Task Sjeckanje

Paula likes to prepare stir fry. In order to make it as yummy as possible, she needs to chop a sequence of n integers into segments of the **maximum** total value.

The *value* of a segment is the **difference of its maximum and minimum**. The value of a chopped sequence is the sum of the values of the segments.

For example if we chop the sequence [1 4 1 5 3 6] into segments [1 4 1] and [5 3 6], the total value is $(4-1)+(6-3)=6$.

There will be q updates of the form "add x to the elements on indices $l, l+1, \ldots, r$". After each update, answer the query "What is the maximum possible value of the chopped sequence?".

Input

The first line contains integers n and q ($1 \leq n, q \leq 200\,000$), the length of the sequence and the number of updates.

The second line contains n integers a_i ($-10^8 \leq a_i \leq 10^8$), the sequence Paula needs to chop.

Each of the following q lines contains integers l, r ($1 \leq l \leq r \leq n$), and x ($-10^8 \leq x \leq 10^8$), describing an update.

Output

Output q lines, the maximum possible value of the sequence after each update.

Scoring

Subtask	Points	Constraints
1	15	$1 \leq n, q \leq 200$
2	40	$1 \leq n, q \leq 3000$
3	55	No additional constraints.

Examples

input

```
4 3
1 2 3 4
1 2 1
1 1 2
2 3 1
```

output

```
2
2
0
```

input

```
4 3
2 0 2 1
4 4 1
2 2 3
1 3 2
```

output

```
2
1
3
```

Clarification of the first example:

Possible optimal choppings after each update are respectively: [2 3 3 4], [4 3] [3 4], and [4 4 4 4].