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## G. Modular Sorting

time limit per test: 5 seconds memory limit per test: 256 megabytes

You are given an integer m ( $2 \le m \le 5 \cdot 10^5$ ) and an array a consisting of nonnegative integers smaller than m.

Answer queries of the following form:

- 1 i x: assign  $a_i := x$
- 2 k: in one operation, you may choose an element  $a_i$  and assign  $a_i := (a_i + k) \pmod{m}^*$  — determine if there exists some sequence of (possibly zero) operations to make a nondecreasing<sup>†</sup>.

Note that instances of query 2 are independent; that is, no actual operations are taking place. Instances of query 1 are persistent.

#### Input

The first line contains an integer t ( $1 \le t \le 10^4$ ) — the number of test cases.

The first line of each test case contains three integers, n, m, and q ( $2 < n < 10^5$ ,  $2 \le m \le 5 \cdot 10^5$ ,  $1 \le q \le 10^5$ ) — the size of the array a, the integer m, and the number of queries.

The second line of each test case contains n integers,  $a_1, a_2, \ldots, a_n$   $(0 \le a_i \le m)$ .

Then follows q lines. Each line is of one of the following forms:

- $1 i x (1 \le i \le n, 0 \le x < m)$
- $2 k (1 \le k < m)$

It is guaranteed that the sum of n and the sum of q over all test cases each do not exceed  $10^5$ .

#### Output

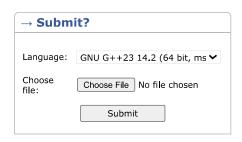
For each instance of query 2, output on a single line "YES" if there exists some sequence of (possibly zero) operations to make a nondecreasing, and "NO" otherwise.

You can output the answer in any case (upper or lower). For example, the strings "yEs", "yes", "Yes", and "YES" will be recognized as positive responses.

## Evample

Example	
input	Сору
2	
7 6 6	
4 5 2 2 4 1 0	
2 4	
1 4 5	
2 4	
2 3	
1 7 2	
2 3	
8 8 3	
0 1 2 3 4 5 6 7	
2 4	
1 3 4	
2 4	

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326923495	Jul/01/2025 18:48	Accepted	

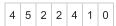
 $<sup>^*</sup>a\pmod{m}$  is defined as the unique integer b such that  $0\leq b < m$  and a-b is an integer multiple of m.

 $<sup>^\</sup>dagger$  An array a of size n is called nondecreasing if and only if  $a_i \leq a_{i+1}$  for all  $1 \leq i < n$ .

output	Сору
YES	
YES NO NO YES YES NO	
NO	
YES	
YES	
NO	

### Note

In the first sample, the array is initially:



By applying the operation twice on  $a_1$ , twice on  $a_2$ , once on  $a_5$ , twice on  $a_6$ , and once on  $a_7$ , the array becomes:

which is in nondecreasing order.

After the second query, the array becomes:

and it can be shown that it is impossible to sort this with operations of the form

 $a_i := (a_i + 4) \pmod 6$  , and it is also impossible to sort this with operations of the form

 $a_i := (a_i + 3) \pmod{6}$ .

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