Moving robots

The experimental rectangular grid consists of M rows of cells, each rows contains N cells.
There are two experimental robots, Robot1 and Robot2, operating in the grid. The movement of each robot is regulated by its own set of commands.

The operation of robots in the grid is divided into C cycles.
In each cycle, Robot1 executes one command from its command sequence and then Robot2 executes one command from its command sequence. In the first cycle, each robot executes the first command in its command sequence. In the second cycle, each robot executes the second command in its command sequence, and so on. When in some cycle a robot executes the last command in its command sequence, in the next cycle this robot jumps to the beginning of its command sequence and executes the first command in it and in the subsequent cycles it performs the subsequent commands in the sequence.
In other words, each robot loops through its sequence of commands during the whole process, executing one command in each cycle.

Each robot is always heading in one of the four principal grid directions: East, North, West or South.
A command has three possible forms.
- L command tells the robot to rotate 90 degrees counterclockwise (to the left) in its current cell and perform no more action.
- R command tells the robot to rotate 90 degrees clockwise (to the right) in its current cell and perform no more action.
- A numerical command, which consists of a single positive integer I, tells robot to move forward in its current heading by I cells.

When a robot is issued a numerical command it may not complete the command due to an obstacle in front of it. A robot can always move only into an empty cell, it cannot move to a cell occupied by the other robot and it also cannot break through the field border. Therefore, if the movement of the robot is blocked by the other robot or by the field border, the robot just stops in the last free cell before the obstacle and performs no other action in the current cycle.
For example, when a command tells robot to move 6 cells towards the field border and there are only 4 free cells between the robot and the border, the robot will move through first 3 free cells and end its movement in the fourth cell, facing directly the border. In an extreme case, the robot may not move at all after a particular numerical command, namely when it already directly faces the field border or a cell occupied by the other robot.
A robot can always turn itself in its cell, no matter where is the other robot or the field border relative to the robot.

The task

You are given initial positions of both robots in the given grid and the command sequence of each robot. Calculate the total number of cells visited at least once by at least one robot. A cell visited multiple times always counts only once in the resulting total.

Input

The first input line contains three integers M, N and C, representing the number of rows in the grid, the number of columns in the grid, and the number of cycles to be executed by the robots. The rows and columns are indexed from 1 to M and N, respectively.
The second line contains three integers X, Y, and H. The values X and Y specify the column and the row of the initial position of the first robot. Value H specifies the initial heading of the first robot, it can attain one of four values 0,1,2,3, representing, in this order, East, North, West and South headings. The third line contains the sequence of commands of the first robot. The items in the sequence are either characters 'L' or 'R' or integers. Each item represents one command. All items are separated by space.
The fourth line specifies the column and the row of the initial position and the initial heading of the second robot, the fifth line specifies the sequence of commands of the second robot. The specification is given in the same format as for the first robot.
It holds, $2 \le M, N \le 100$, $2 \le C \le 1000$. Each integer in a list of commands is positive and less than 1000.

Output

The output consists of a single text line containing the total number of visited cells in all performed cycles.

Example 1

Input

```
8 6 5
2 4 0
4 L 2 L
6 1 1
6 5 R
```

Output

```
16
```

Example 2

Input

```
8 6 10
2 4 0
4 L 2 L
6 1 1
6 5 R
```

Output

```
24
```

Note that Example 2 differs from Example 1 only by the number of cycles to be performed, all other parameters are the same in both Examples.

