Lab 3

Search

ITS 265

Problem 1: (25 points)

8-puzzle is a board game with tiles numbered 1 through 8 located on a 3 x 3 grid, with one space that is blank. Files adjacent to the blank space can be slid into it vertically or horizontally.

The **starting** position for the games is:

1 3 4

8 2

7 6 5

Each state in the state space corresponds to a particular position on the board. There are four operators corresponding to the blank space moving up(U), left(L), down(D) or right(R). The operators for movement of the tiles must be evaluated in the following order: D, U, L, and R (this is the strategy on how to move the blank tile around).

The **goal** for the state of the board is:

1 2 3

8 4

7 6 5

Draw the search tree resulting from breadth-first search. Label the nodes in the order in which they are expanded. (Use a drawing tool in Word or Visio to draw the board positions).

Show the sequence of moved to reach the goal.

Note: When you draw your search tree, draw the board configuration at each node to represent the state at that node.

Problem 2: (75 points)

In the grid maze loaded on Brightspace (maze-in2), modify the grid with a new robot starting position in the second row of the maze. Modify the goal for the robot to move to in a position in the second to last row in the maze. Modify the program you wrote in lab 2 to use the Depth First Search code (provided on Brightspace) to search for a path from start to goal for the robot. Use the result from the DFS search (which will be a list of maze grid positions) to move the robot one grid position at a time until it reached its goal. When you get to the goal, clean the space. Write this program using Python.

Submit the word file for problem 1 and the Python code file in problem 2 in a zip file and upload it to Brightspace.