Assignment 4: Heap Sort

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#include<iostream> using namespace std; #define siee 20

class heap

{

int arr[siee]; //stores the elements int n; //number of elements public:

heap() //initalise the array

{

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

arr[i]=0;

//n=0;

}

void getdata() //gets the data from the user

{

cout<<"Enter the number of elements"<<endl; cin>>n;

cout<<"Enter the elements"<<endl; for(int i=0;i<n;i++) //input the elements

cin>>arr[i];

}

void build\_heap(int a[10],int n)

{

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

{

heapify(a,i,n-1); //heapify the array

}

}

void lowest\_grade()

{

int p=n-1; int i=0; int r=n/2;

heapify(arr,i,n);

for(int k=0;k<=r;k++)

{

int temp=arr[i]; //swap the elements arr[i]=arr[p];

arr[p]=temp; n--;p--;

heapify(arr,i,n); //call to heapify functon

}

}

void heapify(int a[10],int i,int n)

{

int j;

if (i >(n/2))

return; j=2\*i+1; if(a[j]<a[j+1]) j++;

if(a[j]>a[i]) //if greater

{

heapify(a,j,n);

int temp= a[i]; //swap the elements a[i]=a[j];

a[j]=temp;

}

}

void provide\_intern()

{

cout<<"Internship is provided to student with "<< arr[0]<<" marks"<<endl; arr[0]=arr[n-1];

n--;

putdata();

}

void putdata()

{

cout<<"The elements are:"<<endl; for(int m=0;m<n;m++)

{

cout<<arr[m]<<"\t";

}

}

void heap\_all()

{

build\_heap(arr,n);

}

};

int main()

{

heap h; int ch; do

{

cout<<"\n Enter your choice"<<endl;

cout<<" 01. Accept the Marks "<<endl; cout<<" 02. Display the Marks "<<endl; cout<<" 03. Create Heap Tree "<<endl; cout<<" 04. Provide Internships "<<endl; cout<<" 05. Student having Lowest Scores: "<<endl; cin>>ch;

switch(ch)

{

case 1: h.getdata();

break;

case 2: h.putdata();

break;

case 3:cout<<"Heap Tree is"<<endl; h.heap\_all();

* 1. utdata(); break;

case 4: h.provide\_intern();

break;

case 5: h.lowest\_grade();

cout<<"Students in accordance to marks are" <<endl; h.putdata();

break;

}

}while(ch!=5); return 0;

}

/\*

------------------------OUTPUT------------------------------------

Enter your choice

* + 1. Accept the Marks
    2. Display the Marks
    3. Create Heap Tree
    4. Provide Internships
    5. Student having Lowest Scores:

1

Enter the number of elements 10

Enter the elements

66 77 55 45 99 34 56 87 45 86

Enter your choice

1. Accept the Marks
2. Display the Marks
3. Create Heap Tree
4. Provide Internships
5. Student having Lowest Scores:

2

The elements are:

66 77 55 45 99 34 56 87 45 86

Enter your choice

1. Accept the Marks
2. Display the Marks
3. Create Heap Tree
4. Provide Internships
5. Student having Lowest Scores:

3

Heap Tree is

The elements are:

99 66 56 87 77 34 55 45 45 86

Enter your choice

1. Accept the Marks
2. Display the Marks
3. Create Heap Tree
4. Provide Internships
5. Student having Lowest Scores:

4

Internship is provided to student with 99 marks The elements are:

86 66 56 87 77 34 55 45 45

Enter your choice

1. Accept the Marks
2. Display the Marks
3. Create Heap Tree
4. Provide Internships
5. Student having Lowest Scores:

5

Students in accordance to marks are The elements are:

45 34 45 66

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