Problem A. RMQ

Input file:	**standard input**
Output file:	**standard output**
Time limit:	2 seconds
Memory limit:	256 megabytes

Implement data structure to support dynamic RMQ queries. Given initial array a with $0 \le N \le 10^4$ elements and $0 \le M \le 10^4$ requests of 2 types:

? l r $- RMQ(l, r)$

+ i val $- update(i, val)$ (a[i] := val)

Provide answer for each RMQ request.

Input

First line contains two integer numbers: $0 \le N, M \le 10^4$ — number of elements in the array and number of requests.

Next line contains N integer numbers a_i — elements of initial array, $|a_i| \le 10^5$.

Each of following M lines contains request of one of 2 types:

? l r $- RMQ(l, r)$. $0 \le l < r \le N$

or

+ i val $- update(i, val)$. $0 \le i < N; |val| < 10^5$

Output

For each "?"request provide answer — minimum value on requested range: $RMQ(l, r) = min\{a[i] : i \in [l; r)\}$.

Examples

standard input	standard output
3 3 5 5 5 ? 0 3 + 1 2 ? 0 3	5 2
3 5 1 2 3 ? 0 3 ? 1 3 ? 2 3 + 0 2 ? 0 3	1 2 3 2
5 3 1 2 3 4 -5 ? 0 3 + 0 5 ? 0 3	1 2

Problem B. RZQ

Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	256 megabytes

After Lecture 9 on Algorithms and Data structures at MSAI, your are very interested in different range queries.

The last idea which interested you is RZQ. $RZQ(l,r)$ — number of zeroes in the array in range $[l,r)$:

$$RZQ(l,r) = |\{i : a[i] = 0\} \cap [l;r)|.$$

You have found a dynamic (non-constant) array and are experimenting with it. You want to check if it's possible to compute RZQ queries using $O(\log N)$ operations.

You have an initial array a which consists of N elements $|a_i| \leq 10^4$. You have requests of 2 types:

`? l r` — $RZQ(l,r)$. $0 \leq l < r \leq N$

or

`+ i delta` — $inc(i, delta)$: **increase** a[i] value by delta. $0 \leq i < N; |delta| < 10^4$

Provide an answer for each "?"request.

Input

First line contains two integer numbers: $0 < N, M \leq 10^5$ — number of items in array and number of requests.

Second line contains N integer numbers divided by space character: initial state of a array. $|a_i| \leq 10^4$.

Each of following M lines contain one character ("?"or "+") followed by two integer numbers. This line describes a request:

`? l r` — $RZQ(l,r)$. $0 \leq l < r \leq N$

`+ i delta` — $inc(i, delta)$. $0 \leq i < N; |delta| < 10^4$

Output

For each "?"request print one integer number — answer for RZQ request.

Examples

standard input	standard output
3 6 1 1 1 ? 0 3 + 1 -1 ? 0 3 ? 0 1 ? 1 2 ? 2 3	0 1 0 1 0
3 9 0 0 0 ? 0 3 + 1 1 ? 0 3 + 0 1 ? 0 3 + 2 1 ? 0 3 + 1 -1 ? 0 3	3 2 1 0 1
3 7 0 0 0 ? 0 3 + 1 2 ? 0 3 + 1 -1 ? 0 3 + 1 -1 ? 0 3	3 2 2 3