Bradley Mont

Com Sci 32

Professor Smallberg

Lecture 2, Discussion 2C

UID: 804-993-030

Homework 2: Stacks and Queues

2.

The first 12 (r,c) coordinates popped off the stack by the algorithm are:

1. (4,3)

2. (3,3)

3. (5,3)

4. (5,2)

5. (5,1)

6. (6,1)

7. (7,1)

8. (8,1)

9. (8,2)

10. (6,3)

11. (4,4)

12. (4,5)

4.

The first 12 (r,c) coordinates popped off the queue by the algorithm are:

1. (4,3)

2. (4,4)

3. (5,3)

4. (3,3)

5. (4,5)

6. (6,3)

7. (5,2)

8. (4,6)

9. (5,5)

10. (5,1)

11. (4,7)

12. (6,5)

The stack-based algorithm uses a “depth-first search” to search for the solution to the maze. When it finds an open direction, it continues in that direction until it reaches a solution or a dead end. It covers the whole “depth” of a path before resorting to trying a different path. The stack-based algorithm searches this way because the newest coordinate gets popped off the top of the stack, so the alternate directions will be toward the bottom of the stack and will not be popped off unless the current direction does not succeed. This way, it keeps exploring the newest points in a given path to see if that path is correct before checking any other path. Alternatively, the queue-based algorithm uses a “breadth-first search” to search for the solution to the maze. Instead of exploring the depth of one pass to its completion, it checks all directions and explores all of the paths simultaneously without first advancing one path to its completion. The queue-based algorithm searches this way because the newest coordinates are added to the rear, and the front is popped; therefore, each direction will have its coordinates added to the end, opposed to just having one direction’s path added to the front. This way, it explores several paths, instead of the depth of just one path.