Artificial Intelligence
Lab 1 Report

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Objective

The objective of this task is to simulate BFS, DFS, and DFID in the state space. State space consists of an m*n grid. Where start state is (0,0) & goal is the position of (*) in the grid. Pacman is allowed to move UP, DOWN, LEFT and RIGHT except for boundaries. A comparison of the path length and the number of states explored between the different search methods and, also between the orders in which neighbours are added, are performed.

How To Run:

./Compile.sh

Pseudo Code:

movegen():

1. Pop elements that we want to look for depending on algo dfs,bfs or dfid from the open list.
2. Check for all the neighbours ,if value[n]=" " or "*" .
3. For all neighbours in order given:
    a. If visited[n]= 0 then push in the open list .
    b. make visited [n]=1
4. Then search whether that element is goal state ,if yes break from loop.
5. Otherwise,again go to the 1st step.
6. Continue process from 2 to 4.

goalstate():

1. If value[n]=”*”
2. Return found

Order: Left, Right, Up, Down

Dimensions	Algorithm	No. states explored	Path length
2*2	BFS	15	10
	DFS	14	10
	DFID	80	10
3*3	BFS	35	23
	DFS	23	23
	DFID	627	23
4*4	BFS	42	24
	DFS	24	24
	DFID	621	24
5*5	BFS	59	33
	DFS	41	33
	DFID	1358	33

Order: Left, Right, Up, Down

Dimensions	Algorithm	No. states explored	Path length
2*2	BFS	13	10
	DFS	11	10

	DFID	81	10
3*3	BFS	35	23
	DFS	29	29
	DFID	832	23
4*4	BFS	42	24
	DFS	46	26
	DFID	862	24
5*5	BFS	59	33
	DFS	82	37
	DFID	2172	33

Conclusion:

We observed in DFID that the increase in the number of explored states is due to small branching factors & high constants attached with time complexity. Results of the dependence of path length & number of states explored, as seen in the previous section ar as follows:

1. BFS:
    a. No. States Explored : Dependence on order of neighbours added
    b. Path Length : Doesn't dependence on order of neighbours added
2. DFS:
    a. No. States Explored : Dependence on order of neighbours added
    b. Path Length : Dependence on order of neighbours added
3. DFID:

a. No. States Explored : Dependence on order of neighbours added
b. Path Length : Doesn't dependence on order of neighbours added

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