Maximum Non-Adjacent Subsequence Sum

There is an array of N integers. Initially, the i-th element (indexed starting at 1) is A_i. A *non-adjacent subsequence* of an array is a subset of elements such that no two adjacent elements of the array are in the subset. The *maximum non-adjacent subsequence sum* (MNASM) of an array is the sum of the elements in the non-adjacent subsequence with the largest sum.

For example, the MSANM of:

- [3, 2, 1] is 4: [**3**, 2, **1**].
- [20, 2, 3, 10, 6] is 30: [**20**, 2, 3, **10**, 6].
- [100, 100] is 100: [100, **100**].

You are tasked with facilitating B operations. There are two types of operations:

- `U i x`: Update the value of the i-th element to x.
- `Q l r`: Query the MANSM of the subarray starting at the l-th element and ending at the r-th element, inclusive.

Constraints

You are guaranteed that:

- $1 \leq N \leq 100\,000$.
- $1 \leq B \leq 100\,000$.
- There will be at least one query.
- Each element will be between 1 and 10 000 inclusive before all updates, and after each update.
- $1 \leq l \leq r \leq N$, for each query.

Input

- The first line of input contains the two integers N and B.
- The second line contains N integers. The i-th integer (starting from 1) is A_i.
- Then, B lines follow describing the operations. Each line begins with a character describing the type of query (`U` for update, and `Q` for query).
  - `U`: Two integers i and x follow, indicating that the i-th element is changed to x.
  - `Q`: Two integers l and r follow, querying the MSNASM of the subarray from the l-th to the r-th element inclusive.

Output

The output should contain one line for each query. The i-th line should give the answer to the i-th query.

Sample Input

```
6 7
100 300 20 90 150 90
Q 1 6
U 2 10
Q 1 6
Q 3 5
U 6 30
Q 6 6
Q 3 4
```

Sample Output

```
480
280
170
30
90
```

Explanation

- For the 1st query: [100, **300**, 20, **90**, 150, **90**].
- For the 2nd query: [**100**, 10, 20, **90**, 150, **90**].
- For the 3rd query: [**20**, 90, **150**].
- For the 4th query: [**30**].
- For the 5th query: [20, **90**].