Max Heap

Input file:	**standard input**
Output file:	**standard output**
Time limit:	1 second
Memory limit:	256 megabytes

You have to build a max heap, which is able to support the following operations.

1. Insert in heap.

2. Delete root(maximum) element of the heap.

3. Delete an element at the 'i' index in the heap.

4. Display maximum element.

There will be 'Q' number of queries for the above 4 operations, you have to update the max heap according to the queries. Output will be printed only for opration number 4 i.e. Display maximum element. If heap is empty print -1 for operation 4.

Input

The first line of input has a single integer Q indicating the number of queries. The following Q queries will have the given format -

- 1 x - Insert integer 'x' in heap.

- 2 - Delete root(maximum element) of heap.

- 3 i - Delete element at index 'i' in heap.

- 4 - Display maximum element of heap.

$(1 \leq Q \leq 10^5)$

$(-2^{31} \leq x \leq 2^{31} - 1)$

$(0 \leq i \leq 10^3 - 1)$

Output

For each instance of the query 4 print the answer in the new line. Print -1 in case the heap is empty.

Example

standard input	standard output
9 1 4 1 5 1 6 1 2 4 2 4 3 2 4	6 5 5

Note

Example:

Explanation:

Number of queries = 9

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1   4   Insert 4

4

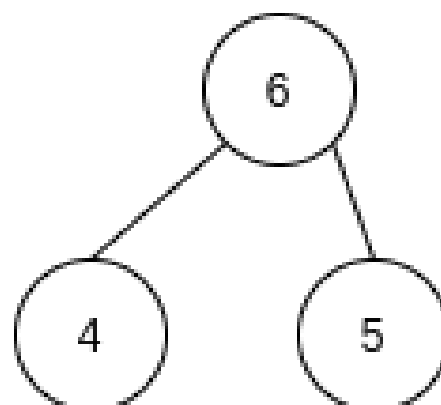**1   5**   Insert 5

5
4

1   6   Insert 6

6
4   5
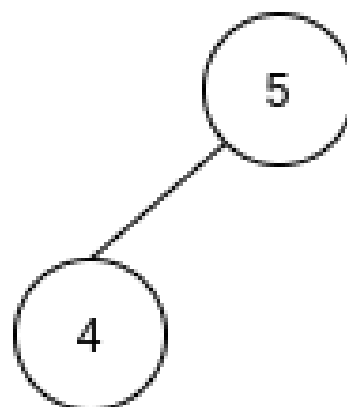
Рис. 1: example explanation

1 2   Insert 2

```
        6
       / \
      4   5
     /
    2
```
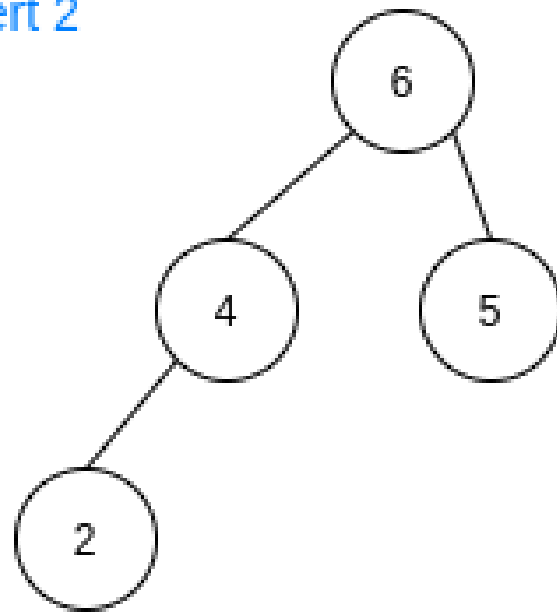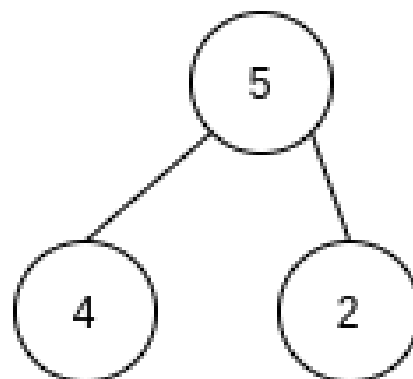
4   Display Maximum   o/p : 6

2   Delete root

```
        5
       / \
      4   2
```
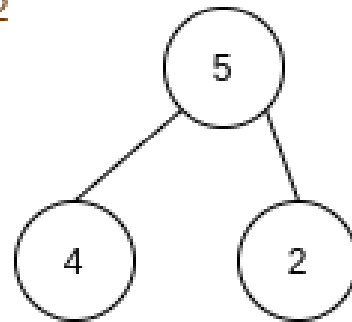
4   Display Maximum   o/p : 5

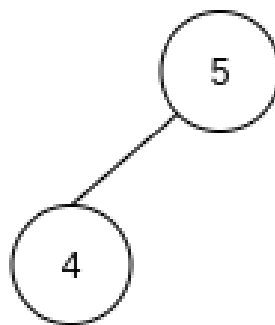Рис. 2: example explanation

3 2   Delete element at index 2

[5, 4, 2]
 0 1 2

So, we need to delete element at index 2

4   Display Maximum   o/p : 5

Рис. 3: example explanation