**CSE 537: Assignment 4**

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1. **DFS Algorithm**

* Depth First Search algorithm is implemented in XSB-Prolog in the file ‘dfs.P’.
* The algorithm avoids expanding any already visited states.
* Prolog implementation is done using recursion.
* Test maze is modelled as Prolog facts in the file maze1.P

1. **BFS Algorithm**

* Breadth First Search algorithm is implemented in XSB-Prolog in the file ‘bfs.P’.
* Prolog list is used as a Queue to store the unexplored nodes.
* The algorithm avoids expanding any already visited states.
* Test maze is modelled as Prolog facts in the file maze1.P

1. **A\* Algorithm**

* A\* Search Algorithm is implemented in XSB-Prolog in the file ‘astar2.P’.
* Prolog list is used as a Queue to store the unexplored nodes.
* Sorting of nodes in the queue is done based on the sum of forward cost and heuristics value using built-in module called parsort/4
* Test maze is modelled as Prolog facts in the file maze\_astar.P

1. **CornersProblem**

* Test maze is modelled as Prolog facts with four corners as the goal states.
* BFS is the search technique used.

**Space Analysis:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Search Type** | **Total cost of finding the path with different mazes** | | |
| **bigMaze** | **tinyMaze** | **mediumMaze** |
| **DFS** | 210 | 10 | 130 |
| **BFS** | 210 | 8 | 68 |
| **A Star** | 210 | 10 | 68 |

**Time Analysis:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Search Type** | **Time taken with different mazes** | | |
| **bigMaze** | **tinyMaze** | **mediumMaze** |
| **DFS** | 0.7 | 0.7 | 0.7 |
| **BFS** | 0.7 | 0.7 | 0.7 |
| **A Star** | 0.7 | 0.7 | 0.7 |