Advance Programming

Student Name: Deshveer Singh **UID:** 22BCS14259

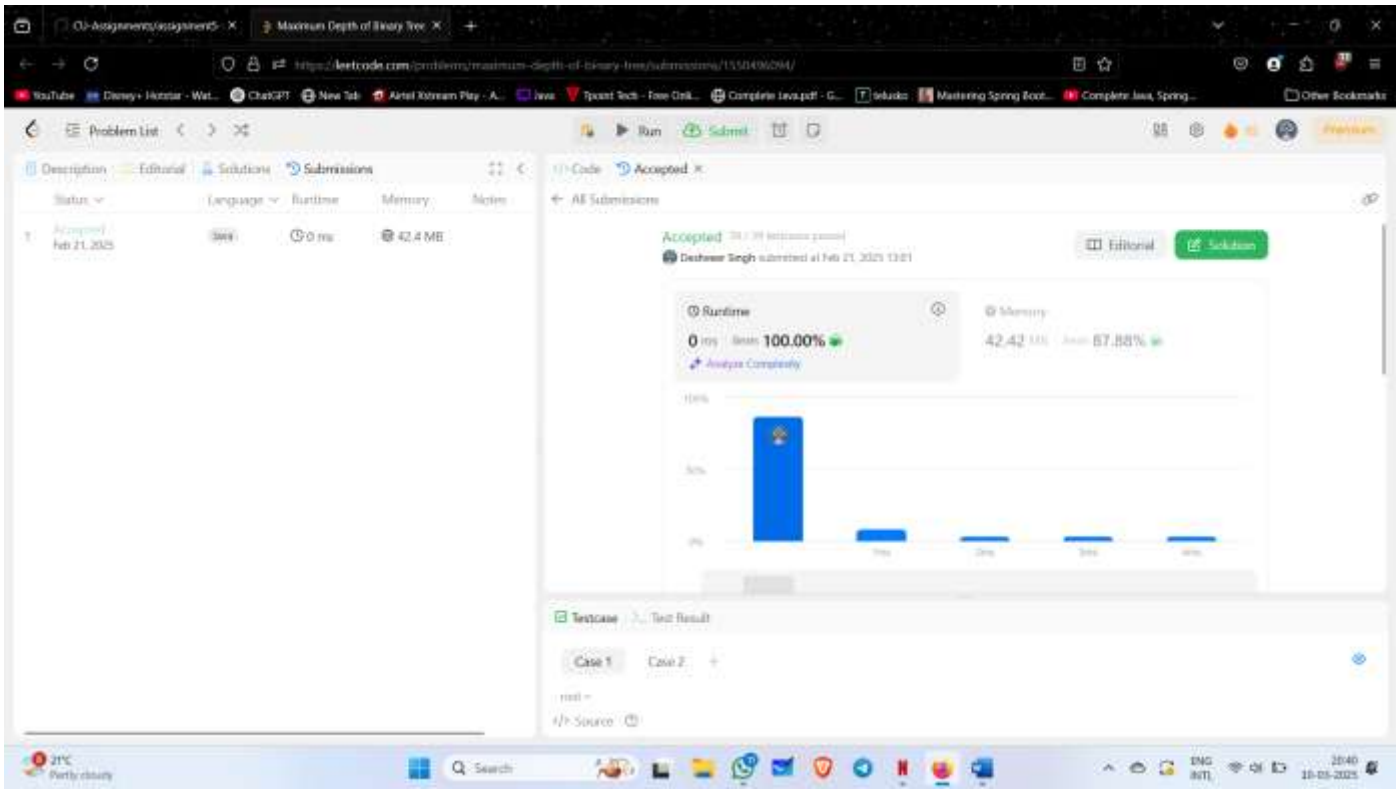
Branch: CSE **Section/Group:** 612-B

Semester: 6th **Date of Performance:** 20/02/25

Subject Name: Advance Programming **Subject Code:** 22CSP-367

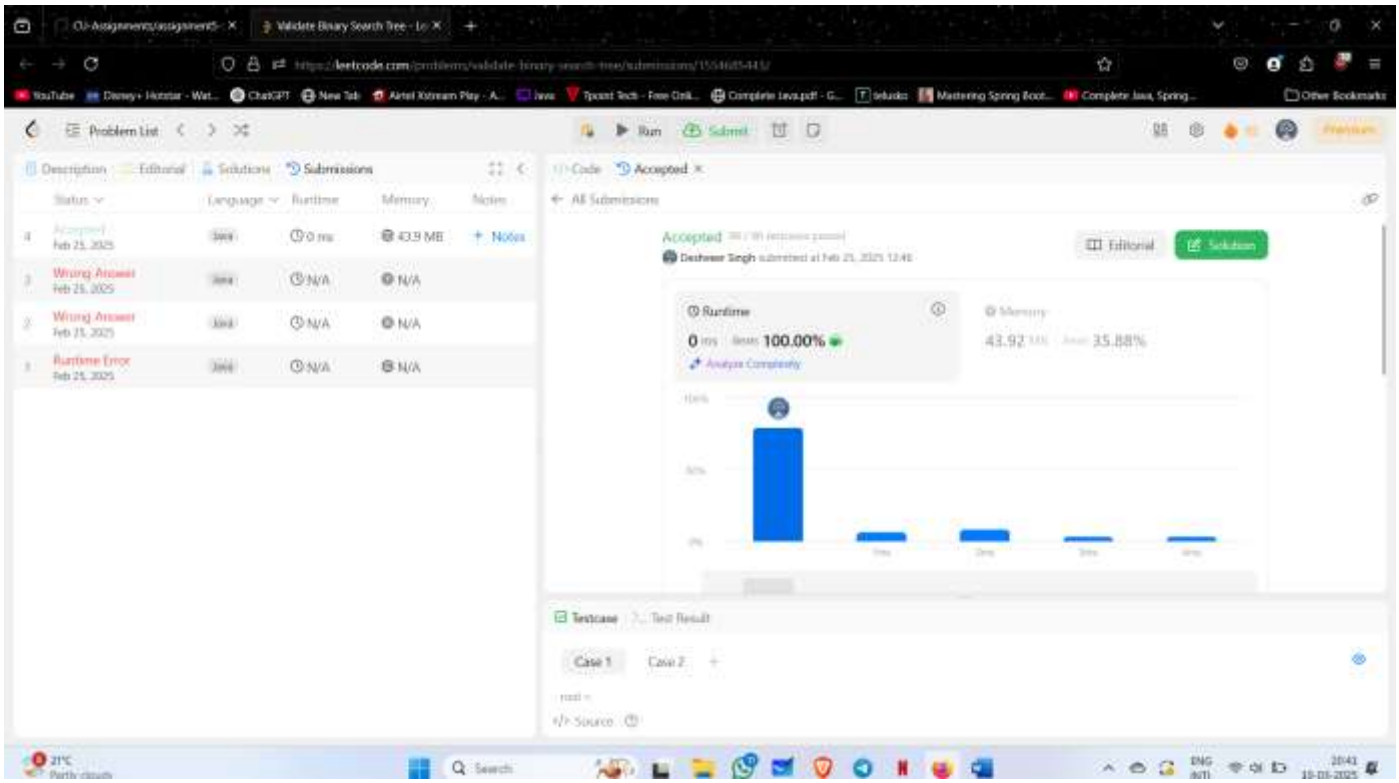
1. 104:

```
class Solution {
    public int maxDepth(TreeNode root) {
        if(root == null) return 0;

        int nodeRight = maxDepth(root.left);
        int nodeLeft = maxDepth(root.right);

        return 1 + Math.max( nodeLeft, nodeRight);
    }
}
```



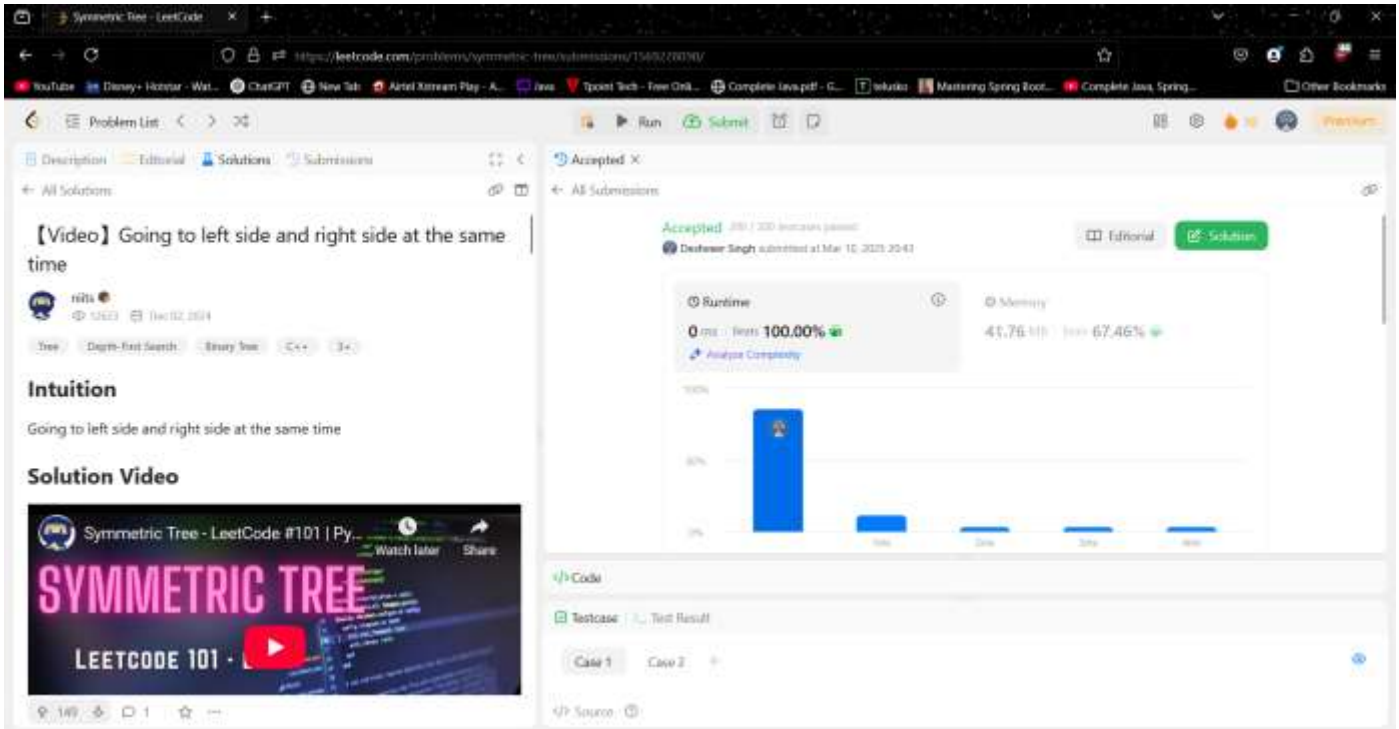
2. 98:

```
class Solution {
    public boolean isValidBST(TreeNode root) {
        return valid(root, Long.MIN_VALUE, Long.MAX_VALUE);
