

Koh-Lanta

There are an odd number of contestants N participating in the final challenge of the hit reality TV show *Koh-Lanta*. The contestants are numbered from 1 to N according to their strength, with contestant 1 being the weakest and contestant N being the strongest.

The contestants stand in a line, with the i -th contestant standing p_i metres from the left end of the line. No two contestants stand at the same position.

The challenge consists of $\frac{N-1}{2}$ rounds. In each round, only the three contestants with the lowest p_i participate (that is, the three contestants closest to the left end of the line). Of the three, the contestants with the **highest strength** and the **lowest strength** are eliminated (the two weaker contestants work together to beat the strongest one, then the weakest contestant is beaten by the other remaining contestant). The eliminated contestants leave the line and do not participate in any more rounds.

After all the rounds are over, the single remaining contestant is crowned the winner.

The gameshow organizers haven't finalized the values of p_i yet. Thus, they have asked you to facilitate Q operations. There are two types of operations:

- U: The contestant x_i moves to a new position v_i metres from the left end of the line. After each U operation, no two contestants stand at the same position.
- W: With the current positions of the contestants, determine the winner.

Subtasks and Constraints

For all subtasks, you are guaranteed that:

- $3 \leq N \leq 300\,000$, and N is odd.
- $1 \leq p_i \leq 1\,000\,000$ for all i .
- $1 \leq Q \leq 300\,000$.
- $1 \leq x_i \leq N$ for all i .
- $1 \leq v_i \leq 1\,000\,000$ for all i .
- Before all, and after each operation, no two contestants have the same p_i .

Additional constraints for each subtask are given below.

Subtask	Points	Additional constraints
1	5	$N, Q \leq 100$
2	7	$N, Q \leq 5000$
3	15	See * below.
4	11	See ** below.
5	20	$x_i = x_j$ for all i and j . That is, in all U operations, it is the same contestant who moves.
6	26	For each W operation, the contestant's positions at that moment are at most N .
7	16	No additional constraints.

*In Subtask 3: Only contestants with initial position ≤ 100 will move, and they will only move to other positions ≤ 100 (that is, for all U operations, $p_{x_i}, v_i \leq 100$ for all i). All contestants with initial position > 100 do not move.

**In Subtask 4: Only contestants with initial position ≥ 999900 will move, and they will only move to other positions ≥ 999900 (that is, for all U operations, $p_{x_i}, v_i \geq 999900$ for all i). All contestants with initial position < 999900 do not move.

Input

- The first line of input contains the two integers N and Q .
- The second line contains N integers p_1, p_2, \dots, p_N .
- The following Q lines describe the operations. The i -th line begins with either a U or W denoting the type of operation:
 - If it is a U operation, the two integers x_i and v_i follow.
 - If it is a W operation, nothing else follows.

Output

For each W operation, output a line containing the winner given the positions of the contestants at that time.

Sample Input 1

```
5 8
2 1 4 8 6
W
U 1 7
W
U 5 2
U 2 9
U 4 3
U 4 1
W
```

Sample Output 1

```
4
3
2
```

Sample Input 2

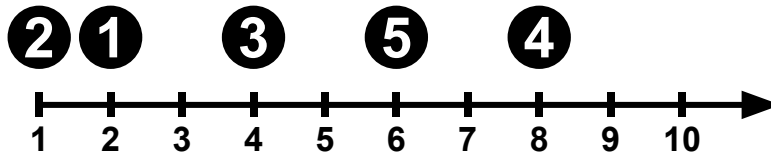
```
11 7
10 3 9 7 2 5 4 8 1 11 6
W
W
U 9 313
U 6 1
U 10 5
U 9 11
W
```

Sample Output 2

```
6
6
7
```

Explanation

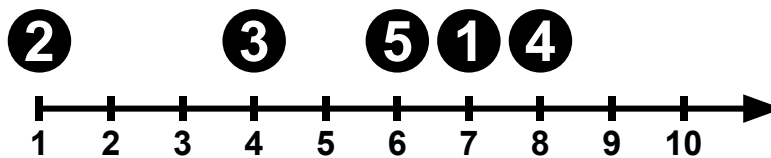
In Sample Input 1, there are $N = 5$ contestants and $Q = 8$ operations. At the first W operation, the contestants are positioned as follows:



The winner would be contestant 4, since:

- In the first round, contestants 2, 1 and 3 participate. 1 and 3 are eliminated.
- In the second round, contestants 2, 5 and 4 participate. 2 and 5 are eliminated.

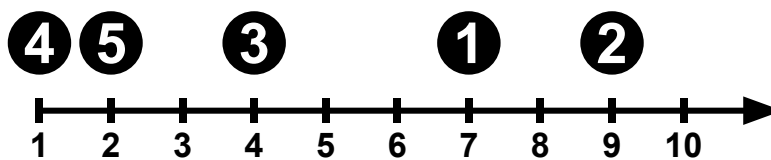
At the second W operation, the contestants are positioned as follows:



The winner would be contestant 3, since:

- In the first round, contestants 2, 3 and 5 participate. 2 and 5 are eliminated.
- In the second round, contestants 3, 1 and 4 participate. 1 and 4 are eliminated.

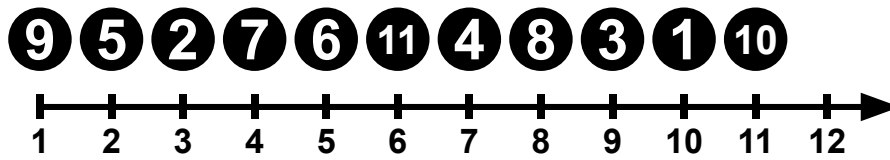
At the third W operation, the contestants are positioned as follows:



The winner would be contestant 2, since:

- In the first round, contestants 4, 5 and 3 participate. 3 and 5 are eliminated.
- In the second round, contestants 4, 1 and 2 participate. 1 and 4 are eliminated.

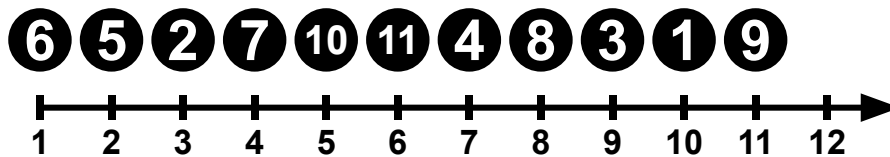
In Sample Input 2, there are $N = 11$ contestants and $Q = 2$ operations. At the first (and second) W operation, the contestants are positioned as follows:



The winner would be contestant 6, since:

- In the first round, contestants 9, 5 and 2 participate. 2 and 9 are eliminated.
- In the second round, contestants 5, 7 and 6 participate. 5 and 7 are eliminated.
- In the third round, contestants 6, 11 and 4 participate. 4 and 11 are eliminated.
- In the fourth round, contestants 6, 8 and 3 participate. 3 and 8 are eliminated.
- In the fifth round, contestants 6, 1 and 10 participate. 1 and 10 are eliminated.

At the third W operation, the contestants are positioned as follows:



The winner would be contestant 7, since:

- In the first round, contestants 6, 5 and 2 participate. 2 and 6 are eliminated.
- In the second round, contestants 5, 7 and 10 participate. 5 and 10 are eliminated.
- In the third round, contestants 7, 11 and 4 participate. 4 and 11 are eliminated.
- In the fourth round, contestants 7, 8 and 3 participate. 3 and 8 are eliminated.
- In the fifth round, contestants 7, 1 and 9 participate. 1 and 9 are eliminated.