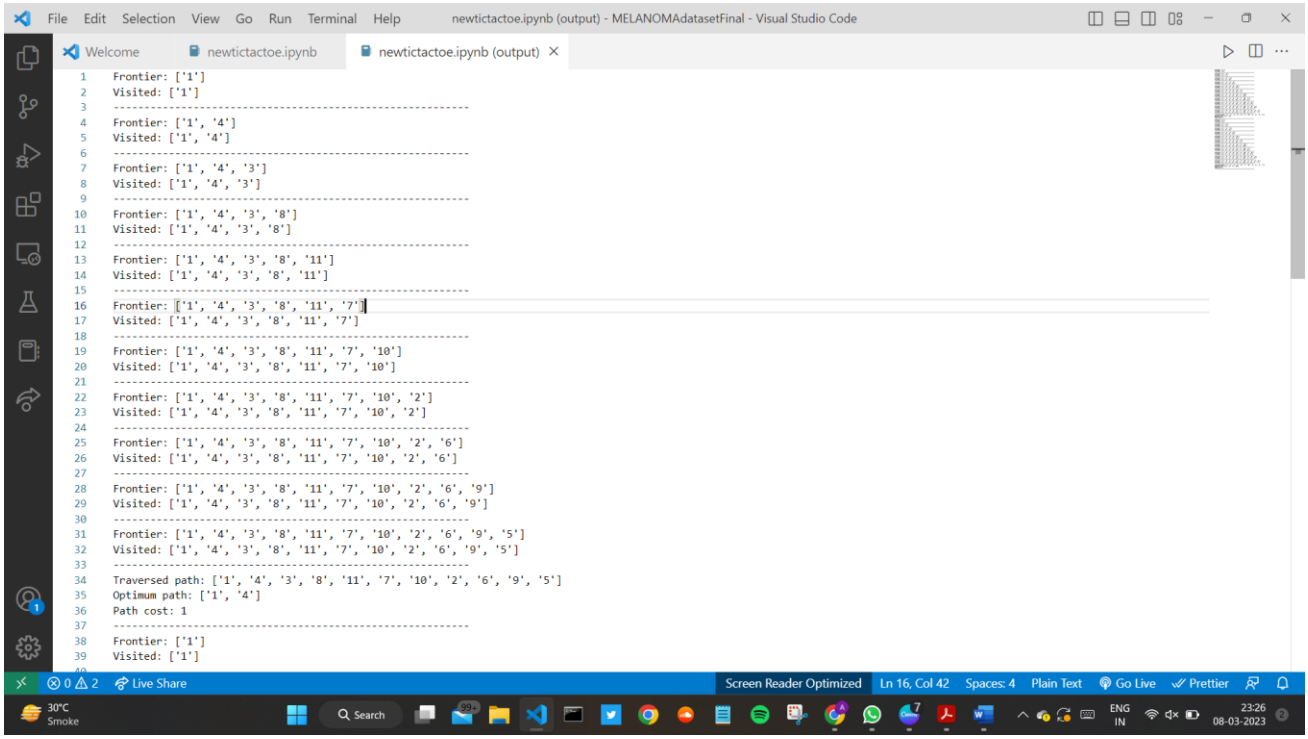
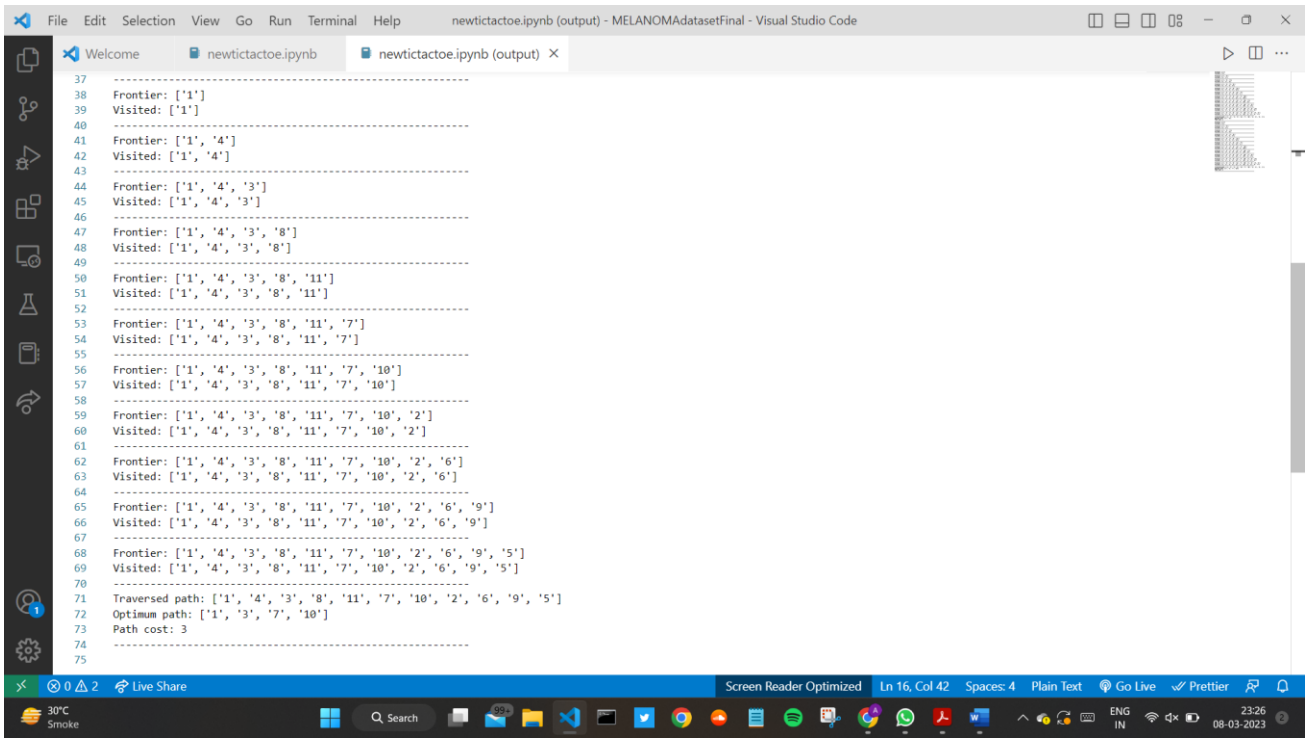
AI LAB 04

