University of Echahid Hamma Lakhdar
Faculty of Exact Sciences
Department of Computer Science

Module: Algo & Data Structure I
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Series of Exercises N° : 04

Exercise N°1

Let T1, T2 arrays of 5 integer elements filled by the user, and T3 arrays of 10 integer elements. Write an algorithm that fills T3 by merging the two arrays T1 and T2 .

T1 :	1	8	-4	9	1

T2 :	3	6	5	2	10

T3 :	1	8	-4	9	1	3	6	5	2	10

Exercise N°2

Write an algorithm that reads the elements of an array T of 10 integer elements and displays the number of occurrences of an element X given by the user in T.

Exercise N°3

Write an algorithm that finds the minimum value in a user-entered array T of 10 integers and displays its position. (If there are multiple occurrences, display the last one.)

Exercise N°4

Given an array T[10] of integers, write an algorithm that fills 9 elements sorted in ascending order upon input, then reads and inserts an element X given by the user at the correct position in T.

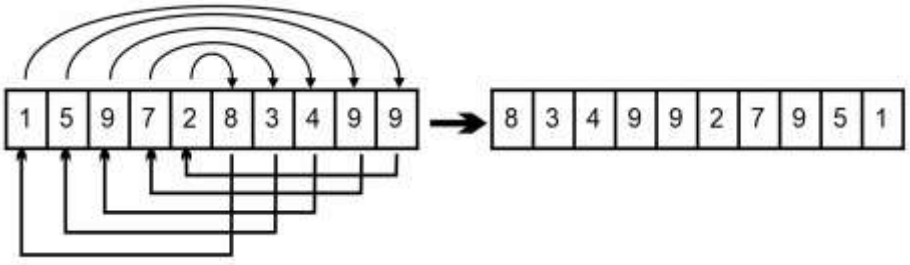
Exercise N°5

Write an algorithm that performs a left circular shift of one position for the elements of a 10-element array T, entered by the user.

Extend the algorithm to perform the left circular shift 5 times.

Exercise N° 6

The method for sliding elements from an array T with N elements (N is an even number provided by the user, $10 \leq N \leq 100$) is given as follows:



Before sliding After sliding

Write an algorithm that reads the elements of the array T and then performs the sliding operation using this method.

Exercise N°7

Write an algorithm that reads a positive integer composed of 5 significant digits, then extracts its digits one by one and puts them into an array T as illustrated in the following example:

N = 25496 **T**

2	5	4	9	6

Exercise N°8

Write an algorithm that reads the elements of a matrix Mat [N][M], then compares the sum of the elements of the even rows with that of the odd rows.

Exercise N°9

Write an algorithm that reads the elements of a matrix Mat [N][N], then copies these elements into the matrices Mat1[N][N] and Mat2[N][N] and sets the following elements to zero:

- for Mat1[N][N]: the elements of the main and the inverse diagonals.
- for Mat2[N][N]: the elements of the lower triangle.

Exercise N°10

Write an algorithm that reads the elements of a matrix Mat[N][M], then inserts the Max element of each row i of the matrix Mat into position i of an array T[N]. Then, sort the elements of the array T in ascending order.

Exercise N°11

For a matrix Mat [N,N], we define Si as the sum of the elements in row i with those in column i, without repetition of the common element. Write an algorithm that reads the elements of Mat, then finds the maximum of the Si values and displays the corresponding index i.

Exercise N°12

Write the algorithm that allows us to construct Pascal's triangle in a square matrix of order P, knowing that Pascal's triangle will be as follows:

Order	**Pascal's Triangle**
0	1
1	1 1
2	1 2 1
3	1 3 3 1
4	1 4 6 4 1
	. . . . . .

Exercice N°13

Write an algorithm that searches for saddle points in a matrix A[N][M], i.e., those that are both a maximum in their row and a minimum in their column. The program displays the positions and values of all the saddle points found.