

Problem D. Deja Vu

Input file: *standard input*
Output file: *standard output*
Time limit: 5 seconds
Memory limit: 512 mebibytes

You are given an array x_1, x_2, \dots, x_n .

You need to perform two types of queries on this array.

- Given i and y , set $x_i = y$.
- Given l , find the smallest d among all tuples (a, b, c, d) with $l \leq a < b < c < d$ and $x_a < x_b < x_c < x_d$, or reply that there are no such tuples.

Input

The first line contains two integers n, q ($1 \leq n, q \leq 500\,000$): the number of elements in the array and the number of queries.

The second line contains n integers x_1, x_2, \dots, x_n ($1 \leq x_i \leq 10^9$).

Each of the next q lines contains the description of a query.

If the first integer in the line is equal to 1, then the next two integers are i and y ($1 \leq i \leq n, 1 \leq y \leq 10^9$), describing a query of the first type.

Otherwise, the first integer in the line is equal to 2, and the next integer is equal to l ($1 \leq l \leq n$), describing a query of the second type.

Output

For each query of the second type, return the smallest d among all tuples (a, b, c, d) such that $l \leq a < b < c < d$ and $x_a < x_b < x_c < x_d$, or print “-1” if there are no such tuples.

Example

standard input	standard output
11 10	4
1 2 3 4 5 10 9 8 7 6 8	5
2 1	6
1 3 2	-1
2 1	-1
1 1 2	11
2 1	
2 5	
2 6	
1 9 6	
1 10 7	
2 5	