Felix the repairman

- Time limit: 3 seconds
- Memory limit: 256 MB

Maybe many of you know Fix-It Felix Jr. from the cartoon Wrecker Ralph. Felix is a repairman who has a magic hammer. His hammer will repair any broken or broken object in the blink of an eye.

Felix has recently entered the city of square structures to repair the damage caused by the earthquake. In this city, all the buildings are in the form of squares$n \times n$are made. The rows of this square from top to bottom and the columns of this square from left to right with 1$n$are numbered. In each square, the main diameter is connected from the upper left corner to the lower right corner, and the minor diameter is connected from the upper right corner to the lower left corner.

Felix, who is a philanthropist, decides to repair all the houses below the sub-diameter of the buildings for free. In order to continue the work of the people of the city,mThey are hiring. In each turn, people first select a house on the minor diagonal and a direction between the top and left directions. Felix must start from the specified house and move in the specified direction, repairing the houses one by one. He stops when he reaches a house that has already been repaired or when he gets out of the table. (It is possible that the first house, that is, the house on the marked subdiameter, has already been repaired, which is actually a sign of the humor of the townspeople)

Felix wants to know exactly how many houses he will repair at each turn. You help Felix figure out this number.

Input

In the first line, in order of values$n$And$m$They come with the following conditions.

$$1 \leq n \leq 1\,0^9$$

$$1 \leq m \leq 2 \cdot 1\,0^5$$

And in$m$Next line, in each line in order of valuesc_iAndr_iAndd_iThey show the column number and row number of the selected house on the sub-diagonal and the selected direction of that turn, respectively.

ifd_iIf it is equal `'U'`, it means that the selected direction is high. otherwise$d_i$will be equal `'L'` and the selected direction is equal to left.

The specified houses are guaranteed to be on the subdiameter.

Output

In this issue$m$We will have an output line that is the value of the line$i$M, number of houses repaired in operation$i$It shows M.

Example

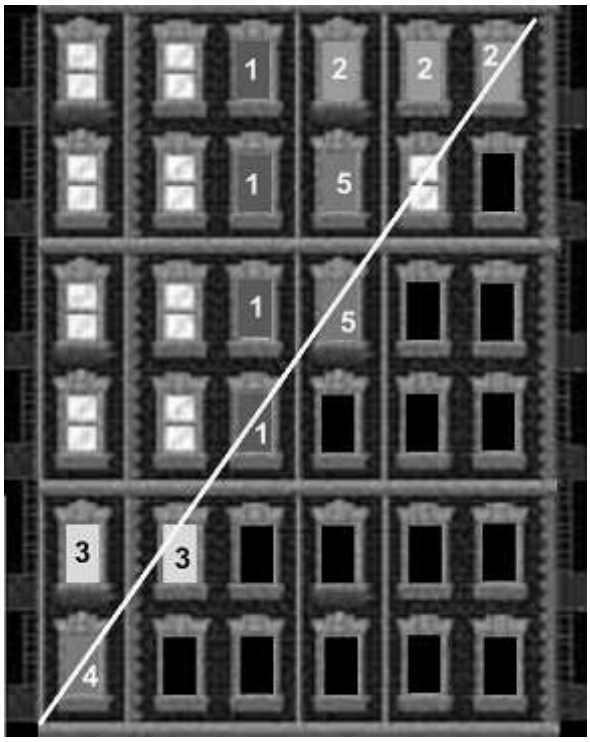
Sample input 1

```
6 5
3 4 U
6 1 L
2 5 L
1 6 U
4 3 U
```

Sample output 1

```
4
3
2
1
2
```

The image of the first example is as follows. The black houses have been repaired in the way of God's pleasure :)) and the colored and numbered houses represent the houses that have been repaired in the respective operations. The white line shows the subdiameter:



Sample input 2

```
10 6
2 9 U
10 1 U
1 10 U
8 3 L
10 1 L
6 5 U
```

Sample output 2

```
9
1
```

```
10
6
0
2
```

The following image is related to the second example: