COMP 341/Intro. to Artificial Intelligence

Project 1: Search

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Q1)

In DFS, we dive deep into one path until we hit a dead end, which can be inefficient if the answer isn't along that path. BFS, on the other hand, checks all the nearby possibilities first. This can mean checking more possibilities overall, but often leads to finding the shortest path more quickly. I use BFS if I suspect the answer isn't too deep in the tree, as it'll give you the shortest path. DFS is better when you're working with huge trees and limited memory, or if the solution might be deep within the tree.

Q2)

UCS is like a diligent worker who methodically checks every option based on cost, without considering the end goal. A\* is more like a smart worker who uses hints (heuristics) to head towards the goal more directly, which often means less work overall. I go for UCS if I don't have any good hints about how to reach your goal. On the other hand, I choose A\* when I do have helpful hints, as it'll likely get me to the goal faster and with less effort.

Q3)

I chose to represent the state by where Pac-Man is and which corners he has already visited. This way, we keep track of our progress without including unnecessary details.

Q4)

For the Corners Problem, I implemented a heuristic that calculates the Manhattan distance to the nearest unvisited corner and updates Pac-Man's position accordingly. This process repeats until all corners are visited. The heuristic is admissible, using the minimum grid distance, and consistent, as it always reflects the cost to the nearest unvisited corner without overestimating. This strategy efficiently guides Pac-Man to the nearest corners, effectively reducing the search space.

Q5)

I used the farthest food dot's distance as my heuristic. It’s a safe bet because it’s based on the real shortest path without considering walls, ensuring my solution is always practical and never overestimates.

Q6)

A consistent heuristic is like having a reliable map; it ensures you're on the most efficient path. An inadmissible heuristic is more like a rough guess, which might get you there faster but could also lead you astray. I stick with a consistent heuristic for the most reliable and efficient route. An inadmissible heuristic can be a gamble, but it might be worth it when you're in a hurry and willing to accept a less-than-perfect path.