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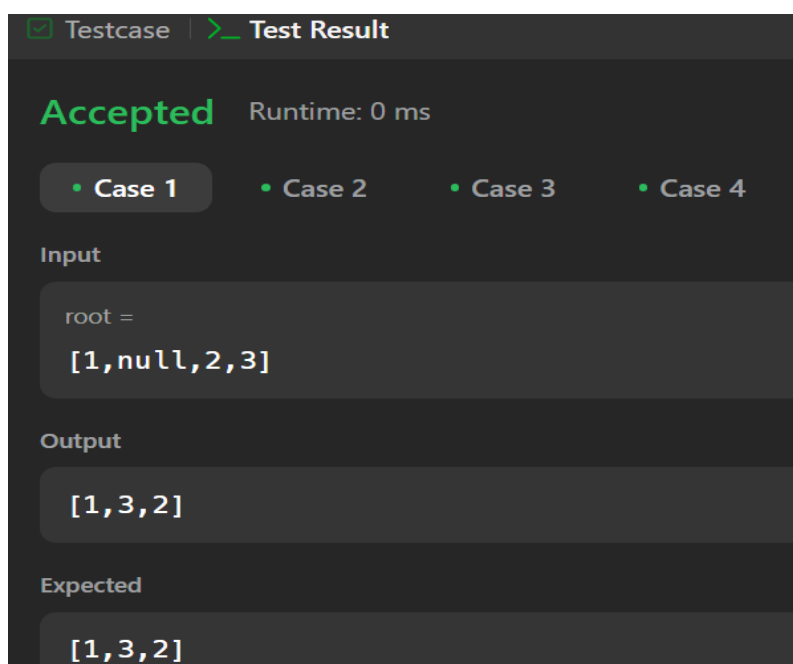
Ques 1. Binary Tree Inorder Traversal.

Code:

```
class Solution {
public:
    void inorder(TreeNode* root, vector<int>& result) {
        if (!root) return;
        inorder(root->left, result);
        result.push_back(root->val);
        inorder(root->right, result);
    }

    vector<int> inorderTraversal(TreeNode* root) {
        vector<int> result;
        inorder(root, result);
        return result;
    }
};
```

Output:



The screenshot shows a dark-themed interface for testing code. At the top, there are two tabs: 'Testcase' (with a green checkmark icon) and 'Test Result' (with a green arrow icon). Below the tabs, the word 'Accepted' is displayed in large green font, followed by 'Runtime: 0 ms'. Underneath, there are four buttons labeled 'Case 1', 'Case 2', 'Case 3', and 'Case 4', each with a small green dot to its left. The 'Case 1' button is highlighted. Below the buttons, the 'Input' section shows 'root =' followed by '[1,null,2,3]'. The 'Output' section shows '[1,3,2]'. The 'Expected' section also shows '[1,3,2]'. The interface indicates that the code passed the test case.

Ques 2. Symmetric Tree.

Code:

```
class Solution {
public:
    bool isMirror(TreeNode* t1, TreeNode* t2) {
        if (!t1 && !t2) return true;
        if (!t1 || !t2) return false;
        return (t1->val == t2->val) &&
            isMirror(t1->left, t2->right) &&
            isMirror(t1->right, t2->left);
    }
    bool isSymmetric(TreeNode* root) {
        if (!root) return true;
        return isMirror(root->left, root->right);
    }
};
```

Output:

☒ Testcase | [> Test Result](#)

Accepted Runtime: 0 ms

- Case 1
- Case 2

Input
root =
[1,2,2,3,4,4,3]

Output
true

Expected
true

Ques 3. Maximum Depth of Binary Tree.

Code:

```
class Solution {  
public:  
    int maxDepth(TreeNode* root) {  
        if (!root) return 0;  
        return 1 + max(maxDepth(root->left), maxDepth(root->right));  
    }  
};
```

Output:

☒ Testcase | [Test Result](#)

Accepted Runtime: 0 ms

- Case 1
- Case 2

Input

root =
[3,9,20,null,null,15,7]

Output

3

Expected

3

Ques 4. Validate Binary Search Tree.

Code:

```
class Solution {  
public:  
    bool validate(TreeNode* node, long minVal, long maxVal) {  
        if (!node) return true;  
        if (node->val <= minVal || node->val >= maxVal) return false;  
        return validate(node->left, minVal, node->val) && validate(node->right, node->val, maxVal);  
    }  
  
    bool isValidBST(TreeNode* root) {  
        return validate(root, LONG_MIN, LONG_MAX);  
    }  
};
```

Output:

☒ Testcase | [Test Result](#)

Accepted Runtime: 0 ms

- Case 1
- Case 2

Input

root =
[2,1,3]

Output

true

Expected

true

Ques 5. Kth Smallest Element in a BST.

