Assignment 5

Student Name: Surbhi Priya **UID: 22BCS10268**
Branch: CSE **Section/Group: 22BCS_IOT_612**
Semester: 6th **Date of Performance:04/03/25**
Subject Name: Advance prog. Lab **Subject Code: 22CSP-351**

Q1)Maximum Depth of a Binary Tree

- **Code:**

```
class Solution {
public int maxDepth(TreeNode root) {
    if(root==null){
        return 0;
    }
    int leftht=maxDepth(root.left);
    int rightht=maxDepth(root.right);
    return Math.max(leftht,rightht)+1;
  }
}
```

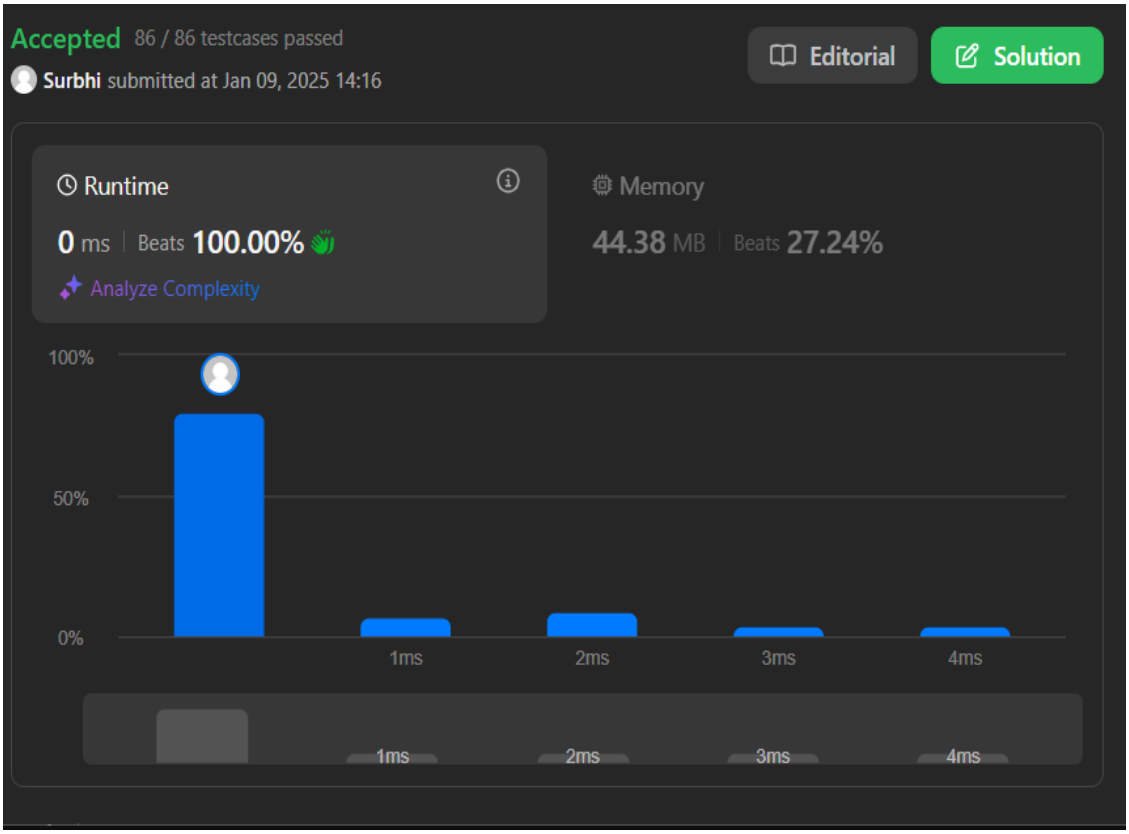
- **Screenshot:**

Q2) Validate Binary Search Tree

- **Code:**

```
class Solution {
 public boolean helperFunction(TreeNode root,Integer lower,Integer upper){
 if(root==null){
    return true;
 }
 if((lower!=null && root.val<=lower)|| (upper!=null && root.val>=upper)){
    return false;
 }
 return helperFunction(root.left,lower,root.val) && helperFunction(root.right,root.val,upper);
}
public boolean isValidBST(TreeNode root) {
    return helperFunction(root,null,null);
}
}
```

- **Screenshot:**

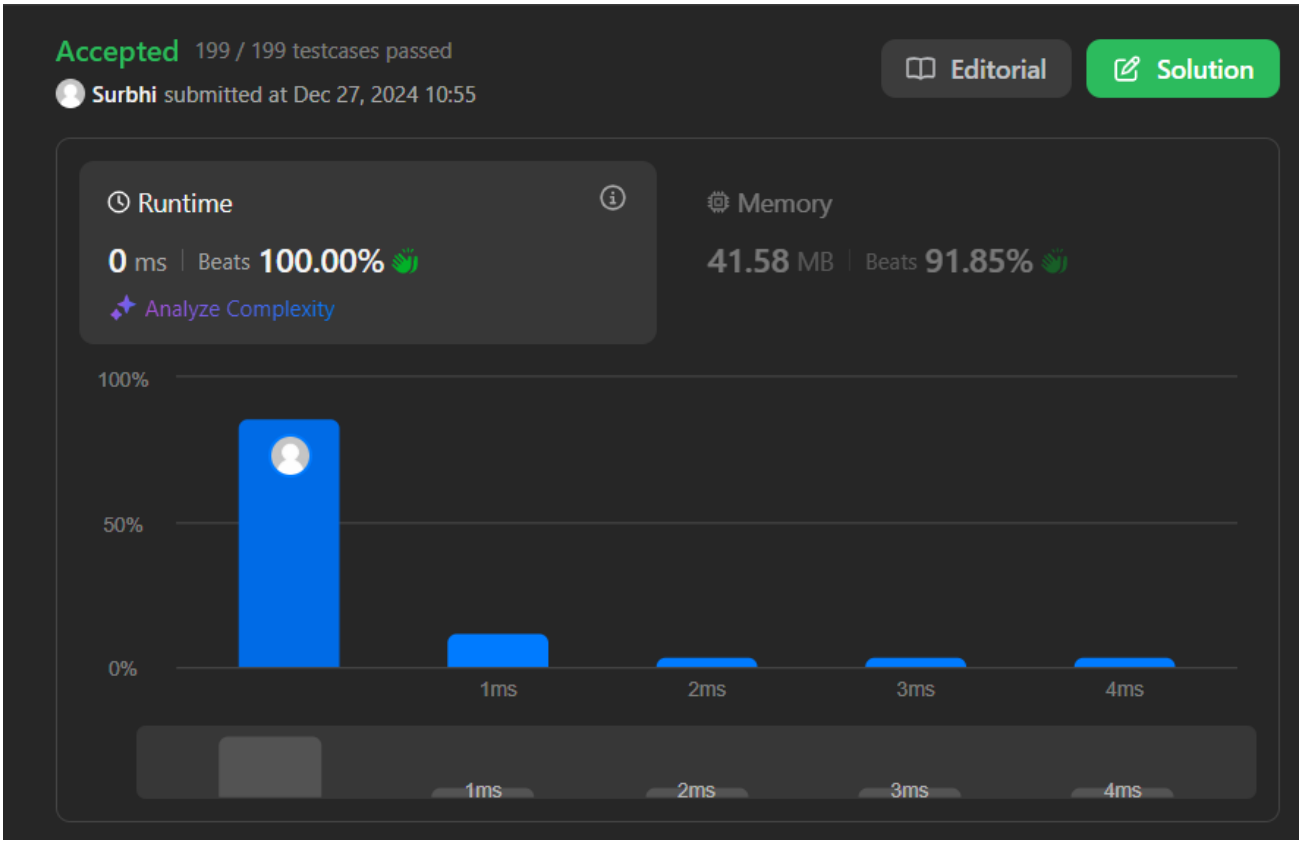


Q3) Symmetric Tree

- **Code:**

```
class Solution {
    public boolean isMirror(TreeNode t1,TreeNode t2){
        if(t1==null && t2==null){
            return true;
        }
        if(t1==null || t2==null){
            return false;
        }
        return (t1.val == t2.val) && isMirror(t1.left, t2.right) && isMirror(t1.right, t2.left);
    }
    public boolean isSymmetric(TreeNode root) {
        if (root == null) {
            return true;
        }
        return isMirror(root.left, root.right);
    }
}
```

