WORKSHEET 5

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Semester: 6th **Date of Performance:** 17/02/2025

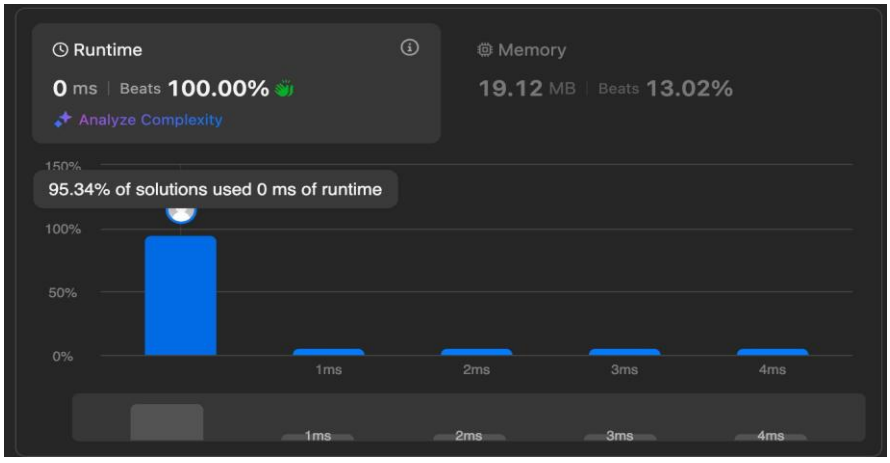
Subject Name: AP LAB - II **Subject Code:** 22CSP-351

1. **Aim:** Given the root of a binary tree, return *its maximum depth*.
   A binary tree's **maximum depth** is the number of nodes along the longest path from the root node down to the farthest leaf node.

2. **Source Code:**

```
class Solution {

public:

    int maxDepth(TreeNode* root) {          if (root == nullptr) {

return 0;           } else {              return 1 + std::max(maxDepth(root-

>left), maxDepth(root->right));

        }}};
```

3. **Screenshots of outputs:**

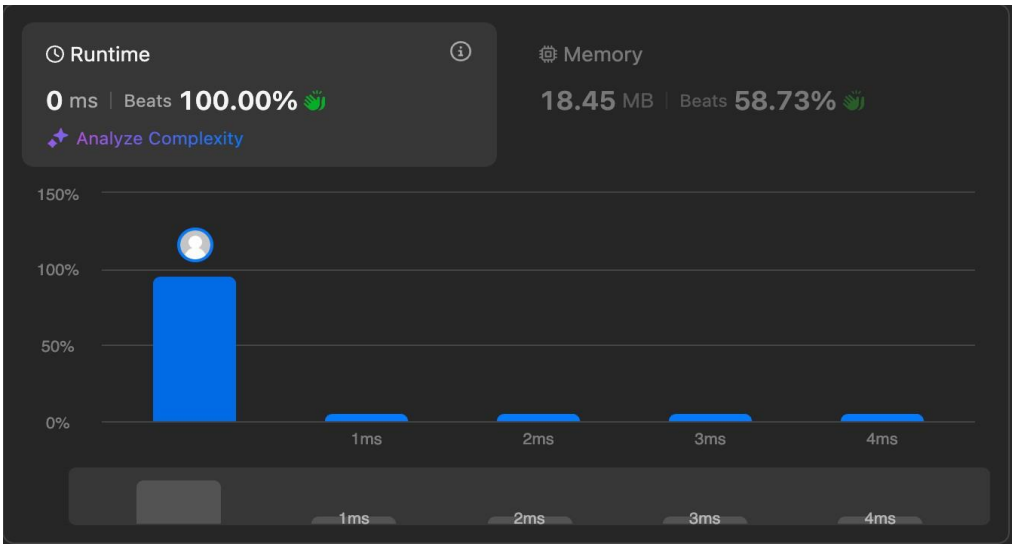


2. Aim: Given the root of a binary tree, check whether it is a mirror of itself (i.e., symmetric around its center).

Source Code:

```
class Solution {
public:
    bool isSymmetric(TreeNode* root) {
if (root == nullptr) {
return true;
        }
        return isMirror(root->left, root->right);
    } private:
    bool isMirror(TreeNode* left, TreeNode* right) {
if (left == nullptr && right == nullptr) {
return true;
        }
        if (left == nullptr || right == nullptr || left->val != right->val) {
return false;
        }
        return isMirror(left->left, right->right) && isMirror(left->right,
right->left);
    }
};
```

Screenshots of outputs:



4. Aim: Given two integer arrays preorder and inorder where preorder is the preorder traversal of a binary tree and inorder is the inorder traversal of the same tree, construct and return the binary tree.

Source Code:

```
class TreeNode {
    int val;
    TreeNode left, right;

    TreeNode(int val) {
        this.val = val;
    }
}

class Solution {
    public TreeNode buildTree(int[] preorder, int[] inorder) {
        Map<Integer, Integer> inorderMap = new HashMap<>();
        for (int i = 0; i < inorder.length; i++) {
            inorderMap.put(inorder[i], i);
        }
        return buildTreeHelper(preorder, 0, preorder.length - 1, inorder, 0,
inorder.length - 1, inorderMap);
    }

    private TreeNode buildTreeHelper(int[] preorder, int preStart, int
preEnd,
                                     int[] inorder, int inStart, int inEnd,
Map<Integer, Integer> inorderMap) {
        if (preStart > preEnd || inStart > inEnd) {
            return null;
        }

        int rootVal = preorder[preStart];
        TreeNode root = new TreeNode(rootVal);
        int rootIndexInorder = inorderMap.get(rootVal);
        int leftSubtreeSize = rootIndexInorder - inStart;

        root.left = buildTreeHelper(preorder, preStart + 1, preStart +
leftSubtreeSize,
                                    inorder, inStart, rootIndexInorder - 1,
inorderMap);
        root.right = buildTreeHelper(preorder, preStart + leftSubtreeSize +
1, preEnd,
```

```
                                        inorder, rootIndexInorder + 1, inEnd,
inorderMap);

            return root;
        }
}};
```

4. Screenshots of outputs: