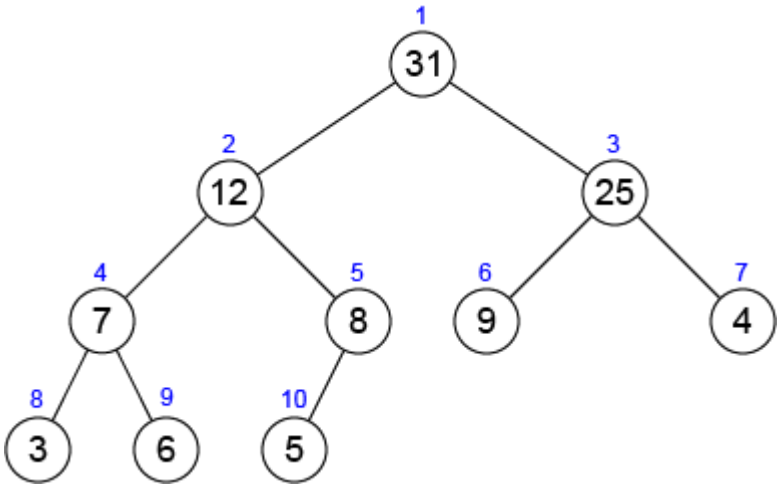
Problem B. B

Time limit	2000 ms
Mem limit	131072 kB
OS	Linux

A binary heap which satisfies max-heap property is called max-heap. In a max-heap, for every node i other than the root, $A[i] \leq A[parent(i)]$, that is, the value of a node is at most the value of its parent. The largest element in a max-heap is stored at the root, and the subtree rooted at a node contains values no larger than that contained at the node itself.

Here is an example of a max-heap.



Write a program which reads an array and constructs a max-heap from the array based on the following pseudo code.

$maxHeapify(A, i)$ move the value of $A[i]$ down to leaves to make a sub-tree of node i a max-heap. Here, H is the size of the heap.

```
1  maxHeapify(A, i)
2      l = left(i)
3      r = right(i)
4      // select the node which has the maximum value
5      if l ≤ H and A[l] > A[i]
6          largest = l
7      else
8          largest = i
9      if r ≤ H and A[r] > A[largest]
10         largest = r
```

```
11
12     if largest ≠ i  // value of children is larger than that of i
13         swap A[i] and A[largest]
14         maxHeapify(A, largest) // call recursively
```

The following procedure buildMaxHeap(A) makes A a max-heap by performing maxHeapify in a bottom-up manner.

```
1 buildMaxHeap(A)
2    for i = H/2 downto 1
3        maxHeapify(A, i)
```

Input

In the first line, an integer H is given. In the second line, H integers which represent elements in the binary heap are given in order of node id (from 1 to H).

Output

Print values of nodes in the max-heap in order of their id (from 1 to H). Print a single space character before each value.

Constraint

- $1 \leq H \leq 500,000$
- $-2,000,000,000 \leq$ value of a node $\leq 2,000,000,000$

Sample Input 1

```
10
4 1 3 2 16 9 10 14 8 7
```

Sample Output 1

```
 16 14 10 8 7 9 3 2 4 1
```

Reference

Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. The MIT Press.