ITCS 3153: Introduction to Artificial Intelligence

In-class assignment

Informed Search

Edit your previous program to solve text-based grids (using DFS and BFS) to solve the grids using A* and greedy search algorithms.

Write the final path to a file (as in the previous assignment), and print the following data to console:

1) If a solution could be found
2) Number of states expanded
3) Final path (list the locations), if one can be found
4) What heuristic function you used

Edit your program to toggle between using A* and greedy-search without separate functions.

A big difference in this problem is that the values on the grids will have any value from 0-9. **Any nonzero value represents the step cost to move to that location from any of its neighbors.** A value of 0 indicates that the location cannot be traversed. An example grid can be seen below.

1 5 2 4 1 5 1 0 4 0
1 5 0 2 4 1 0 2 5 0
1 0 0 5 1 2 1 4 4 3
2 0 0 2 0 0 2 4 4 0
2 0 4 2 2 1 1 5 1 2
0 3 4 0 0 3 4 2 1 3
1 0 3 0 0 5 1 0 4 3
2 4 0 0 0 2 4 0 0 0
0 4 5 5 2 5 3 0 4 3
3 0 3 3 5 5 3 4 1 1

Bonus:
Create a new program to run A* on the 8-puzzle problem. Refer to the textbook for specific details on the problem. Try testing your algorithm with the following start and goal state pairs. The ‘0’ character represents the blank tile.

Initial:
2 8 3
1 6 4
7 0 5

Goal:
1 2 3
8 6 4
7 5 0

Initial:
7 2 4
5 0 6
8 3 1

Goal:
0 1 2
3 4 5
6 7 8

Report on the same data as above. Display the final path as a series of puzzle states (it will be long).