#include<iostream>

using namespace std;

void MaxHeapify(int\* arr,int n, int i)

{

int left, right,largest,temp;

left = (2\*i) ;

right = (2\*i) + 1 ;

if(left<=n && arr[left]>=arr[i])

{largest = left ;}

else

{ largest = i; }

if(right<=n && arr[right]>=arr[largest])

{ largest=right;}

if(largest!=i)

{

temp = arr[largest];

arr[largest]= arr[i];

arr[i] = temp;

MaxHeapify(arr,n,largest);

}

}

void BuildmaxHeap(int \* arr,int n)

{

int heapSize = n;

int heapArray[heapSize];

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

{

MaxHeapify(arr,n,i);

}

}

void HeapSort(int \* arr,int n)

{

int temp;

int heap\_size = n;

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

{

temp = arr[1];

arr[1] = arr[i];

arr[i] = temp;

heap\_size = heap\_size - 1;

MaxHeapify(arr,heap\_size,1);

}

}

int main()

{

int arr[100],n;

cout<< "\n Enter a size of the array::";

cin>>n ;

cout<< "\n Insert The Element Into The Array::";

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

cin>>arr[i];

cout<< "\n The Max-Heap is::";

BuildmaxHeap(arr,n);

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

{

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

}

cout<<endl;

cout<< "\n After The Sorting Array ::";

HeapSort(arr,n);

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

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

cout<<"\n-----------------------------------------------------------";

return 0;

}