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Editor

Time Limit: 3000/2000 MS (Java/Others) Memory Limit: 131072/131072 K (Java/Others)
Total Submission(s): 3372 Accepted Submission(s): 937

Problem Description

You are going to implement the most powerful editor for integer sequences.
The sequence is empty when the editor is initialized.
There are 5 types of instructions.

- I x Insert x after the cursor.
- D Delete the element before the cursor.
- L Move the cursor left unless it has already been at the begin.
- R Move the cursor right unless it has already been at the end.
- Q k Suppose that the current sequence **BEFORE the cursor** is $\{a_1, a_2, \dots, a_n\}$. Find $\max_{1 \leq i \leq k} S_i$ where $S_i = a_1 + a_2 + \dots + a_i$.

Input

The input file consists of multiple test cases. For each test case:
The first line contains an integer Q , which is the number of instructions. The next Q lines contain an instruction as described above.
($1 \leq Q \leq 10^6$, $|x| \leq 10^3$ for I instruction, $1 \leq k \leq n$ for Q instruction)

Output

For each Q instruction, output the desired value.

Sample Input

```
8
I 2
I -1
I 1
Q 3
L
D
R
Q 2
```

Sample Output

```
2
3
```

Hint

The following diagram shows the status of sequence after each instruction:

```
I 2  [2]
      ^
I -1 [2, -1]
      ^
I 1  [2, -1, 1]
      ^
Q 3  [2, -1, 1]
      ^
L    [2, -1, 1]
      ^
D    [2, 1]
      ^
R    [2, 1]
      ^
Q 2  [2, 1]
      ^
```

Source

2013 Multi-University Training Contest 10

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Hangzhou Dianzi University Online Judge 3.0
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