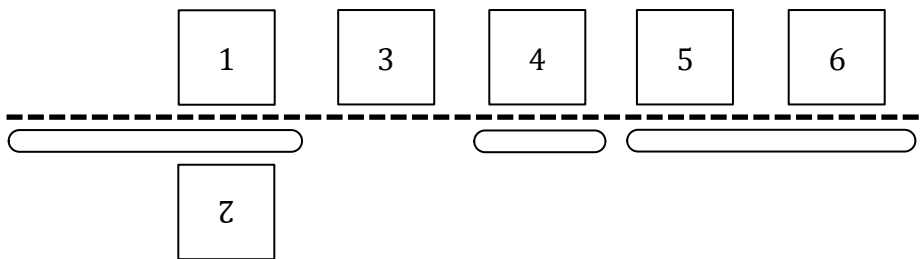


Conveyor

Teddy runs a sushi restaurant in the city of Warsaw. Known for the high quality of its food, each piece of sushi has a quality rating. The restaurant has been running well, but today the restaurant's owner, Chairman Ong, is coming to examine the sushi to ensure it is up to standard.

Teddy places N pieces of sushi on his trusty conveyor belt, numbered 1 to N from left to right, shown in the diagram below. The piece of sushi numbered i has quality rating Q_i .



The conveyor belt consists of a series of individual belts which rotate forwards or backwards, carrying the sushi along the belt.¹ This may cause some of the sushi to be hidden under the belt, out of sight of Chairman Ong.²

Of course, Chairman Ong wishes to ensure the quality of his restaurant's sushi. Hence at any point in time he may observe the continuous line of sushi between the x^{th} and y^{th} pieces of sushi he sees on the belt (inclusive). Obviously Teddy must ensure that these pieces of sushi are of sufficient quality (otherwise he must somehow distract Chairman Ong). Hence before Chairman Ong finishes observing, he must know the sum of quality ratings of all the sushi Chairman Ong observes.

Teddy can control the belts as he wishes. Sometimes, Teddy spots a piece of sushi that is badly made, and thus he must quickly replace it with a new piece of sushi, possibly with a different quality rating.

Help Teddy keep his job by answering his queries quickly.

¹ Notice that sushi can't actually be transported on this conveyor belt.

² For strange unknown reasons, the sushi doesn't fall off the belt. Perhaps it's thanks to Teddy's secret sticky sushi rice recipe.

Input

The first line contains integers N , the number of metronomes, B , the number of belts, and M , the number of events.

The next N lines contain one integer Q_i .

The next B lines contain two integers L_i and R_i , indicating that belt i spans from metronome L_i and R_i . No two belts intersect.

The next M lines contain the queries. There are 3 types of queries:

1 $x k$ - Teddy rotates belt x by k objects forward if $k > 0$, and $-k$ objects backward if $k < 0$.

2 $x q$ - Teddy replaces object x with a new metronome with quality rating q .

3 $x y$ - Chairman Ong observes the objects as stated above. If this is not possible, output -1.

Output

For every query 3, output the sum of quality ratings of the metronomes observed on a separate line.

Constraints

$$1 \leq N, M, B \leq 500,000$$

$$1 \leq Q_i \leq 10^9$$

Subtasks

Subtask 1 (11 points): $N, M, B \leq 1000$.

Subtask 2 (17 points): $N = B$.

Subtask 3 (6 points): There are no 'rotate' queries.

Subtask 4 (10 points): $B = 1, L_1 = 1, R_1 = N$.

Subtask 5 (56 points): No further constraints.

Sample Input

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

Sample Output

```
21
3
```

Note: The third query rotates the first belt to the configuration shown above.