

# CSE 537: Assignment 4

## Team Members:

Nupur Dichwalkar: 109955223

Raghavendra Kumar: 110009168

### 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

### 2) 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

### 3) 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

### 4) 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

