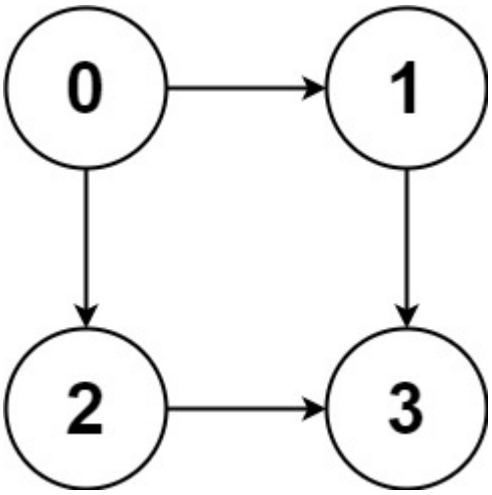
All Paths From Source to Target LeetCode

Given a directed acyclic graph (**DAG**) of n nodes labeled from 0 to n - 1, find all possible paths from node 0 to node n - 1 and return them in **any order**.

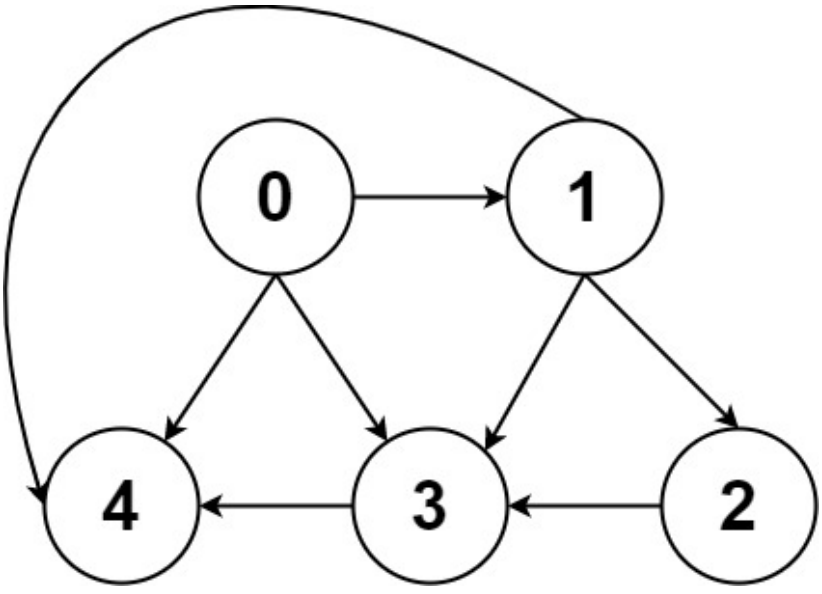
The graph is given as follows: graph[i] is a list of all nodes you can visit from node i (i.e., there is a directed edge from node i to node graph[i][j]).

Example:



Output: {{0, 1, 3}, {0, 2, 3}}

Example 1:



Output: {{0, 4}, {0, 3, 4} . {0, 1, 4}, {0, 1, 3, 2}, {0, 1, 2, 3, 4}}

Approach 1: Function to find all paths from source to target using BFS traversal

- **Explanation:**
    - The **allPathSourceToTargetBFS** function uses BFS traversal to explore paths from the source to the target.
    - It maintains a queue (**bfsQueue**) to iteratively explore neighbors.
    - Paths are extended during traversal, and once the target is reached, the path is added to the result.
- **Time Complexity:**
    - **The time complexity is O(V + E), where V is the number of vertices, and E is the number of edges.**
        - **Each vertex and edge are visited once during BFS traversal.**
- **Space Complexity:**
    - **The space complexity is O(V + E), where V is the number of vertices, and E is the number of edges.**
        - **The queue (bfsQueue) and the result paths contribute to space usage.**

Approach 2: Function to find all paths from source to target using DFS traversal

- **Explanation:**
    - The **allPathSourceToTargetDFS** function uses DFS traversal to explore paths from the source to the target.
    - It maintains a recursive DFS function (**dfsTraversal**) to explore neighbors.
    - Paths are extended during traversal, and once the target is reached, the path is added to the result.
- **Time Complexity:**
    - **The time complexity is O(V + E), where V is the number of vertices, and E is the number of edges.**
        - **Each vertex and edge are visited once during DFS traversal.**
- **Space Complexity:**

- **The space complexity is O(V + E), where V is the number of vertices, and E is the number of edges.**
    - **The recursive call stack and the result paths contribute to space usage.**

Conclusion

The program effectively finds all paths from the source to the target in a directed graph using both BFS and DFS traversal approaches. **These methods provide different perspectives on graph exploration, and the time and space complexity of both approaches are reasonable for typical graph sizes.**