COCI '12 Contest 6 #6 Bakterije

Time limit: 1.0s   **Memory limit:** 32M

Luka is bored in chemistry class yet again. This time, he's playing with intelligent bacteria. He has arranged his K bacteria on a rectangular board divided in N rows, labelled with numbers from 1 to N starting from the top, and M columns, labelled with numbers from 1 to M starting from the left.

Each bacterium begins its adventure in a certain cell, facing one of the four neighbouring cells, and carries out the following actions every second:

1. Reads the number X dedicated to that bacterium in the current cell.
2. Turns 90 degrees clockwise, X times.
3. If it is facing a cell outside the board, it turns 180 degrees.
4. Finally, it moves to the cell that it is facing.

Luka has placed a trap in one cell. The trap will activate and kill the bacteria as soon as they **all** step on that cell in the **same second**. Since Luka only has two hours of chemistry class today, help him determine how long the game will last, in seconds.

Input Specification

The first line of input contains the positive integers N ($3 \leq N \leq 50$), M ($3 \leq M \leq 50$), and K ($1 \leq K \leq 5$).

The second line of input contains the positive integers X and Y, the row and column where Luka has placed the trap.

The remainder of the input consists of bacteria descriptions, for each bacterium i from 1 to K:

- two positive integers X_i, Y_i – the row and column of the starting cell of bacterium i, and the character C_i representing the starting direction that the bacterium is facing (U – up, R – right, D – down, L – left).
- N by M matrix of digits between 0 and 9 , inclusive; the digit in row x and column y represents the number in cell (x, y) dedicated to bacterium i.

Output Specification

The first and only line of output must contain the total duration of Luka's game, in seconds. If the game will never end, output -1 .

Sample Input 1

```
3 3 1
2 2
1 1 R
010
000
000
```

Sample Output 1

```
3
```

Sample Input 2

```
3 4 2
2 2
3 4 R
2327
6009
2112
3 2 R
1310
2101
1301
```

Sample Output 2

```
8
```

Sample Input 3

```
4 4 3
4 3
1 1 U
1001
0240
3322
2327
1 3 L
9521
2390
3020
2421
2 2 D
3397
2013
1102
7302
```

Sample Output 3

```
296
```