Problem 11.1  [Link-Cut LCA].  Show how to answer least common ancestor queries \( \text{lca}(v, w) \) in \( O(\log n) \) time per operation in a link-cut tree.

**Hints:**

- You do not need to modify any data stored in the link-cut trees.
- Think about what happens when you do \( \text{access}(v) \) followed by \( \text{access}(w) \).