Data Object

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Vectors

Exercise 1

a. Create a vector, named `vec1`, containing the following values:
   1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90

b. Select the 5-th element of `vec1`.

c. Select the first 10 elements of `vec1.`

d. Select all the elements of `vec1` apart from the 2nd and the 6th element.

Exercise 2

a. Generate a vector, named `vec2`, containing numbers from 1 to 10 and of length 8, using the operator `seq`.

b. Select the values of `vec2` which are greater than 4.

c. Select the values of `vec2` which are equal or less than 2 or which are equal or greater than 6.

Exercise 3

a. Generate the following vector using the operator `rep`:
   `vec3 <- c("one", "two", "one", "two", "one", "two")`

b. Generate a new vector, named `vec5`, combining the previous vector, `vec3`, with the following one:

```
vec4 <- c("three", "four")
```

Matrices

Exercise 1

Generate a matrix, named `mat1`, with 5 rows and 3 columns, using `matrix` function:

```
##      [,1] [,2] [,3]
## [1,]    1    2    3
## [2,]    4    5    6
## [3,]    7    8    9
## [4,]   10   11   12
## [5,]   13   14   15
```

Exercise 2

Starting from the following vector:

```
mat2 <- 1:8
```

Generate a matrix with 2 rows and 4 columns using the function `dim`.

Exercise 3

a. Generate a matrix, named `mat3`, combining the following columns:

```
a <- 1:3
b <- 7:9
c <- 8:6
```

b. Add the following row to `mat3`:

```
d <- 4:6
```

Exercise 4

Considering the following matrix, named `mat4`:

```
mat4 <- matrix(1:24, nrow = 6, ncol = 4, byrow = TRUE)
mat4
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    2    3    4
## [2,]    5    6    7    8
## [3,]    9   10   11   12
## [4,]   13   14   15   16
## [5,]   17   18   19   20
## [6,]   21   22   23   24
```

a. Select the third and the fifth row of `mat4`.

b. Select all columns of `mat4` apart from the first.

c. Select second and third rows and second and third columns of `mat4`.

Lists

Exercise 1

a. Generate a list, named `list1` that contains the following R elements:

```
vec <- 1:10
mat <- matrix(1:9, ncol = 3)
name <- "Oscar"
```

b. Add to `list1` the following element:

```
letters <- c("a", "b", "c", "d")
```

Exercise 2

Given the following list, named `list2`:

```
list2 <- list(vec = c(1,3,5,7,8), mat = matrix(1:12, ncol = 4),
              sub_list = list(names = c("Veronica", "Enrico", "Andrea", "Anna"),
                              numbers = 1:4))
list2
```

```
## $vec
## [1] 1 3 5 7 8
##
## $mat
##      [,1] [,2] [,3] [,4]
## [1,]    1    4    7   10
## [2,]    2    5    8   11
## [3,]    3    6    9   12
##
## $sub_list
## $sub_list$names
## [1] "Veronica" "Enrico"   "Andrea"   "Anna"
##
## $sub_list$numbers
## [1] 1 2 3 4
```

a. Entract the first element of `list2`.

b. Extract the objects contained in the first element of `list2`.

c. Extract the object named `sub_list` from `list2`.

d. Extract the second rows of the matrix included in the second element of `list2`.

Factors

Exercise 1

Starting from the vector:

```
fac1 <- c("F", "F", "M", "M" , "F")
```

Generate the corresponding factor with two levels: "F" and "M"

Exercise 2

Starting from the vector:

a. Generate the corresponding factor considering that 1 = "Female", 2 = "Male" e 3 = "Trans".

b. Select the all elements of `fac2` apart from "Male".

Data Frames

Exercise 1

a. Generate a data frame, named `df1`, corresponding to:

```
##    id     name class mean
## 1   1     Luca    5A  6.0
## 2   2   Chiara    5A  7.0
## 3   3     Lisa    5A  5.0
## 4   4   Matteo    5A  6.5
## 5   5    Alice    5A  7.5
## 6   6    Marco    5B  4.5
## 7   7 Veronica    5B  9.0
## 8   8   Nicola    5B  8.0
## 9   9    Elena    5B  8.5
## 10 10  Daniele    5B  7.0
```

Remember to maintain character vectors as they are, specifiyng `stringsAsFactors = FALSE`.

b. Select the first 3 rows of `df1`.

c. Select the last 6 rows and the first 3 columns of `df1`.

d. Select the column `class` of `df1`.

e. Convert the column `class` of `df1` in a factor with levels: "5A" and "5B"

f. How many columns and rows `df1` has?

g. Generate another dataframe, named `df2` composed by the columns `name` and `mean` of `df1`, specifying the argument `stringsAsFactors = FALSE`.

h. Show the first rows and the structure of `df2`.