- **Screenshot:**



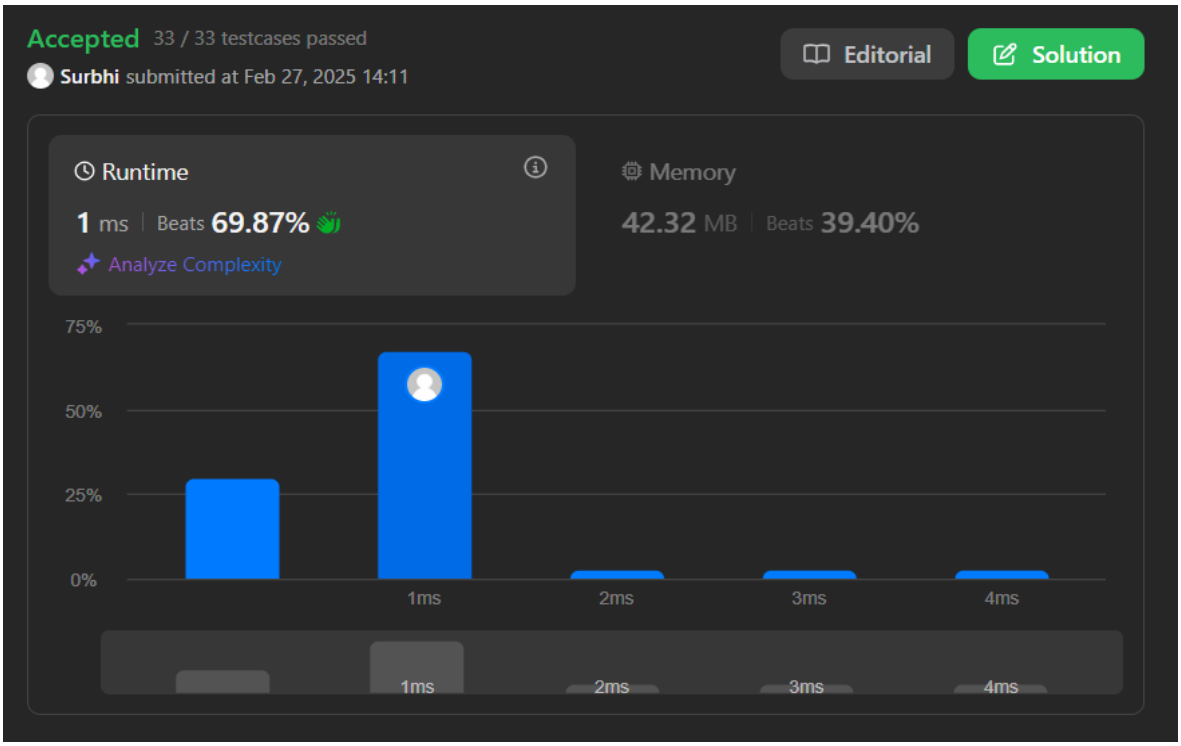
Q4) Binary Tree Zigzag Level Order Traversal

- **Code:**

```
class Solution {
public List<List<Integer>> zigzagLevelOrder(TreeNode root) {
    List<List<Integer>>result=new ArrayList<>();
    if (root == null) return result;
    Queue<TreeNode>q=new LinkedList<>();
    q.add(root);
    int level = 0;
    while(!q.isEmpty()){
        int size=q.size();
        List<Integer>ls=new LinkedList<>();
        for(int i=0;i<size;i++){
            TreeNode curr=q.poll();
            ls.add(curr.val);

            if (curr.left != null) q.add(curr.left);
            if (curr.right != null) q.add(curr.right);
        }
        if (level % 2 == 1) {
            Collections.reverse(ls);
        }
        result.add(new ArrayList<>(ls));
        level++;
```

```
        }
        return result;
    }
}
```