    }

    private boolean valid(TreeNode root, long min, long max) {
        if (root == null) {
            return true;
        }

        if (root.val <= min || root.val >= max) {
            return false;
        }

        return valid(root.left, min, root.val) && valid(root.right, root.val, max);
    }
}
```



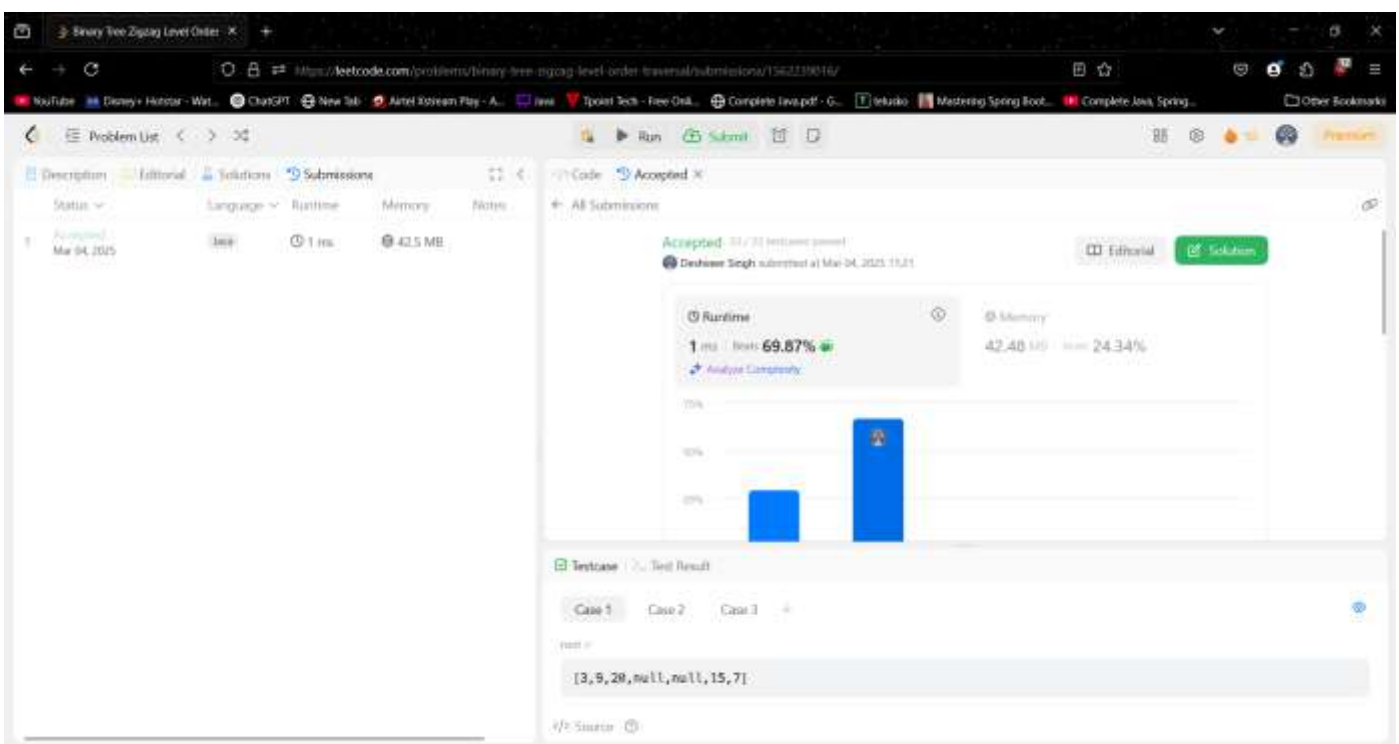
3. 101:

```
class Solution {
    public boolean isSymmetric(TreeNode root) {
        return isMirror(root.left, root.right);
    }

    private boolean isMirror(TreeNode n1, TreeNode n2) {
        if (n1 == null && n2 == null) {
            return true;
        }

        if (n1 == null || n2 == null) {
            return false;
        }

