AI - 2 - Ali Ul Haq - 500667810

Assignment 3

3.a):Describe your design choices and approach of your implementation in a brief report: I used the depth first code and further adjusted accordingly to the psuedo code given in the AI sheets. Furthermore the util.PriorityQueue() was used

3.b.i):Describe your design choices and approach of your implementation in a brief report: I used the uniformCostSearch function and added the heurstics with the PriorityQueue with the following code:

frontier = util.PriorityQueue() frontier.push(node, (node.cost + heuristic(node.state,problem)))

3.b.ii):Describe your findings of the implementation. How does the selected heuristic affect the search paths?:

With 0 costs it follows the solution of breadthFirstSearch just like uniformCostSearch

3.b.ii):Describe your findings of the implementation. How does the selected heuristic affect the search paths?:

3.b.ii):What is the behaviour of A* when using the nullHeuristic? Does this behav-iour match (or comes close to) any other search algorithm?:

With 0 costs it follows the solution of breadthFirstSearch, which expands 620 nodes With openMaze: astar with manhattanHeuristic: Alis-

```
MacBook-Pro:search aliulhaq$ python pacman.py -l openMaze -p
SearchAgent -z .5 -a fn=astar,heuristic=manhattanHeuristic
[SearchAgent] using function astar and heuristic manhattanHeuristic
[SearchAgent] using problem type PositionSearchProblem Path found
with total cost of 68 in 0.1 seconds Search nodes expanded: 245
Pacman emerges victorious! Score: 442 Average Score: 442.0 Scores:
442.0 Win Rate: 1/1 (1.00) Record: Win
```

The other algorithms get stuck and take a long time for finding the solution.