *Ctrl+Shift+Enter*.

```{r}
plot(cars)
```

Add a new chunk by clicking the *Insert Chunk* button on the toolbar or by pressing *Ctrl+Alt+I*.

When you save the notebook, an HTML file containing the code and output will be saved alongside it (click the
*Preview* button or press *Ctrl+Shift+K* to preview the HTML file).

The preview shows you a rendered HTML copy of the contents of the editor. Consequently, unlike *Knit*,
*Preview* does not run any R code chunks. Instead, the output of the chunk when it was last run in the editor
is displayed.
````

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R - Introduction

		Explanation
Name	Numeric	
Examples	2 4.5 pi 3E10 Inf -Inf	Number that includes integers, decimals, infinity, scientific notation
Operation/ Functions	(1+3-(5*29)^2)/4 max(4,7) min(-2,3E4) sqrt(16) abs(-3) round(4.612,2) ceiling(1.4) floor(1.4) exp(3) log(6)	
Verification	is.numeric(4)	

R - Basic data type

		Explanation
Name	Character	
Examples	“tudo bem? como vais” ‘gato’	Text enclosed by quotation marks “” or single quotation
Operation/ Functions	str_c str_length	Concatenar strings string length
Verification	is.character(“ola”)	

R - Basic data type

		Explanation
Name	Date/Datetime	
Examples	dia <- dmy("14/10/1979") diahora <- ymd_hms("2010-12-13 15:30:30")	To create a date or datetime use functions applied to character
Operation/ Functions	month(dia) hour(diahora) today() now()	package ludridate Make Dealing with Dates a Little Easier • lubridate (tidyverse.org)
Verification	is.character("ola")	

R - Basic data type

		Explanation
Name	Boolean	
Examples	TRUE FALSE	
Operation/ Functions	1==1 & “a”==”ds” 1==1 | “a”==”ds”	
Verification	TRUE FALSE	

R - Basic data type

		Explanation
Name	Special	
Examples	NA NULL	Missing value - the value exist, but we don't know the value. Empty set
Operation/Functions		
Verification	is.na(NA) is.null(NULL	

R - Basic data type

		Explanation
Name	Vector	
Examples	c(1,5,2) c("pato","lebre","gato")	Sequence of multiple elven
Operation/ Functions	seq(3,6,0.1) ou 2:10 runif(10) rep(11,5) mean(100:200) sum(100:200) quantile(100:200,0.75) str_c(c("numero","letra","simbolo") , c("1","a","#"), sep = " - ") length vector[3]	Most function that apply to numeric or character can be applied to vectors
Verification	is.vector	

R - Basic data type

		Explanation
Name	List	
Examples	list(a="ola",b=34,c=yms("2020/03/01")	
Operation/Functions	lista[[1]] lista[3] lista[1:3] length(lista)	Get element 1 return the element Get element 3 return a list Get elements 1 to 3 return a list
Verification	is.list	

R - Basic data type

		Explanation
Name	Factor	
Examples	as.factor(c("a","c"))	
Operation/Functions	Same as vectors	
Verification	is.factor("ola")	

R - Basic data type

		Explanation
Name	data.frame	
Examples	data.frame(nome=c("pedro",antonio", idade=c(23,31)) iris	
Operation/ Functions	iris[2,"Species"] iris[,"Sepal.Length"] iris[2,] iris[2,1] iris[2,1] <- iris[2,1] + 1 iris[2,"Species"] <- "ola" iris[2,"Species"] <- "versicolor" iris$nova_coluna <- "constante" iris[,"outra_nova_coluna"] <- iris[,"Sepal.Length"] + 1 iris[,"Species"] <- as.character(iris[,"Species"])	iris[2,"Species"] é NA porque Species é factor e não ha elementos "ola" iris[2,"Species"] muda para "versicolor"
Verification	is.data.frame(iris)	