1st Class: R 4 Beginners

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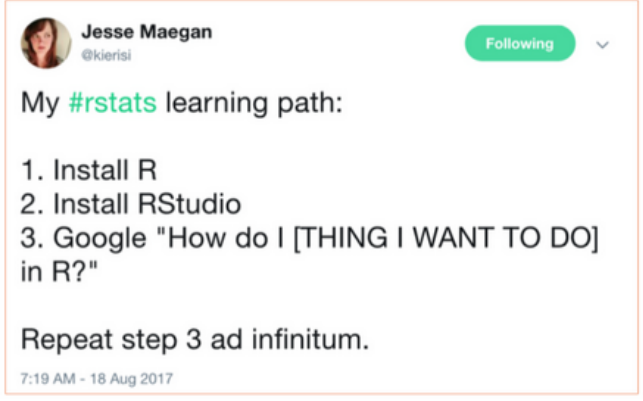
Class Github

- Link to Class Github:
  https://github.com/MajoRB15/StanfordCourse_R4beginners

R Installation

- Install in: https://cran.r-project.org/
- If you need more help you can also see: https://rstudio-education.github.io/hopr/starting.html



How does R looks like

Starting to code in R

Project Creation

Create a project by:

- Assigning a place to this class in your computer (mentally)
- Open R, go to File tab
- Click Create New Project
- Assing the directory/place you want to save this in your computer
- Give it the name: *R_MiniCourse*

Heading

A good heading is useful for project sharing and is a good practice of bioinformatics! Headings must have:

```
#Author:
#Date:
# Script Purpose:
#Input directory:
#Output directory:
#Packages needed:
```

R Basics

R Basics

```
# This is a comment
```

- Ctr + Shift + C ; Comment several lines
- "=" is used for assigning values as well as "<-"
- Ctrl + Enter; running code

Types of Variables- Use

Type	Example	Use
numeric	2.5	For storing any type of number values
integer	2	For integer numbers
double	2.5	For decimal numbers
character	"Hello"	Words
factor	Comedy	Categorical Values
logical	1; TRUE	Logical Values

Types of variables - Managment

Type	**Conversion**
`numeric`	`as.numeric()`
`integer`	`as.integer()`
`double`	`as.double()`
`character`	`as.character()`
`factor`	`as.character()`
`logical`	`as.logical()`

Types of variables - Rules

Type	**Rules**
`numeric`	`0= FALSE; 1= FALSE; "A" = NA`
`integer`	`0= FALSE; 1= FALSE; "A" = NA`
`double`	
`character`	`"1"= 1; "FALSE"= FALSE`
`factor`	
`logical`	`0 = FALSE; 1 = TRUE; "A" = NA; "8" = NA`

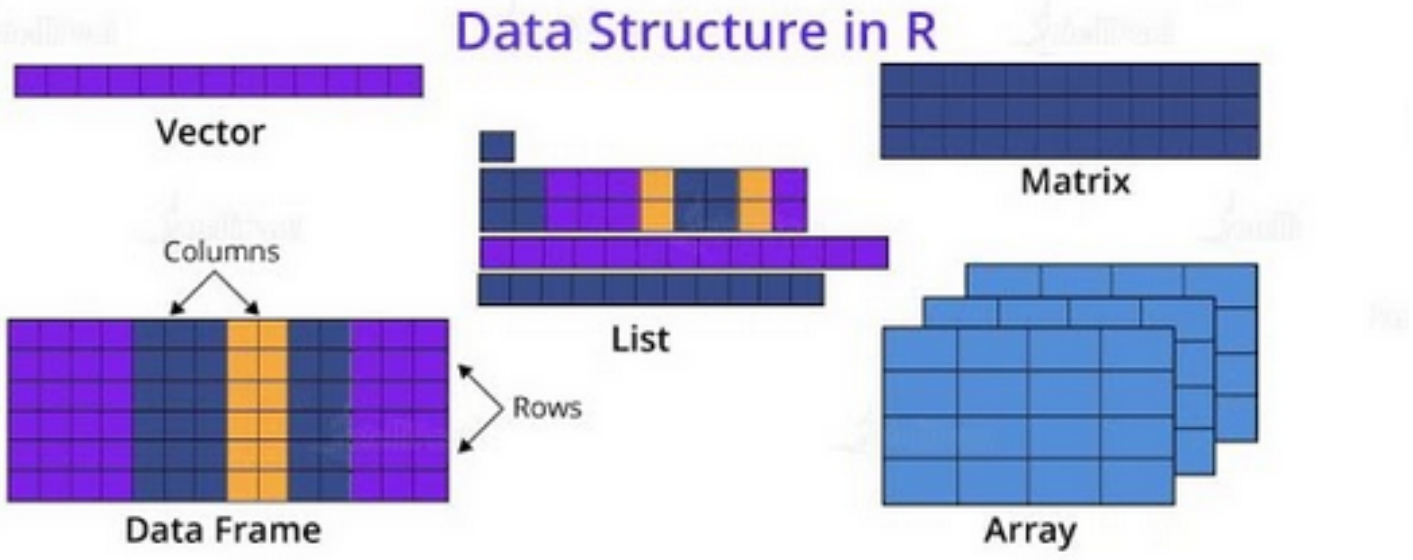
Useful commands

```
getwd() #Get Working Directory

#Set Working Directory
setwd("/home/majo/Desktop/Stanford/R_MiniCourse")

#Visualize file in the working directory
dir()

#To know the type of variable
str(variable)
class(variable)
```

