COMP341
Assignment 1

Report

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Written Q1:

While implementing BFS and DFS search algorithms on same mazes in Pacman's world, it is obtained that if BFS is used, cost is less but total nodes expanded is more in the contrast of DFS. The quantity of nodes expanded is relative to their space complexity difference, DFS takes advantage. I would use DFS when the environment has more tiers and goal is in the depth like in bigMaze and use BFS when the environment has less tier and more node as a child like openMaze.

Written Q2:

UCS is based on choosing node with less cost and A* is about to choose closest node with less code. After testing these algorithms on bigMaze and openMaze environments, it is obtained that A* expanded less node then UCS at the end. So that this difference brings about that A* will be faster while reaching goal. I would use UCS when I must succeed less cost as much as it can but there is possibility that it can choose longer path. I would use A* while aiming to reach goal faster and minimize the cost.

Written Q3:

I thought that while Pacman moves in the maze, there should be a variable collects the information about whether each corners are visited or not. Pacman is the object moving around and it can carry that info by state inside. After Pacman reaches any corner, Pacman takes this situation into memory in state by turning False variable to True. If you ask me why we are collecting info in state itself, I can say that simplest solution would be global variable at the beginning of the code but it is object oriented so that it is implemented accordance with class.

Written Q4:

I have implemented a heuristic algorithm using Manhattan Distance to give h(n) to node by distance of furthest unvisited goal corner and give h(n) to goal states as 0. Due to environments having walls in maze, this situation guaranteed the consistency and admissibility by the following, that means minimum cost between nodes will be 1 and heuristic difference between nodes will be 1. In short, the heuristic value increasing towards the corners in the maze will take Pacman to the nearest target due to the low cost when choosing the new successor.

Written Q5:

In this problem I used the same algorithm as the heuristic function that searches for corners. I made it go to the closest dot by giving heuristics according to the farthest point, and I made it progress with this strategy. The admissibility and consistency situations are similar to the previous situation, but it could not get the full score from the autograder.