Tutorial 5
Arrays, Matrices, Sorting

Exercise 1:

Write the algorithm that: (Write an algorithm for each question)

1. Given an array A of N numbers,
   a. Initializes the elements of the array to 1
   b. Reads the elements of the array, then display them
   c. Finds the largest number of the array (maximum)

2. Given two vectors A1 and A2 of the same size N,
   a. Performs the addition of the two arrays
   b. Performs the product of the two arrays

3. Provides the reverse of a given array

4. Given that a sorted array A, it inserts an incoming element in its place. (optional)

Exercise 2 :

Given an array T and an element X,

   a. Write the algorithm that provides the index of the first occurrence of this element, if it exists within the array.

   b. Write the algorithm that provides the index of the last occurrence of this element, if it exists within the array.

   c. Write the algorithm that provides the indexes of all the occurrences of this element if it exists within the array.

Exercise3 :

1. Given a matrix of N × M dimension, write the algorithm that
   a. Computes the sum of elements of each column, and the sum of elements of each row.
   b. Computes the transpose of the given matrix

2. Given a square matrix, write the algorithm that
   a. Checks if its two diagonals are equal.
   b. Verifies, if the matrix is symmetric

Exercise 4: (for the class session)

Given an array of N characters (char), write the algorithm that:

a. Allows you to perform a circular right shift of one position.

b. Displays the elements that occur once in the array.

c. Finds the most frequent element amidst the array's elements, and the number of its occurrences

d. Performs the search for an element in an array and displays its position when it finds it.