Problem F: Was it a Dream?

You find yourself in a cramped, spherical space. You try to move, but other than feeling a small impact, nothing happens. You then try to move in the opposite direction, and you feel yourself start rolling. You roll, roll, roll, then you bump into something and you come to a stop. Strangely enough, you are okay, albeit a bit sick. Having nothing better to do, you keep at it for some time. At some point, you realise that you have some control over the direction of the rolling and that, once you start rolling, you only stop when you hit something that must be some kind of obstacle. After that, you may only move in the direction you came from, or at a right angle from it. Suddenly, just as you begin getting tired of what seems like a pointless exercise, your stomach reaches for your mouth as you run out of ground and start falling. And you keep falling. What have you gotten yourself into now? Then, there's a crash. The sphere shatters. You're home.

Task

Given the map of the rectangular space where the sphere moves in, and your initial location, your task is to compute the minimum number of moves it takes to reach the hole which will take you home (it is not so much the rolling that upsets you, but the bumping into things). Each location of the space is either empty, or it contains an obstacle or the hole.

The sphere may only move through the empty locations, in the directions parallel to the sides of the map. Once the sphere starts moving, it only stops when it hits an obstacle or it falls through the hole. If the sphere falls off a side of the map, there is no way of getting back on the map again and you will never get home.

Input

The first line of input contains three integers, R, C and T, representing, respectively, the number of rows and columns of the map, and the number of test cases.

Each of the following R lines contains C characters, describing a line of the map. An empty location is represented by the character '`.`' (dot), an obstacle is represented by the letter '`O`', and the single hole is represented by '`H`'.

The final T lines contain a pair (r_i, c_i) of integers each, which represents your initial location in the i^{th} test case. The initial location is always empty. Location $(1, 1)$ corresponds to the first character of the first row, in input order, and location (R, C) corresponds to the last character of the last row.

Constraints

$1 \leq R, C \leq 900$	Number of rows and of columns of the map
$1 \leq T \leq 10$	Number of test cases
$(1, 1) \leq (r_i, c_i) \leq (R, C)$	Initial locations

Output

The output consists of one line for each test case, containing either a single integer, denoting the minimum number of moves it takes you to reach the hole, starting from the corresponding initial location, or the word `Stuck`, if it is not possible to reach the hole from the initial location.

Sample Input

```
10 20 3
.....O..............
OOO.OO.OOOOOOOO.....
O.............O..OOO
O.O..O.............O
O.O..O........OOO..O
..O..O..........O..O
..O..OOOO.......O..O
..O.........H.....O
..O................O
..OOOOOOOOOOOOOOOOOO
8 1
8 5
1 10
```

Sample Output

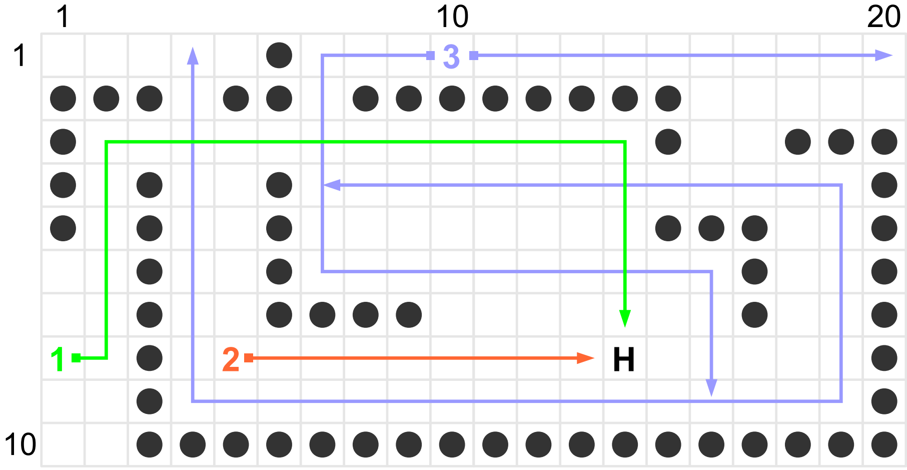
```
4
1
Stuck
```

Sample Explanation

From location $(8, 1)$ (where the green 1 is), you can move right, stopping at location $(8, 2)$ due to the obstacle in location $(8, 3)$. From there, you can move down, falling off the map, or up, stopping at $(3, 2)$. From $(3, 2)$, you can move right, to $(3, 14)$, and then down, falling through the hole when you reach location $(8, 14)$.

At location $(8, 5)$ (the orange 2), you are in line of sight of the hole and you only have to move right to reach it and get home.

If you start from location $(1, 10)$ (the blue 3), you may only stop at locations $(1, 7)$, $(6, 7)$, $(6, 16)$, $(9, 16)$, $(9, 4)$, $(9, 19)$, $(4, 19)$, and $(4, 7)$, neither of which gives you access to the hole.


1
10
20
1
10
3
1
2
H