- **Screenshot:**

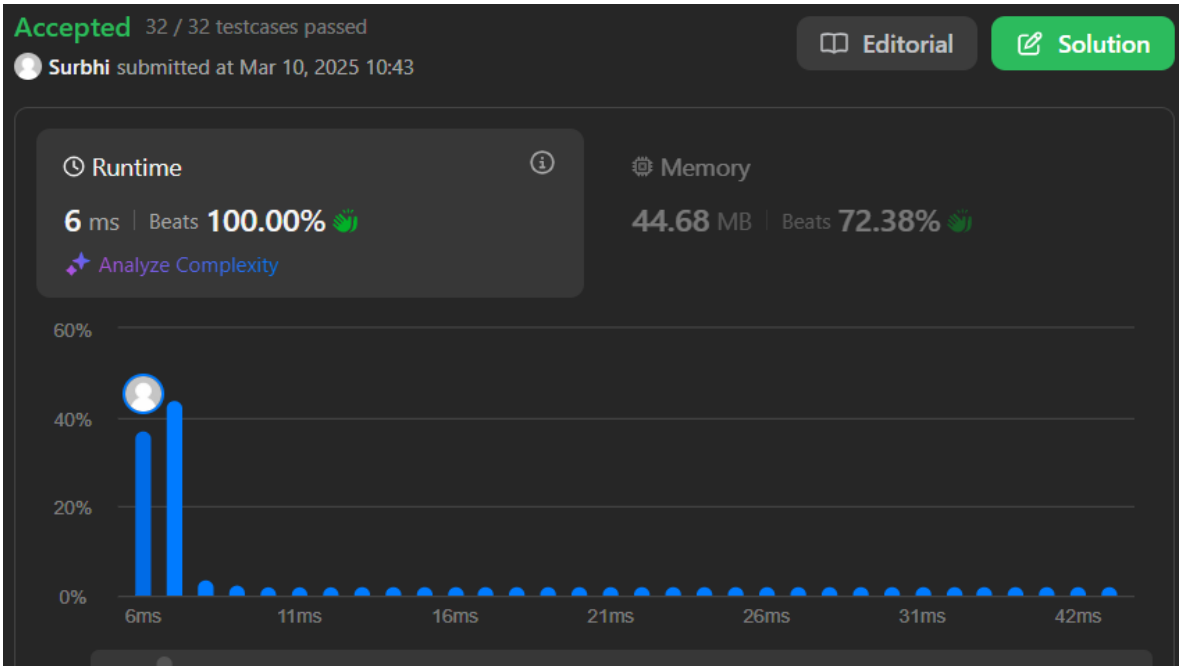


Q5) Lowest Common Ancestor of a Binary Tree

- **Code:**

```
class Solution {
    public TreeNode lowestCommonAncestor(TreeNode root, TreeNode p, TreeNode q) {
        // Base case: null node
        if (root == null) return null;

        // If the current node is either p or q, return it
        if (root == p || root == q) return root;

        // Recur for left and right children
        TreeNode left = lowestCommonAncestor(root.left, p, q);
        TreeNode right = lowestCommonAncestor(root.right, p, q);

        // If both left and right return a non-null value, current node is LCA
        if (left != null && right != null) return root;

        // Otherwise, return the non-null child (or null if both are null)
        return left != null ? left : right;
    }
}
```

- **Screenshot:**



Q6) Binary Tree Inorder Traversal

- **Code:**

```
class Solution {
public void Traversal(TreeNode root,List<Integer>ans){
    if(root==null) return;
    Traversal(root.left,ans);
    ans.add(root.val);
    Traversal(root.right,ans);
}
public List<Integer> inorderTraversal(TreeNode root) {
    List<Integer>ans=new ArrayList<>();
    Traversal(root,ans);
    return ans;
}
}
```

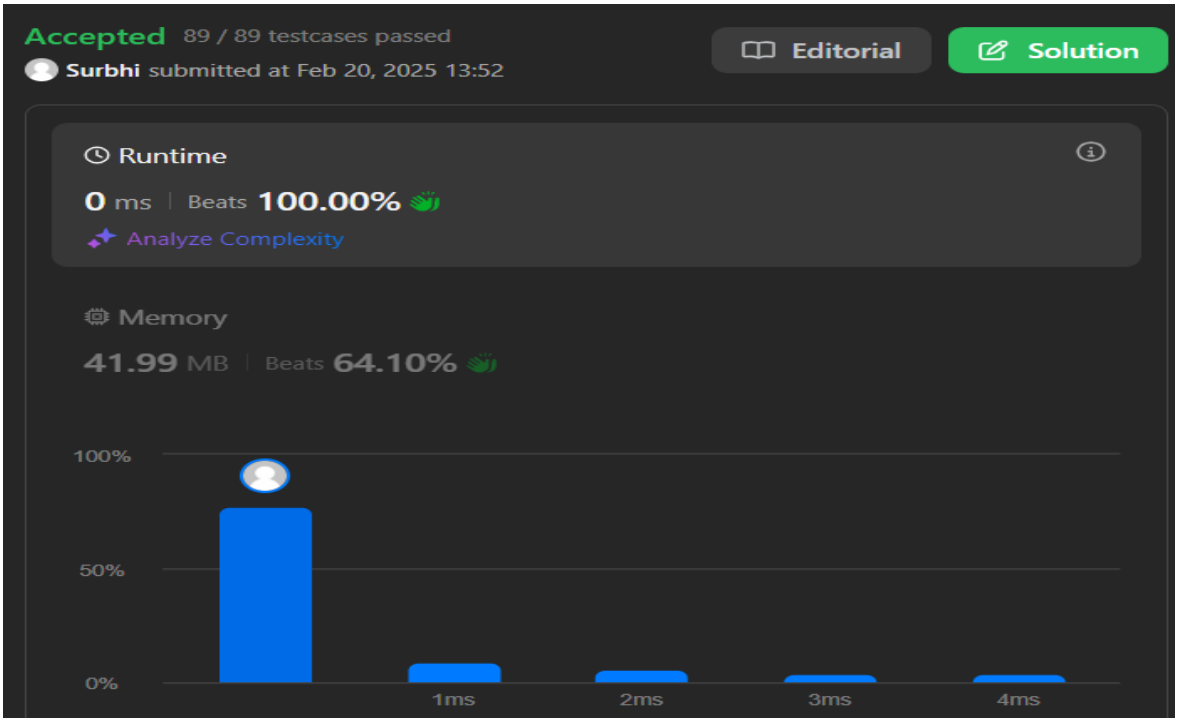
- **Screenshot:**

Q7) Binary Tree Level Order Traversal

- **Code:**

```
class Solution {
    public List<List<Integer>> levelOrder(TreeNode root) {
        List<List<Integer>> ans = new ArrayList<>();
        if (root == null) return ans;

        Queue<TreeNode> queue = new LinkedList<>();
        queue.add(root);

        while (!queue.isEmpty()) {
            int levelSize = queue.size();
            List<Integer> level = new ArrayList<>();

            for (int i = 0; i < levelSize; ++i) {
                TreeNode node = queue.poll();
                level.add(node.val);

                if (node.left != null) queue.add(node.left);
                if (node.right != null) queue.add(node.right);
            }
            ans.add(level);
        }
        return ans;
    }
}
```

- **Screenshot:**

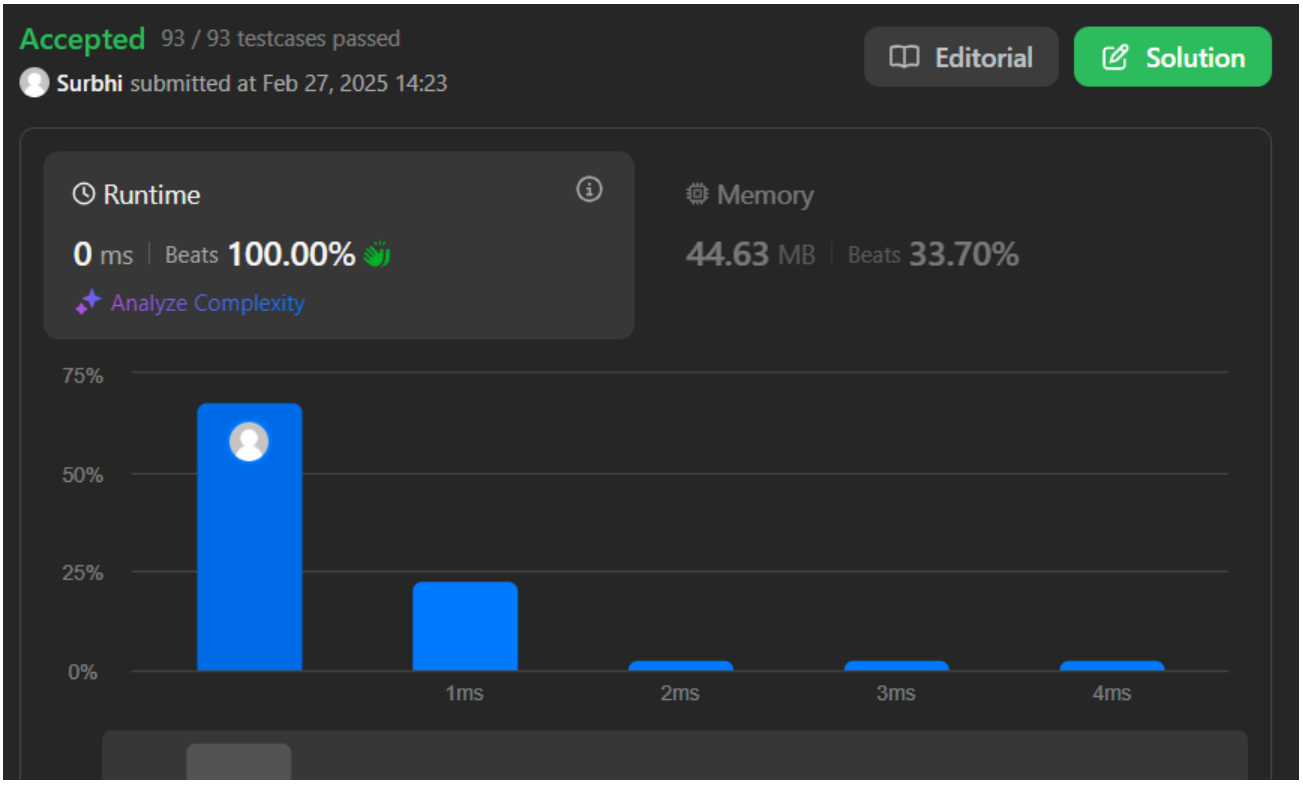


Q8) Kth smallest element in a BST

- **Code:**

```
class Solution {
    private int count = 0;
    private int result = 0;

    public void inOrder(TreeNode root,int k){
        if(root==null){
            return;
        }
        inOrder(root.left,k);
        count++;
        if (count == k) {
            result = root.val;
            return;
        }
        inOrder(root.right,k);
    }
    public int kthSmallest(TreeNode root, int k) {
        inOrder(root,k);
        return result;
    }
}
```

- **Screenshot:**



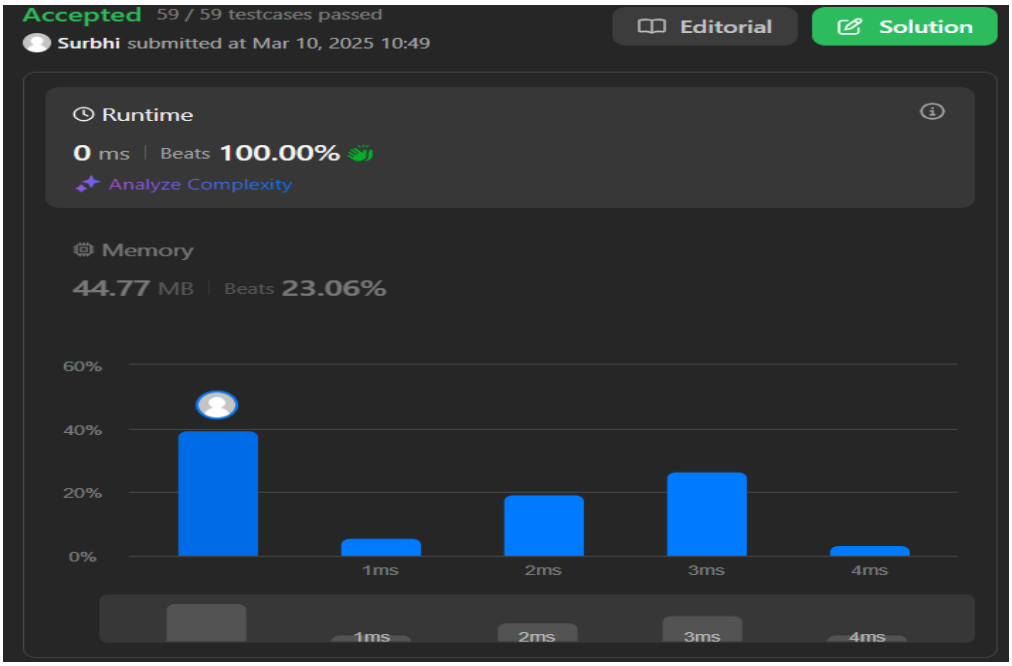
Q9) Populating Next Right Pointers in Each Node

