1st Class: R 4 Beginners

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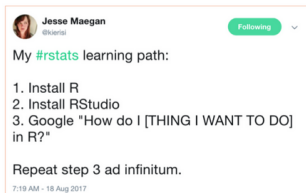
- Link to Class Github:
  https://github.com/MajoRB15/StanfordCourse_R4beginners

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

```r
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)
```
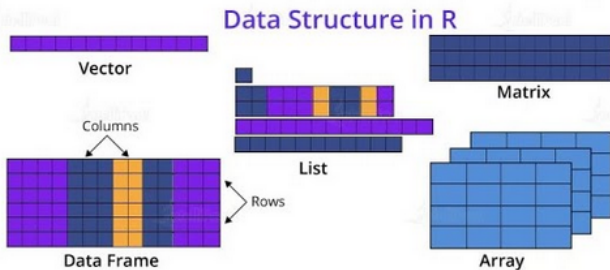
Upload commands

```
data.frame("/home/directory/Data_Example1.csv")
table("/home/majo/directory/Stanford/Data_Example1.csv")
read.csv("/home/directory/Stanford/Data_Example1.csv")
```

Types of Data

Data Structure in R

Vectors

- One dimension

```r
#---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

```r
#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

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

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

Answers

Matrix

```
#Creation of the matrix
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
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]
```