COMPUTER SCIENCE
Exercise 5

Objectives of the exercise:
- Write programs able to store and memorize many values

Content:
- Advanced use of vectors
- Introduction of arrays

Preferably to solve in the lab

Exercise 1.   Develop the version 1.2 of the binary for dummies application implementing the following missing functionalities:
Convert a decimal positive number into pure binary
Convert a decimal number into a sign & magnitude binary number
Convert a decimal number into a two's complement binary number
Perform addition or subtraction of two two's complement numbers

Exercise 2.   Write a C program that defines two arrays v1 and v2 of N integer elements and store them into arrays "acceptable" values taken from keyboard according to following rules:
a) In v1 should be stored only values that are either positive or negative multiple of 3
b) In v2 should be stored only values that are either negative non-multiple of 3 or odd ones.
c) Other possible values should be ignored
d) Inserting finishes when one of 2 arrays is complete; at that point the program should print out all the values of both arrays.

To solve at home

Exercise 3.   Write C program that defines and manipulates an array composed by 10 integer values; the program should:
a) read values from the keyboard and memorize them into the array;
b) print out content of the array after having read values;
c) compute and print out average of elements stored in array using a variable of type "float"
d) identify and print out a maximum value and its ordinal position in the array
Improvement to the program: consider the case in which the maximum value occurs more than one time and print out all corresponding positions.

Exercise 4.   Write a C program that reads maximum N integer values where N is an arbitrary constant value. The acquisition should go on until the series is monotonic, which is composed by numbers in decreasing or increasing order. Print out the content of arrays at the end of reading of values.

Example:

(N=10)
```
1 4 6 10 4            ← inserting of 4 terminates iterations
9 7 6 7               ← inserting of 7 terminates iterations
1 2 3 4 5 6 7 8 9 10  ← I've read 10 values and stop here
```
<u>Hint:</u> write the simplified version at first choosing single direction of monotony (increasing or decreasing), after pass to the full solution.