- **Code:**

```
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;
    }
}
```

- **Screenshot:**

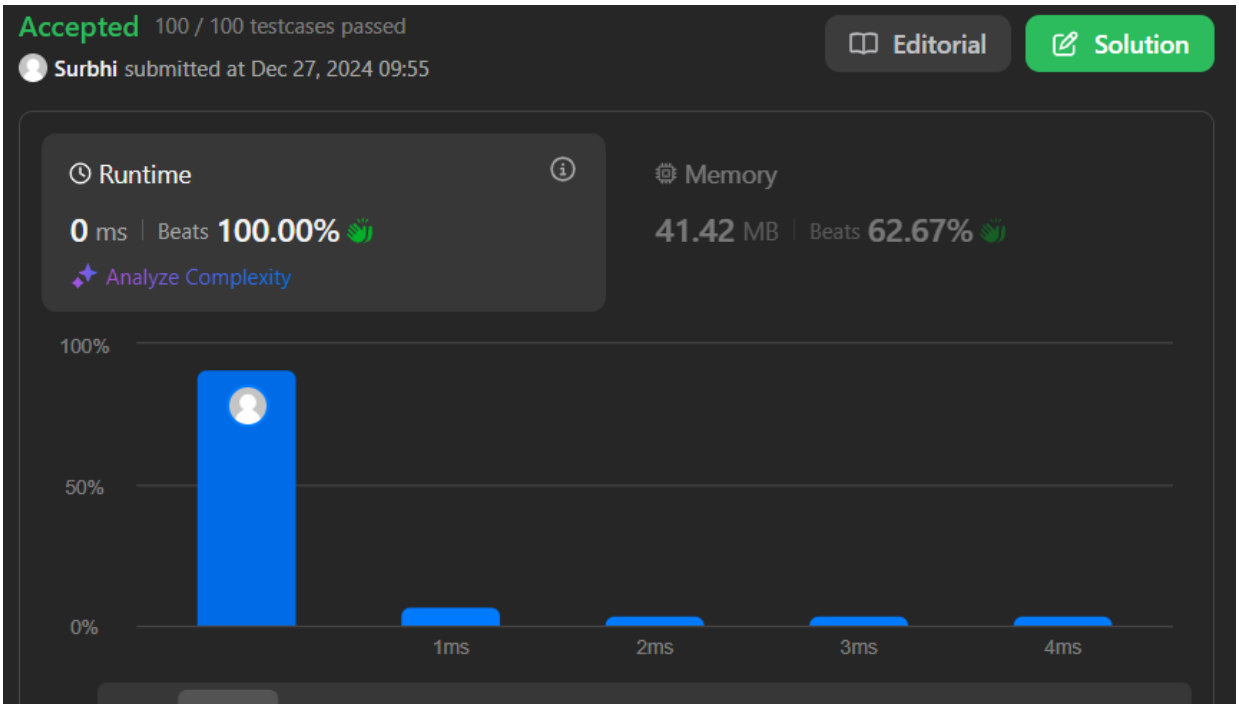


Q10) Sum of Left Leaves

- **Code:**

```
class Solution {
    public int calSum(TreeNode node){
        if (node == null) {
            return 0;
        }
        int sum = 0;
        if(node.left!= null && node.left.left==null && node.left.right==null){
            sum+=node.left.val;
        }
        sum += calSum(node.left);
        sum += calSum(node.right);
        return sum;
    }
    public int sumOfLeftLeaves(TreeNode root) {
        return calSum(root);
    }
}
```

- **Screenshot:**


Accepted 100 / 100 testcases passed
Surbhi submitted at Dec 27, 2024 09:55
Editorial
Solution
Runtime
0 ms | Beats 100.00%
Analyze Complexity
Memory
41.42 MB | Beats 62.67%
100%
50%
0%
1ms
2ms
3ms
4ms