

Here's a list of 15 commonly asked tree-based problems in interviews, categorized by difficulty. I've included input and output examples for each.

Easy

1. Maximum Depth of Binary Tree

- **Problem:** Find the maximum depth (or height) of a binary tree.
- **Input:**

Copy code

```
3
 / \
9  20
 / \
15 7
```

Get citation

- **Output:** `3`

2. Minimum Depth of Binary Tree

- **Problem:** Find the minimum depth of a binary tree.
- **Input:**

Copy code

```
1
 / \
2  3
 /
4
```

- **Output:** `2`

3. Invert Binary Tree

- **Problem:** Flip a binary tree upside down (invert it).
- **Input:**

Copy code

```
4
 / \
2  7
```

/\/
1 3 6 9

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Copy code

```
- Output:
```

Copy code

```
4
```

/
7 2
/\/
9 6 3 1

Copy code

4. Symmetric Tree

- **Problem:** Check if a binary tree is symmetric (mirror image of itself).

- **Input:**

Copy code

```
1
 / \
2   2
```



```
 /\
3 4 4 3
```

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```
- Output: `true`
```

5. Path Sum

- **Problem:** Check if a path from root to leaf equals a given sum.

- **Input:**

Copy code

```
5
 / \
4   8
```



```
//
11 13 4
 /\
7 2 1
```

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```
- Sum: `22`
- Output: `true` (Path: 5 -> 4 -> 11 -> 2)
```

Medium

1. Binary Tree Level Order Traversal

- **Problem:** Return the level order traversal of a binary tree's nodes' values.

- **Input:**

Copy code

```
3
 / \
9   20
 / \
15  7
```



- **Output:** `[[3], [9, 20], [15, 7]]`

2. Validate Binary Search Tree

- **Problem:** Determine if a binary tree is a valid binary search tree.

- **Input:**

Copy code

```
2
 / \
1   3
```

- **Output:** `true`

3. Lowest Common Ancestor of a Binary Search Tree

- **Problem:** Find the lowest common ancestor of two nodes in a binary search tree.

- **Input:**

Copy code

```

      6
     /\
    2  8

```

/\
 0 4 7 9

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```

- Nodes: `2`, `8`
- Output: `6`

```

4. Binary Tree Zigzag Level Order Traversal

- **Problem:** Return the zigzag level order traversal of a binary tree's nodes' values.

- **Input:**

Copy code

```

      3
     /\
    9  20
   /\
  15  7

```

- **Output:** `[[3], [20, 9], [15, 7]]`

5. Sum of Left Leaves

- **Problem:** Find the sum of all left leaves in a binary tree.

- **Input:**

Copy code

```

      3
     /\
    9  20
   /\
  15  7

```

- **Output:** `24` (Only leaf node 9 is a leaf)

Hard

1. Serialize and Deserialize Binary Tree

- **Problem:** Implement methods to serialize and deserialize a binary tree.

- **Input (Serialize):**

Copy code

```

      1
     /\
    2  3
   /\
  4  5

```

- **Output (Deserialize):** `["1", "2", "3", "null", "null", "4", "5"]`

2. Construct Binary Tree from Preorder and Inorder Traversal

- **Problem:** Given preorder and inorder traversal of a tree, construct the binary tree.

- **Input:**

- **Preorder:** `[3, 9, 20, 15, 7]`
- **Inorder:** `[9, 3, 15, 20, 7]`

- **Output:**

Copy code

```
3
 / \
9  20
 / \
15  7
```

3. Binary Tree Maximum Path Sum

- **Problem:** Find the maximum path sum in a binary tree.
- **Input:**

```
markdown Copy code
-10
 / \
9  20
 / \
15  7
```

- **Output:** `42` (Maximum path sum: 15 -> 20 -> 7)

4. Recover Binary Search Tree

- **Problem:** Given a binary search tree where two nodes are swapped, recover the tree.
- **Input:**

```
Copy code
1
 / \
3  2
```

- **Output:**

```
Copy code
2
 / \
1  3
```

5. Count Unival Subtrees

- **Problem:** Count the number of unival subtrees (all nodes in the subtree have the same value).
- **Input:**

```
Copy code
5
 / \
1  5
 / \
5  5
```

- **Output:** `4` (The subtrees rooted at each 5 node are unival)

These problems cover a broad spectrum of difficulty levels and concepts in tree-based algorithms, often appearing in coding interviews.

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