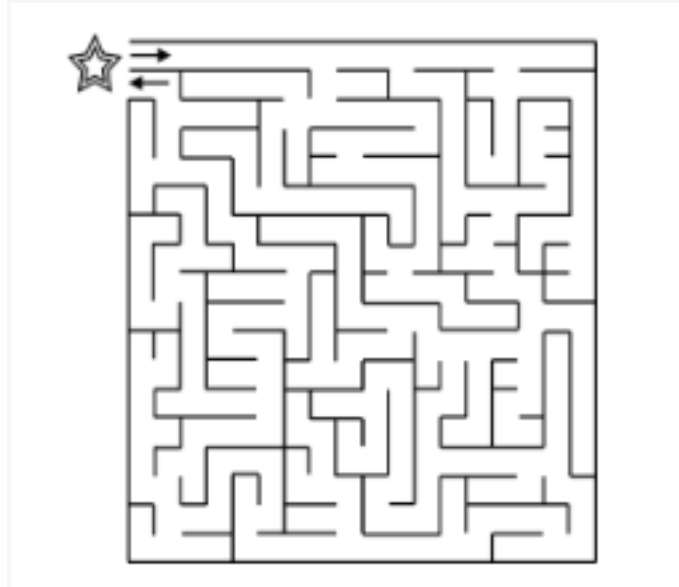# Validate The Maze

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 Constraints:

- 1≤t≤100001≤t≤10000
- 1≤m≤201≤m≤20
- 1≤n≤201≤n≤20

Input Format

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 Format

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

Sample test

inputcopy
6 4 4 #### #... #.## #.## 5 5 #.### #..## ##..# #.#.# ###.# 1 1 . 5 1 # # . . # 2 2 #.

outputcopy
valid valid invalid valid invalid invalid