WORKSHEET 5

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

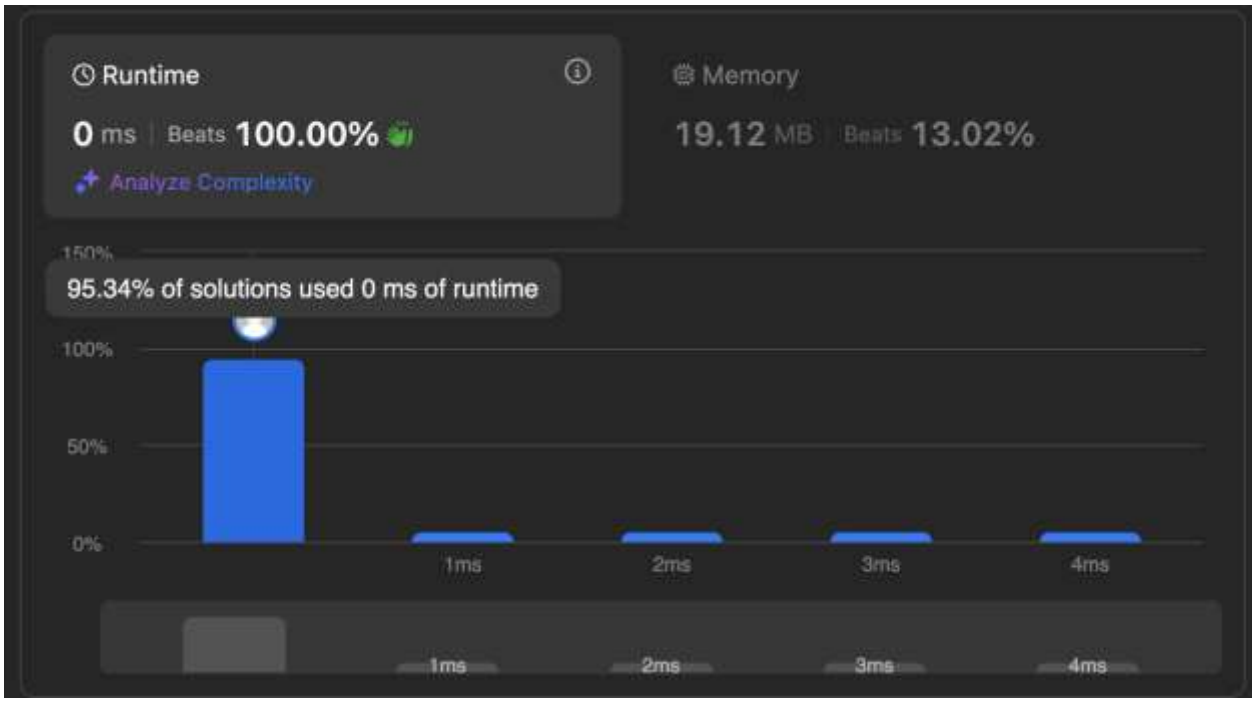
1. **Aim:** Given the root of a binary tree, return *its maximum depth*.
   A binary tree's **maximum depth** is the number of nodes along the longest path from the root node down to the farthest leaf node.

2. **Source Code:**

```
class Solution:
def maxDepth(self, root: Optional[TreeNode]) -> int:
        if not root:
                return 0
        return 1 + max(self.maxDepth(root.left), self.maxDepth(root.right))


class TreeNode:
def __init__(self, val=0, left=None, right=None):
        self.val = val
        self.left = left
        self.right = right
```

