Assignment One — Stack and Queue: Walking Rats in a maze

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Deadline: 2016 Oct. 27, 11:59pm

1 Build a maze

Use mazeG to generate a maze, the generator outputs a maze.txt. Your program must read the txt file to build a maze for this homework.

Download mazeG from here: mazeg.out

Test Data: mazeA.txt, mazeB.txt, mazeC.txt

1.1 Maze Specification

Size : 2 * 101 x 101 (a 2-story 101 by 101 maze space includes walls) Direction : X axis, Y axis, Z axis(up and down)

Rats Initial positions:

ratA : (0,1,1) ie., 1F postion (1,1)

ratB : (1,99,99) ie., 2F postion (99,99)

X represents a wall partion
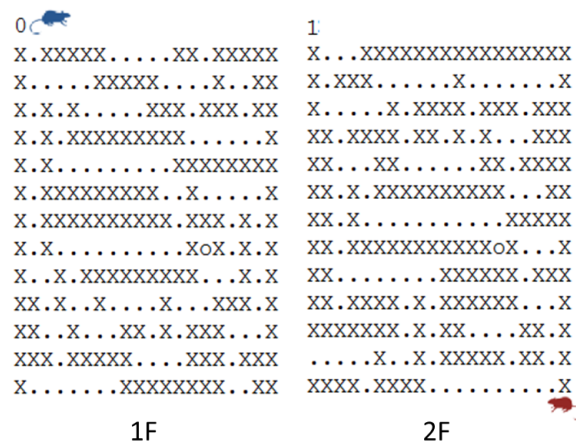
. represnets a road

o represents a stair

```
0                            1
X.XXXXX.....XX.XXXXX   X...XXXXXXXXXXXXXXX
X.....XXXXX....X..XX   X.XXX......X.......X
X.X.X.....XXX.XXX.XX   X.....X.XXXX.XXX.XXX
X.X.XXXXXXXXX......X   XX.XXXX.XX.X.X...XXX
X.X.........XXXXXXX   XX...XX......XX.XXXX
X.XXXXXXXXX..X.....X   XX.X.XXXXXXXXX...XX
X.XXXXXXXXXX.XXX.X.X   XX.X..........XXXXX
X.X.........XoX.X.X   XX.XXXXXXXXXXoX...X
X..X.XXXXXXXXX...X.X   XX.......XXXXXX.XXX
XX.X..X....X...XXX.X   XX.XXXX.X.XXXXXX...X
XX..X...XX.X.XXX...X   XXXXXXX.X.XX....XX.X
XXX.XXXXX....XXX.XXX    .....X..X.XXXXX.XX.X
X.......XXXXXXXX..XX   XXXX.XXXX.........X
           1F                    2F
```

Figure 1: An Illustration of the 2-story maze.

2 Rats Walk

The first rat starts from the upper left corner (0,1,1) and stops at the lower right corner (1,99,99) of the maze, as well as it walks according to this direction sequence: $Upstairs > Right > Down > Up > Left$

The other rat starts from the lower right corner (1,99,99) and stops at the upper left corner (0,1,1) of the maze, as well as it walks according to this direction sequence: $Downstairs > Left > Up > Down > Right$

3 By Using Stacks

Utilize stacks to implement the maze based on the specification and check whether two rats would meet each other. Rats will stop in these three cases:

1. They meet each other in the maze in ([0/1], x, y).
2. One of the Rats arrived its destination first.
3. Rats arrived its destinations at the same time.

You must output a result.txt including the walking trajectories and one of these three cases.

ratA : (0,1,1) → (0,2,1) → (0,2,2) → etc. →(z1, x1, y1)

ratB : (1,99,99) → (1,99, 98) → (1,99, 97) → etc. → (z2, x2, y2)

Rats didn't meet each other in the maze. Or Rats met each other in (0,23,55)

4 How to submit

To submit your file electronically, enter the following command from csie workstation:
turnin ds.hw1 [your files]

To check the file you turnin, enter the following command from csie workstation:
turnin −ls ds.hw1

You can see other description about turnin from following link:
https://www.cs.ccu.edu.tw/lab401/doku.php?id=turninhowto

A readme file is required for all graded assignments. Your homework will not be accepted until you provide one.

Grading (for TA)

The TA(s) will mark and give points according to the following table:

Part 1	Source code can be compiled without any error.	5%
Part 2	Readme file, code style, and comments in source code.	15%
Part 3	Result correctness (result.txt).	80%
README file	README file should include students name, class ID, a brief description of the code, and other issues students think that will be helpful for the TAs to understand their homework.	