

DMOPC '19 Contest 2 P3 - Selection

Time limit: 1.4s **Memory limit:** 256M
Python: 4.5s

Veshy has a box with N items, the i th of which has a "goodness" of g_i on Veshy's standards. Over a period of M minutes, one of two events may occur. On the i th minute, either Veshy's standards have changed and the a_i th item's "goodness" has changed to b_i , or he wants to know the goodness of the c_i th best item in the subarray of items, $g_{l_i}, g_{l_i+1}, \dots, g_{r_i}$.

It is recommended that Python users use PyPy instead.

Constraints

In all subtasks,

$$1 \leq N \leq 300\,000$$

$$1 \leq M \leq 100\,000$$

$$0 \leq g_i, b_i \leq 20$$

$$1 \leq a_i, l_i, r_i, c_i \leq N$$

Subtask 1 [10%]

$$N \leq 100$$

Subtask 2 [30%]

$$0 \leq g_i, b_i \leq 1$$

Subtask 3 [60%]

No additional constraints.

Input Specification

The first line contains two space-separated integers, N and M .

The next line contains N integers, the i th of which being g_i .

M lines follow, each of which are either in the form:

1 a b - the a_i th item now has goodness b_i

2 l r c - Veshy wants to know the goodness c_i th best item in the subarray of items: $l, l+1, \dots, r$

Output Specification

For each query, output the goodness of the c_i th best item in the subarray of items. It is guaranteed that there are at least c_i items in the subarray.

Sample Input

```
5 5
3 15 19 7 14
2 2 4 2
1 2 9
2 1 2 2
1 5 17
2 1 5 3
```

Sample Output

```
15
3
9
```