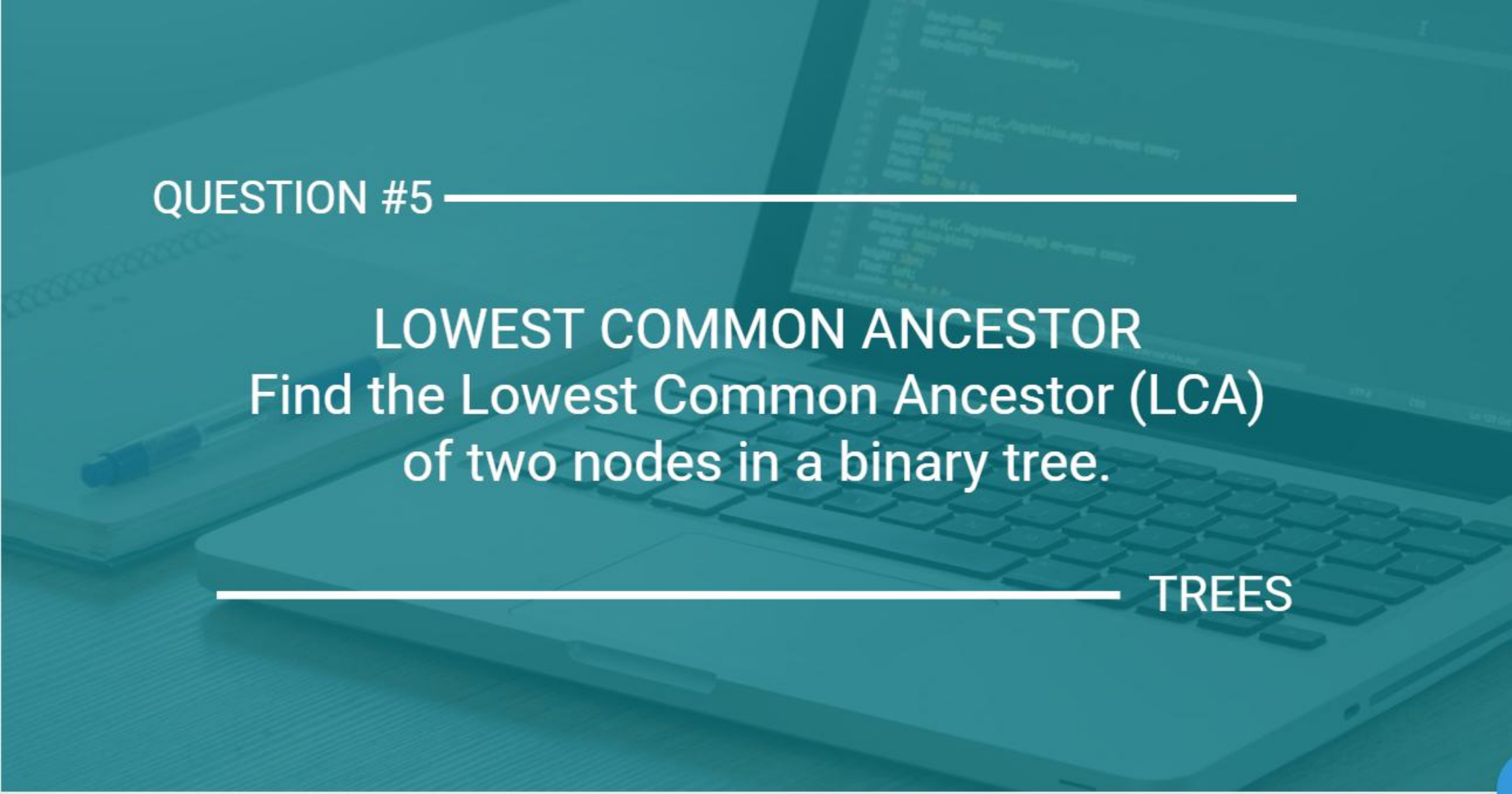

QUESTION #5

LOWEST COMMON ANCESTOR

Find the Lowest Common Ancestor (LCA) of two nodes in a binary tree.

TREES

Solution

METHOD 1 (Storing root to n1 and root to n2 paths):

1. Find path from root to n1 and store it in a vector or array.
2. Find path from root to n2 and store it in another vector or array.
3. Traverse both paths till the values in arrays are same. Return the common element just before the mismatch.

This method finds LCA in O(n) time, but requires three tree traversals plus extra spaces for path arrays.

NERVING INTO DATA STRUCTURES

Solution

METHOD 2 (Using Single Traversal)
The idea is to traverse the tree starting from root.

1. If any of the given keys (n1 and n2) == root,
   root is LCA (assuming both keys are present).
2. Else,
   recur for left and right subtree.
3. The node which has one key present in its left subtree and the other key present in right subtree is the LCA.
4. If both keys lie in left subtree,
   left subtree has LCA also,
   Else,
   LCA lies in right subtree.