1 Life of Creatures

Given a *board* with *m* by *n* cells, each cell has an initial state *live* (1) or *dead* (0). Each cell interacts with its eight neighbors (horizontal, vertical, diagonal) using the following four rules.

1. Any creature with fewer than two live neighbors dies, as if caused by under-population.
2. Any creature with two or three live neighbors lives on to the next generation.
3. Any creature with more than three live neighbors dies, as if by over-population..
4. Any dead cell with exactly three live neighbors becomes a creature, as if by reproduction.

Write a function to compute the next state (after one update) of the board given its current state. The next state is created by applying the above rules simultaneously to every cell in the current state, where births and deaths occur simultaneously.

Sample Input/Output

Input	Output	Comments
4 3 **1 1 0** **0 1 0** **1 1 1** **0 0 0**	**1 1 0** **0 0 0** **1 1 1** **0 1 0**	• First Line 4 3 represents the size of grid • Next 4 lines represents info creatures • According to rule 3(creature with more than three live neighbors dies) creature **1**(1,1) becomes **0**. • According to rule 4(Any dead cell with exactly three live neighbors becomes a creature, as if by reproduction) creature **0**(3,1) becomes **1**.
2 2 **1 0** **0 0**	**0 0** **0 0**	• First Line 2 2 represents the size of grid • Next 2 lines represents info creatures • According to rule 1(Any creature with fewer than two live neighbors dies, as if caused by under-population). creature **1**(0,0) becomes **0**.

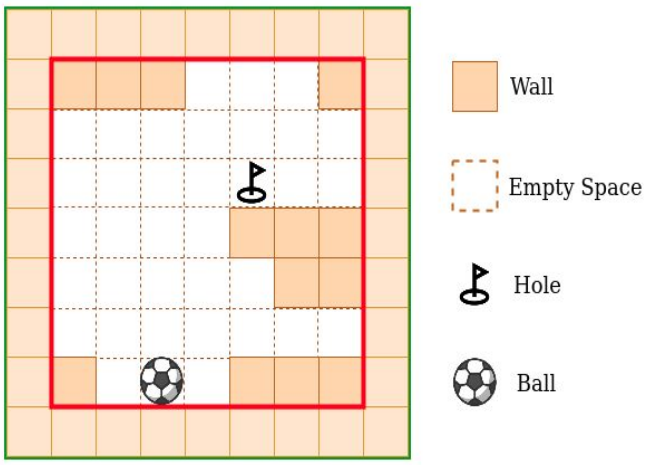
2 Is Goal Possible ?

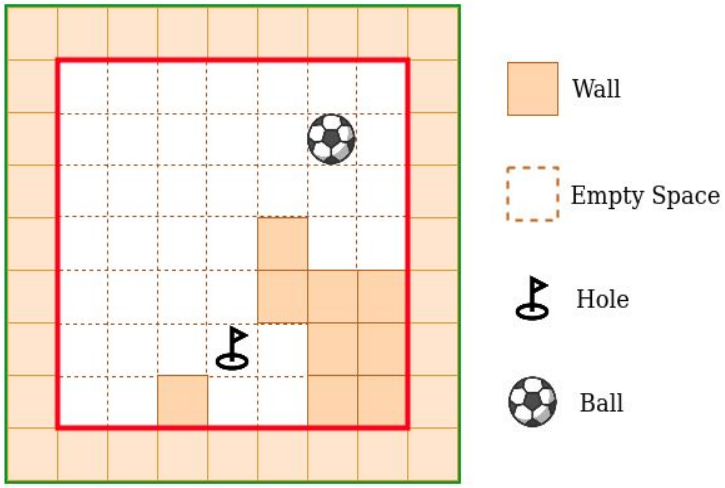
There is a ball in a maze with empty spaces and walls. The ball can go through empty spaces by rolling up (U), down (D), left (L) or right (R), but it won't stop rolling until hitting a wall. When the ball stops, it could choose the next direction. There is also a hole in this maze. The ball will drop into the hole if it rolls on to the hole.

Given the ball position, the hole position and the maze, find out how the ball could drop into the hole by moving the shortest distance. The distance is defined by the number of empty spaces traveled by the ball from the start position (excluded) to the hole (included). Output the moving directions by using 'U', 'D', 'L' and 'R'. Since there could be several different shortest ways, you should output the lexicographically smallest way. If the ball cannot reach the hole, output "-1".

The maze is represented by a binary 2D array. 1 means the wall and 0 means the empty space. You may assume that the borders of the maze are all walls. The ball and the hole coordinates are represented by row and column indexes.

Sample Input / Output

Input	Output	Comments
7 7 1 1 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 1 1 0 0 0 0 0 0 0 1 0 0 0 1 1 1 6 2 2 4	RURDL	• 3 represents number of machines • 1 represents number of workers • 2 represents units required to hire a worker or buy a machine 

7 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 1 1 0 0 0 0 0 1 1 0 0 1 0 0 1 1 1 5 5 3	-1	**Explanation: The ball cannot reach the hole.** 

3 Smith visits Allen

Write a Program to produce the generalized shortened forms of a given word.

Note: The order of the output is in sorted form (Ascending).

Input/Output

Input	Output	
kmit	**[1m1t, 1m2, 1mi1, 1mit, 2i1, 2it, 3t, 4, k1i1, k1it, k2t, k3, km1t, km2, kmi1, kmit]**	
i am	**[1 1m, 1 2, 1 a1, 1 am, 2a1, 2am, 3m, 4, i 1m, i 2, i a1, i am, i1a1, i1am, i2m, i3]**	