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Homework 2

CS 32

int main()

{

string maze[10] = {

"XXXXXXXXXX",

"X...X..X.X",

"X.XXX....X",

"X.X.XXXX.X",

"XXX......X",

"X...X.XX.X",

"X.X.X..X.X",

"X.XXXX.X.X",

"X..X...X.X",

"XXXXXXXXXX"

};

if (pathExists(maze, 10,10, 4,3, 1,8))

cout << "Solvable!" << endl;

else

cout << "Out of luck!" << endl;

}

2) What are the first 12 coordinates popped off the stack by the algorithm?

a. (4,3), (3,3), (5,3), (5,2), (5,1), (6,1), (7,1), (8,1), (8,2), (6,3), (4,4), (4,5).

4) What are the first 12 coordinates popped off the queue by the algorithm?

a. (4,3), (4,4), (5,3), (3,3), (4,5), (6,3), (5,2), (4,6), (5,5), (5,1), (4,7), (6,5).

b. These two algorithms are different because of the implementation of a stack versus a queue. In both algorithms, the “boxes” to the east, south, west, and north of the current position are checked through, with the coordinate of each box being pushed to the stack if that box is a plausible move. The difference lies in that for a stack, if there is a box open to both the east, south, west, and north of the current position, the last box checked – the north box – will be the starting position of the next looping of this algorithm. Consequently, if there is another north box to this new starting position, that box will be followed. For this reason, this stack-based solution is called a depth-first search. The algorithm will traverse through one path before it goes back and tries traversing through the other directions. The queue-based solution will go one box to the east, then south, then west, then north of the original position, if these are unoccupied paths, before going further down the other paths, thus its name, “breadth-first search.”