

"Hey! I have an awesome task with chameleons, 5th task for Saturday's competition."
"Go ahead. . . "

(...)

"That's too difficult, I have an easier one, they won't even solve that one."

"You are given an array of N integers from the interval $[1, K]$. You need to process M queries. The first type of query requires you to change a number in the array to a different value, and the second type of query requires you to determine the length of the shortest **contiguous subarray** of the current array that contains all numbers from 1 to K ."

"Hm, I can do it in $O(N^6)$. What's the limit for N ?"

INPUT

The first line of input contains the integers N , K and M ($1 \leq N, M \leq 100\,000, 1 \leq K \leq 50$). The second line of input contains N integers separated by space, the integers from the array. After that, M queries follow, each in one of the following two forms:

- "1 p v " - change the value of the p^{th} number into v ($1 \leq p \leq N, 1 \leq v \leq K$)
- "2" - what is the length of the shortest contiguous subarray of the array containing all the integers from 1 to K

OUTPUT

The output must consist of the answers to the queries of the second type, each in its own line. If the required subarray doesn't exist, output -1 .

SCORING

In test cases worth 30% of total points, it will hold $1 \leq N, M \leq 5\,000$.

SAMPLE TESTS

ulaz 4 3 5 2 3 1 2 2 1 3 3 2 1 1 1 2	ulaz 6 3 6 1 2 3 2 1 1 2 1 2 1 2 1 4 1 1 6 2 2
izlaz 3 -1 4	izlaz 3 3 4