# Artificial Intelligence Assignment 2

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1] Depth First Search

For tinyMaze-

Path found with total cost of 10 in 0.0 seconds

Search nodes expanded: 15

Pacman emerges victorious! Score: 500

Average Score: 500.0

Scores: 500.0

Win Rate: 1/1 (1.00)

Record: Win

For mediumMaze –

Path found with total cost of 130 in 0.0 seconds

Search nodes expanded: 146

Pacman emerges victorious! Score: 380

Average Score: 380.0

Scores: 380.0

Win Rate: 1/1 (1.00)

Record: Win

For bigMaze –

Path found with total cost of 210 in 0.0 seconds

Search nodes expanded: 390

Pacman emerges victorious! Score: 300

Average Score: 300.0

Scores: 300.0

Win Rate: 1/1 (1.00)

Record: Win

For openMaze –

Path found with total cost of 298 in 0.0 seconds

Search nodes expanded: 576

Pacman emerges victorious! Score: 212

Average Score: 212.0

Scores: 212.0

Win Rate: 1/1 (1.00)

Record: Win

2] Breadth First Search

For tinyMaze –

Path found with total cost of 8 in 0.0 seconds

Search nodes expanded: 15

Pacman emerges victorious! Score: 502

Average Score: 502.0

Scores: 502.0

Win Rate: 1/1 (1.00)

Record: Win

For mediumMaze –

Path found with total cost of 68 in 0.0 seconds

Search nodes expanded: 269

Pacman emerges victorious! Score: 442

Average Score: 442.0

Scores: 442.0

Win Rate: 1/1 (1.00)

Record: Win

For bigMaze –

Path found with total cost of 210 in 0.0 seconds

Search nodes expanded: 620

Pacman emerges victorious! Score: 300

Average Score: 300.0

Scores: 300.0

Win Rate: 1/1 (1.00)

Record: Win

For openMaze –

Path found with total cost of 54 in 0.0 seconds

Search nodes expanded: 682

Pacman emerges victorious! Score: 456

Average Score: 456.0

Scores: 456.0

Win Rate: 1/1 (1.00)

Record: Win

3] Uniform Cost Search

For mediumMaze with UCS Agent

Path found with total cost of 68 in 0.0 seconds

Search nodes expanded: 269

Pacman emerges victorious! Score: 442

Average Score: 442.0

Scores: 442.0

Win Rate: 1/1 (1.00)

Record: Win

For mediumDottedMaze with StayEastSearchAgent

Path found with total cost of 1 in 0.0 seconds

Search nodes expanded: 186

Pacman emerges victorious! Score: 646

Average Score: 646.0

Scores: 646.0

Win Rate: 1/1 (1.00)

Record: Win

For mediumScaryMaze with StayWestAgent

Path found with total cost of 68719479864 in 0.0 seconds

Search nodes expanded: 108

Pacman emerges victorious! Score: 418

Average Score: 418.0

Scores: 418.0

Win Rate: 1/1 (1.00)

Record: Win

4] A\* Search

Using Manhattan Heuristic with tinyMaze

Path found with total cost of 8 in 0.0 seconds

Search nodes expanded: 14

Pacman emerges victorious! Score: 502

Average Score: 502.0

Scores: 502.0

Win Rate: 1/1 (1.00)

Record: Win

Using Manhattan Heuristic with mediumMaze

Path found with total cost of 68 in 0.0 seconds

Search nodes expanded: 221

Pacman emerges victorious! Score: 442

Average Score: 442.0

Scores: 442.0

Win Rate: 1/1 (1.00)

Record: Win

Using Manhattan Heuristic with bigMaze

Path found with total cost of 210 in 0.0 seconds

Search nodes expanded: 549

Pacman emerges victorious! Score: 300

Average Score: 300.0

Scores: 300.0

Win Rate: 1/1 (1.00)

Record: Win

Using Manhattan Heuristic with openMaze

Path found with total cost of 54 in 0.0 seconds

Search nodes expanded: 535

Pacman emerges victorious! Score: 456

Average Score: 456.0

Scores: 456.0

Win Rate: 1/1 (1.00)

Record: Win

5] Corner problem with Breadth First Search

For tinyCorners

Path found with total cost of 28 in 0.0 seconds

Search nodes expanded: 0

Pacman emerges victorious! Score: 512

Average Score: 512.0

Scores: 512.0

Win Rate: 1/1 (1.00)

Record: Win

For mediumCorners

Path found with total cost of 106 in 0.0 seconds

Search nodes expanded: 0

Pacman emerges victorious! Score: 434

Average Score: 434.0

Scores: 434.0

Win Rate: 1/1 (1.00)

Record: Win

6] Food problem with A\* algorithm

Using Null Heuristic on trickySearch

Path found with total cost of 60 in 2.5 seconds

Search nodes expanded: 16688

Pacman emerges victorious! Score: 570

Average Score: 570.0

Scores: 570.0

Win Rate: 1/1 (1.00)

Record: Win

Using Null Heuristic on testSearch

Path found with total cost of 7 in 0.0 seconds

Search nodes expanded: 14

Pacman emerges victorious! Score: 513

Average Score: 513.0

Scores: 513.0

Win Rate: 1/1 (1.00)

Record: Win

7] Food problem with a heuristic

As the pacman world is a x,y grid, Manhattan and Euclidean distances were the possible heuristics. Both these heuristics deliver and perform extremely well in according to the reference provided on the Berkeley. The Manhattan distance seems to perform better in the trickySearch and hence we have used this as our heuristic.

Using Manhattan Distance as the heuristic on testSearch

Path found with total cost of 7 in 0.0 seconds

Search nodes expanded: 10

Pacman emerges victorious! Score: 513

Average Score: 513.0

Scores: 513.0

Win Rate: 1/1 (1.00)

Record: Win

Using Euclidean Distance as the heuristic on testSearch

Path found with total cost of 7 in 0.0 seconds

Search nodes expanded: 10

Pacman emerges victorious! Score: 513

Average Score: 513.0

Scores: 513.0

Win Rate: 1/1 (1.00)

Record: Win

Using Manhattan Distance as the heuristic on trickySearch

Path found with total cost of 60 in 5.8 seconds

Search nodes expanded: 5349

Pacman emerges victorious! Score: 570

Average Score: 570.0

Scores: 570.0

Win Rate: 1/1 (1.00)

Record: Win

Using Euclidean Distance as the heuristic on trickySearch

Path found with total cost of 60 in 6.0 seconds

Search nodes expanded: 5741

Pacman emerges victorious! Score: 570

Average Score: 570.0

Scores: 570.0

Win Rate: 1/1 (1.00)

Record: Win