

Data Structures and Algorithms Lab  
Lab Test - V2

Maximum Marks: 20

Max Time: 40 minutes

SET – A

There is a graph with  $n$  vertices, where each vertex is labeled from  $0$  to  $n - 1$  (inclusive). The edges in the graph are represented as a 2D integer array `edges`, where each `edges[i] = [ui, vi]` denotes an edge between vertex `ui` and vertex `vi`. Every vertex pair is connected by at most one edge, and no vertex has an edge to itself.

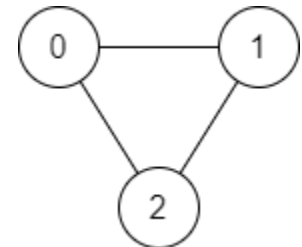
You want to determine if there is a valid path that exists from vertex `source` to vertex `destination`.

Given `edges` and the integers `n`, `source`, and `destination`, return `true` if there is a valid path from `source` to `destination`, or `false` otherwise.

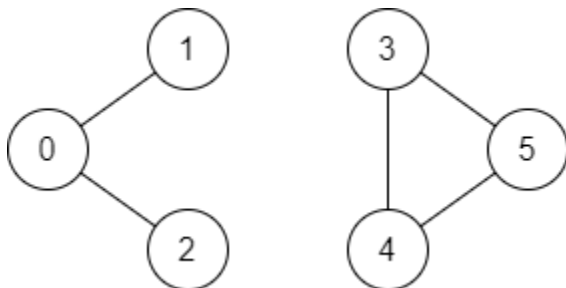
**Example 1:**

Input: `n = 3, edges = [[0,1],[1,2],[2,0]], source = 0, destination = 2`  
Output: `true`

Explanation: There are two paths from vertex 0 to vertex 2:  
- `0 → 1 → 2`  
- `0 → 2`



**Example 2:**



Input: `n = 6, edges = [[0,1],[0,2],[3,5],[5,4],[4,3]], source = 0, destination = 5`  
Output: `false`  
Explanation: There is no path from vertex 0 to vertex 5.

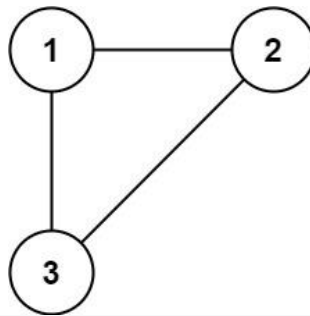
## SET – B

A tree can be considered as an **undirected graph** that is connected and has no cycles.

You are given a graph that started as a tree with  $n$  nodes labeled from 1 to  $n$ , with one additional edge added. The added edge has two **different** vertices chosen from 1 to  $n$ , and was not an edge that already existed. The graph is represented as an array `edges` of length  $n$  where `edges[i] = [ai, bi]` indicates that there is an edge between nodes  $a_i$  and  $b_i$  in the graph.

Return *an edge that can be removed so that the resulting graph is a tree of  $n$  nodes*. If there are multiple answers, return the answer that occurs last in the input.

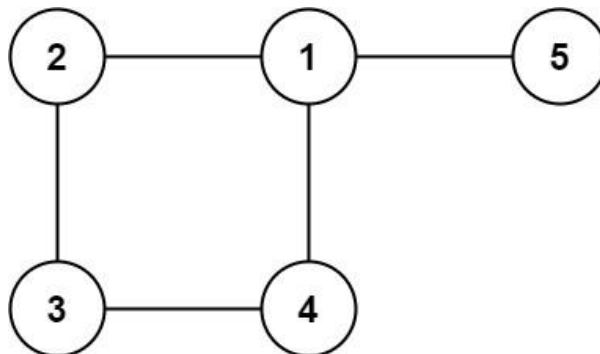
**Example 1:**



Input: `edges = [[1,2],[1,3],[2,3]]`

Output: `[2,3]`

**Example 2:**



Input: `edges = [[1,2],[2,3],[3,4],[1,4],[1,5]]`

Output: `[1,4]`