**Name :** Atharva Arjun Goral

**Roll No :** 3101033

**Batch :** B  **Div :** A

# **Assignment No. 1**

**CODE :**

def dfs(visited, graph, node):

if node not in visited:

print(node, end=" ")

visited.add(node)

for adjacent in graph.get(node, []): # Use .get() to avoid KeyError

dfs(visited, graph, adjacent)

def bfs(graph, start\_node):

visited = set()

queue = [start\_node]

while queue:

node = queue.pop(0)

if node not in visited:

print(node, end=" ")

visited.add(node)

queue.extend([adj for adj in graph.get(node, []) if adj not in visited])

def input\_graph():

graph = {}

n = int(input("Enter the number of nodes: "))

for \_ in range(n):

node = input("Enter the node: ").strip()

adjacents = input(f"Enter the adjacents of {node} (space-separated): ").split()

graph[node] = adjacents

return graph

# Driver Code

print("Enter the graph details:")

graph = input\_graph()

start\_node = input("Enter the starting node: ").strip()

while True:

print("\nChoose the traversal method:")

print("1. DFS (Depth-First Search)")

print("2. BFS (Breadth-First Search)")

print("3. Exit")

choice = input("Enter your choice: ").strip()

if choice == '1':

print("\nFollowing is the Depth-First Search:")

dfs(set(), graph, start\_node) # Pass a fresh set

elif choice == '2':

print("\nFollowing is the Breadth-First Search:")

bfs(graph, start\_node) # No need to pass `visited` separately

elif choice == '3':

print("Exiting program.")

break

else:

print("Invalid choice, please try again!")

**OUTPUT :**

Enter the graph details:

Enter the number of nodes: 5

Enter the node: A

Enter the adjacents of A (space-separated): B C

Enter the node: B

Enter the adjacents of B (space-separated): D

Enter the node: C

Enter the adjacents of C (space-separated): E

Enter the node: D

Enter the adjacents of D (space-separated):

Enter the node: E

Enter the adjacents of E (space-separated):

Enter the starting node: A

Choose the traversal method:

1. DFS (Depth-First Search)

2. BFS (Breadth-First Search)

3. Exit

Enter your choice: 1

Following is the Depth-First Search:

A B D C E

Choose the traversal method:

1. DFS (Depth-First Search)

2. BFS (Breadth-First Search)

3. Exit

Enter your choice: 2

Following is the Breadth-First Search:

A B C D E

Choose the traversal method:

1. DFS (Depth-First Search)

2. BFS (Breadth-First Search)

3. Exit

Enter your choice: 3

Exiting program.