

Problem Statement : Write C++ program to store first year percentage of students in array. Write function for sorting array of floating point numbers in ascending order using

- Selection Sort
- Bubble sort
- Insertion Sort
- Shell Sort and display top five scores.

```
#include<iostream>
using namespace std;
class Student
{
    float a[30];
    int i,j,n;
public:
    void accept();
    void display();
    void insertionSort();
    void shellSort();
    void displayTop5();
    void selectionsort();
    void bubblesort();
    int getn()
    {
        return n;
    }
};

void Student::accept()
{
    cout<<"\nEnter Number of Students: ";
    cin>>n;
    cout<<"\nEnter percentages of "<<n<<" students: "<<endl;
    for(int i=0;i<n;i++)
    {
        cin>>a[i];
```

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    }
}
void Student::display()
{
    for(int i=0;i<n;i++)
    {
        cout<<a[i]<<" ";
    }
}
void Student::displayTop5()
{
    int c;
    for(int i=n-1,c=0;i>=0 && c<5; i--,c++)
    {
        cout<<c+1<<" )" <<a[i]<<"\n";
    }
}
void Student::bubblesort()
{
    float temp;
    int j,n,i,a[30];
    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;
            }
        }
    }
    display();
}
void Student::insertionSort()

```

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{
    int i,j;
    for(int i=1;i<n;i++)
    {
        float temp=a[i];
        for(j=i-1;j>=0 && a[j]>temp;j--)
        {
            a[j+1]=a[j];
        }
        a[j+1]=temp;
    }
    display();
}

void Student::shellSort()
{
    int i,j,k;
    float temp;
    for(int i=n/2;i>0;i=i/2)
    {
        for(j=i;j<n;j++)
        {
            temp=a[j];
            for(k=j-1;k>=0 && a[k]>temp;k--)
            {
                a[k+1]=a[k];
            }
            a[k+1]=temp;
        }
    }
    display();
}

void Student::selectionsort()
{
    int min;
    float temp;
    for(i=0;i<(n-1);i++)

```

```

{
    min=i;
    for(j=i+1;j<n;j++)
    {
        if(a[j]<a[min])
        {
            min=j;
        }
    }
    temp=a[i];
    a[i]=a[min];
    a[min]=temp;
}
}
int main()
{
    Student s;
    int choice;
    do
    {
        cout<<"\n***** MENU *****\n";
        cout<<"\n1.Insertion Sort";
        cout<<"\n2.Shell Sort";
        cout<<"\n3.Display Top 5";
        cout<<"\n4.selectionsort";
        cout<<"\n5.bubblesort";
        cout<<"\n0.Exit";
        cout<<"\nEnter Choice: ";
        cin>>choice;
        switch(choice)
        {
            case 1:
                s.accept();
                cout<<"\nBefore Sorting: "<<endl;
                s.display();
                cout<<"\nAfter Sorting: "<<endl;

```

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        s.insertionSort();
        break;
    case 2:
        s.accept();
        cout<<"\nBefore Sorting: "<<endl;
        s.display();
        cout<<"\nAfter Sorting: "<<endl;
        s.shellSort();
        break;
    case 3:
        s.accept();
        cout<<"\n5 Toppers Are:\n"<<endl;
        s.displayTop5();
        break;
    case 4:
        s.accept();
        cout<<"\nBefore Sorting: "<<endl;
        s.display();
        cout<<"\nAfter Sorting: "<<endl;
        s.selectionsort();
        s.display();
        break;
    case 5:
        s.accept();
        cout<<"\n before sorting:"<<endl;
        s.display();
        cout<<"\nafter sorting:"<<endl;
        s.bubblesort();
        s.display();
        break;
    }
}
while(choice!=0);
return 0;
}

```

OUTPUT :-

```
C:\Users\Anuj Kulkarni\Desktop >

***** MENU *****
1.Insertion Sort
2.Shell Sort
3.Display Top 5
4.selectionsort
5.bubblesort
0.Exit
Enter Choice: 1
Enter Number of Students: 6
Enter percentages of 6 students:
20
50
30
60
40
10
Before Sorting:
20 50 30 60 40 10
After Sorting:
10 20 30 40 50 60
***** MENU *****
1.Insertion Sort
2.Shell Sort
3.Display Top 5
4.selectionsort
5.bubblesort
0.Exit
Enter Choice: 2
Enter Number of Students: 6
Enter percentages of 6 students:
20
50
30
60
40
10
Before Sorting:
20 50 30 60 40 10
After Sorting:
10 20 30 40 50 60
***** MENU *****
1.Insertion Sort
2.Shell Sort
3.Display Top 5
4.selectionsort
5.bubblesort
0.Exit
Enter Choice: 3
5 Toppers Are:
1 )60
2 )50
3 )40
4 )30
5 )20
***** MENU *****
1.Insertion Sort
2.Shell Sort
3.Display Top 5
4.selectionsort
5.bubblesort
0.Exit
Enter Choice: 4
Enter Number of Students: 6
Enter percentages of 6 students:
20
50
30
60
40
10
Before Sorting:
20 50 30 60 40 10
After Sorting:
10 20 30 40 50 60
***** MENU *****
1.Insertion Sort
2.Shell Sort
3.Display Top 5
4.selectionsort
5.bubblesort
0.Exit
Enter Choice: 0
-----
Process exited after 75.2 seconds with return value 0
```