Maximum Sum

You are given a sequence A[1], A[2], ..., A[N] ($0 \le A[i] \le 10^8$, $2 \le N \le 10^5$). There are two types of operations and they are defined as follows:

Update:

This will be indicated in the input by a 'U' followed by space and then two integers i and x.

U i x, $1 \le i \le N$, and x, $0 \le x \le 10^8$.

This operation sets the value of A[i] to x.

Query:

This will be indicated in the input by a 'Q' followed by a single space and then two integers i and j.

Q x y, $1 \le x < y \le N$.

You must find i and j such that $x \le i, j \le y$ and i != j, such that the sum A[i]+A[j] is maximized. Print the sum A[i]+A[j].

Input

The first line of input consists of an integer **N** representing the length of the sequence. Next line consists of N space separated integers A[i]. Next line contains an integer **Q**, $Q \le 10^5$, representing the number of operations. Next Q lines contain the operations.

Output

Output the maximum sum mentioned above, in a separate line, for each Query.

Example

Input:
5
1 2 3 4 5
6
Q 2 4
Q 2 5
U 1 6
Q 1 5
U 1 7
Q 1 5

Output:
7
9
11
12

Warning: large Input/Output data, be careful with certain languages