        return n1.val == n2.val && isMirror(n1.left, n2.right) && isMirror(n1.right, n2.left);
    }
}
```



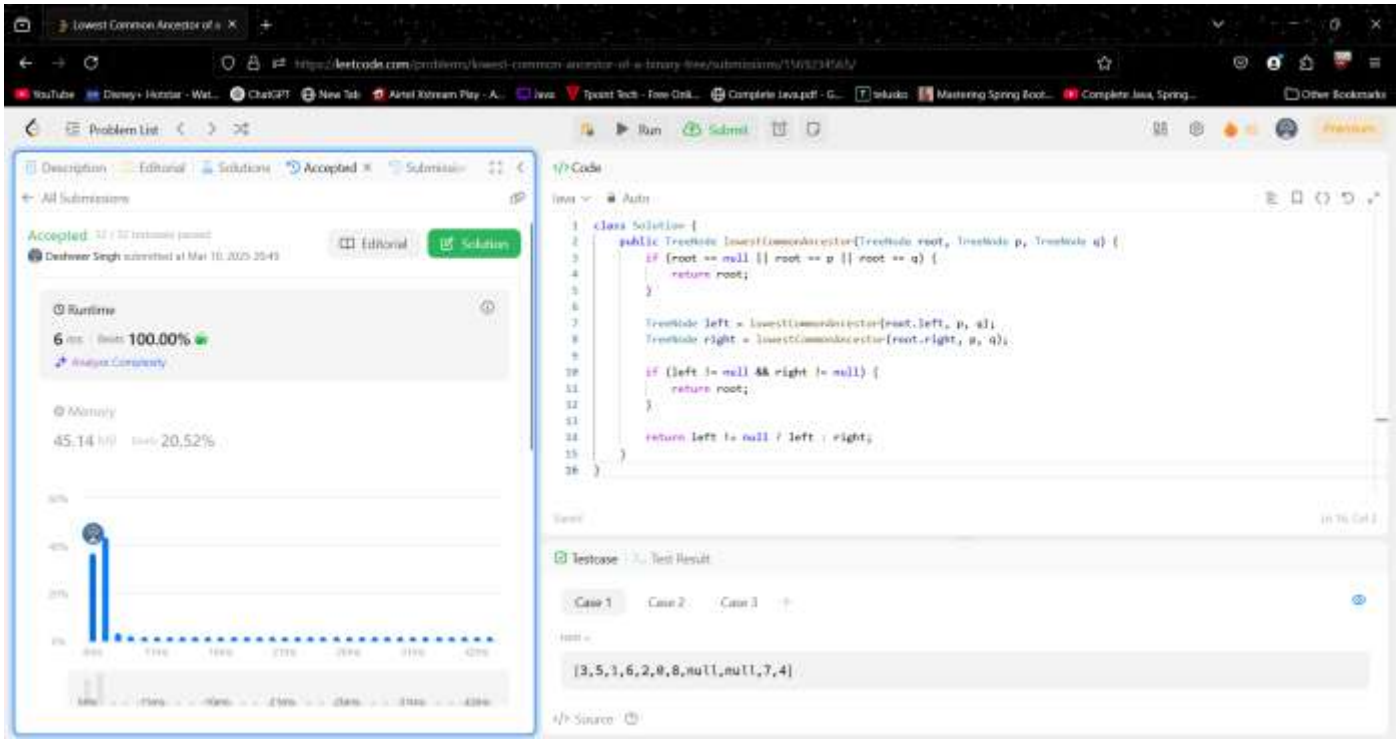
4. 103:

```
class Solution {
    public List<List<Integer>> zigzagLevelOrder(TreeNode root) {
        Queue<TreeNode> st = new LinkedList<>();
        List<List<Integer>> ans = new ArrayList<>();
        if(root!=null)st.add(root);
        int k = 0;
        while(!st.isEmpty()){
            ArrayList<Integer> arr = new ArrayList<>();
            int n = st.size();
            // PUSHING TILL QUEUE.SIZE()
            for(int i = 0 ; i<n ; i++){
                TreeNode temp = st.poll();
                if(temp==null)break;
                arr.add(temp.val);
                if(temp.left!=null)st.add(temp.left);
