Artificial Intelligence
lab-1- Report

Q1.

DFS:-

Observations:-

for tinyMaze :
Path found with total cost of 10
time taken =0.0 seconds
Search nodes expanded: 15

for MediumMaze :
Path found with total cost of 130
time taken =0.0 seconds
Search nodes expanded: 146

for BigMaze :
Path found with total cost of 210
time taken =0.0 seconds
Search nodes expanded: 390

Q2.

BFS:-

Observations:-

for MediumMaze :
Path found with total cost of 68
time taken =0.0 seconds
Search nodes expanded: 269

for BigMaze :
Path found with total cost of 210
time taken =0.1 seconds
Search nodes expanded: 620

Q3.

UCS:-

Observations:-

for MediumMaze :

Path found with total cost of 68

time taken =0.1 seconds

Search nodes expanded: 269

for MediumDottedMaze :

Path found with total cost of 1

time taken =0.0 seconds

Search nodes expanded: 186

for MediumScaryMaze :

Path found with total cost of 68719479864

time taken =0.0 seconds

Search nodes expanded: 108

Q4.

A* Search:-

Path found with total cost of 210

time taken=0.1 seconds

Search nodes expanded: 549

Q5.

Finding All the Corners:-

for tiny corners:

Path found with total cost of 28

time taken = 0.0 seconds

Search nodes expanded: 252

for medium corners:

Path found with total cost of 106

time taken=0.4 seconds

Search nodes expanded: 1966

Q6.

corners problem:
goal_state: To find all corners
Desining an Heuristic function:

let (x,y) be the coordinates of the agent and let (x1,y1),(x2,y2),(x3,y3),(x4,y4) be the coordinates of all corners.
Let us suppose (u,v) be the coordinates of one of unvisited corners
calculate the Manhattan distace between (x,y) and (u,v)
that is |(u-x)|+|(v-y)|
similarly, we find the manhattan distances of all unvisited corners from the current position of agent and we take the maximum of all these distances as heuristic value.

I have choosen this distance as heuristic because this distance gives us the no. Of steps to reach to a particular palce without considering the walls. So we need atleast these many no. of steps .
So this heuristic is an admissible heuristic because no of steps required to reach a particular corner without walls will be lesser than going in the maze with walls.