Example 3

Input

```
7 7 20
2 2 1
4 R
6 6 3
4 R 3 R
```

Output

```
19
```

```
Step by step illustration of the robots movements in the grid in Examples 1 and 2.
The robots are indicated by their nubers and a symbol showing the heading of the robot.
The visited cells are marked by symbols '+' (plus), the unvisited cells ar marked by '.' (dot).
```

```
Example 1

Initial configuration
  .  .  .  .  .  .  .  .  .
  .  .  .  .  .  .  .  .  .
  . 1>  .  .  .  .  .  .  .
  .  .  .  .  .  .  .  .  .
  .  .  .  .  .  .  .  .  .
  .  .  .  .  . 2^  .  .  .

cycle 1 ------------------
  robot 1 command 4
  .  .  .  .  .  .  .  .  .
  .  .  .  .  .  .  .  .  .
  .  +  +  +  + 1>  .  .  .
  .  .  .  .  .  .  .  .  .
  .  .  .  .  .  .  .  .  .
  .  .  .  .  . 2^  .  .  .
  robot 2 command 6
  .  .  .  .  .  .  .  .  .
  .  .  .  .  .  .  .  .  .
  .  +  +  +  + 1>  .  .  .
  .  .  .  .  . 2^  .  .  .
  .  .  .  .  .  +  .  .  .
  .  .  .  .  .  +  .  .  .

cycle 2 ------------------
   robot 1 command L
   .  .  .  .  .  .  .  .  .
   .  .  .  .  .  .  .  .  .
   .  +  +  +  + 1^  .  .  .
   .  .  .  .  . 2^  .  .  .
   .  .  .  .  .  +  .  .  .
   .  .  .  .  .  +  .  .  .
   robot 2 command 5
   .  .  .  .  .  .  .  .  .
   .  .  .  .  .  .  .  .  .
   .  +  +  +  + 1^  .  .  .
   .  .  .  .  . 2^  .  .  .
   .  .  .  .  .  +  .  .  .
   .  .  .  .  .  +  .  .  .

cycle 3 ------------------
   robot 1 command 2
   .  .  .  .  .  . 1^  .  .
   .  .  .  .  .  .  +  .  .
   .  +  +  +  +  +  .  .  .
   .  .  .  .  .  . 2^  .  .
   .  .  .  .  .  .  +  .  .
   .  .  .  .  .  .  +  .  .
   robot 2 command R
   .  .  .  .  .  . 1^  .  .
   .  .  .  .  .  .  +  .  .
   .  +  +  +  +  +  .  .  .
   .  .  .  .  .  . 2>  .  .
   .  .  .  .  .  .  +  .  .
   .  .  .  .  .  .  +  .  .

cycle 4 ------------------
   robot 1 command L
   .  .  .  .  .  . 1<  .  .
   .  .  .  .  .  .  +  .  .
   .  +  +  +  +  +  .  .  .
   .  .  .  .  .  . 2>  .  .
   .  .  .  .  .  .  +  .  .
   .  .  .  .  .  .  +  .  .
   robot 2 command 6
   .  .  .  .  .  . 1<  .  .
   .  .  .  .  .  .  +  .  .
   .  +  +  +  +  +  .  .  .
   .  .  .  .  .  .  +  + 2>
   .  .  .  .  .  .  +  .  .
   .  .  .  .  .  .  +  .  .

cycle 5 ------------------
   robot 1 command 4
   . 1<  +  +  +  +  .  .
   .  .  .  .  .  .  +  .  .
   .  +  +  +  +  +  .  .  .
   .  .  .  .  .  .  +  + 2>
   .  .  .  .  .  .  +  .  .
   .  .  .  .  .  .  +  .  .
   robot 2 command 5
   . 1<  +  +  +  +  .  .
   .  .  .  .  .  .  +  .  .
   .  +  +  +  +  +  .  .  .
   .  .  .  .  .  .  +  + 2>
   .  .  .  .  .  .  +  .  .
   .  .  .  .  .  .  +  .  .
```

```
Example 2

 Initial configuration
  .  .  .  .  .  .  .  .  .

cycle 3 ------------------
   robot 1 command 2
   .  .  .  .  .  . 1^  .  .
   .  .  .  .  .  .  +  .  .
   .  +  +  +  +  +  .  .  .
   .  .  .  .  .  . 2^  .  .
   .  .  .  .  .  .  +  .  .
   .  .  .  .  .  .  +  .  .
   robot 2 command R
   .  .  .  .  .  . 1^  .  .

cycle 6 ------------------
   robot 1 command L
   . 1v  +  +  +  +  .  .
   .  .  .  .  .  .  +  .  .
   .  +  +  +  +  +  .  .  .
   .  .  .  .  .  .  +  + 2>
   .  .  .  .  .  .  +  .  .
   .  .  .  .  .  .  +  .  .
   robot 2 command R
   . 1v  +  +  +  +  .  .

cycle 9 ------------------
   robot 1 command 4
   .  +  +  +  +  +  .  .
   .  +  .  .  .  +  .  .
   .  +  +  +  + 1>  .  .
   .  .  .  .  .  +  +  +
   .  .  .  .  .  +  .  +
   .  .  .  .  .  +  . 2v
   robot 2 command R
   .  +  +  +  +  +  .  .
```