                if(temp.right!=null)st.add(temp.right);
            }
              // REVERSING IF K IS ODD
            if(k%2!=0){
                Collections.reverse(arr);
                ans.add(new ArrayList<>(arr));
            }else ans.add(new ArrayList<>(arr));
                // INCREASING COUNTER
            k++;
        }return ans;
    }
}
```



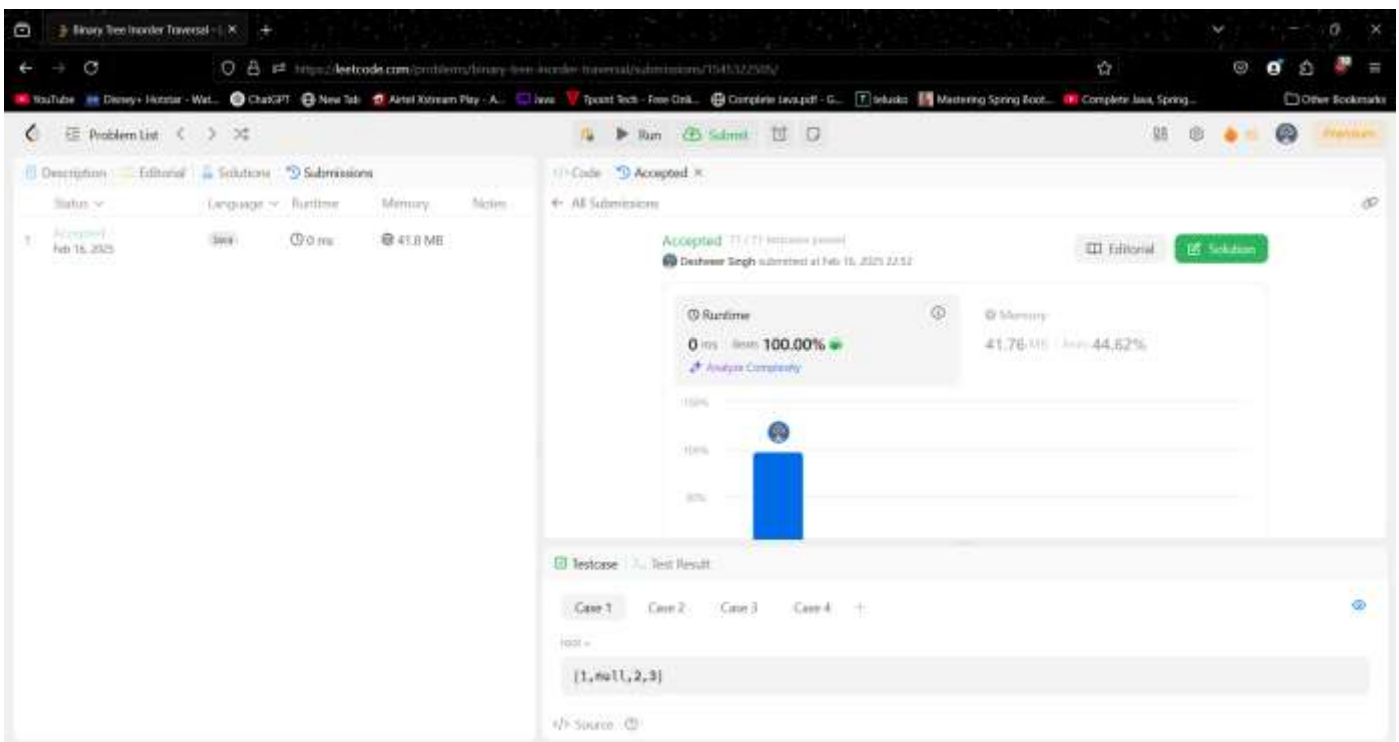
5. 236:

```
class Solution {
    public TreeNode lowestCommonAncestor(TreeNode root, TreeNode p, TreeNode q) {
        if (root == null || root == p || root == q) {
            return root;
        }

        TreeNode left = lowestCommonAncestor(root.left, p, q);
        TreeNode right = lowestCommonAncestor(root.right, p, q);

        if (left != null && right != null) {
            return root;
        }

        return left != null ? left : right;
    }
}
```



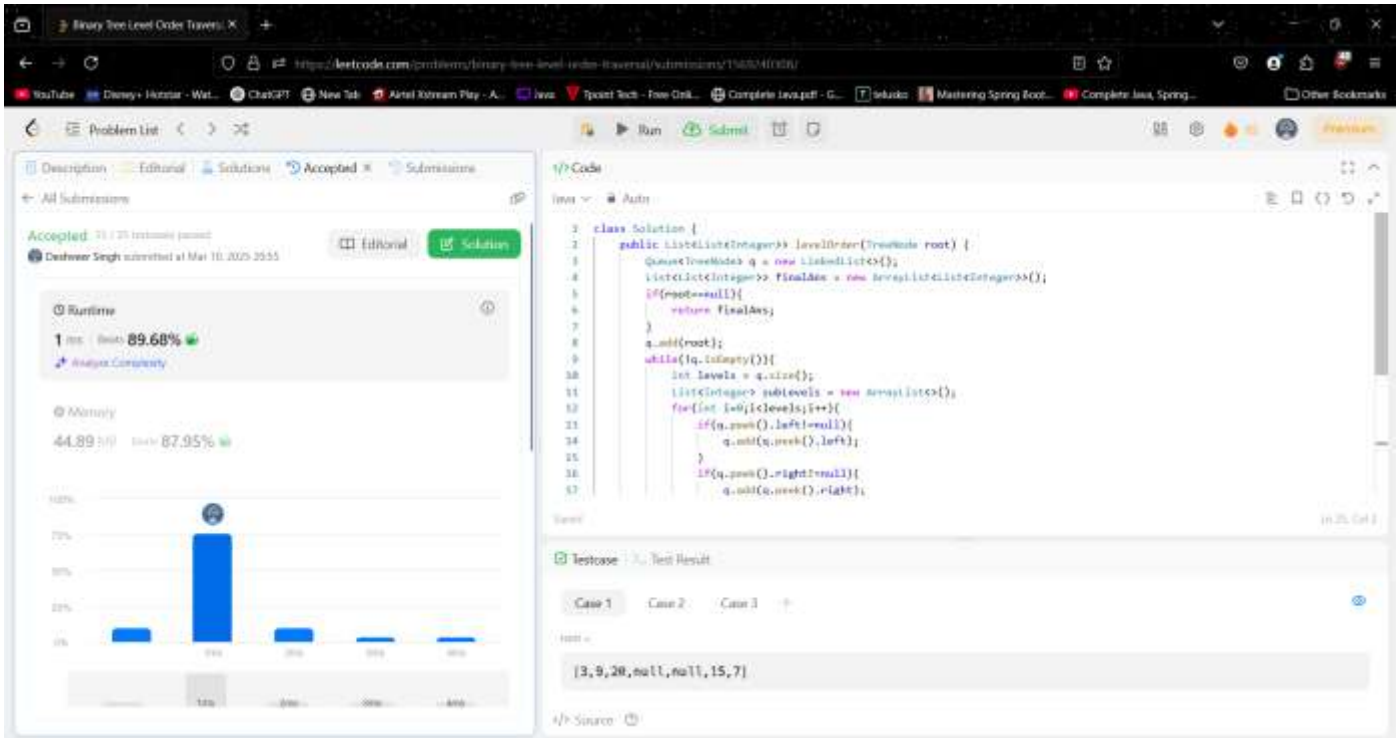
6. 94:

```
class Solution {
    private List<Integer> res = new ArrayList<>();
    public List<Integer> inorderTraversal(TreeNode root) {
        traverse(root);
        return res;
    }

    private void traverse(TreeNode root) {
        if (root == null) {
            return;
        }
        traverse(root.left);
        res.add(root.val);
        traverse(root.right);
    }
}
```



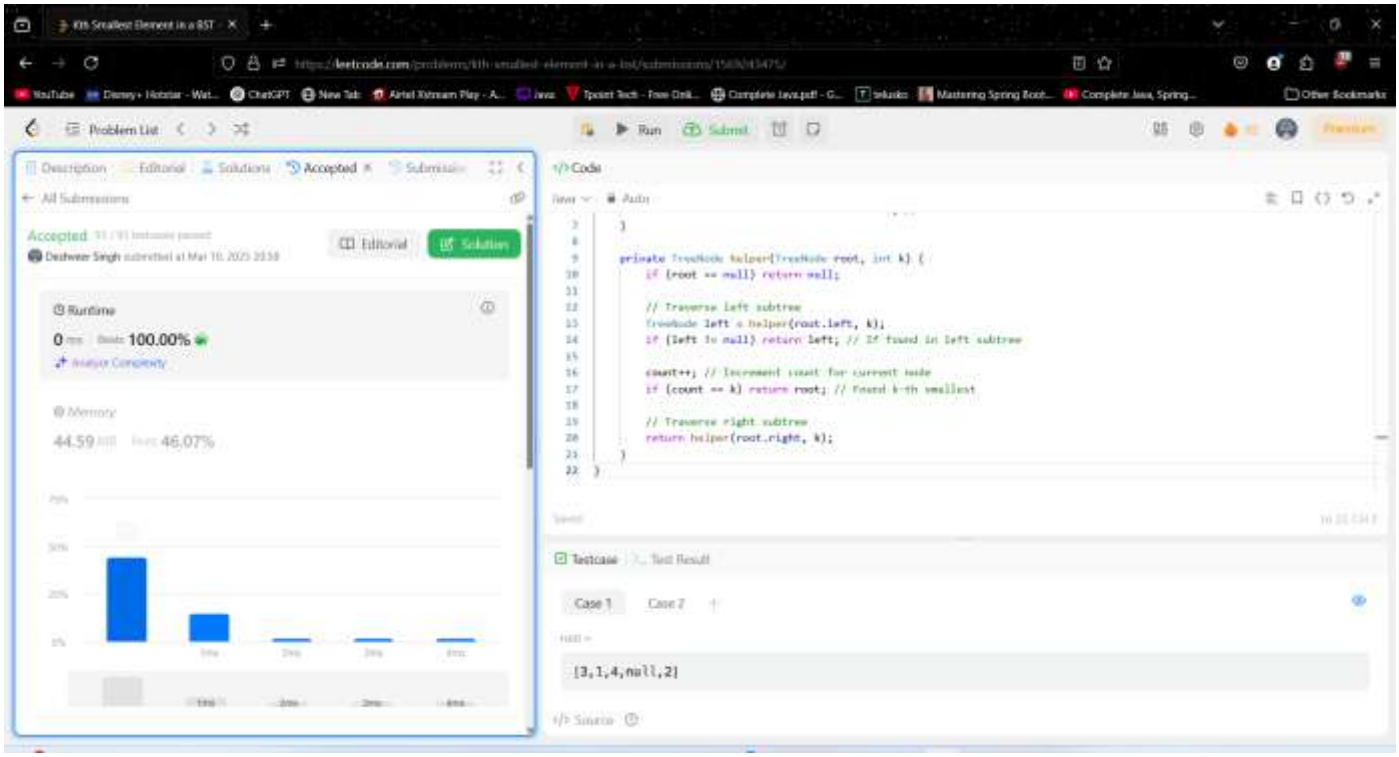
7. 102:

```
class Solution {
    public List<List<Integer>> levelOrder(TreeNode root) {
        Queue<TreeNode> q = new LinkedList<>();
