AI Lab\BFS.py

```python
from collections import deque

class Graph:
    def __init__(self, directed=False):
        self.graph = {}
        self.directed = directed

    def add_edge(self, u, v):
        if u not in self.graph:
            self.graph[u] = []
        self.graph[u].append(v)

        if not self.directed:
            if v not in self.graph:
                self.graph[v] = []
            self.graph[v].append(u)

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

        traversal = []

        while queue:
            vertex = queue.popleft()
            traversal.append(vertex)

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

        return traversal

if __name__ == "__main__":
    g = Graph()
    g.add_edge(0, 1)
    g.add_edge(0, 2)
    g.add_edge(1, 2)
    g.add_edge(2, 0)
    g.add_edge(2, 3)
    g.add_edge(3, 3)

    print("BFS traversal starting from vertex 2:")
    print(g.bfs(2))

```


>_pwsh
Python_LocalVC
master ≡ ?1
2ms
>> python -u "d:\SelfRepoClone\Python_LocalVC\AI Lab\BFS.py"
BFS traversal starting from vertex 2:
[2, 0, 1, 3]