

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) X
1 Frontier: ['1']
2 Visited: ['1']
3 -----
4 Frontier: ['1', '4']
5 Visited: ['1', '4']
6 -----
7 Frontier: ['1', '4', '3']
8 Visited: ['1', '4', '3']
9 -----
10 Frontier: ['1', '4', '3', '8']
11 Visited: ['1', '4', '3', '8']
12 -----
13 Frontier: ['1', '4', '3', '8', '11']
14 Visited: ['1', '4', '3', '8', '11']
15 -----
16 Frontier: ['1', '4', '3', '8', '11', '7']
17 Visited: ['1', '4', '3', '8', '11', '7']
18 -----
19 Frontier: ['1', '4', '3', '8', '11', '7', '10']
20 Visited: ['1', '4', '3', '8', '11', '7', '10']
21 -----
22 Frontier: ['1', '4', '3', '8', '11', '7', '10', '2']
23 Visited: ['1', '4', '3', '8', '11', '7', '10', '2']
24 -----
25 Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6']
26 Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6']
27 -----
28 Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9']
29 Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9']
30 -----
31 Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
32 Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
33 -----
34 Traversed path: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
35 Optimum path: ['1', '4']
36 Path cost: 1
37 -----
38 Frontier: ['1']
39 Visited: ['1']
40 -----
```

```
File Edit Selection View Go Run Terminal Help newtictactoe.ipynb (output) - MELANOMAdatasetFinal - Visual Studio Code
Welcome newtictactoe.ipynb newtictactoe.ipynb (output) X
37 -----
38 Frontier: ['1']
39 Visited: ['1']
40 -----
41 Frontier: ['1', '4']
42 Visited: ['1', '4']
43 -----
44 Frontier: ['1', '4', '3']
45 Visited: ['1', '4', '3']
46 -----
47 Frontier: ['1', '4', '3', '8']
48 Visited: ['1', '4', '3', '8']
49 -----
50 Frontier: ['1', '4', '3', '8', '11']
51 Visited: ['1', '4', '3', '8', '11']
52 -----
53 Frontier: ['1', '4', '3', '8', '11', '7']
54 Visited: ['1', '4', '3', '8', '11', '7']
55 -----
56 Frontier: ['1', '4', '3', '8', '11', '7', '10']
57 Visited: ['1', '4', '3', '8', '11', '7', '10']
58 -----
59 Frontier: ['1', '4', '3', '8', '11', '7', '10', '2']
60 Visited: ['1', '4', '3', '8', '11', '7', '10', '2']
61 -----
62 Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6']
63 Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6']
64 -----
65 Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9']
66 Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9']
67 -----
68 Frontier: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
69 Visited: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
70 -----
71 Traversed path: ['1', '4', '3', '8', '11', '7', '10', '2', '6', '9', '5']
72 Optimum path: ['1', '3', '7', '10']
73 Path cost: 3
74 -----
75 -----
```