

NEKAMELEONI

"Hey! I have an awesome task with chameleons, 5 th 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 .

Example

Input:

```
4 3 5
2 3 1 2
2
1 3 3
```

2
1 1 1
2

Output:

3
-1
4