

PROGRAM 1: BFS-Breath First Search

Code:

```
DFS.py - C:/Users/saimo/AppData/Local/Programs/Python/Python313/DFS.py (3.13.7)
File Edit Format Run Options Window Help

# bfs_graph.py
from collections import deque

def bfs(graph, start):
    visited = set([start])
    q = deque([start])
    order = []
    while q:
        v = q.popleft()
        order.append(v)
        for nb in graph.get(v, []):
            if nb not in visited:
                visited.add(nb); q.append(nb)
    return order

if __name__ == "__main__":
    g = {
        1: [2],
        2: [7],
        7: [3],
        3: [6],
        6: [8],
        8: [10],
        10: [4],
        4: [5],
        5: [9],
        9: []
    }

    print(bfs(g, 1))
```

Output:

```
IDLE Shell 3.13.7
File Edit Shell Debug Options Window Help

Python 3.13.7 (tags/v3.13.7:bce1c3, Aug 14 2025, 14:15:11) [MSC v.1944 64 bit (AMD64)] on win32
Enter "help" below or click "Help" above for more information.

>>
==== RESTART: C:/Users/saimo/AppData/Local/Programs/Python/Python313/DFS.py ====
[1, 2, 7, 3, 6, 8, 10, 4, 5, 9]
>>
```

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        6: [7],
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        4: [8],
        8: []
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Output:

```
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Python 3.13.7 (tags/v3.13.7:bceelc3, Aug 14 2025, 14:15:11) [MSC v.1944 64 bit (AMD64)] on win32
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==== RESTART: C:/Users/saimo/AppData/Local/Programs/Python/Python313/DFS.py ====
[1, 2, 3, 5, 6, 7, 4, 8]
>>>
```

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            if nb not in visited:
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    return order

if __name__ == "__main__":
    g = {
        "A": ["B"],
        "B": ["C"],
        "C": ["D"],
        "D": ["E"],
        "E": ["F"],
        "F": ["G"],
        "G": []
    }

    print(bfs(g, "A"))
```

Output:

```
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File Edit Shell Debug Options Window Help
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>>>
==== RESTART: C:/Users/saimo/AppData/Local/Programs/Python/Python313/DFS.py ====
['A', 'B', 'C', 'D', 'E', 'F', 'G']
>>> |
```