Chenxi Sun

Assignment 9 Document Analysis

1. My partner is Jordan Newton, and I submitted the code for the assignment.
2. Jordan has average programming abilities but through my mentoring he is learning a lot about graphs. He has the basic concept of graph but does not know some of the deeper things. Like that the graph could be represented by a list or a matrix depending on how dense and sparse the vertex neighbors is. The implementation and the basic design of the program also needs to be thought through.
3. Yes, the straight line distance will affect the algorithm of this program. If the walls and obstruction are ignored the algorithm will be essential N. because of the obstruction the algorithm will go through the adjacent neighbor list. Depending on how big the list is it could make the Big O O(N^2) instead of the linear straight line which will be O(N). Since this graph is only 4 neighbors at most the big O will still be O(N) but in dense graphs with adjacent neighbors represented by matrixes the big O will be O(N^2). Depending on the maze size if the maze size is very big and dense the big O can get to O(N^2).
4. The difference between the straight line distance and a path with a lot of obstructions is that if the path is straight the big O will be O(N). The reason for this is that the list of adjacent neighbors in each vertex will essentially be 1 and the next node is only checked once. While with a path of obstructions the entire list of adjacent neighbors need to be checked to ensure they are not obstructed. Since there are only up, down, left and right the list will be at most 4. So the big O even if it is not a straight line will be O(N). This is assuming the maze is small.
5. If the length of the maze is very large then the big O for solving the maze will be O(N^2). This is because the path has to be retraced after breadth first search. If the length is relatively small and the obstruction are few then the big O for solving the maze will be O(N). As the adjacent neighbors will at most be 4 which is very sparse.
6. I spent about 5 hours on this assignment.