Code:

```
class Solution {
public:
    void inorder(TreeNode* root, vector<int>& elements) {
        if (!root) return;
        inorder(root->left, elements);
        elements.push_back(root->val);
        inorder(root->right, elements);
    }

    int kthSmallest(TreeNode* root, int k) {
        vector<int> elements;
        inorder(root, elements);
        return elements[k - 1]; // Since k is 1-indexed
    }
};
```

Output:

The screenshot displays a code execution environment with a dark theme. At the top, there are two tabs: 'Testcase' (selected) and 'Test Result'. Below the tabs, the word 'Accepted' is shown in green, followed by 'Runtime: 0 ms'. There are two case buttons: 'Case 1' (selected) and 'Case 2'. Under the 'Input' section, there are two input fields: 'root =' with the value '[3,1,4,null,2]' and 'k =' with the value '1'. Under the 'Output' section, there is a single output field showing the value '1'. Under the 'Expected' section, there is a single expected value field showing the value '1'.

Ques 6. Binary Tree Level Order Traversal.

Code:

```
class Solution {
public:
    vector<vector<int>> levelOrder(TreeNode* root) {
        vector<vector<int>> result;
        if (!root) return result;
        queue<TreeNode*> q; q.push(root);
        while (!q.empty()) {
            int size = q.size();
            vector<int> level;
            for (int i = 0; i < size; i++) {
                TreeNode* node = q.front(); q.pop();
                level.push_back(node->val);
                if (node->left) q.push(node->left);
                if (node->right) q.push(node->right);
            }
            result.push_back(level);
        }
        return result;
    };
};
```

Output:

The screenshot displays a test result interface with a dark theme. At the top, there are two tabs: 'Testcase' and 'Test Result', with 'Test Result' being the active tab. Below the tabs, the word 'Accepted' is shown in green, followed by 'Runtime: 0 ms'. There are three case selection buttons: 'Case 1' (selected), 'Case 2', and 'Case 3'. The 'Input' section shows 'root =' followed by the array '[3,9,20,null,null,15,7]'. The 'Output' section shows the result '[[3], [9,20], [15,7]]'. The 'Expected' section shows the same result '[[3], [9,20], [15,7]]', indicating a successful match.

```
Testcase | > Test Result
```

Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3

Input

root =
[3,9,20,null,null,15,7]

Output

[[3], [9,20], [15,7]]

Expected

[[3], [9,20], [15,7]]

Ques 7. Binary Tree Level Order Traversal II.

Code:

```
class Solution {
public:
    vector<vector<int>> levelOrderBottom(TreeNode* root) {
        vector<vector<int>> result;
        if (!root) return result;
        queue<TreeNode*> q;
        q.push(root);

        while (!q.empty()) {
            int size = q.size();
            vector<int> level;
            for (int i = 0; i < size; i++) {
                TreeNode* node = q.front();
                q.pop();
                level.push_back(node->val);
                if (node->left) q.push(node->left);
                if (node->right) q.push(node->right);
            }

            result.push_back(level);
        }

        reverse(result.begin(), result.end());
        return result;
    }
};
```

Output:

Testcase

Test Result

Accepted Runtime: 0 ms

• Case 1

• Case 2

• Case 3

Input

root =
[3,9,20,null,null,15,7]

Output

[[15,7],[9,20],[3]]

Expected

[[15,7],[9,20],[3]]

Ques 8. Binary Tree Zigzag Level Order Traversal.

Code:

```
class Solution {
public:
    vector<vector<int>> zigzagLevelOrder(TreeNode* root) {
        vector<vector<int>> result;
        if (!root) return result;

        queue<TreeNode*> q;
        q.push(root);
        bool leftToRight = true;

        while (!q.empty()) {
            int size = q.size();
            deque<int> level; // Use deque for flexible insertion

            for (int i = 0; i < size; i++) {
                TreeNode* node = q.front();
                q.pop();

                if (leftToRight)
                    level.push_back(node->val);
                else
                    level.push_front(node->val);

                if (node->left) q.push(node->left);
                if (node->right) q.push(node->right);
            }

            result.push_back(vector<int>(level.begin(), level.end()));
            leftToRight = !leftToRight; // Toggle direction
        }
    }
};
```

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

Output:

Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3

Input

```
root =  
[3,9,20,null,null,15,7]
```

Output

```
[[3],[20,9],[15,7]]
```

Expected

```
[[3],[20,9],[15,7]]
```

Ques 9. Binary Tree Right Side View.

Code:

```
class Solution {
public:
    vector<int> rightSideView(TreeNode* root) {
        vector<int> result;
        if (!root) return result;

        queue<TreeNode*> q;
        q.push(root);

        while (!q.empty()) {
            int size = q.size();
            int rightmost = 0;

            for (int i = 0; i < size; i++) {
                TreeNode* node = q.front();
                q.pop();

                rightmost = node->val; // Store last node of the level

                if (node->left) q.push(node->left);
                if (node->right) q.push(node->right);
            }

            result.push_back(rightmost);
        }

        return result;
    }
};
```

Output:

☒ Testcase | [Test Result](#)

Accepted Runtime: 0 ms

• Case 1

• Case 2

• Case 3

• Case 4

Input

```
root =  
[1,2,3,null,5,null,4]
```

Output

```
[1,3,4]
```

Expected

```
[1,3,4]
```

Ques 10. Construct Binary Tree from Inorder and Postorder Traversal.

