Practical # 11

Objective:

Understand three Sorting techniques (i.e., Selection Sort, Bubble Sort, and Insertion Sort) and ***Design*** *C++program to sort data in the some specific order.*

Theory:

In this Lab, we discuss the three Sorting techniques (i.e., Selection Sort, Bubble Sort, and Insertion Sort). Sorting refers to the operation or technique of arranging and rearranging sets of data in some specific order.

Selection Sort works:

The selection sort algorithm is performed using the following steps:
Step 1 - Select the first element of the list (i.e., Element at first position in the list).
Step 2: Compare the selected element with all the other elements in the list.
Step 3: In every comparison, if any element is found smaller than the selected element (for Ascending order), then both are swapped.
Step 4: Repeat the same procedure with element in the next position in the list till the entire list is sorted.

Bubble Sort work:

The Bubble sort algorithm is performed using the following steps:
Step 1 - Bubble sort starts with very first two elements, comparing them to check which one is greater. Put larger one at higher index.
Step 2 - It takes next two values compare these values and place larger one at higher index.
Step 3 - This process does iteratively until the largest value is not reached at the last index. Then start again from 0 (zero) index up to n-1 index.
Step 4 - The algorithm follows the same steps iteratively until elements are not sorted

Insertion Sort work:

The insertion sort algorithm is performed using the following steps:
Step 1 - Assume that first element in the list is in sorted portion and all the remaining elements are in unsorted portion.
Step 2: Take first element from the unsorted portion and insert that element into the sorted portion in the order specified.
Step 3: Repeat the above process until all the elements from the unsorted portion are moved into the sorted portion.

Lab Objectives:

- To be able to write C++ program for sorting algorithm.

C++ program: Write C++ program to arrange elements in ascending order using selection sorting algorithm.

```
#include<iostream>
using namespace std;
int main()
{
    int tot, arr[50], i, j, temp, small, chk, index;
    cout<<"Enter the Size of Array: ";
    cin>>tot;
    cout<<"Enter "<<tot<<" Array Elements: ";
    for(i=0; i<tot; i++)
        cin>>arr[i];
    for(i=0; i<(tot-1); i++)
    {
        chk=0;
        small = arr[i];
        for(j=(i+1); j<tot; j++)
        {
            if(small>arr[j])
            {
                small = arr[j];
                chk++;
                index = j;
            }
        }
        if(chk!=0)
        {
            temp = arr[i];
            arr[i] = small;
            arr[index] = temp;
        }
    }
    cout<<"\nSorted Array is:\n";
    for(i=0; i<tot; i++)
        cout<<arr[i]<<" ";
    cout<<endl;
    return 0;
}
```

OUTPUT

```
Enter the Size of Array: 4
Enter 4 Array Elements: 45
25
87
31

Sorted Array is:
25 31 45 87
```

Review Questions/ Exercise:

1. Write a C++ program that implements Selection sort algorithm to arrange a list of integers in descending order.

   _____

2. Write a C++ program that implements Bubble sort algorithm to arrange a list of integers in ascending order.

   _____

3. Write a C++ program that implements Bubble sort algorithm to arrange a list of integers in descending order.

   _____

4. Write a C++ program that implements Insertion sort algorithm to arrange a list of integers in ascending order.

   _____

5. Write a C++ program that implements Insertion sort algorithm to arrange a list of integers in descending order.

   _____

Name: _____

Roll #: _____

Date: _____

Subject Teacher

Remarks: