WORKSHEET 5

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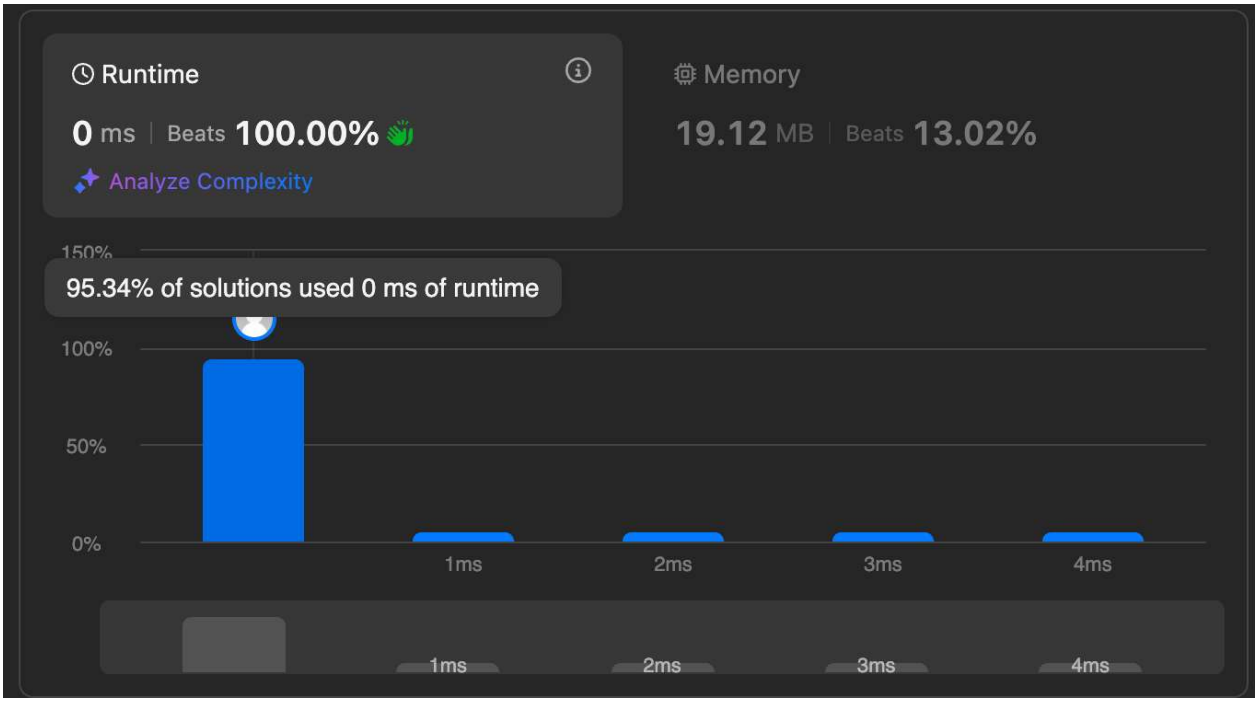
Subject Name: AP LAB - II
Subject Code: 22CSP-351

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.

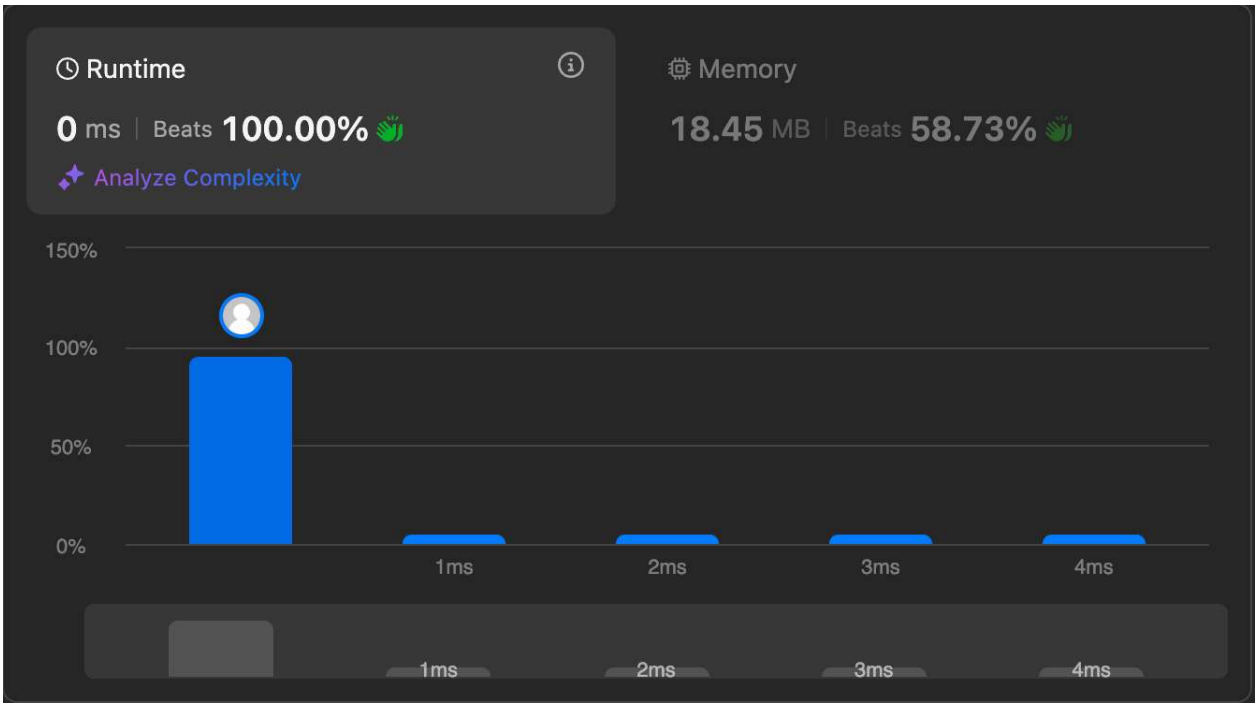
Aim: Given the root of a binary tree, check whether it is a mirror of itself (i.e., symmetric around its center).

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:



3.

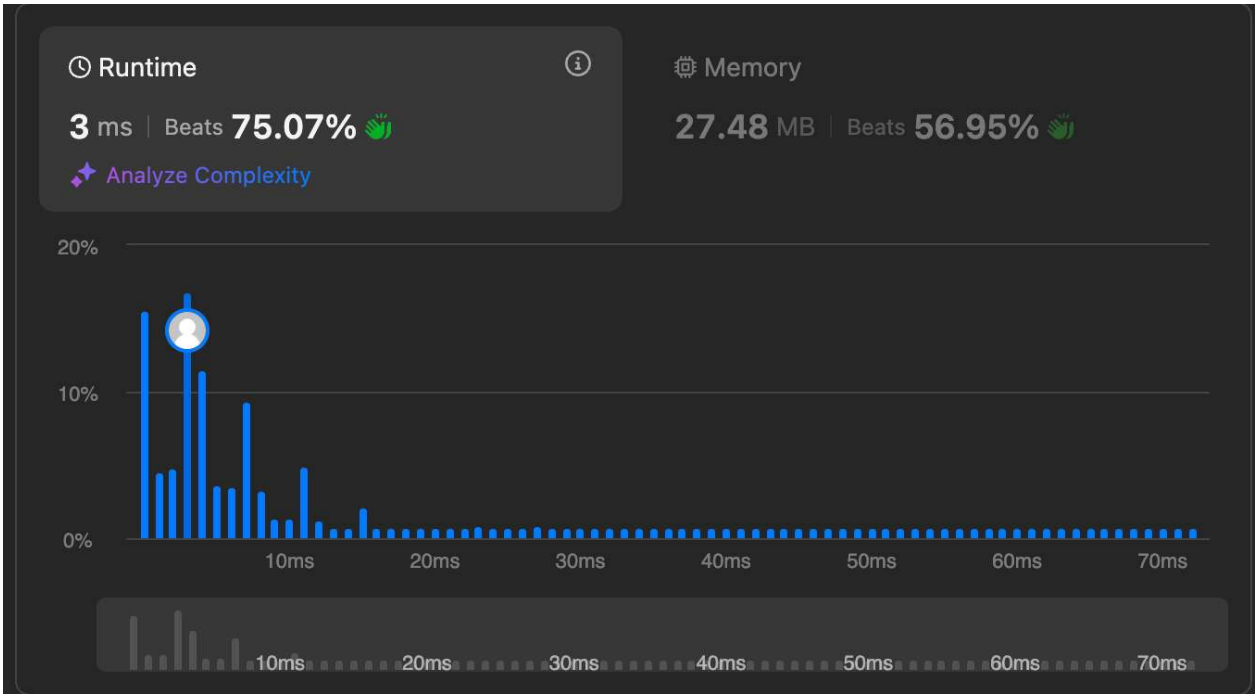
Aim: Given two integer arrays preorder and inorder where preorder is the preorder traversal of a binary tree and inorder is the inorder traversal of the same tree, construct and return the binary tree.

Source Code:

```
class Solution {
public:
    TreeNode* buildTree(vector<int>& preorder, vector<int>& inorder) {
        unordered_map<int, int> inorderMap;
        for (int i = 0; i < inorder.size(); ++i) {
            inorderMap[inorder[i]] = i;
        }
        return buildTreeHelper(preorder, 0, preorder.size() - 1, inorder, 0,
inorder.size() - 1, inorderMap);
```

```
    }
private:
    TreeNode* buildTreeHelper(vector<int>& preorder, int preStart, int
preEnd,
        vector<int>& inorder, int inStart, int inEnd,
        unordered_map<int, int>& inorderMap) {
        if (preStart > preEnd || inStart > inEnd) {
            return nullptr;
        }
        int rootVal = preorder[preStart];
        TreeNode* root = new TreeNode(rootVal);
        int rootIndexInorder = inorderMap[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:**


Runtime
3 ms | Beats 75.07%
Analyze Complexity
Memory
27.48 MB | Beats 56.95%
20%
10%
0%
10ms
20ms
30ms
40ms
50ms
60ms
70ms