C/C++ Programming

Course ID: IT116IU

Lab 4

Array

Full name + Student ID: ……

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Class: ……

Group: ……

Date: ……

I. Objectives

Understanding the use of array, function and loop in C programming. Why we need to use array and how to use it to solve specific problems.

Get familiar with the skill for defining and manipulating of arrays.

II. Pre-Lab Preparation

Read the theory carefully at home before coming to the class.

III. In-Lab Procedure

Exercise 1

Write a C Program to insert an element in a specified position in a given array. Then, the sorted array will be displayed.

Output:

Enter how many elements: 5
Enter the elements:
12
89
24
8
46

Input array elements are: 12 89 24 8 46
Sorted list is: 8 12 24 46 89
Enter the element to be inserted: 62
Final list is: 8 12 24 46 62 89

Exercise 2

Write a C program to input elements in two arrays and merge two arrays into a third array. After that printout the merged array in ascending form. Make sure that user is not allow to enter any zero length array.

Output:

Input first array elements: 1, 4, 6, 9, 15

Input second array elements: 2, 5, 8, 10

Merged array in ascending order = 1, 2, 4, 5, 6, 8, 9, 10, 15

Exercise 3

Write a C program to print diamond star pattern. The size of pattern is based on the input of user but is lower than 10.

Output:

Enter N (0<N<11): 5

```
    *
   ***
  *****
 *******
*********
 *******
  *****
   ***
    *
```

Exercise 4

Write a C program that generates a 30-element array with random numbers from 1 to 30. Print the array then the user will input 2 integer numbers and the program should count:

a. How many numbers occurs in the array $<$ 1st number and is even number, show their position.
b. How many numbers occurs in the array $>$ 2nd number and is odd number, show their position.
c. How many number N occurs in the array with 1st $<$ N $<$ 2nd, show their position.

Output:

Original array:

27 21 9 16 18 30 17 20 17 12 2 16 15 29 4 19 8 4 15 12 11 10 1 9 6 3 22 8 3 25

Enter 1st number: 10

Enter 2nd number: 20

Option: 1

Found 6 numbers < 10 and are even number

Their positions are: 11 15 17 18 25 28

Do you want to continue? y

Option: 2

Found 4 numbers > 20 and are odd number

Their positions are: 1 2 14 30

Do you want to continue? y

Option: 3

Found 11 numbers N with 10 < N < 20

Their positions are: 4 5 7 9 10 12 13 16 19 20 21

Do you want to continue? n

Exit program!!!

Exercise 5

Program to simulate a seat-booking system on an airplane. There are two classes (first class and economy class), each has 5 seats. A client comes to the ticket office can choose a class and then a seat to buy. If the choice is still available, let the user choose the seat, or else display "The seat is booked. Please choose another seat". Repeat this process till there is no seat available on the airplane. Display then "Next flight leaves in 3 hours". If all seats are booked, the program will display "Sorry! There is no seat available."

Sample output:

```
HELLO! WELCOME TO C LAB AIRLINES!
---------------------------------------------------------------------------
The current seating chart:
0    0    0    0    0    0    0    0    0    0
---------------------------------------------------------------------------
 Please choose your class.
Type 1 for first class or 2 for economy class: 1
Please choose your seat (from 1 to 5): 4
---------------------------------------------------------------------------
Here is your boarding pass:    First class    Seat number is: 4
---------------------------------------------------------------------------
Next passenger (y or n)? y
HELLO! WELCOME TO C LAB AIRLINES!
---------------------------------------------------------------------------
The current seating chart:
0    0    0    1    0    0    0    0    0    0
---------------------------------------------------------------------------
Please choose your class.
Type 1 for first class or 2 for economy class: 1
Please choose your seat (from 1 to 5): 4
The seat is no longer available. Please choose another seat: 5
---------------------------------------------------------------------------
Here is your boarding pass:    First class    Seat number is: 5
---------------------------------------------------------------------------
Next passenger (y or n)? y
HELLO! WELCOME TO C LAB AIRLINES!
---------------------------------------------------------------------------
The current seating chart:
0    0    0    1    1    0    0    0    0    0
---------------------------------------------------------------------------
 Please choose your class.
Type 1 for first class or 2 for economy class: 2
Please choose your seat (from 6 to 10): 7
---------------------------------------------------------------------------
Here is your boarding pass:    Economy class   Seat number is: 7
---------------------------------------------------------------------------
Next passenger (y or n)? n
Thank you for choosing C LAB AIRLINES. Next flight leaves in 3 hours
```

THE END