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### Worksheet 3 « Arrays »

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#### Exercise 1

Write a program that asks the user to input 10 integers stored in an array. The program should display the number of even numbers in this array.

#### Exercise 2

Write a program that asks the user to input in an array 10 integers that must be between 0 and 20, then computes and displays the number of 0, 1, ..., 20 in this array.

#### Exercise 3

- 1- Write a program that asks the user to input 10 integers in an array as well as an integer value **V**. The program must find if **V** is in the array and must delete the first occurrence of **V** by shifting the following elements one position to the left and adding a 0 at the end of the array. The program should then display the final array.
- 2- Write a program to delete a selected array element (in specific position).
- 3- Write a program to delete all occurrences of a value **V** from the array, use a second array

#### Exercise 4

- 1- Write a program that asks the user to enter 10 integers stored in an array as well as a integer **V** and an integer **i** between 0 and 9. The program must shift one position to the right all the elements starting from index **i** (removing the last element from the array) and must put the value **V** in the array at index **i**. The program should then display the final array.
- 2- Write program to insert an element in an array at a specific position.

#### Exercise 5

Write a program to input 2 arrays of integers **a** and **b** with different sizes. The program must merge **a** and **b** in a third array **c** (union of two unsorted arrays).

**Example** **a** = {4,5,8,6} ; **b** = {5,14,20} → **c** = {4,5,8,6, 5,14,20}

#### Exercise 6

Write a program that:

- 1- Inputs the elements of an array **T**, then displays the array.
- 2- Calculates and displays the sum and the average of the array elements.
- 3- Finds the highest and the lowest value in the array then displays them with their position (1<sup>st</sup> ones).
- 4- Inverses the elements in the array **T** without using a second array.
- 5- Puts the positive values ( $\geq 0$ ) of **T** in a second array **TPOS** and the negative values of **T** in a third array **TNEG**. Displays **TPOS**, and **TNEG**.

#### Exercise 7

Write a program that asks the user to type 10 integers which will be stored in an array. The program must then display either "the array is increasing", or "the array is decreasing", or "the array is constant", or "the array is arbitrary"

**Exercise 8**

Write a program to merge two sorted arrays of integers in a new sorted array.

**Exercise 9**

Write a program that asks the user to input 10 integers in an array, then displays the following menu :

- 1- Sort in decrease order
- 2- Sort in increase order
- 3- Exit

The program then asks to type an integer between 1 and 3. If the user types 1 or 2 the array is sorted and displayed . When he types 3, the program ends.

**NB.** You must use two different methods to sort the array.

**Exercise 10**

Write a program that finds the Highest and Lowest values of a matrix and displays them with their position.

**Exercise 11**

Write a program that read a matrix (two-dimensional array) of integers then store the even and odd numbers into two other arrays (one dimension), The Program should display the three arrays.

**Exercise 12**

Write a program to read numbers in a matrix and calculate and show the sum of each row and column of this matrix .

**Exercise 13**

Write a program that performs and displays the product (multiplication) of two matrixes.

**Exercise 14**

Write a program to read square matrix and calculate its transposed matrix.

**Exercise 15**

- 1- Write a program to evaluate the sum of elements above and below main diagonal of matrix and the sum of elements of the main diagonal.
- 2- Write a program to display upper half and lower half Triangle of Square Matrix