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Homework 2

Given the algorithm, main function, and maze shown at the end of problem 1, what are the first 12 (r,c) coordinates popped off the stack by the algorithm?

1) (4,3)

2) (5,3)

3) (6,3)

4) (5,2)

5) (5,1)

6) (6,1)

7) (7,1)

8) (8,1)

9) (8,2)

10) (3,3)

11) (4,4)

12) (4,5)

Given the same main function and maze as are shown at the end of problem 1, what are the first 12 (r,c) coordinates popped from the queue in your queue-based algorithm?

1) (4,3)

2) (4,4)

3) (3,3)

4) (5,3)

5) (4,5)

6) (5,2)

7) (6,3)

8) (4,6)

9) (5,5)

10) (5,1)

11) (4,7)

12) (6,5)

How do the two algorithms differ from each other? (Hint: how and why do they visit cells in the maze in a different order?)

The stack algorithm pushes undiscovered coordinates to the top of the stack, and therefore, they will be popped off (discovered) before those that have been there for longer (last in, first out). It explores each discoverable cell until it can no longer, in other words, depth search. The queue algorithm pushes undiscovered coordinates to the bottom of the queue which means they will be popped off (discovered) in the order that they are pushed (first in, first out). It explores the cells and the next one at a time, kind of like waves or ripples starting at the starting coordinate and going outward, discovering the cell that are in the same ripple.