An Animal Contest 3 P7 - Monkey Lasers (Up Version)

Time limit: 2.0s Java: 3.5s **Memory limit:** 256M Java: 512M

Note: This problem is a modified version of this problem. The only difference is that in this problem, Moses can go up.

Moses the monkey finds himself in a grid with a ton of lasers!

The grid has $N+2$ rows numbered from 0 to $N+1$, and M columns numbered from 1 to M. Each row i from row 1 to N has a special laser located on cell c_i of that row. However, each laser can only face one direction d_i, either left or right, which Moses knows beforehand. A laser located at column i facing left will vaporize everything in any cell on the same row with column j where $j < i$. Similarly, a laser facing right will vaporize every cell on the same row with column $j > i$.

Moses can start off in any cell on row 0. He wishes to reach row $N+1$, but has a strong desire to not be vaporized. Thus, from his current cell, Moses can move to any adjacent cell inside the grid that does not cause him to be vaporized, incurring a cost of 1. If Moses moves into a row where the laser is not looking in his direction, he uses his handy-dandy gadget to destroy it permanently. Note that Moses is **not** allowed to enter a cell with a laser.

Moses also has a special ability that he can use, and by using his special ability once, he flips the direction of every remaining laser. Using this ability while he is in row i has a cost of k_i. Note that the special ability is available to be used an infinite number of times in any row between 0 and N inclusive.

Given that Moses can end off in any cell on row $N+1$, what is the smallest possible cost required to reach row $N+1$ without being vaporized?

Constraints

$1 \leq N \leq 2 \times 10^5$

$2 \leq M \leq 10^9$

$1 \leq c_i \leq M$

$1 \leq k_i \leq 10^9$

Input Specification

The first line contains two space-separated integers N and M.

The next line contains N space-separated integers c_i, the position of the laser for each row from 1 to N.

The third line contains a string d of length N where the i^{th} laser is facing left if d_i is `L` and facing right if d_i is `R`.

The fourth and final line contains $N+1$ space-separated integers k_i, the cost of using the special ability on each row from 0 to N.

Output Specification

Output one integer representing the minimum cost Moses will incur to reach row $N + 1$.

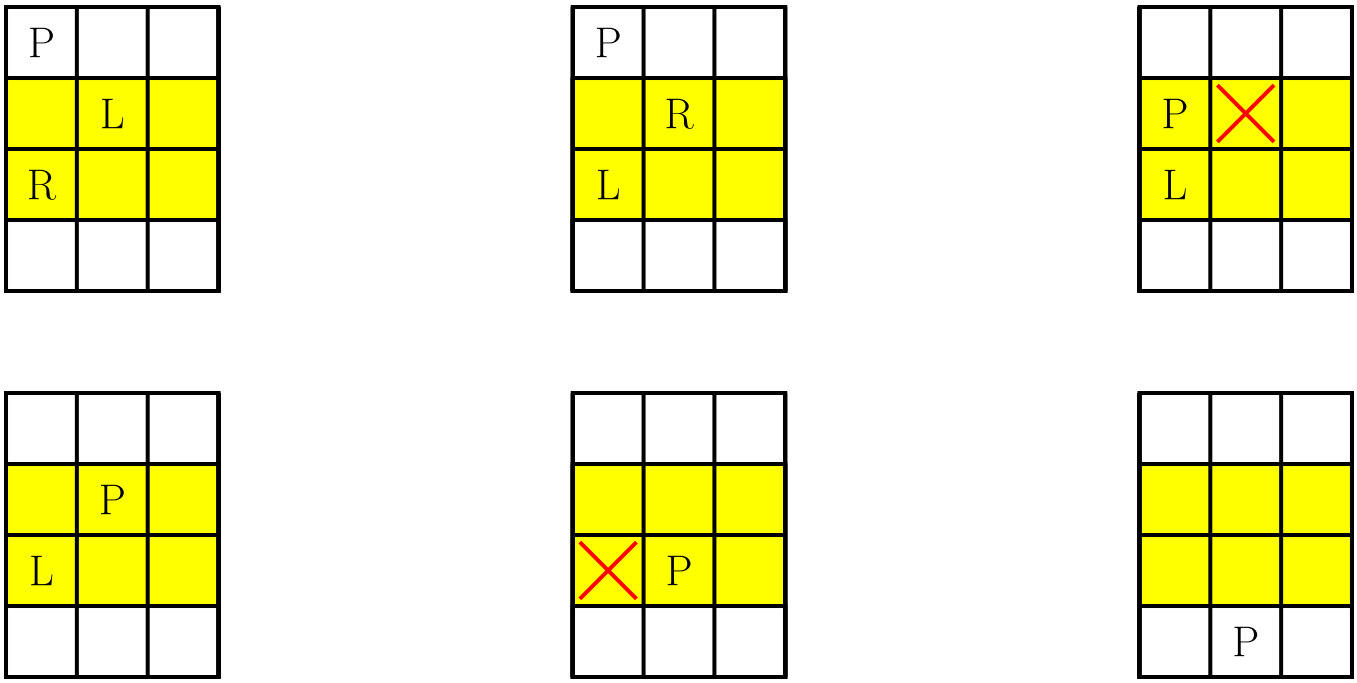
Sample Input 1

```
2 3
2 1
LR
7 727 69
```

Sample Output 1

```
11
```

Explanation for Sample 1



For the purposes of this explanation, assume that cell $(0, 1)$ is the top-leftmost cell and cell $(N + 1, M)$ is the bottom-rightmost cell in the above diagrams. The lasers in each row are labeled with the direction they are facing, `L` for left and `R` for right; Moses is represented by the character `P`.

The diagrams show Moses' situation every time he uses his special ability or makes a move. The following lines describe Moses' journey in chronological order.

The top-left diagram shows the grid's initial state. To minimize cost, Moses decides to start at cell $(0, 1)$.

The top-middle diagram shows the grid's state after Moses uses his special ability while at row 0. This incurs a cost of 7.

Moses moves into the grid at cell $(1, 1)$, incurring a cost of 1. He destroys the laser on row 1. This is seen in the top-right diagram.

Moses moves right into cell $(1, 2)$, incurring a cost of 1. Since the laser is no longer there, this is a legal move. This is shown in the bottom-left diagram.

Moses then moves down into cell $(2, 2)$, incurring a cost of 1. He destroys the laser on row 2. This is depicted by the bottom-middle diagram.

Moses moves down one more time arriving at cell $(3, 2)$, incurring a cost of 1. This is shown by the bottom-right diagram.

Moses has reached row $N + 1$ incurring a total cost of 11, which can be proven to be minimal.

Sample Input 2

```
3 3
1 3 2
LRR
420 563 447 7216
```

Sample Output 2

```
5
```