**CME 4403**

**Lab 1 Worksheet - Due Date: 2nd March 23:59**

*Write down answer the space below the question. Please replace the file name with your name before submitting to the Classroom.*

1. a) Define a variable **name** that contains a gene name “John”.

name <- “John”

b) Define a variable **measure** that contains expression value 5.7

measure <- 5.7

c) Define a variable **fault** that shows the mutation status of the gene as TRUE

fault <- TRUE

1. a) Define a character vector **name\_vector** that contains 5 names: John, Asli, Can, Berk, Cansu.

name\_vector <- c("John", "Asli", "Can", "Berk", "Cansu")

b) Define a numeric vector **num\_vector** that contains 5 integer values: 3, -2, 4, -1, 5.

num\_vector <- c(3, -2, 4, -1, 5)

c) Define a Boolean vector **bool\_vector** that contains: TRUE, FALSE, TRUE, FALSE, TRUE.

bool\_vector <- c(TRUE, FALSE, TRUE, FALSE, TRUE)

d) Define a numeric vector **rand\_num** that contains 30 numbers between 3 and 100 with equal intervals (Hint: use the seq() function).

rand\_num <- seq(from = 3, to = 100, length = 30)

1. a) Print **second** and **third** elements of **name\_vector.**

name\_vector[2]

name\_vector[3]

b) Print **num\_vector** elements which are bigger than 3.

num\_vector[(num\_vector > 3)]

c) Print people names that are indicated as TRUE in **bool\_vector**.

name\_vector[(bool\_vector == TRUE)]

d) Print the summation of **num\_vector** (Hint: use the sum() function).

sum(num\_vector)

e) Create a new vector (**pos\_num**) that only contains positive values in **num\_vector**.

pos\_num <- num\_vector[(num\_vector > 0)]

1. a) Create a new list for specifying person data: **person\_list.** The initial list should contain 3 data: “John”, 27, “Computer Engineer”.

person\_list <- list("John", 27, "Computer Engineer")

b) Assign the name of each element in **person\_list**: “name”, “age”, “occupation”

names(person\_list) <- c("name", "age", "occupation")

c) Add a new element to the current **person\_list**:name: “salary” value: 4000

person\_list <- c(person\_list, "salary" = 4000)

d) Print the name and salary of this person separately.

person\_list$name

person\_list$salary

1. Create a matrix and apply the following operations on:
2. Create a matrix called **weather\_matrix** by using *seq* command that creates 15 numbers from 5 to 30 with equal intervals. **weather\_matrix** should contain 5 rows and 3 columns, fill the matrix by rows.

weather\_matrix <- matrix(seq(from = 5, to = 30, length = 15), byrow = TRUE, nrow = 5, ncol = 3)

1. Set the row (day1, day2, day3, day4, day5) and column (s1, s2, s3) names of **weather\_matrix.**

rownames(weather\_matrix) <- c("day1", "day2", "day3", "day4", "day5")

colnames(weather\_matrix) <- c("s1", "s2", "s3")

1. Compute the summation of samples (rowSums) and find which day has the highest amount of temperature.

which.max(rowSums(weather\_matrix))

1. Choose day4 and day5 and their s2 and s3 samples, save them in **subB** object.

subB <- c(weather\_matrix[4,2], weather\_matrix[4,3], weather\_matrix[5,2], weather\_matrix[5,3])

1. Use built-in data.frame: “mtcars”
2. What is the size of mtcars?

32

1. Select the cars from **mtcars** that has 6 or smaller cylinder size, and then assign it to **smallc** object.

smallc <- mtcars[mtcars$cyl<=6,]

1. How many cars are in the **smallc** object?

18

1. What is the average horse power (hp) of all cars in **smallc**?

98.05556

1. Get the cars that have 5 gears in in **smallc**. What are the names of those cars?

rownames(smallc[smallc$gear==5,])

1. Write a loop block to check which numbers are even / odd within a given vector **inp\_vec** that contains5, 2, 7, 6, 3, 19, 23, 78, 145, 3, 4, 6, 9, 12, 67. Print a message that indicates the number type such as “6 is even” (the number itself and its type: even/odd).

inp\_vec <- c(5, 2, 7, 6, 3, 19, 23, 78, 145, 3, 4, 6, 9, 12, 67)

for (variable in inp\_vec) {

if(variable %% 2 == 0) print("The number even")

else print("The number odd")

}

1. Create 3 vectors: **name** ("Ali","Cenk","Mete"), **age** (26,32,29), **salary** (2700, 3200, 4900). Then combine these vectors in a data.frame (**company**). Find the name of the employee who gets the highest salary in that company by writing a loop structure.

name <- c("Ali","Cenk","Mete")

age <- c(26,32,29)

salary <- c(2700, 3200, 4900)

company <- data.frame(c(name), c(age), c(salary))

max = 0

for (row in 1:nrow(company)) {

tempSalary = company[row, "c.salary."]

if(tempSalary > max) max = tempSalary

}

company[company$c.salary.==max,1]