        List<List<Integer>> finalAns = new ArrayList<List<Integer>>();
        if(root==null){
            return finalAns;
        }
        q.add(root);
        while(!q.isEmpty()){
            int levels = q.size();
            List<Integer> subLevels = new ArrayList<>();
            for(int i=0;i<levels;i++){
                if(q.peek().left!=null){
                    q.add(q.peek().left);
                }
                if(q.peek().right!=null){
                    q.add(q.peek().right);
                }
                subLevels.add(q.remove().val);
            }
            finalAns.add(subLevels);
        }
        return finalAns;
    }
}
```



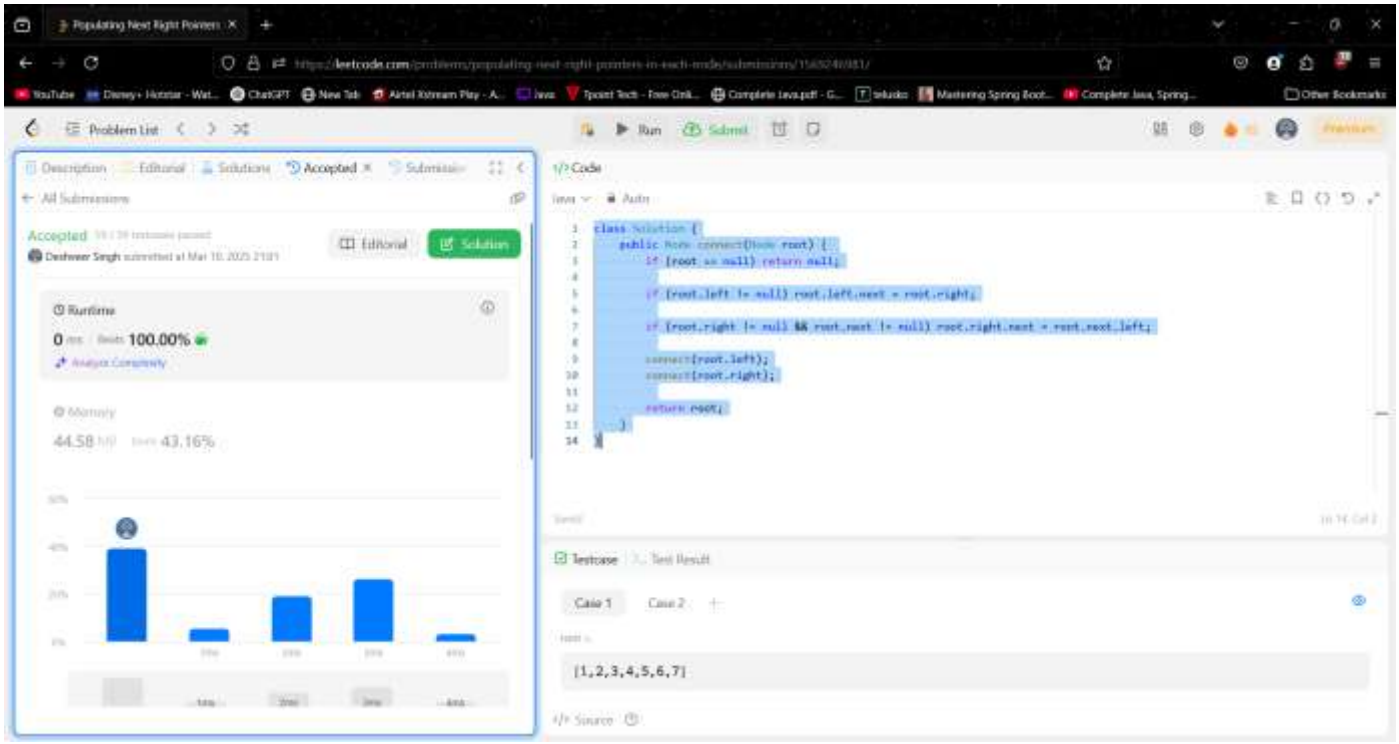
8. 230:

```
class Solution {