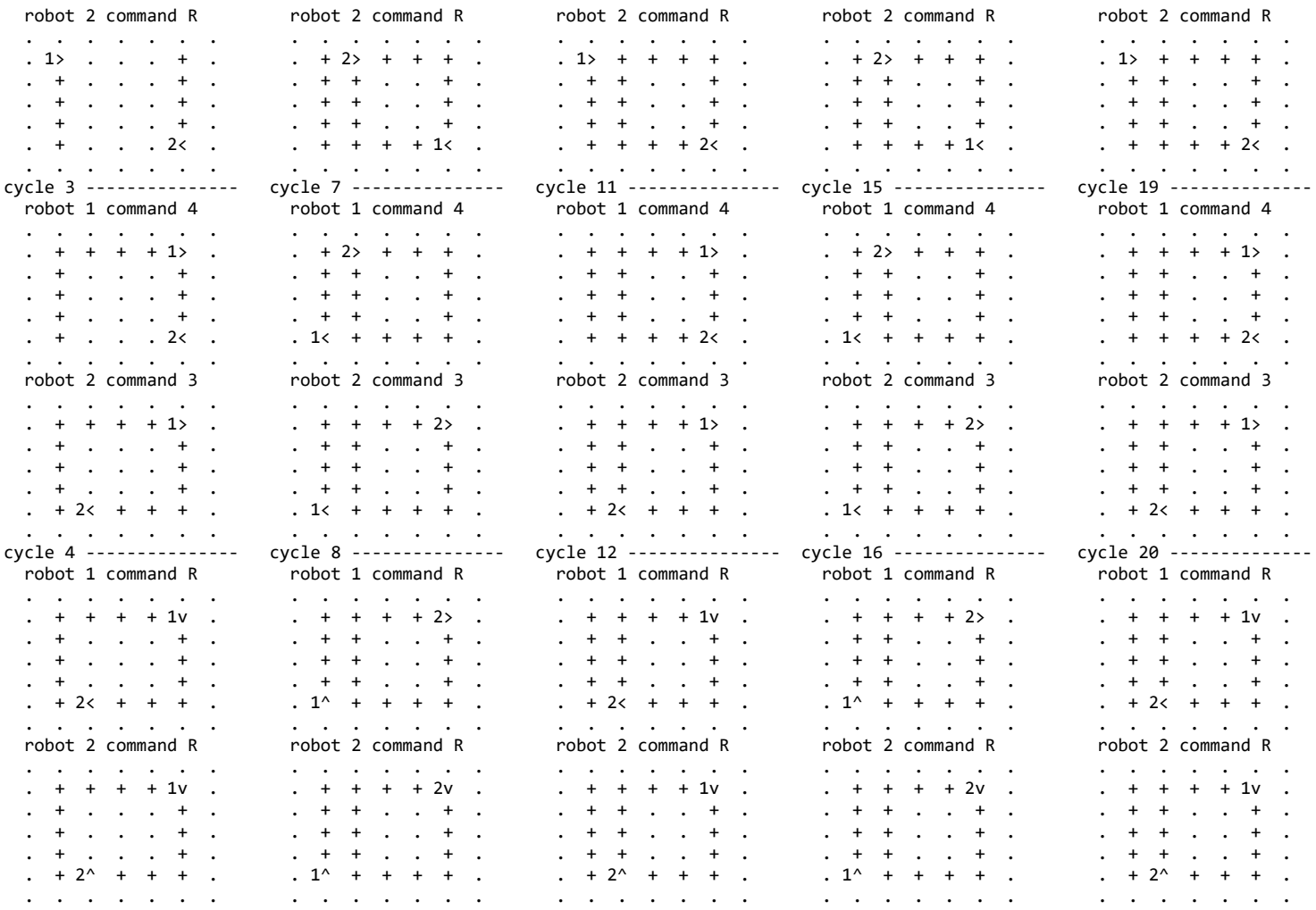
```
  . . . . . . . . .        . . . . . . + . .        . . . . . . + . .        . + . . . + . .
  . 1> . . . . . .        . + + + + + . .        . + + + + + . .        . + + + + 1> . .
  . . . . . . . . .        . . . . . 2> . .        . . . . . . + + 2v        . . . . . . + + +
  . . . . . . . . .        . . . . . . + . .        . . . . . . + . .        . . . . . . + . +
  . . . . . 2^ . .        . . . . . . + . .        . . . . . . + . .        . . . . . . + . 2<
cycle 1 ------------------  cycle 4 ------------------  cycle 7 ------------------  cycle 10 -----------------
  robot 1 command 4          robot 1 command L          robot 1 command 2          robot 1 command L
  . . . . . . . . .        . . . . . 1< . .        . + + + + + . .        . + + + + + . .
  . . . . . . . . .        . . . . . . + . .        . + . . . + . .        . + . . . + . .
  . + + + + 1> . .        . + + + + + . .        . 1v + + + + . .        . + + + + 1^ . .
  . . . . . . . . .        . . . . . 2> . .        . . . . . . + + 2v        . . . . . . + + +
  . . . . . . . . .        . . . . . . + . .        . . . . . . + . .        . . . . . . + . +
  . . . . . 2^ . .        . . . . . . + . .        . . . . . . + . .        . . . . . . + . 2<
  robot 2 command 6          robot 2 command 6          robot 2 command 6          robot 2 command 6
  . . . . . . . . .        . . . . . 1< . .        . + + + + + . .        . + + + + + . .
  . . . . . . . . .        . . . . . . + . .        . + . . . + . .        . + . . . + . .
  . + + + + 1> . .        . + + + + + . .        . 1v + + + + . .        . + + + + 1^ . .
  . . . . . 2^ . .        . . . . . . + + 2>        . . . . . . + + +        . . . . . . + + +
  . . . . . + . . .        . . . . . . + . .        . . . . . . + . +        . . . . . . + . +
  . . . . . + . . .        . . . . . . + . .        . . . . . . + . 2v        . 2< + + + + + +
cycle 2 ------------------  cycle 5 ------------------  cycle 8 ------------------
  robot 1 command L          robot 1 command 4          robot 1 command L
  . . . . . . . . .        . 1< + + + + . .        . + + + + + . .
  . . . . . . . . .        . . . . . . + . .        . + . . . + . .
  . + + + + 1^ . .        . + + + + + . .        . 1> + + + + . .
  . . . . . 2^ . .        . . . . . . + + 2>        . . . . . + + +
  . . . . . + . . .        . . . . . . + . .        . . . . . + . +
  . . . . . + . . .        . . . . . . + . .        . . . . . + . 2v
  robot 2 command 5          robot 2 command 5          robot 2 command 5
  . . . . . . . . .        . 1< + + + + . .        . + + + + + . .
  . . . . . . . . .        . . . . . . + . .        . + . . . + . .
  . + + + + 1^ . .        . + + + + + . .        . 1> + + + + . .
  . . . . . 2^ . .        . . . . . . + + 2>        . . . . . + + +
  . . . . . + . . .        . . . . . . + . .        . . . . . + . +
  . . . . . + . . .        . . . . . . + . .        . . . . . + . 2v
```

