Artificial Intelligence

ASSIGNMENT #1

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Objective:

To understand the basics of search algorithms and implement a simple search algorithm in Python.

Source: Arad

Destination: Bucharest

TASK:

1.Research the Depth-First Search (DFS) & Breadth First Search (BFS)Algorithms.2.Apply DFS and BFS on Romanian example3.The program should take as input a graph and represents an adjacency list along withsource and goal nodes.4.The program should output the shortest path or optimize path from source to the goalnode.5.Also highlight which of the algorithm outperform other.

WORKING/PROCEDURE:

DFS

```
# create an empty set to store visited nodes
  stack = [start]  # create a stack with the starting node
  while stack:  # loop while the stack is not empty
   node = stack.pop()  # remove the last node from the stack
   if node not in visited:  # if the node is not visited
    visited.add(node)  # mark the node as visited
    if node == goal:  # if we have found the goal node
    return list(visited)  # return the path from start to goal
   stack.extend(set(graph[node]) - visited)  # add unvisited neighbors to the stack
   return None  # if we didn't find the goal node, return None
```

BFS

```
# create an empty set to store visited nodes
 queue = [start]  # create a queue with the starting node
  while queue:  # loop while the queue is not empty
  node = queue.pop(0)  # remove the first node from the queue
```

```
if node not in visited:  # if the node is not visited
 visited.add(node)  # mark the node as visited
 if node == goal:  # if we have found the goal node
  return list(visited)  # return the path from start to goal
 queue.extend(set(graph[node]) - visited)  # add unvisited neighbors to the queue
 return None  # if we didn't find the goal node, return None
```

RESULT:

```
The shortest path from Arad to Bucharest using DFS is: Arad -> Lugoj -> Timisoara -> Pitesti -> Bucharest -> Mehadia -> Craiova
-> Drobeta
The shortest path from Arad to Bucharest using BFS is: Fagaras -> Arad -> Rimnicu Vilcea -> Lugoj -> Timisoara -> Oradea -> Pit
esti -> Zerind -> Bucharest -> Sibiu -> Craiova
```