

Range Second Max

Time Limit: 3s
Memory Limit: 512MB

Problem Description

You are given N positive integers. You are also given Q queries, each of which is one of two types:

1. Replace the integer at a certain position
2. Given a start and end position, return the second largest integer in the range. Note that there will always be at least two integers in the range.

Also note that we consider two integers at different positions to be different, even if they contain the same value. So given the range containing 3, 3, and 2, the answer is 3 (it doesn't matter which one).

Input Specification

Each test file starts with a line containing two integers N and Q . A line containing N positive integers (from 1 to 10^9), separated by spaces, follows.

Then, Q lines follow, one for each query. The following describes the format:

1. The first query type has the format “1 i $repl_i$ ” where $repl_i$ is an integer that will replace the value in the position i .
2. The second query type has the format “2 $start_i$ end_i ” where $start_i$ and end_i define the range (between 1 and N , and $start_i \leq end_i$).

Output Specification

For each query of the second type, output a line containing the second largest integer within the given range.

Constraints

$$1 \leq N \leq 10^5$$

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

Sample Input

```
10 6
3 1 7 2 2 3 5 9 8 1
2 1 7
2 3 5
2 1 10
1 5 3
2 3 5
2 4 6
```

Sample Output

```
5
2
8
3
3
```