Example of:
"R EXAM – UniBO – Prof. Filippo Piccinini"

Time available: 30 minutes.

You are not allowed to consult books/manuals or use electronic devices. Exchanging information or communicating with other people, as well as any other form of cheating is not allowed. Every infraction implies the immediate disqualification of your exam. **Write the answers not here but in the provided protocol-sheet, writing on the top of the first page of the protocol-sheet the following information**:

Name: _____

Surname: _____

University ID: _____

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EXERCISE 1: Starting from the vector *vect1<- c(12, 11, 10, 9, 8, 10, 6, 5, 10, 3, 2, 10)*:
(I) Report the line of code to create the following matrix and name it as *mat1*:

```
     [,1] [,2] [,3] [,4]
[1,]   12    9    6    3
[2,]   11    8    5    2
[3,]   10   10   10   10
```

(II) Report the lines of code to set the names of the columns of *mat1* as *"day0", "day1", "day2", "day3"*, and the names of the rows of *mat1* as *"first", "second", "third"*.
(III) Report the lines of code to compute the four sums of the elements in the four different columns of *mat1* (in other words, report the line of code to compute the sum of the element in each column of *mat1*).
(IV) Report the lines of code to extract the values of *mat1* related to column *"day2"*, rows *"second"* and *"third"*.

EXERCISE 2: Considering the following *R* script:

```
int2<- 0
print("A")
if(int1>10){
        print("B")
        if(int1>15){
                int2<- int1*2
                print("C")
        } else {
                int2<- int1*2
                print("D")
        }
} else if(int1<10){
        print("E")
        if(int1>3){
                int2<- int1*3
                print("F")
        } else {
                switch(int1,int2<-int1,int2<-int1*3,int2<-int1*5)
                print("G")
        }
}
print(int2)
```

Indicate the final value of *int2* and the sequence of visualized letters in the following 3 cases:
(I) *int1<- 16*; (II) *int1<- 10*; (III) *int1<- 2*

EXERCISE 3: Write a *R* function called *checkIfANumberIsInAVector* that takes as input 2 elements, one vector of integers called *vec1* and one integer called *int1*, and checks if *int1* is inside *vec1*. In case of *int1* inside *vec1* the function returns a logical variable (that is a Boolean variable) equal to *TRUE*; *FALSE* otherwise. The *checkIfANumberIsInAVector* function must use a *for* or *while* cycle (the student can decide if using a *for* cycle or if using a *while* cycle) to look if *int1* is inside *vec1*, and it must immediately stop the cycle if *int1* is found inside *vec1*. To better understand how *checkIfANumberIsInAVector* works, see the examples reported below:

```
yesOrNo<- checkIfANumberIsInAVector(c(5, 2, 4, 3, 1), 2); print(yesOrNo)
[1] TRUE
yesOrNo<- checkIfANumberIsInAVector(c(5, 2, 4, 3, 1), 7); print(yesOrNo)
[1] FALSE
```