Riphah International University

Artificial Intelligence (AI)

Lab 4

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Section: BSCS-6A

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Lab

BFS

```python
from collections import deque

def bfs(graph, start):
    visited = set()
    queue = deque([start])
    visited.add(start)
    counter = 0

    while queue:
        vertex = queue.popleft()
        print(vertex, end=' ')
        counter += 1

        for neighbor in graph[vertex]:
            if neighbor not in visited:
                queue.append(neighbor)
                visited.add(neighbor)

    return counter

graph = {
    5: [3, 7],
    3: [2, 4],
    7: [8],
    2: [],
    4: [8],
    8: [],
}

start_node = 5
print("BFS traversal starting from node", start_node, ":")
total_visited = bfs(graph, start_node)
print("\nTotal nodes visited:", total_visited)
```

```
PS D:\Uni\Semester 6\Artifical Itteligence\Lab Task> python -u "d:\Uni\Semester 6\Artifical Itteligence\Lab Task\BFS lab 4.py"
BFS traversal starting from node 5 :
5 3 7 2 4 8
Total nodes visited: 6
PS D:\Uni\Semester 6\Artifical Itteligence\Lab Task>
```

DFS

```python
from collections import deque

def dfs(graph, start, visited=None, counter=None):
    if visited is None:
        visited = set()
    if counter is None:
        counter = [0]
    visited.add(start)
    print(start, end=' ')
    counter[0] += 1
    for neighbor in graph[start]:
        if neighbor not in visited:
            dfs(graph, neighbor, visited, counter)

graph = {
    5: [3, 7],
    3: [2, 4],
    7: [8],
    2: [],
    4: [8],
    8: [],
}

start_node = 5
print("DFS traversal starting from node", start_node, ":")
counter = [0]
dfs(graph, start_node, counter=counter)
print("\nTotal nodes visited:", counter[0])
```

```
PS D:\Uni\Semester 6\Artifical Itteligence\Lab Task> python -u "d:\Uni\Semester 6\Artifical Itteligence\Lab Task\tempCodeRunnerFile.py"
DFS traversal starting from node 5 :
5 3 2 4 8 7
Total nodes visited: 6
PS D:\Uni\Semester 6\Artifical Itteligence\Lab Task>
```