



East West University

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Lab Manual : 01
Course Code : CSE207
Course Title : Data Structures
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Objective:

The objective of this lab is to provide a fundamental idea about the sorting element of an integer array using C programming. At the end of the lab, students are able to know:

- How to take input into an array.
- How to sort the element of the array.

Preliminary:

Bubble sort is a sorting algorithm that compares two adjacent elements and swaps them until they are not in the intended order. We will learn how to take input from the user and find the output.

```
#include<stdio.h>
```

```
int main() {  
  
    int a[100];  
    int n,i,pos=-1,item;  
    printf("Enter number of elements: ");  
    scanf("%d",&n);  
    printf("Enter your data :");  
    for(i=0; i<n;i++)  
        scanf("%d",&a[i]);  
  
    printf("Your array :");  
    for(i=0; i<n;i++)  
        printf("%d\t",a[i]);  
  
    int temp,j;  
  
    for(i=0; i<n-1;i++)  
        for(j=0;j<n-1-i;j++)  
        {  
            if(a[j]>a[j+1])  
            {
```

```

        temp=a[j];
        a[j]=a[j+1];
        a[j+1]=temp;
    }

}

printf("\nYour array :");
    for(i=0; i<n;i++)
        printf("%d\t",a[i]);
}

```

Lab Task

Exercise 1:

Modify the above code to count the number of pass and swap operation for an array of size N.

Exercise 2

Write a program to find second maximum and minimum number of an integer array. Show the sample input and output clearly.

| Sample Input | Sample Output |
|----------------|---|
| 17, 4,5,6,2,10 | Second Maximum: 10 Second Minimum: 4 |

Exercise 3

The following algorithm will print the duplicate entry in an integer array.

Write a program in C to find the duplicate number.

ALGORITHM:

- **STEP 1:** START
- **STEP 2:** INITIALIZE arr[] = { 1, 2, 3, 4, 2, 7, 8, 8, 3 }.
- **STEP 3:** length = sizeof(arr)/sizeof(arr[0])
- **STEP 4:** PRINT "Duplicate elements in given array:"
- **STEP 5:** SET i=0. REPEAT STEP 6 to STEP 9 UNTIL i<length
- **STEP 6:** SET j=i+1. REPEAT STEP 7 and STEP 8 UNTIL i<length
- **STEP 7:** if(arr[i] == arr[j])
 PRINT arr[j]
- **STEP 8:** j=j+1
- **STEP 9:** i+1.
- **STEP 10:** RETURN 0.
- **STEP 11:** END

| Sample Input | Sample Output |
|---------------------------|---|
| 1, 2, 3, 4, 2, 7, 8, 8, 3 | Duplicate elements in given array: 2 3 8 |

4. Write a program in C to delete an element at desired position from an array.

| Sample Input | Sample Output |
|---|--------------------------------|
| Input array elements: 10 20 30 40 50 Input position to delete: 2 | Array elements: 10, 30, 40, 50 |

5. Write a program in C to insert element in array at specified position.

| Sample Input | Sample Output |
|--|---|
| Input array elements: 10, 20, 30, 40, 50 Input element to insert: 25 Input position where to insert: 3 | Elements of array are: 10, 20, 25, 30, 40, 50 |

6. Find the elements of an array that are greater than a specific Threshold. Create a new array to store all the elements from the original array that exceed a given threshold.

| Sample Input | Sample Output |
|--|---------------|
| Input array elements: 10,25,89,50,100 Threshold: 30 | 89,50,100 |

7. Remove duplicate elements from the 1D array and print the modified array.

| Sample Input | Sample Output |
|-----------------------------------|---------------|
| Input array elements: 10,20,10,30 | 10,20,30 |

8. Generate and print the first N elements of the Fibonacci series in a 1D array. ($F(n)=F(n-1) + F(n-2)$ with initial conditions: $F(0)=0$, $F(1)=1$).

| Sample Input | Sample Output |
|--------------|-------------------|
| N=8. | 0,1,1,2,3,5,8,13. |

9. Sort an 1D array in ascending Order.

| Sample Input | Sample Output |
|-----------------------------------|---------------|
| Input array elements: 30,50,10,20 | 10,20,30,50 |

10. Find if an array contains a subarray (Suppose the Subarray length is 2) with a specific pattern. The subarray pattern is defined as a sequence of two consecutive elements.

| Sample Input | Sample Output |
|---|---------------|
| Input array elements: 1,2,5,7,9,10 Subarray: 5,7 | Found |
| Input array elements: 1,2,3,4,5 Subarray: 1,4 | Not Found |