Program:

#include <iostream>

using namespace std;

void maxHeapify(int a[], int i, int n){

int j, temp;

temp=a[i];

j=2\*i;

while(j<=n){

if(j<n && a[j+1]>a[j])

j=j+1;

if(temp>a[j])

break;89

else if(temp<=a[j]){

a[j/2]=a[j];

j=2\*j;

}

}

a[j/2]=temp;

return;

}

void build\_maxheap(int a[], int n){

int i;

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

maxHeapify(a,i,n);

}

}

void max\_HeapSort(int a[], int n){

int i, temp;

for(i=n; i>=2; i--){

temp = a[i];

a[i] = a[1];

a[1] = temp;

maxHeapify(a, 1, i-1);

}

}

void min\_heapify(int a[], int i, int n){

int j, temp;

temp = a[i];

j = 2\*i;

while(j<=n){

if(j<n && a[j+1]<a[j])

j=j+1;

if(temp<a[j])

break;

else if(temp>=a[j]){

a[j/2] = a[j];

j= 2\*j;

}

}

a[j/2] = temp;

return;

}

void build\_minheap(int a[], int n){90

int i;

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

min\_heapify(a,i,n);

}

}

void min\_HeapSort( int a[], int n){

int i, temp;

for(i=n; i>=2; i--){

temp = a[i];

a[i] = a[1];

a[1] = temp;

min\_heapify(a, 1, i-1);

}

}

void print(int arr[], int n){

cout<<"\nsorted data: ";

for(int i=1; i<=n; i++){

cout<<"->"<<arr[i];

}

return;

}

int main()

{

int n, i, ch;

cout<<"Enter the number of elements to be sorted: " ;

cin>>n;

int arr[n];

for(i=1; i<=n; i++) {

cout<<"Enter element "<<i<<": ";

cin>>arr[i];

}

do{

cout<<"\n\n1]Heap sort using max heap";

cout<<"\n2]Heap sort using min heap";

cout<<"\n3]Exit";

cout<<"\nEnter your choice: ";

cin>>ch;

switch(ch){

case 1:91

build\_maxheap(arr, n);

max\_HeapSort(arr, n);

print(arr, n);

break;

case 2:

build\_minheap(arr, n);

min\_HeapSort(arr, n);

print(arr, n);

break;

}

}while(ch!=3);

return 0;

}

**OUPUT:**

Enter the number of elements to be sorted: 5

Enter element 1: 3

Enter element 2: 2

Enter element 3: 4

Enter element 4: 1

Enter element 5: 5

1]Heap sort using max heap

2]Heap sort using min heap

3]Exit

Enter your choice: 1

sorted data: ->1->2->3->4->5

1]Heap sort using max heap

2]Heap sort using min heap

3]Exit

Enter your choice: 2

sorted data: ->5->4->3->2->1

1]Heap sort using max heap

2]Heap sort using min heap92

3]Exit

Enter your choice: 3