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G. Array Game

time limit per test: 6 seconds

memory limit per test: 512 megabytes

input: standard input

output: standard output

Consider a following game between two players:

There is an array b_1, b_2, \dots, b_k , consisting of positive integers. Initially a chip is placed into the first cell of the array, and b_1 is decreased by 1. Players move in turns. Each turn the current player has to do the following: if the index of the cell where the chip is currently placed is x , then he or she has to choose an index $y \in [x, \min(k, x + m)]$ such that $b_y > 0$, move the chip to the cell y and decrease b_y by 1. If it's impossible to make a valid move, the current player loses the game.

Your task is the following: you are given an array a consisting of n positive integers, and q queries to it. There are two types of queries:

- 1 $l\ r\ d$ — for every $i \in [l, r]$ increase a_i by d ;
- 2 $l\ r$ — tell who is the winner of the game that is played on the subarray of a from index l to index r inclusive. Assume both players choose an optimal strategy.

Input

The first line contains three integers n, m and q ($1 \leq n, q \leq 2 \cdot 10^5$, $1 \leq m \leq 5$) — the number of elements in a , the parameter described in the game and the number of queries, respectively.

The second line contains n integers a_1, a_2, \dots, a_n ($1 \leq a_i \leq 10^{12}$) — the elements of array a .

Then q lines follow, each containing a query. There are two types of queries. The query of the first type is denoted by a line 1 $l\ r\ d$ ($1 \leq l \leq r \leq n$, $1 \leq d \leq 10^{12}$) and means that for every $i \in [l, r]$ you should increase a_i by d . The query of the second type is denoted by a line 2 $l\ r$ ($1 \leq l \leq r \leq n$) and means that you have to determine who will win the game if it is played on the subarray of a from index l to index r (inclusive).

There is at least one query of type 2.

Output

For each query of type 2 print 1 if the first player wins in the corresponding game, or 2 if the second player wins.

Examples

input

Copy

```
5 2 4
1 2 3 4 5
1 3 5 6
2 2 5
1 1 2 3
2 1 5
```

output

Copy

```
1
1
```

input

Copy

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

Educational Codeforces Round 54 (Rated for Div. 2)

Finished

→ Practice?

Want to solve the contest problems after the official contest ends? Just register for practice and you will be able to submit solutions.

Register for practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Problem tags

data structures games *2700

No tag edit access

→ Contest materials

- Announcement
- Tutorial #1
- Tutorial #2

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

output

Copy

```
1
2
1
```

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