    private int count = 0; // Counter for visited nodes

    public int kthSmallest(TreeNode root, int k) {
        TreeNode result = helper(root, k);
        return result != null ? result.val : 0; // Return value or 0 if not found
    }

    private TreeNode helper(TreeNode root, int k) {
        if (root == null) return null;

        // Traverse left subtree
        TreeNode left = helper(root.left, k);
        if (left != null) return left; // If found in left subtree

        count++; // Increment count for current node
        if (count == k) return root; // Found k-th smallest

        // Traverse right subtree
        return helper(root.right, k);
    }
}
```



9. 116:

```
class Solution {
    public Node connect(Node root) {
        if (root == null) return null;

        if (root.left != null) root.left.next = root.right;

        if (root.right != null && root.next != null) root.right.next = root.next.left;

        connect(root.left);
        connect(root.right);

        return root;
    }
}
```



10. 404:

```
class Solution {
    private int sum = 0;
    public int sumOfLeftLeaves(TreeNode root) {
        sumTree(root, false);
        return sum;
    }
    private void sumTree(TreeNode node, boolean flag){
        if(node == null) return;

        if(node.left == null && node.right == null && flag == true){
            sum += node.val;
        }

        sumTree(node.left, true);
        sumTree(node.right, false);

        return;
    }
}
```