Upload commands

```
#All of these will read the file, upload it to R
#and save it in the variable data
data.frame("/home/directory/Data_Example1.csv")
read.table("/home/majo/directory/Stanford/Data_Example1.csv
read.csv("/home/directory/Stanford/Data_Example1.csv")
```

Types of Data



Vectors

- One dimension

```
#---Vector Creation----
c(1,2,3)
#Saving it in a variable
vector=c(1,2,3)
#Vector of characters
names= c("Andy", "Mia", "Greg")
```

Matrix

- Two dimensions

```
#---Matrix Creation----
matrix(nrow = 3, ncol=4) #Empty matrix 3x4

matrix(seq_len(12), nrow = 3, ncol=4)
```

Useful Commands

```
#seq_len()
seq_len(4) #number from 1-4 in order

#Bind data:
#paste0()
paste0("Gene", seq(5)) #It will create a vector of Genes
#numbered from 1-5. Gene1,...,Gene5

#For repetition
rep("Dominant", 7) #It will repeat Dominant 7 times
```

seq() command will work the same way as seq_len()

Access to the data

Vector

```
#Vector of characters
names= c("Andy", "Mia", "Greg")
#Printing our vector
names #or
print(names)
#Getting Mia
names[2]
#Eliminating Greg
names =names[-3]
```

Access to the data

Matrix

```
#Save our matrix
matrix1=matrix(seq_len(12), nrow = 3, ncol=4)
#Print matrix
matrix1
matrix1[,drop=FALSE]

#Access number 5
matrix1[2,2]
#Print first column
matrix1[,1, drop=FALSE]
```

Exercises

Vector

- Create a Vector called names and add your 4 favorite movie characters names
- Print the first and the third character name at the same time and save it in a variable call “buddys”
- Eliminate the 1st character in the vector and afterwards replace it with someone elses name

Exercises

Matrix

- Create a matrix called Genes that looks like this:

```
##       [,1]    [,2]
## [1,] "Gene1" "Gene1"
## [2,] "Gene2" "Gene2"
```

- Replace the element [1,2] with a "1".
- Is number 1 a character or a number? If it isn't a number, turn it to a number. Can you?
- Eliminate column 1 of your matrix

Answers

Vector

```r
#Names vector
names= c("Stich", "Saitama", "Luffy", "Enola")
#Printing first and third names
names[c(1,3)]
#Eliminating the 1st character
names= names[-1]
```

Answers

Matrix

```r
#Creation of the matrix: There are several ways of doing t
matrix= matrix(paste0("Gene",seq(2)), 2,2)
matrix= matrix(c("Gene1", "Gene2", "Gene1", "Gene2"), 2,2)
matrix= matrix(rep(c("Gene1", "Gene2"),2), 2,2)
```

Answers

Matrix

```
#Replacing the element [1,2] with a "1".
matrix[1,2]=1

#Obtaining the type of variable of [1,2] element
str(matrix[1,2])

#Turning [1,2] element into a number.
#These would be the commands if you could do this, BUT...
matrix[1,2]= as.numeric(matrix[1,2])
matrix[1,2]= as.integer(matrix[1,2])
matrix[1,2]= as.double(matrix[1,2])
#...you cant have different types of variables in matrixes
#nor in vectors
```

Answers

Matrix

```
#Eliminating column 1 of the matrix
matrix= matrix[,-1]
```