Coalition of Power

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

As light spread across the island, the flow of power within each house began to shift. Over time, it moved back and forth, its traces quietly recorded.

The people sought to retrace every moment the power passed through, hoping to discover the point of its strongest coalition.

Now, follow the flow they once shared—and recover the records that have been lost.

In a village on the island, there are N houses arranged in a row, numbered from 1 to N from left to right.

On day 0, house i had an initial power of a_i.

Over the course of M days, a mysterious phenomenon occurred: power shifted between neighboring houses. Specifically, on the i-th day, the power of house x_i increased by v_i, and the power of house x_i+1 decreased by v_i. (v_i may be negative.)

The villagers recorded the progression of power over time in a grid. For example, if $N = 4$, $M = 5$, $a = [3, -2, 2, -2]$, $x = [3, 1, 2, 1, 2]$, and $v = [-4, -2, 3, 2, -4]$, the grid of power over time (with each row representing a day and each column representing a house) would appear as follows:

	1	2	3	4
0	3	-2	2	-2
1	3	-2	-2	2
2	1	0	-2	2
3	1	3	-5	2
4	3	1	-5	2
5	3	-3	-1	2

As the shifts in power continued, some villagers sought to form a **coalition** to strengthen the unity of the houses and balance the distribution of power. The process of forming a coalition is as follows:

- Choose a day t and a leading house number x. ($0 \le t \le M, 1 \le x \le N$)
- Select a continuous range of houses $[l, r]$ such that x is included in the range. ($1 \le l \le x \le r \le N$)
- The power of the coalition is defined as the sum of the powers of the houses in the range $[l, r]$ based on their values on day t.
  - At this point, define P_{tx} as the **maximum** coalition power achievable for the fixed values of t and x.

To plan their coalitions effectively, the people wanted to compare the potential powers of different configurations across various time frames and houses. In this process, Q questions were raised. The i-th question is as follows:

- What is the total sum of P_{tx} for all pairs (t, x) such that $s_i \leq t \leq e_i$ and $l_i \leq x \leq r_i$?

Answer these questions efficiently and help determine the strength of each possible coalition plan.

Input

The first line contains three space-separated integers N, M, and Q.

The second line contains N space-separated integers $a_1, a_2, \cdots, a_N$ representing the initial power of the houses.

The following M lines each contain the information about the movement of power as two space-separated integers x_i and v_i. This means that on the i-th day, the power of house x_i increases by v_i, and the power of house $x_i + 1$ decreases by v_i.

The following Q lines each contain four space-separated integers s_i, e_i, l_i, r_i representing each question.

- $2 \leq N \leq 10^5$
- $1 \leq M \leq 10^5$
- $1 \leq Q \leq 10^5$
- $-10^9 \leq a_i \leq 10^9$ $(1 \leq i \leq N)$
- $1 \leq x_i < N$ $(1 \leq i \leq M)$
- $-10^9 \leq v_i \leq 10^9$ $(1 \leq i \leq M)$
- $0 \leq s_i \leq e_i \leq M$ $(1 \leq i \leq Q)$
- $1 \leq l_i \leq r_i \leq N$ $(1 \leq i \leq Q)$

Output

For each of the Q questions, output the answer modulo $10^9 + 7$, one per line.

Scoring

- Subtask 1 (8 points): $N \leq 2000, M \leq 2000, Q \leq 1000, s_i = e_i, l_i = r_i$ $(1 \leq i \leq Q)$
- Subtask 2 (16 points): $N \leq 2000, M \leq 2000, s_i = e_i, l_i = r_i$ $(1 \leq i \leq Q)$
- Subtask 3 (10 points): $s_i = e_i, l_i = r_i$ $(1 \leq i \leq Q)$
- Subtask 4 (19 points): $s_i = e_i$ $(1 \leq i \leq Q)$
- Subtask 5 (17 points): $l_i = r_i$ $(1 \leq i \leq Q)$
- Subtask 6 (30 points): No additional constraints.

Examples

standard input	standard output
4 5 4 3 -2 2 -2 3 -4 1 -2 2 3 1 2 2 -4 1 3 1 2 3 4 3 4 0 2 2 2 0 5 1 4	14 6 5 51
3 2 9 3 -2 1 1 -3 2 -2 0 0 1 1 0 0 2 2 0 0 3 3 1 1 1 1 1 1 2 2 1 1 3 3 2 2 1 1 2 2 2 2 2 2 3 3	3 2 2 2 2 2 2 2 3