



INOI 30

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Tehran, Iran

Summer Camp Programming Finals - Day 3

ZIGZAG

en (US)

ZIGZAG

Finally, Arash managed to get accepted for the best university in the world, but there is a problem! Due to COVID-19 pandemic, he didn't manage to get a visa. But today the embassy opened. The embassy operates quite unusual. If you go there on the day i , it costs you p_i bucks. But strangely enough, p_i can be negative! It means the embassy will give you money if you go there on that day. Arash wants to prove these numbers are random and the embassy is controlled by an idiot. So he wants to count the number of ZIGZAG substrings of the array p . Arash call an array a of length $1 \leq k$ ZIGZAG if and only if it satisfies at least one of the following conditions:

- $a_1 < a_2 > a_3 < a_4 > a_5 < a_6 > a_7 < \dots a_k$ in other words, for each even x , $a_x - 1 < a_x > a_x + 1$
- $a_1 > a_2 < a_3 > a_4 < a_5 > a_6 < a_7 > \dots a_k$ in other words, for each even x , $a_x - 1 > a_x < a_x + 1$

But unfortunately, Arash has to handle q queries. In each query, some data either changes or he just wants to know the answer for a certain subarray of p . These queries are as follows:

- all of the costs form the L -th to the R -th days are multiplied by -1
- embassy adds V bucks to the cost of each of the L -th to the R -th days.
- she wants to know the number of ZIGZAG substring of the array p

Note that each query affects all of the following queries. It means that they are NOT independent.

Input

The first line of the input contains two integers n - the number of days that embassy published its entrance fee - and q - the number of questions Arash will ask.

Second line of the input contains n integers p_1, p_2, \dots, p_n - the entrance fee of each day.

In the i -th line of the next q lines, each line will be in one of the following formats:

- * $l_i r_i$ - all of the costs in the segment $[l_i, r_i]$ gets multiplied by -1 .
- + $l_i r_i v_i - v_i$ gets added to all of the costs in the segment $[l_i, r_i]$.
- ? $l_i r_i$ - Arash wants to know the number of ZigZag substrings in the segment $[l_i, r_i]$.

Output

For each question Arash asks, print the number of ZigZag substrings of that segment.

Constraints

- $1 \leq n \leq 3 \times 10^5$
- $1 \leq q \leq 3 \times 10^5$
- $-10^9 \leq p_i \leq 10^9$
- $-10^9 \leq x_i \leq 10^9$
- $1 \leq l_i \leq r_i \leq n$

Subtasks

Subtasks	score	constraints
1	8	$n, q \leq 5000$
2	42	for any query which $t_i = ?$ we have : $l_i = 1$ and $r_i = n$
3	35	$n, q \leq 10^5$
4	15	No additional constraints.

Examples

Standard input	Standard output
4 4 2 3 -1 -1 ? 1 4 + 3 3 4 * 1 3 ? 2 4	7 4
6 8 -2 7 3 4 1 6 ? 1 6 + 3 5 4 * 1 6 + 5 6 -3 ? 2 5 * 3 5 + 4 4 -2 ? 3 6	21 5 10

Sample explanation

In the first sample following substrings are ZigZag.

$$\{ \langle 2 \rangle, \langle 3 \rangle, \langle -1 \rangle, \langle -1 \rangle, \langle 2, 3 \rangle, \langle 3, -1 \rangle, \langle 2, 3, -1 \rangle \}$$

In the second sample following substrings are ZigZag.

$$\{ \langle -3 \rangle, \langle -3 \rangle, \langle -1 \rangle, \langle -3, -1 \rangle \}$$