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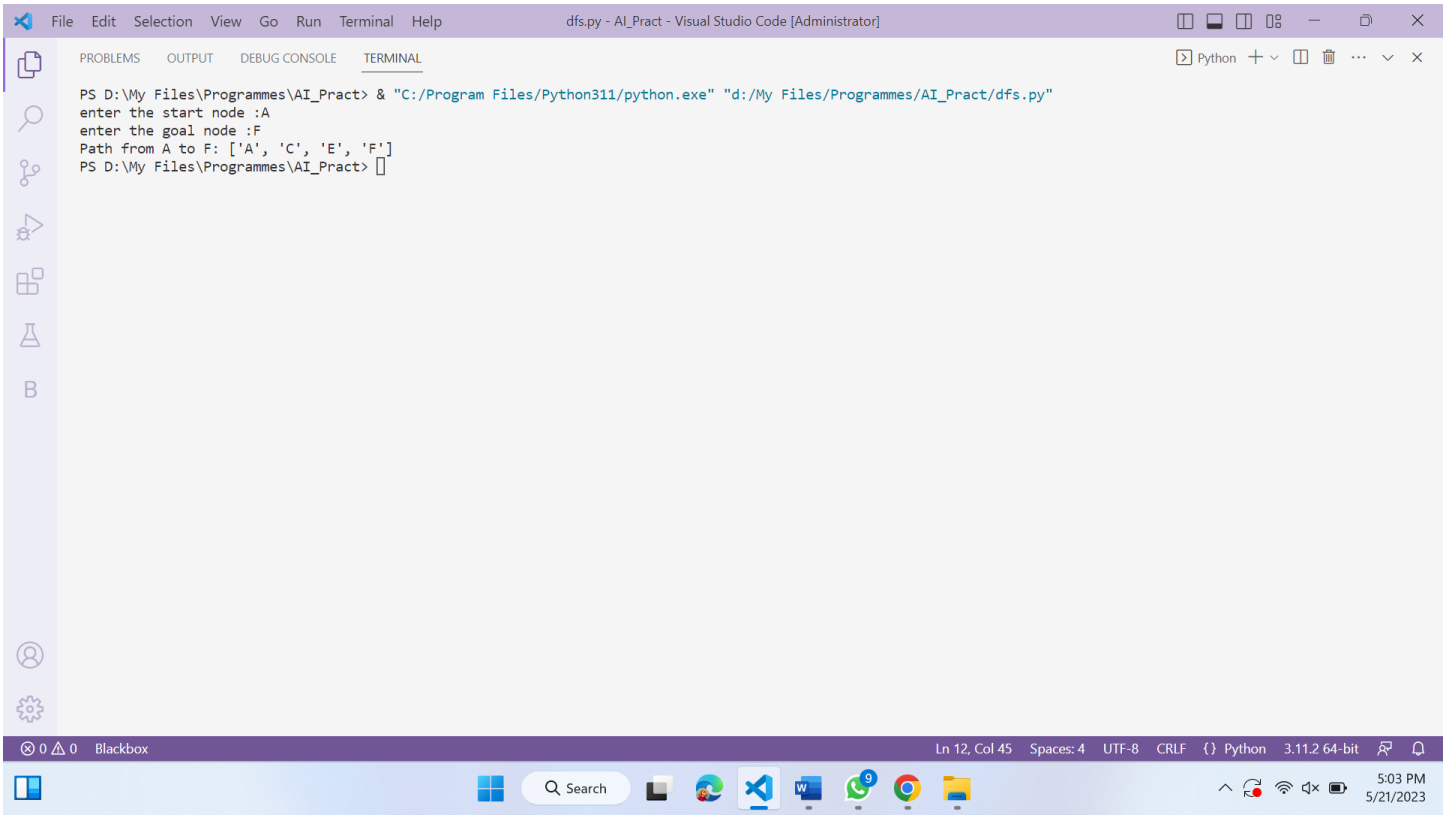
Practical – 1

1)DFS

Code:

```
def depthfirstsearch(graph, start_node, goal_node):
    visited = set()
    stack = [(start_node, [start_node])]

    while stack:
        (current_node, path) = stack.pop()
        if current_node == goal_node:
            return path
        visited.add(current_node)
        for neighbor in graph[current_node]:
            if neighbor not in visited:
                stack.append((neighbor, path + [neighbor]))

    return None

graph = {
    'A': ['B', 'C'],
    'B': ['A', 'D'],
    'C': ['A', 'E'],
    'D': ['B', 'E', 'F'],
    'E': ['C', 'D', 'F'],
    'F': ['D', 'E']
}

start_node = input("enter the start node :")
goal_node = input("enter the goal node :")

path = depthfirstsearch(graph, start_node, goal_node)
if path is not None:
    print(f"Path from {start_node} to {goal_node}: {path}")
else:
    print(f"No path found from {start_node} to {goal_node}")
```

Output:


File Edit Selection View Go Run Terminal Help
dfs.py - AI_Pract - Visual Studio Code [Administrator]
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Python
PS D:\My Files\Programmes\AI_Pract> & "C:/Program Files/Python311/python.exe" "d:/My Files/Programmes/AI_Pract/dfs.py"
enter the start node :A
enter the goal node :F
Path from A to F: ['A', 'C', 'E', 'F']
PS D:\My Files\Programmes\AI_Pract>
0 0 Blackbox
Ln 12, Col 45 Spaces: 4 UTF-8 CRLF {} Python 3.11.2 64-bit
Search
5:03 PM
5/21/2023

2)BFS

Code:

```
from collections import deque
import graphlib
def breadthfirstsearch(graph, start_node, goal_node):
    queue = deque([(start_node, [start_node])])

    while queue:
        current_node, path = queue.popleft()
        print(f"Exploring node {current_node}: Explored nodes so far: {path}")
        if current_node == goal_node:
            return path
        for neighbor in graph[current_node]:
            if neighbor not in path:
                queue.append((neighbor, path + [neighbor]))
    return None
print(graphlib)
start_node = input("Enter Start Node: ")
goal_node = input("Enter Goal Node: ")

graph = {
    'A': ['B', 'C'],
    'B': ['A', 'D'],
    'C': ['A', 'E'],
    'D': ['B', 'E', 'F'],
    'E': ['C', 'D', 'F'],
    'F': ['D', 'E']
}
path = breadthfirstsearch(graph, start_node, goal_node)
if path is not None:
    print(f"Path from {start_node} to {goal_node}: {path}")
else:
    print(f"No path found from {start_node} to {goal_node}")
```

Output:

```
PS D:\My Files\Programmes\AI_Pract> & "C:/Program Files/Python311/python.exe" "d:/My Files/Programmes/AI_Pract/bfs (1).py"
<module 'graphlib' from 'C:\\Program Files\\Python311\\Lib\\graphlib.py'>
Enter Start Node: A
Enter Goal Node: F
Exploring node A: Explored nodes so far: ['A']
Exploring node B: Explored nodes so far: ['A', 'B']
Exploring node C: Explored nodes so far: ['A', 'C']
Exploring node D: Explored nodes so far: ['A', 'B', 'D']
Exploring node E: Explored nodes so far: ['A', 'C', 'E']
Exploring node E: Explored nodes so far: ['A', 'B', 'D', 'E']
Exploring node F: Explored nodes so far: ['A', 'B', 'D', 'F']
Path from A to F: ['A', 'B', 'D', 'F']
PS D:\My Files\Programmes\AI_Pract>
```