ARTIFICIAL INTELLIGENCE ASSIGNMENT #1

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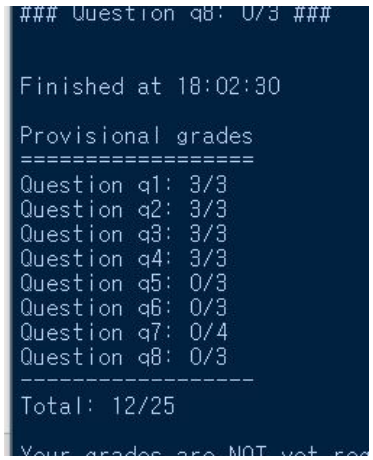
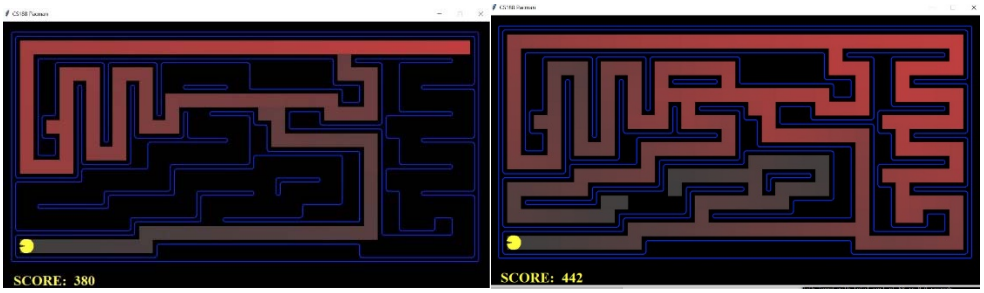
▶▶ I want to use 1 late day. Thank you.

1. The result of autograder.py



2. Discussions

★ Discuss why the DFS can have lower score than the BFS. (When playing mediumMaze, DFS has lower score than BFS). You can attach the screenshot of Pacman play. Then, why would someone prefer DFS over BFS even though it can have lower score?



-> These are the screenshot of Pacmanplay(mediumMaze, DFS and BFS). As you can see, DFS has lower score than BFS. Score increase when pacman gets dots and it decrease when pacman moves and results nothing. It means when eating a dot, if pacman gets a dot faster, it will get bigger score.

Since BFS can find the optimal path, usually BFS will get higher score than DFS. But DFS has its advantage either. BFS should expand almost every nodes. In contrast, DFS usually doesn't need to expand nodes that much. Therefore it can be a reason why someone prefer DFS over BFS.

★ Discuss the difference between A* and BFS algorithm. Which algorithm do you think is better than the other? Why?

-> The biggest difference between A* and BFS is whether it is uninformed or informed. Informed search means the algorithm knows which state is easy to get goal state. Since A* algorithm is informed search, it will expand mainly toward the goal(it uses heuristic function). In contrast, BFS will expand equally in all directions. So, in the Position search problem of pacman, both algorithm will find optimal path. However, BFS will expand almost every nodes which means inefficient. Therefore I think A* algorithm is better than the other only when heuristic function is well defined.

★ When will DFS outperform BFS?

-> When goal state is deep and skewed to the left, DFS will outperform BFS. Also when memory is the real concern, DFS will outperform BFS because BFS needs bigger memory when the number of nodes big.