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CS32 Homework 2

2. Given the algorithm, main function, and maze shown at the end of problem 1, what are the first 9 (r,c) coordinates popped off the stack by the algorithm?

→The first 9 coordinates popped off the stack are as follows:

(1, 1)
(2, 1)
(3, 1)
(1, 2)
(1, 3)
(1, 4)
(2, 4)
(3, 4)
(3, 3)

4. Given the same main function and maze as are shown at the end of problem 1, what are the first 9 (r,c) coordinates popped from the queue in your queue-based algorithm?

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 first 9 coordinates popped off the queue are as follows:

(1, 1)
(1, 2)
(2, 1)
(1, 3)
(3, 1)
(1, 4)
(2, 4)
(3, 4)
(3, 5)

When using a stack to traverse the maze, we push in coordinates in the north, east, south, and west directions, respectively. Since we pop from the last item to the first, we will keep checking the west direction first, followed by south, east, and north. (Stacks: Last In First Out)

We push the coordinates in the same order (north, east, south, and west, respectively) when using a queue. However, instead of popping from the last item, we start with the first one. Thus we will keep checking the north first, followed by east, south, and west. (Queues: First in First Out)