

Can you answer these queries VI

Given a sequence A of N ($N \leq 100000$) integers, you have to apply Q ($Q \leq 100000$) operations:

Insert, delete, replace an element, find the maximum contiguous (non empty) sum in a given interval.

Input

The first line of the input contains an integer N.

The following line contains N integers, representing the starting sequence $A_1..A_N$, ($|A_i| \leq 10000$).

The third line contains an integer Q. The next Q lines contains the operations in following form:

I x y: insert element y at position x (*between x - 1 and x*).

D x : delete the element at position x.

R x y: replace element at position x with y.

Q x y: print $\max\{A_i + A_{i+1} + \dots + A_j \mid x \leq i \leq j \leq y\}$.

All given positions are valid, and given values are between -10000 and +10000.

The sequence will never be empty.

Output

For each "Q" operation, print an integer (one per line) as described above.

Example

Input:

```
5
3 -4 3 -1 6
10
I 6 2
Q 3 5
R 5 -4
Q 3 5
D 2
Q 1 5
I 2 -10
Q 1 6
R 2 -1
Q 1 6
```

Output:

```
8
3
6
3
5
```