CS312:Artificial Intelligence Laboratory

Lab 1 Report

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1. Introduction

The objective of this task is to simulate breadth-first search, depth-first search, and DFID in the state space. The state-space consists of an m x n grid. The start state is (0,0). The goal state is the position of (*) in the grid. The Pacman is allowed to move UP, DOWN, LEFT and RIGHT (except for boundary).

2. Pseudo Code

MoveGen(state)

This function accepts a state and returns all the states that can be reached from the given state in one step.

function MoveGen(state):

```
1. neighbors = []
2. for neighbor n of state in the order(DOWN, UP, RIGHT,
   LEFT):
3.      if neighbor not in {'+', '-', '|'} then
4.           neighbors.append(neighbor)
5. return neighbors
```

GoalTest(state, target_state)

This function checks whether the state is the target(goal) state or not. If it is a target state it returns true otherwise false.

function GoalTest(state, target_state):

```
1. if state.value == target_state.value then
2.      return true
3. return false
```

3.Results

- **Order: Down,Up,Right,Left**

ALGORITHM	No. of horizontal cells	No. of vertical cells	No. of states explored	Path length
BFS	2	2	13	10
DFS	2	2	10	10
DFID	2	2	62	10
BFS	3	3	22	15
DFS	3	3	29	15
DFID	3	3	225	15
BFS	5	5	69	25
DFS	5	5	74	25
DFID	5	5	1077	25
BFS	7	7	134	51
DFS	7	7	121	51
DFID	7	7	6295	51

- **Order: Left,Right,Up,Down**

ALGORITHM	No. of horizontal cells	No. of vertical cells	No. of states explored	Path length
BFS	2	2	13	10
DFS	2	2	14	10
DFID	2	2	63	10
BFS	3	3	20	15
DFS	3	3	17	17
DFID	3	3	249	15
BFS	5	5	67	25
DFS	5	5	36	29
DFID	5	5	895	25
BFS	7	7	135	51
DFS	7	7	93	59
DFID	7	7	10248	51

4. Results

BFS:

- The path length does not depend on the order in which the neighbors of each node are added.
- The number of states explored depends on the order in which the neighbors of each node are added.

DFS:

- The path length depends on the order in which the neighbors of each node are added.
- The number of states explored depends on the order in which the neighbors of each node are added.

DFID:

- The path length does not depend on the order in which the neighbors of each node are added.
- The number of states explored depends on the order in which the neighbors of each node are added.