# Maze Solution Report

## INTRODUCTION:

Maze solving game is to find the exit in the maze, need to go through a series of wrong attempts to find the right path, sometimes may not find the path. Similar to given an rectangular grid, set the upper left corner as the starting point S. A car starts at the starting point and goes to the bottom right to the end point T. Barriers are placed at several grids to indicate that the grid is unreachable. Try to design an algorithm to find a route from starting point S to ending point T. I tried to solve this problem by using DFS and BFS, that is, starting from the entrance, to explore in a certain direction, if it can go through, then continue to go; Otherwise, go back the way you came. Move in another direction and keep exploring until all possible paths have been explored. In order to be able to return to the original position at any point, it is obvious that a last in, first out structure is needed to hold the path from the entrance to the current position.

## ANALYSIS:

Depth-first search (DFS) plus backtracking:

Advantage: There is no need to record precursor nodes as in breadth first search (BFS).

Disadvantages: The first feasible path found may not be the shortest path. If the shortest path needs to be found, all feasible paths need to be found and then compared one by one to find the shortest path.

Breadth first search (BFS):

Advantage: The first path found is the shortest path.

Disadvantages: The precursor nodes of nodes need to be recorded to form a path.

## ALGORITHM:

The maze running process can be simulated as a search process:

Step 1. At each location, always ask it to test the next location in the order of east, south, west, north and so on.

Step 2. If a certain direction can be passed and has not been reached, move forward and continue the search in the new position.

Step 3. If you are unable to go in any of the four directions or have reached it before, take a step back and continue exploring the next position from the original position.

Every step forward or backward is judged: if it reaches the exit, a path has been found; if it returns to the entrance, there is no path.