AI 1: Depth First Search

DFS algorithm in Python

```
# DFS algorithm
def dfs(graph, start, visited=None):
    if visited is None:
        visited = set()
    visited.add(start)

    print(start)

    for next in graph[start] - visited:
        dfs(graph, next, visited)
    return visited



graph = {'0': set(['1', '2']),
         '1': set(['0', '3', '4']),
         '2': set(['0']),
         '3': set(['1']),
         '4': set(['2', '3'])}

dfs(graph, '0')
```

output:

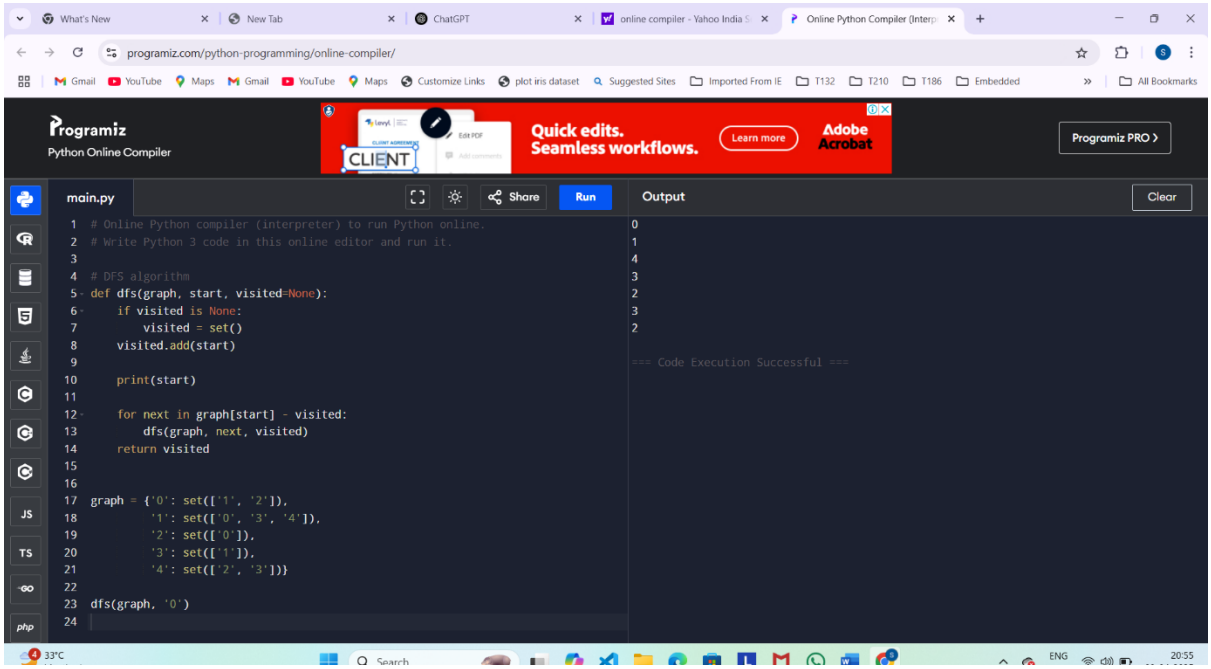
0

2

1

3

4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# Online Python compiler (interpreter) to run Python online.
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if visited is None:
visited = set()
visited.add(start)
print(start)
for next in graph[start] - visited:
dfs(graph, next, visited)
return visited
graph = {'0': set(['1', '2']),
'1': set(['0', '3', '4']),
'2': set(['0']),
'3': set(['1']),
'4': set(['2', '3'])}
dfs(graph, '0')
0
1
4
3
2
3
2
=== Code Execution Successful ===
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Search
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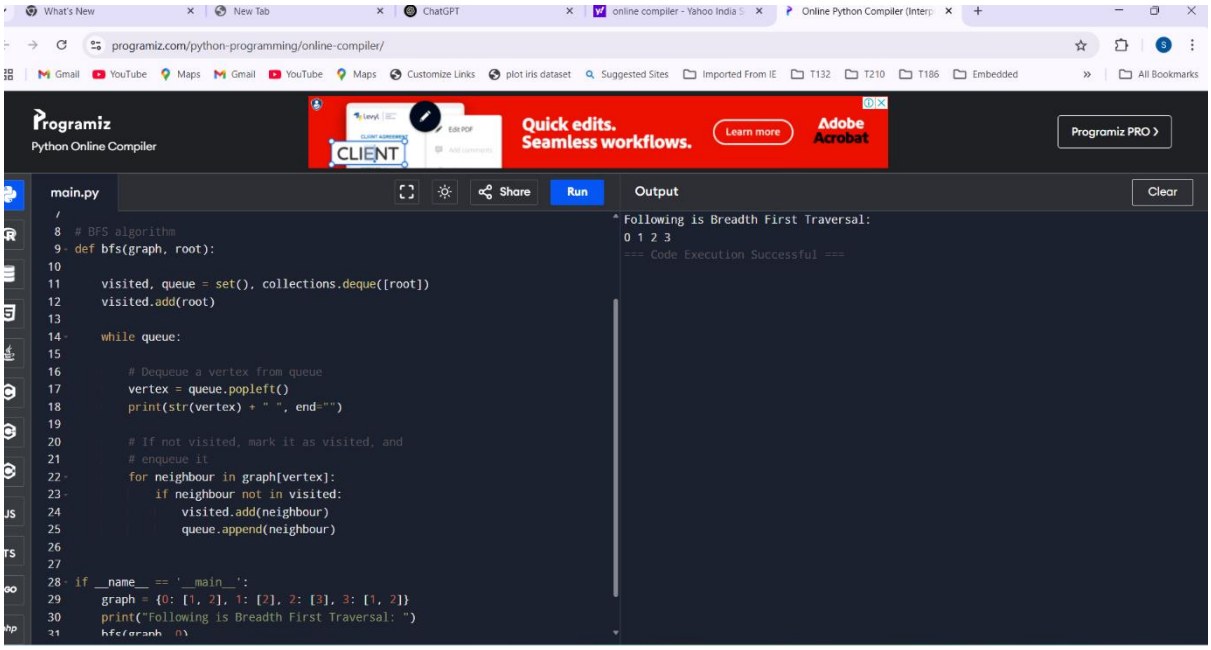
```
# BFS algorithm in Python
import collections

# BFS algorithm
def bfs(graph, root):

    visited, queue = set(), collections.deque([root])
    visited.add(root)

    while queue:

        # Dequeue a vertex from queue
        vertex = queue.popleft()
        print(str(vertex) + " ", end="")

        # If not visited, mark it as visited, and
        # enqueue it
        for neighbour in graph[vertex]:
            if neighbour not in visited:
                visited.add(neighbour)
                queue.append(neighbour)


if __name__ == '__main__':
    graph = {0: [1, 2], 1: [2], 2: [3], 3: [1, 2]}
    print("Following is Breadth First Traversal: ")
    bfs(graph, 0)
```

OUTPUT

Following is Breadth First Traversal:

0 1 2 3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# BFS algorithm
def bfs(graph, root):
visited, queue = set(), collections.deque([root])
visited.add(root)
while queue:
# Dequeue a vertex from queue
vertex = queue.popleft()
print(str(vertex) + " ", end="")
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Following is Breadth First Traversal:
0 1 2 3
=== Code Execution Successful ===