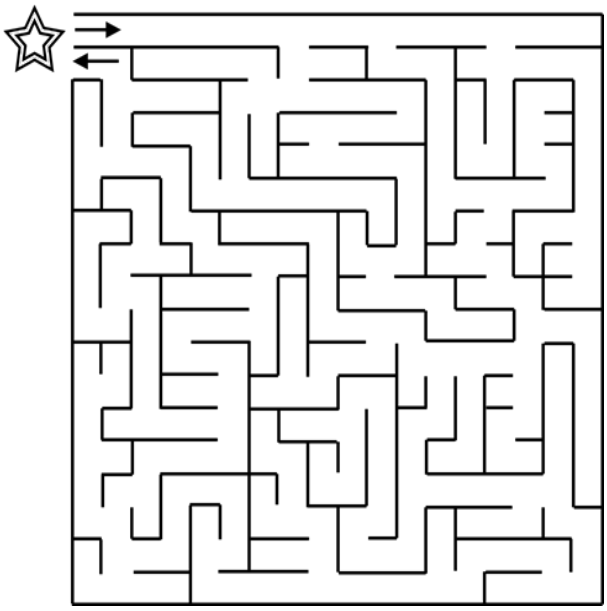
MAZE MAKING

There are many algorithms to generate maze. (http://en.wikipedia.org/wiki/Maze_generation_algorithm). After generating the maze we've to validate whether it's a valid maze or not. A valid maze has exactly one entry point and exactly one exit point (exactly 2 openings in the edges) and there must be atleast one path from the entry point to exit point.



Given a maze, just find whether the maze is "valid" or "invalid".

Input Specification:

The first line consists of an integer t, the number of test cases. Then for each test case, the first line consists of two integers m and n, the number of rows and columns in the maze. Then contains the description of the matrix M of order mxn. M[i][j]=# represents a wall and M[i][j]='.' represents a space.

Output Specification:

For each test case find whether the maze is "valid" or "invalid".

Input Constraints:

1<=t<=10000

1<=m<=20

1<=n<=20

Sample Input:

```
6
4 4
####
#...
#.##
#.##
5 5
#.###
#..##
##..#
```

```
#.#.#
###.#
1 1
.
5 1
#
#
.
.
#

2 2
#.
.#
3 4
#..#
#.##
#.##
```

Sample Output:

```
valid
valid
invalid
valid
invalid
invalid
```