

Binary Search Tree (BST) Problem Set

1. Find Minimum and Maximum

Given the root of a BST, return the minimum and maximum values. Hint: Go left until you can't (min), go right until you can't (max).

2. Validate BST

Check if a given binary tree is a valid BST. Hint: Keep track of the valid min and max range for each subtree.

3. Range Sum in BST

Return the sum of all node values in $[L, R]$. Hint: Skip left subtree if node $< L$, skip right if node $> R$.

4. Count Nodes in Range

Count how many nodes have values in $[L, R]$. Hint: Same as range sum but count nodes instead of summing values.

5. Find Closest Value

Given a BST and a target, return the node value closest to target. Hint: Traverse down the tree, keep track of the closest so far.

6. Lowest Common Ancestor (LCA)

Given two values p and q , find their lowest common ancestor in the BST. Hint: The split point (where one value goes left and the other right) is the LCA.

7. Trim BST

Remove all nodes outside the range $[L, R]$ and return the new root. Hint: If root $< L$, return right; if root $> R$, return left.

8. Range Product in BST

Return the product of all nodes in the range $[L, R]$. Hint: Same as range sum but multiply instead of summing.

9. K-th Smallest in BST

Return the k -th smallest element in the BST. Hint: Use in-order traversal and count nodes.

10. K-th Largest in BST

Return the k-th largest element in the BST. Hint: Use reverse in-order traversal and count nodes.

11. K-th Smallest in Range

Find the k-th smallest element within range [L, R]. Hint: In-order traversal, but only consider nodes within [L, R].