Code:

```
def dfs(graph, start, goal):
    visited = []
    frontier = []
    stack = [[start, 0, [start]]]  # [node, cost, path]
    optimal_path = []

    while stack:
        node, cost, path = stack.pop()
        if node not in visited:
            visited.append(node)
            frontier.append(node)
            if node == goal:
                if not optimal_path or cost < optimal_path[1]:
                    optimal_path = [path, cost]
            for neighbor in graph[node]:
                if neighbor not in visited:
                    stack.append([neighbor, cost+1, path+[neighbor]])

        print("Frontier:", frontier)
        print("Visited:", visited)
        print("------------------------------------------------------------")

    print("Traversed path:", visited)
    print("Optimum path:", optimal_path[0])
    print("Path cost:", optimal_path[1])
    print("------------------------------------------------------------")



dfs(graph, '1', '4')
dfs(graph, '1', '10')
```

Output


File Edit Selection View Go Run Terminal Help newtictactoe.ipynb (output) - MELANOMAdatasetFinal - Visual Studio Code
Welcome
newtictactoe.ipynb
newtictactoe.ipynb (output)
Frontier: ['1']
Visited: ['1']
Frontier: ['1', '4']
Visited: ['1', '4']
Frontier: ['1', '4', '3']
Visited: ['1', '4', '3']
Frontier: ['1', '4', '3', '8']
Visited: ['1', '4', '3', '8']
Frontier: ['1', '4', '3', '8', '11']
Visited: ['1', '4', '3', '8', '11']
Frontier: ['1', '4', '3', '8', '11', '7']
Visited: ['1', '4', '3', '8', '11', '7']
Frontier: ['1', '4', '3', '8', '11', '7', '10']
Visited: ['1', '4', '3', '8', '11', '7', '10']
Frontier: ['1', '4', '3', '8', '11', '7', '10', '2']
Visited: ['1', '4', '3', '8', '11', '7', '10', '2']
Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6']
Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6']
Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9']
Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9']
Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
Traversed path: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
Optimum path: ['1', '4']
Path cost: 1
Frontier: ['1']
Visited: ['1']
Live Share
Screen Reader Optimized
Ln 16, Col 42
Spaces: 4
Plain Text
Go Live
Prettier
30°C Smoke
Search
ENG IN
23:26 08-03-2023


File Edit Selection View Go Run Terminal Help newtictactoe.ipynb (output) - MELANOMAdatasetFinal - Visual Studio Code
Welcome
newtictactoe.ipynb
newtictactoe.ipynb (output)
Frontier: ['1']
Visited: ['1']
Frontier: ['1', '4']
Visited: ['1', '4']
Frontier: ['1', '4', '3']
Visited: ['1', '4', '3']
Frontier: ['1', '4', '3', '8']
Visited: ['1', '4', '3', '8']
Frontier: ['1', '4', '3', '8', '11']
Visited: ['1', '4', '3', '8', '11']
Frontier: ['1', '4', '3', '8', '11', '7']
Visited: ['1', '4', '3', '8', '11', '7']
Frontier: ['1', '4', '3', '8', '11', '7', '10']
Visited: ['1', '4', '3', '8', '11', '7', '10']
Frontier: ['1', '4', '3', '8', '11', '7', '10', '2']
Visited: ['1', '4', '3', '8', '11', '7', '10', '2']
Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6']
Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6']
Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9']
Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9']
Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
Traversed path: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
Optimum path: ['1', '3', '7', '10']
Path cost: 3
Live Share
Screen Reader Optimized
Ln 16, Col 42
Spaces: 4
Plain Text
Go Live
Prettier
30°C Smoke
Search
ENG IN
23:26 08-03-2023