Advanced Data Structures Assignment

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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;

int n,i;

class heap{

public:

int arr[50];

int create();

void display();

void heapsort(int \*,int );

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

};

int heap :: create(){

cout<<"Enter the number of elements : ";

cin>>n;

cout<<"Enter the elements \n";

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

cin>>arr[i];

}

void heap :: display(){

cout<<"Entered elements are \n";

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

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

}

void heap :: heapsort(int arr[], int n){

//build heap

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

heapify(arr,n,i);

//extract each element from root

for(i=n-1;i>=0;i--)

{

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

heapify(arr,i,0);

}

}

void heap :: heapify(int arr[] ,int n, int i ){

int largest = i;

int l = 2\*i+1;

int r = 2\*i+2;

if(l<n && arr[l]>arr[largest])

largest=l;

if(r<n && arr[r]>arr[largest])

largest=r;

if(largest!=i)

{

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

heapify(arr,n,largest);

}

}

int main(){

heap o;

o.create();

o.heapsort(o.arr,n);

o.display();

}

Output:

Enter the number of elements : 6

Enter the elements

34

56

12

90

02

78

Entered elements are

2 12 34 56 78 90