

Problem B : Pomegranate Bowls

During a winter gathering in the city of **Neverland**, a long table is prepared for a traditional celebration. On the table, there are N bowls filled with pomegranate seeds, placed in a row and numbered from 1 to N . Each bowl initially contains a certain number of seeds.

Throughout the gathering, several changes are made to the bowls, and from time to time, the balance of seeds on parts of the table is checked. You are asked to process these operations efficiently.

Operations

There are Q operations of the following three types:

- **Add Seeds:** 1 L R X Add X seeds to each bowl with index from L to R (inclusive).
- **Remove Seeds:** 2 L R X Remove X seeds from each bowl with index from L to R (inclusive). The number of seeds in a bowl may become negative.
- **Balance Check:** 3 L R For the segment $[L, R]$, compute the *balance value*, defined as:

$$\max_{L \leq i \leq R} A_i - \min_{L \leq i \leq R} A_i$$

where A_i is the current number of seeds in the i -th bowl.

All operations must be processed in the given order. For each operation of type 3, output the corresponding balance value.

Input

The first line contains two integers N and Q — the number of bowls and the number of operations.

The second line contains N integers, where the i -th integer represents the initial number of seeds in the i -th bowl.

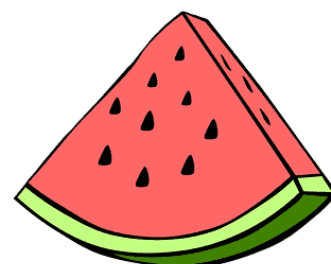
The next Q lines each describe one operation in one of the formats listed above.

$$1 \leq N, Q \leq 2 \times 10^5$$

$$1 \leq L \leq R \leq N$$

$$-10^9 \leq A_i \leq 10^9$$

$$1 \leq X \leq 10^9$$



Output

For each operation of type 3, print a single integer — the balance value for that query. Each result must be printed on its own line.

Example

Standard Input	Standard Output
5 6	4
3 1 4 1 5	4
3 1 5	3
1 2 4 3	0
3 1 5	
2 3 5 2	
3 3 5	
3 1 1	

Note

In the example above:

- The first balance check computes $\max(3, 1, 4, 1, 5) - \min(3, 1, 4, 1, 5) = 5 - 1 = 4$.
- After adding 3 seeds to bowls 2 through 4, the array becomes $[3, 4, 7, 4, 5]$.
- The second balance check again results in $7 - 3 = 4$.
- After removing 2 seeds from bowls 3 through 5, the array becomes $[3, 4, 5, 2, 3]$.
- The third balance check on segment $[3, 5]$ gives $5 - 2 = 3$.
- The final balance check on $[1, 1]$ gives 0.

