Collect Mushrooms 3

Time Limit: 3.0s
Memory Limit: 256MB

Peanut owns a mushroom farm and wants to collect mushrooms. His mushroom farm has N mushrooms in a row, numbered 0 to N-1 from left to right, with 0 closest to him and N-1 farthest from him. Each mushroom i has a unique deliciousness D_i. He assigns M minions one by one to help him collect some mushrooms. Each minion i will want a mushroom between deliciousness X and Y. Since minions are lazy, they'll only go to the closest mushroom that satisfy their desires. Note: Due to some magical fungi properties, the mushroom grows back to its original deliciousness after being collected. :O.

Also, minions sometimes rebel and decide to exchange 2 mushrooms. When this happens, the deliciousness of mushroom X and mushroom Y will swap. (And subsequent mushrooms that grow in the same place will be swapped too.)

Help peanut find at which index will the minions collect its mushroom.

Input

The first line contains the number N and M.
The second line contains N numbers, representing the array D.
M lines will follow. The first character of each line will be T, along with 2 integers X and Y
If T is 0, Peanut wants to know which mushroom (with deliciousness between X and Y) the minion will collect.
If T is 1, the rebellious minion swaps mushroom X and Y.

Output

For every type 0 query, on a separate line, output the index of the mushroom in which the minion collects. (If the minion can't find such mushroom, output "-1" instead)

Input Specifications

Subtask	Score	Bounds	Additional Info
1	17	-	$X_i = Y_i$ for all type 0 queries
2	21	-	There will be no rebellious minions (T ≠ 1)
3	13	N, M ≤ 5,000	-
4	18	N, M ≤ 70,000	$1 ≤ D_i ≤ 100,000$
5	31	-	-
For all subtasks: $1 ≤ N, M ≤ 500,000$, $1 ≤ D_i ≤ 10^9$, $1 ≤ X_i ≤ Y_i ≤ 10^9$, swaps are valid.			

Sample Input 1

6 6
5 3 2 9 7 4
0 2 5
0 6 9
0 7 10
1 0 4
0 2 5
0 7 10

Sample Output 1

0
3
3
1
0