CS2080 Artificial Intelligence
LAB -1
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Question 1 : Depth First Search

Dfs explore one node to the end and than backtrack to other current node to visit its children .
We can use stack to implement dfs as it use last in first out
Property
OBSERVATIONS-
The number of node explore by dfs are very less as compared to bfs as it continue to goes to dept of one node until it find it solution.For medium maze Its path cost is 130 and number of nodes expanded is 146.It is not necessary to find the shortest path as it only finds the leftmost path to goal state in the tree.

Question 2 : Breadth First Search-

Bfs explores all the neighbor node at a particular level before going to the next level.we can implement bfs with the help of queue
As it use first in first out

Observation-

Bfs alway find out the lower cost path but expand a lot more node in order to reach goal state.This occurs because BFS expands all nodes at particular

level first before moving on to the next level. Due to this a lot of extra nodes are expanded however
it gives the lowest path solution as the goal state closest to the starting state is found first.

Question 3 : Uniform Cost Search-

Uniform cost search select the minimum cost first to find the path with minimum cost to reach the goal state
UCS use priority Queue with path cost at it priority.

Observation-

Ucs act like bfs if there is no path cost or all are equal.In other case the expanding of node depend upon the cost of path ,the minimum of all will get expanded first.

Question 4 : A* search-

a* search is similar to ucs but it also use heuristic function which calculates the estimate cost to reach the goal state .Priority Queue priority is set to the function of g(n) and f(n)

Observation-

A* search find out better path than ucs if an admissible and consistent heuristic is used as it prevents the expansion of some of the nodes which have inexpensive paths but the total cost to reach goal state is higher.

Question 5 : Finding All the Corners

The goal state is reach when all the state are being visited by the agent whether there is food or not .Each state has been defined as a tuple which contain the position and another tuple which contain the Visited corner by agent.