

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 C program that provides the index of the first occurrence of this element, if it exists within the array.
- b. Write the C program that provides the index of the last occurrence of this element, if it exists within the array.
- c. Write the C program that provides the indexes of all the occurrences of this element if it exists within the array.

Exercise3 :

1. Given a matrix of $N \times M$ 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 C program that
 - a. Checks if its two diagonals are equal.
 - b. Verifies, if the matrix is symmetric

Exercise 4:

Given an array of N characters (char), write the C program 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.