**Assignment Number: 13**

**Subject: Data Structure and Algorithms**

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**Class: S.E**

**Division: B**

**Batch: B1**

**Title/Problem Statement:**

Write C++ program to store second year percentage of students in array. Write function for

sorting array of floating point numbers in ascending order using

a) Insertion sort b) Shell Sort and display top five scores

**CODE**

#include<iostream>

#include<limits>

using namespace std;

class shell

{

private:

int size,i,j,cn,step;

float temp,small;

float \*arr;

public:

void getdata();

void shelsort();

void insertion();

void top();

};

void shell::getdata()

{

cout<<"enter the no. of students"<<endl;

for(;;)

{

if(cin>>size)

{

break;

}

else

{

cout<<"please enter a valid no"<<endl;

cin.clear();

cin.ignore(numeric\_limits<streamsize>::max(), '\n');

}

}

arr=new float[size];

cout<<"enter the percentage of students"<<endl;

for(i=0;i<size;i++)

{

for(;;)

{

if(cin>>arr[i])

{

if(arr[i]>100)

{

cout<<"it is not valid"<<endl;

}

else

{

break;

}

}

else

{

cout<<"please enter a valid no"<<endl;

cin.clear();

cin.ignore(numeric\_limits<streamsize>::max(), '\n');

}

}

}

cout<<"enetred marks are"<<endl;

for(i=0;i<size;i++)

{

cout<<arr[i]<<endl;

}

}

void shell::shelsort()

{

cout<<"shell sort"<<endl;

for(step=size/2;step>0;step=step/2)

{

for(i=step;i<size;i++)

{

temp=arr[i];

for(j=i;j>=step;j=j-step)

if(temp<arr[j-step])

arr[j]=arr[j-step];

else

break;

arr[j]=temp;

}

}

cout<<" after sorting"<<endl;

for(i=0;i<size;i++)

{

cout<<arr[i]<<endl;

}

}

void shell::insertion()

{

cout<<"insertion sort"<<endl;

for(i=1;i<size;i++)

{

small=arr[i];

for(j=i-1;j>=0 && small<arr[j];j--)

arr[j+1]=arr[j];

arr[j+1]=small;

}

cout<<"after sorting"<<endl;

for(i=0;i<size;i++)

{

cout<<arr[i]<<endl;

}

}

void shell::top()

{

cout<<"displaying top scores"<<endl;

i=size-1;

if(size<5)

{

cout<<"Top "<<size<<" students are :"<<endl;

do

{

cout<<arr[i]<<endl;

i--;

}while(i>=0);

}

else

{

cn=0;

while(cn!=5)

{

cout<<arr[i]<<endl;

i--;

cn++;

}

}

}

int main()

{

shell s;

int ch;

do

{

cout<<"1.enetr marks"<<endl<<"2.sort( by shell ) marks"<<endl<<" 3.by insertion sort"<<endl<<"4.top five scores"<<endl<<"0.exit"<<endl;

cin>>ch;

switch(ch)

{

case 1:

s.getdata();

break;

case 2:

s.shelsort();

break;

case 3:

s.insertion();

break;

case 4:

s.top();

break;

default:

if(ch!=0)

cout<<"INVALID!!!!!!!!"<<endl;

break;

}

cout<<endl;

}while(ch!=0);

return 0;

}

/\*

1.enetr marks

2.sort( by shell ) marks

3.by insertion sort

4.top five scores

0.exit

1

enter the no. of students

4

enter the percentage of students

12.4

78.4

67.3

r

please enter a valid no

34.2

enetred marks are

12.4

78.4

67.3

34.2

1.enetr marks

2.sort( by shell ) marks

3.by insertion sort

4.top five scores

0.exit

3

insertion sort

after sorting

12.4

34.2

67.3

78.4

1.enetr marks

2.sort( by shell ) marks

3.by insertion sort

4.top five scores

0.exit

4

displaying top scores

Top 4 students are :

78.4

67.3

34.2

12.4

1.enetr marks

2.sort( by shell ) marks

3.by insertion sort

4.top five scores

0.exit

\*/

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