Artificial Intelligence
(CS13217)

Lab Report

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Experiment # 3
Implementing Depth First Search

Objective

To understand and implement the Depth First Search Problem.

Software Tool

1. Operating System, Window 10
2. Sublime text, Version 3.0
3. Python

1 Theory

Depth-first search (DFS) is an algorithm for traversing or searching tree or graph data structures. One starts at the root (selecting some arbitrary node as the root in the case of a graph) and explores as far as possible along each branch before backtracking.

Depth-first search, or DFS, is a way to traverse the graph. Initially it allows visiting vertices of the graph only, but there are hundreds of algorithms for graphs, which are based on DFS.

Therefore, understanding the principles of depth-first search is quite important to move ahead into the graph theory.

Now, the word backtrack means that when you are moving forward and there are no more nodes along the current path, you move backwards on the same path to find nodes to traverse. All the nodes will be visited on the current path till all the unvisited nodes have been traversed after which the next path will be selected.

The principle of the algorithm is quite simple: to go forward (in depth) while there is such possibility, otherwise to backtrack.
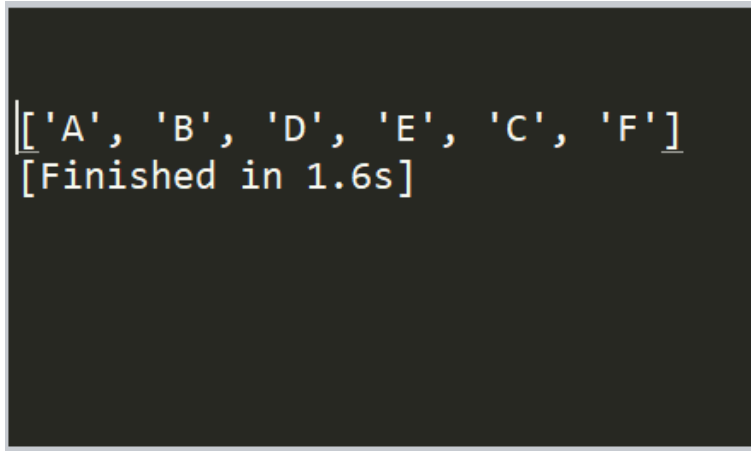
Figure 1: Time Independent Feature Set

2 Task

2.1 Procedure: Task 1

The principle of the algorithm is quite simple: to go forward (in depth) while there is such possibility, otherwise to backtrack.

2.2 Procedure: Task 2

```
def moveTower(height, fromPole, toPole, withPole):
    if height >= 1:
        moveTower(height-1, fromPole, withPole, toPole)
        moveDisk(fromPole, toPole)
        moveTower(height-1, withPole, toPole, fromPole)

def moveDisk(fp, tp):
    print("moving disk from", fp, "to", tp)

moveTower(3, "A", "B", "C")
```

3   Conclusion

Thus we have successfully implemented the Depth First Search program using python.