Code:

```
class Solution {
public:
    unordered_map<int, int> inorderMap; // To store inorder value -> index mapping
    int postIndex; // To track the current root index in postorder

    TreeNode* buildTreeHelper(vector<int>& inorder, vector<int>& postorder, int left, int right) {
        if (left > right) return nullptr; // Base case

        // Get the root from the postorder traversal
        int rootVal = postorder[postIndex--];
        TreeNode* root = new TreeNode(rootVal);

        // Get index of root in inorder array
        int inorderIdx = inorderMap[rootVal];

        // Build right subtree first (since postorder processes left first, we process right first)
        root->right = buildTreeHelper(inorder, postorder, inorderIdx + 1, right);
        root->left = buildTreeHelper(inorder, postorder, left, inorderIdx - 1);

        return root;
    }

    TreeNode* buildTree(vector<int>& inorder, vector<int>& postorder) {
        postIndex = postorder.size() - 1;

        // Store inorder indices for quick lookup
        for (int i = 0; i < inorder.size(); i++) {
            inorderMap[inorder[i]] = i;
        }
    }
}
```

```
        return buildTreeHelper(inorder, postorder, 0, inorder.size() - 1);  
    }  
};
```

Output:

☒ Testcase | [Test Result](#)

Accepted Runtime: 0 ms

- Case 1
- Case 2

Input

inorder =
[9, 3, 15, 20, 7]

postorder =
[9, 15, 7, 20, 3]

Output

[3, 9, 20, null, null, 15, 7]

Expected

[3, 9, 20, null, null, 15, 7]

Ques 11. Find Bottom Left Tree Value.

Code:

```
class Solution {
public:
    int findBottomLeftValue(TreeNode* root) {
        queue<TreeNode*> q;
        q.push(root);
        int bottomLeft = root->val; // Initialize with root value

        while (!q.empty()) {
            int size = q.size();
            bottomLeft = q.front()->val; // First element in this level

            for (int i = 0; i < size; i++) {
                TreeNode* node = q.front();
                q.pop();

                // Push left child first (ensures leftmost node is encountered first)
                if (node->left) q.push(node->left);
                if (node->right) q.push(node->right);
            }
        }
        return bottomLeft;
    }
};
```

Output:

☒ Testcase | >_ Test Result

Accepted Runtime: 0 ms

- Case 1
- Case 2

Input

root =
[2, 1, 3]

Output

1

Expected

1

Ques 12. Binary Tree Maximum Path Sum.

Code:

```
class Solution {
public:
    int maxSum = INT_MIN;

    int maxGain(TreeNode* node) {
        if (!node) return 0;

        // Compute max sum for left and right subtrees, ignoring negative sums
        int leftGain = max(0, maxGain(node->left));
        int rightGain = max(0, maxGain(node->right));

        // Compute the maximum path sum passing through this node
        int pathSum = node->val + leftGain + rightGain;

        // Update global maximum sum
        maxSum = max(maxSum, pathSum);

        // Return max path sum including this node and at most one child
        return node->val + max(leftGain, rightGain);
    }

    int maxPathSum(TreeNode* root) {
        maxGain(root);
        return maxSum;
    }
};
```

Output:

☒ Testcase | [Test Result](#)

Accepted Runtime: 0 ms

- Case 1
- Case 2

Input

root =
[1,2,3]

Output

6

Expected

6

6.0k likes

Ques 13. Vertical Order Traversal of a Binary Tree.

Code:

```
class Solution {
public:
    vector<vector<int>> verticalTraversal(TreeNode* root) {
        map<int, vector<pair<int, int>>> colMap; // {col: [(row, value)]}
        queue<pair<TreeNode*, pair<int, int>>> q; // {node, (row, col)}

        q.push({root, {0, 0}}); // Start with root at (0,0)

        while (!q.empty()) {
            auto [node, pos] = q.front();
            q.pop();
            int row = pos.first, col = pos.second;

            colMap[col].push_back({row, node->val});

            if (node->left) q.push({node->left, {row + 1, col - 1}});
            if (node->right) q.push({node->right, {row + 1, col + 1}});
        }


        vector<vector<int>> result;
        for (auto &[col, nodes] : colMap) {
            // Sort by row first, then by value
            sort(nodes.begin(), nodes.end());

            vector<int> colVals;
            for (auto &[row, val] : nodes) colVals.push_back(val);
            result.push_back(colVals);
        }

        return result;
    }
};
```

```
}  
};
```

Output:

☒ Testcase |  Test Result

Accepted Runtime: 0 ms

- Case 1
- Case 2
- Case 3

Input

root =
[3,9,20,null,null,15,7]

Output

[[9], [3,15], [20], [7]]

Expected

[[9], [3,15], [20], [7]]