Example 3

Initial configuration

```
  . . . . . . . .
  . . . . . 2v . .
  . . . . . . . .
  . . . . . . . .
  . . . . . . . .
  . 1^ . . . . . .
  . . . . . . . .
```

```
cycle 1 ---------------  cycle 5 ---------------  cycle 9 ---------------  cycle 13 ---------------  cycle 17 ---------------
  robot 1 command 4          robot 1 command 4          robot 1 command 4          robot 1 command 4          robot 1 command 4
  . . . . . . . . .        . . . . . . . . .        . . . . . . . . .        . . . . . . . . .        . . . . . . . . .
  . 1^ . . . 2v . .        . + + + + + . .        . 1^ + + + 2v . .        . + + + + + . .        . 1^ + + + 2v . .
  . + . . . . . .        . + . . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .
  . + . . . . . .        . + . . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .
  . + . . . . . .        . + . . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .
  . . . . . . . .        . + 2^ + + 1v . .        . + + + + + . .        . + 2^ + + 1v . .        . + + + + + . .
  robot 2 command 4          robot 2 command 4          robot 2 command 4          robot 2 command 4          robot 2 command 4
  . . . . . . . . .        . . . . . . . . .        . . . . . . . . .        . . . . . . . . .        . . . . . . . . .
  . 1^ . . . + . .        . + 2^ + + + . .        . 1^ + + + + . .        . + 2^ + + + . .        . 1^ + + + + . .
  . + . . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .
  . + . . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .
  . + . . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .
  . + . . . 2v . .        . + + + + 1v . .        . + + + + 2v . .        . + + + + 1v . .        . + + + + 2v . .
  . . . . . . . .        . . . . . . . .        . . . . . . . .        . . . . . . . .        . . . . . . . .
cycle 2 ---------------  cycle 6 ---------------  cycle 10 --------------  cycle 14 ---------------  cycle 18 ---------------
  robot 1 command R          robot 1 command R          robot 1 command R          robot 1 command R          robot 1 command R
  . . . . . . . . .        . . . . . . . . .        . . . . . . . . .        . . . . . . . . .        . . . . . . . . .
  . 1> . . . + . .        . + 2^ + + + . .        . 1> + + + + . .        . + 2^ + + + . .        . 1> + + + + . .
  . + . . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .
  . + . . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .
  . + . . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .        . + + . . + . .
  . + . . . 2v . .        . + + + + 1< . .        . + + + + 2v . .        . + + + + 1< . .        . + + + + 2v . .
  . . . . . . . .        . . . . . . . .        . . . . . . . .        . . . . . . . .        . . . . . . . .
```



Public data

The public data set is intended for easier debugging and approximate program correctness checking. The public data set is stored also in the upload system and each time a student submits a solution it is run on the public dataset and the program output to stdout and stderr is available to him/her.

Link to public data set