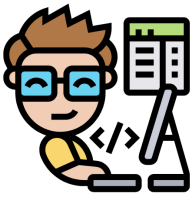


DAILY PROGRAMMING

CHALLENGE

WISDOM SPROUTS
IT Training Hub

Lowest Common Ancestor (LCA) in a Binary Tree

You are given a binary tree and two distinct nodes within the tree. Your task is to find the lowest common ancestor (LCA) of these two nodes. The LCA of two nodes p and q is defined as the lowest node in the tree that has both p and q as descendants (where we allow a node to be a descendant of itself).

Input:

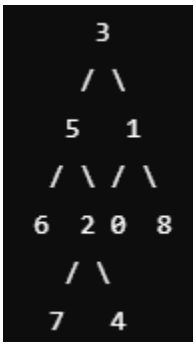
- A binary tree represented as a series of nodes where each node has references to its left and right child.
- Two distinct nodes p and q from the tree.

Output:

- Return the node that is the lowest common ancestor (LCA) of p and q.

Examples:

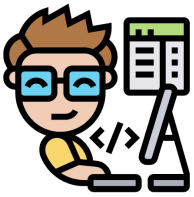
- Example 1
  Input: root = [3, 5, 1, 6, 2, 0, 8, null, null, 7, 4], p = 5, q = 1
  Output: 3
  Explanation:
  - The tree is as follows



  - The lowest common ancestor of nodes 5 and 1 is 3, because 3 is the lowest node that has both 5 and 1 as descendants.

Constraints:

- The number of nodes in the tree is between 2 and 10^5
- Each node's value is unique.
- Both p and q are distinct and guaranteed to be in the tree.



DAILY PROGRAMMING

CHALLENGE

WISDOM SPROUTS
IT Training Hub

Test Cases:

1. Input: root = [3, 5, 1, 6, 2, 0, 8, null, null, 7, 4], p = 5, q = 4
   Output: 5
2. Input: root = [3, 5, 1, 6, 2, 0, 8, null, null, 7, 4], p = 5, q = 1
   Output: 3
3. Input: root = [1, 2], p = 1, q = 2
   Output: 1

Edge Cases:

1. Both Nodes are the Same: If p and q are the same node, the LCA is the node itself
2. One Node is Root: If one node is the root of the tree, the root is the LCA.
3. Small Tree: The tree has only two nodes.