**Challenge 02:**

**Q -1 Fill following table with the information.**

**Commands:**

1. python pacman.py -l bigMaze -z .5 -p SearchAgent -a fn=astar,heuristic=manhattanHeuristic
2. python pacman.py -l bigMaze -z .5 -p StayEastSearchAgent

|  |  |  |
| --- | --- | --- |
|  | **A\* Heuristic** | **UCS** |
| **Total Cost** | 210 | 5 |
| **Nodes Expanded** | 549 | 639 |
| **Score** | 300.0 | 300.0 |

**Q-2 Why Node Expanded is Greater in UCS and Less in A\* Heuristic?**

Because A\* search algorithm is informed search and has brain, A\* algorithm at each step it pick the node having the lowest f f(n) = g(n) + h(n)) and process it And about UCS it is uninformed search algorithm, It expands the least cost node, and it does so in every direction because no information about the goal is provided. That's the reason UCS expand more nodes and A\* expand less nodes to reach goal.

**Q-3 Compare other parameters and give reason why they greater/less/equal.**

A\* algorithm at each step it pick the node having the lowest f f(n) = g(n) + h(n)) but UCS expand goal that has lowest cost that’s the reason this algorithm expand less nodes to reach goal. And both have same score because both follow same path in big maze. UCS cost is less then A\* because UCS pick node having lowest cost but A\* pick the node having lowest f(n) and don’t care about minimum cost like UCS care, that’s why UCS has less cost.

**Challenge 03:**

**Commands:**

1. python pacman.py -l mediumMaze -p SearchAgent -a fn=astar,heuristic=manhattanHeuristic
2. python pacman.py -l mediumMaze -p SearchAgent -a fn=astar,heuristic=euclideanHeuristic
3. python pacman.py -l mediumMaze -p StayEastSearchAgent

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Euclidean** | **Manhattan** | **UCS** |
| **Total Cost** | 68 | 68 | 1 |
| **Nodes Expanded** | 230 | 224 | 260 |
| **Score** | 442.0 | 442.0 | 436 |