Many Approaches

Input file: `standard input`
Output file: `standard output`
Time limit: 3 seconds
Memory limit: 1024 megabytes

There is a park with N squares arranged in a row from left to right, numbered $0, 1, \ldots, N-1$ in this order.

Inside the park, there are N people, also numbered $0, 1, \ldots, N-1$. When you announce a sequence $X = (X_1, X_2, \ldots, X_{|X|})$ of non-negative integers between 0 and $N-1$, the people perform a **march** according to the following rules:

1. For each $i = 0, 1, \ldots, N-1$, person i moves to square i.
2. For each $j = 1, 2, \ldots, |X|$, in this order, do the following:
   - Every person not currently on square X_j moves exactly one square toward X_j.

You are given a sequence $A = (A_0, A_1, \ldots, A_{M-1})$ of length M, consisting of integers between 0 and $N-1$.

You must answer Q online queries. For each $i = 1, 2, \ldots, Q$, integers t'_i, L'_i, R'_i, P'_i are given. First, reconstruct t_i, L_i, R_i, P_i using the following procedure:

Let $\text{ans}_0 = 0$, and let ans_i denote the answer to the i-th query. Reconstruct t_i, L_i, R_i, P_i as follows:

- $t_i = ((t'_i + \text{ans}_{i-1}) \bmod 2)$
- $a = ((L'_i + \text{ans}_{i-1}) \bmod M)$
- $b = ((R'_i + \text{ans}_{i-1}) \bmod M)$
- $L_i = \min(a, b)$
- $R_i = \max(a, b)$
- $P_i = ((P'_i + \text{ans}_{i-1}) \bmod N)$

Here, for a non-negative integer a and a positive integer b, $(a \bmod b)$ denotes the remainder when a is divided by b, which is in the range 0 through $b-1$.

For each reconstructed (t_i, L_i, R_i, P_i), answer the following query:

- If $t_i = 0$: Let $X = (A_{L_i}, A_{L_i+1}, \ldots, A_{R_i})$. Simulate the march and output the final square where person P_i ends up.
- If $t_i = 1$: Let $X = (A_{L_i}, A_{L_i+1}, \ldots, A_{R_i})$. Simulate the march and output how many people end up on square P_i.

Input

The input is given in the following format:

$$
\begin{array}{l}
N\ M\ Q \\
A_0\ A_1\ \ldots\ A_{M-1} \\
t'_1\ L'_1\ R'_1\ P'_1 \\
t'_2\ L'_2\ R'_2\ P'_2 \\
\vdots \\
t'_Q\ L'_Q\ R'_Q\ P'_Q
\end{array}
$$

- All input values are integers.
- $1 \le N, M, Q \le 2 \times 10^5$
- $0 \le A_i \le N-1$ $(0 \le i \le M-1)$
- $0 \le t'_i, t_i \le 1$ $(1 \le i \le Q)$
- $0 \le L'_i, R'_i \le M-1$ $(1 \le i \le Q)$
- $0 \le L_i \le R_i \le M-1$ $(1 \le i \le Q)$
- $0 \le P'_i, P_i \le N-1$ $(1 \le i \le Q)$

Output

Output Q lines. For each $i = 1, 2, \ldots, Q$, output ans_i, the answer to the i-th query.

Examples

standard input	standard output
4 5 3 0 2 3 2 1 0 1 3 2 1 0 2 1 1 4 4 1	2 0 3
7 4 1 3 3 3 3 1 3 0 3	7

Note

In the first example, for $(t_i, L_i, R_i, P_i) = (0, 1, 3, 2)$ with $X = (2, 3, 2)$, person 2 moves as $2 \to 2 \to 3 \to 2$, so the answer is 2.

In the second example, for $(t_i, L_i, R_i, P_i) = (1, 2, 4, 3)$ with $X = (3, 2, 1)$, the number of people on square 3 at the end is 0.

In the third example, for $(t_i, L_i, R_i, P_i) = (1, 4, 4, 1)$ with $X = (1)$, the number of people on square 1 at the end is 3.