ASSIGNMENT-01

BFS with directed graph:

```
from collections import defaultdict, deque

class Graph:
    def __init__(self):
        self.graph = defaultdict(list)

    def add_edge(self, u, v):
        self.graph[u].append(v)

    def bfs(self, start_node):
        visited = set()
        queue = deque([start_node])
        visited.add(start_node)

        while queue:
            current_node = queue.popleft()
            print(current_node, end=" ")

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

# Create a directed graph
graph = Graph()
graph.add_edge(0, 1)
graph.add_edge(0, 2)
graph.add_edge(1, 2)
graph.add_edge(2, 0)
graph.add_edge(2, 3)
graph.add_edge(3, 3)

start_node = 2
```

```
print("BFS traversal starting from node", start_node)
graph.bfs(start_node)
```

Output:

```
BFS traversal starting from node 2
2 0 3 1

...Program finished with exit code 0
Press ENTER to exit console.
```

Bfs for undirected graph:

```
from collections import defaultdict, deque

class Graph:
    def __init__(self):
        self.graph = defaultdict(list)

    def add_edge(self, u, v):
        self.graph[u].append(v)
        self.graph[v].append(u)

    def bfs(self, start_node):
        visited = set()
        queue = deque([start_node])
        visited.add(start_node)

        while queue:
            current_node = queue.popleft()
            print(current_node, end=" ")
```

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

# Create an undirected graph
graph = Graph()
graph.add_edge(0, 1)
graph.add_edge(0, 2)
graph.add_edge(1, 2)
graph.add_edge(1, 3)
graph.add_edge(2, 4)
graph.add_edge(3, 4)
graph.add_edge(4, 5)

start_node = 0
print("BFS traversal starting from node", start_node)
graph.bfs(start_node)
```

OUTPUT:

```
BFS traversal starting from node 0
0 1 2 3 4 5

...Program finished with exit code 0
Press ENTER to exit console.
```