CS 32 Homework 2

2) The first 12 (r,c) coordinates popped off the stack by the algorithm and main routine specified in question 1 are:

(3,5)

(3,6)

(3,4)

(2,4)

(1,4)

(1,3)

(1,2)

(1,1)

(2,1)

(3,3)

(4,5)

(5,5)

4) The first 12 (r,c) coordinates popped from the queue in the queue-based algorithm are:

(3,5)

(4,5)

(3,4)

(3,6)

(5,5)

(3,3)

(2,4)

(6,5)

(5,4)

(1,4)

(7,5)

(5,3)

The main difference in the two algorithms is the order by which they visit and explore the area around each cell. The stack-based algorithm can be characterized as a “depth-first” search because it explores the coordinates along the same general route until it reaches a dead-end, so it tests whether the desired coordinate can be found by following one single route before testing any other routes.

In contrast, the queue-based algorithm can be characterized as a “breadth-first” search because it explores many different routes at the same time. Instead of following one single route until it reaches a dead-end, the queue-based algorithm switches between the routes it explores, thereby testing all possible routes at approximately the same rate.