**Assignment number:11**

**Subject: ADVANCED DATA STRUCTURES LAB**

Name: ***RIA MITTAL***

Class: ***SECOND YEAR ENGINEERING***

Division: ***B***

Roll no: ***222008***

Batch: ***B1***

**PROBLEM STATEMENT:**

Read the marks obtained by students of second year in an online examination of particular subject. Find out maximum and minimum marks obtained in that subject. Use heap data structure. Analyze the algorithm.

**Code:**

#include<iostream>

using namespace std;

class heapsort

{

int heap[100];

int count;

public:

int accept();

int display();

int heapify(int \*,int , int);

int sort(int \* ,int);

int heaps();

int min\_max();

};

int heapsort::accept()

{

cout<<"\nenter the total number of elements\n";

cin>>count;

cout<<"\nenter the elements\n";

for(int i=0;i<count;i++)

cin>>heap[i];

}

int heapsort::display()

{

cout<<"\nthe elements are\n";

for(int i=0;i<count;i++)

cout<<heap[i]<<"\t";

cout<<endl;

}

int heapsort::heapify(int heap[],int count,int i)

{

int largest=i;

int l=(2\*i)+1;

int r=(2\*i)+2;

if(l<count && heap[l]>heap[largest])

largest=l;

if(r<count && heap[r]>heap[largest])

largest=r;

if(largest!=i)

{

swap(heap[i],heap[largest]);

heapify(heap,count,largest);

}

}

int heapsort::sort(int heap[],int count)

{

for(int i=(count/2)-1;i>=0;i--)

heapify(heap,count,i);

for(int i=count-1;i>=0;i--)

{

swap(heap[0],heap[i]);

heapify(heap,i,0);

}

}

int heapsort::heaps()

{

sort(heap,count);

}

int heapsort::min\_max()

{

heaps();

cout<<"\nthe minimum marks are : "<<heap[0];

cout<<"\nthe maximum marks are : "<<heap[count-1]<<endl;

}

int main()

{

char c;

int ans;

heapsort obj;

do

{

cout<<"\n1.)enter details\n2.)display entered details\n3.)sort and display sorted details\n4.)display minimum and maximum marks\n5.)exit\n";

cin>>ans;

switch(ans)

{

case 1: obj.accept();break;

case 2: obj.display();break;

case 3: obj.heaps();obj.display(); break;

case 4: obj.min\_max();break;

case 5: break;

default: cout<<"\ninvalid entry...try again..\n";

}

cout<<"\ndo you want to continue?(y/n) : ";

cin>>c;

}while(c=='y' ||c=='Y');

cout<<endl;

return 0;

}

**OUTPUT:**

1.)enter details

2.)display entered details

3.)sort and display sorted details

4.)display minimum and maximum marks

5.)exit

1

enter the total number of elements

5

enter the elements

12

54

33

11

90

do you want to continue?(y/n) : y

1.)enter details

2.)display entered details

3.)sort and display sorted details

4.)display minimum and maximum marks

5.)exit

2

the elements are

12 54 33 11 90

do you want to continue?(y/n) : y

1.)enter details

2.)display entered details

3.)sort and display sorted details

4.)display minimum and maximum marks

5.)exit

3

the elements are

11 12 33 54 90

do you want to continue?(y/n) : y

1.)enter details

2.)display entered details

3.)sort and display sorted details

4.)display minimum and maximum marks

5.)exit

4

the minimum marks are : 11

the maximum marks are : 90

do you want to continue?(y/n) : y

1.)enter details

2.)display entered details

3.)sort and display sorted details

4.)display minimum and maximum marks

5.)exit

5

do you want to continue?(y/n) : n