

# BFS & DFS

```
bfs_dfs.py X
bfs_dfs.py > ...
1 class Graph:
2     def __init__(self):
3         self.graph = {}
4
5     def add_edge(self, u, v):
6         if u not in self.graph:
7             self.graph[u] = []
8         self.graph[u].append(v)
9
10    def bfs(self, start):
11        visited = set()
12        queue = [start]
13        traversal = []
14
15        while queue:
16            vertex = queue.pop(0)
17            if vertex not in visited:
18                traversal.append(vertex)
19                visited.add(vertex)
20                if vertex in self.graph:
21                    queue.extend(self.graph[vertex])
22
23        return traversal
24
25    def dfs(self, start):
26        visited = set()
27        stack = [start]
28        traversal = []
29
30        while stack:
31            vertex = stack.pop()
32            if vertex not in visited:
33                traversal.append(vertex)
34                visited.add(vertex)
35                if vertex in self.graph:
36                    stack.extend(reversed(self.graph[vertex]))
37
```

```
bfs_dfs.py X
bfs_dfs.py > ...
1 class Graph:
25     def dfs(self, start):
29
30         while stack:
31             vertex = stack.pop()
32             if vertex not in visited:
33                 traversal.append(vertex)
34                 visited.add(vertex)
35                 if vertex in self.graph:
36                     stack.extend(reversed(self.graph[vertex]))
37
38         return traversal
39
40 if __name__ == "__main__":
41     g = Graph()
42     g.add_edge(0, 1)
43     g.add_edge(0, 2)
44     g.add_edge(1, 2)
45     g.add_edge(2, 0)
46     g.add_edge(2, 3)
47     g.add_edge(3, 3)
48
49     print("BFS traversal:", g.bfs(2))
50     print("DFS traversal:", g.dfs(2))
51
```

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```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
DFS traversal: [2, 0, 1, 3]
PS C:\Users\abhib\Desktop\AI> & C:/Users/abhib/miniconda3/python.exe c:/Users/abhib/Desktop/AI/bfs_dfs.py
BFS traversal: [2, 0, 3, 1]
DFS traversal: [2, 0, 1, 3]
PS C:\Users\abhib\Desktop\AI>
```

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