3. Screenshots of outputs:



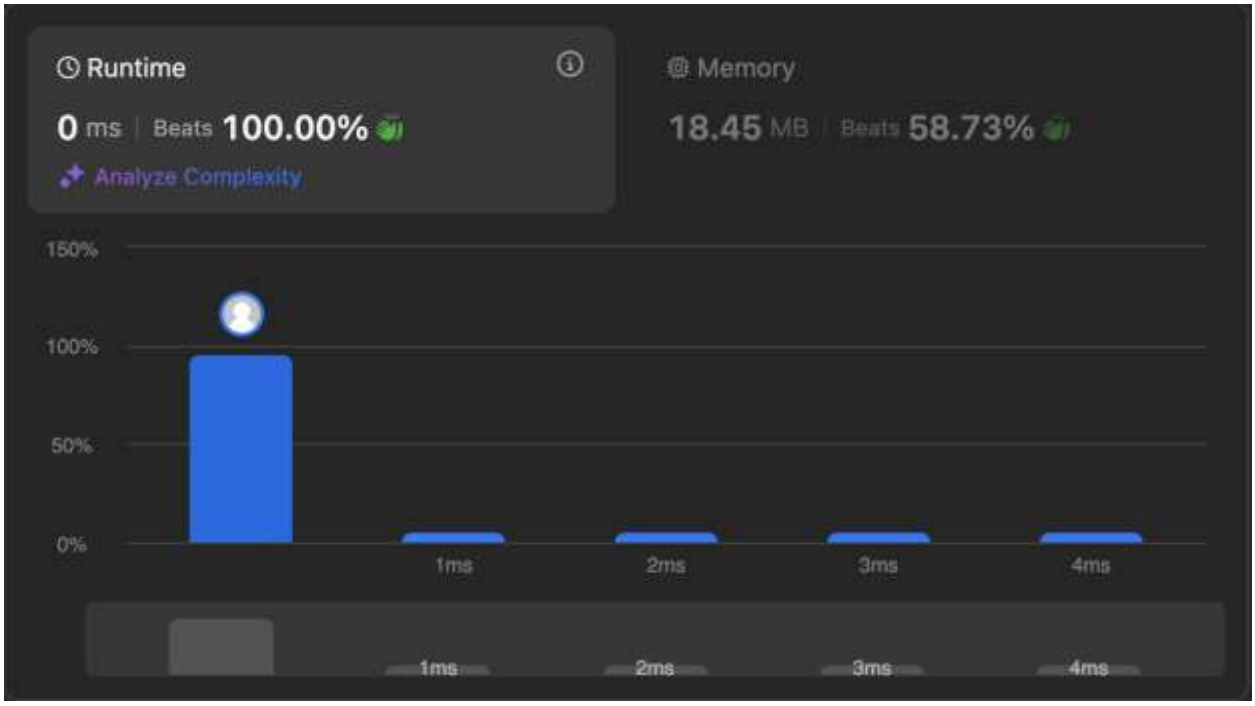
2.

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:
    def isSymmetric(self, root: Optional[TreeNode]) -> bool:
        def isMirror(t1: Optional[TreeNode], t2: Optional[TreeNode]) -> bool:
            if not t1 and not t2:
                return True
            if not t1 or not t2:
                return False
            return (t1.val == t2.val and
                    isMirror(t1.left, t2.right) and
                    isMirror(t1.right, t2.left))
        return isMirror(root, root)
class TreeNode:
    def __init__(self, val=0, left=None, right=None):
        self.val = val
        self.left = left
        self.right = right
```

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 TreeNode:
    def __init__(self, val=0, left=None, right=None):
        self.val = val
        self.left = left
        self.right = right
class Solution:
    def buildTree(self, preorder: List[int], inorder: List[int]) -> Optional[TreeNode]:
        inorder_map = {value: idx for idx, value in enumerate(inorder)}
        return self._buildTreeHelper(preorder, 0, len(preorder) - 1, inorder, 0, len(inorder) - 1,
inorder_map)
    def _buildTreeHelper(self, preorder: List[int], pre_start: int, pre_end: int,
                         inorder: List[int], in_start: int, in_end: int,
                         inorder_map: dict) -> Optional[TreeNode]:
        if pre_start > pre_end or in_start > in_end:
            return None
```

4. **Screenshots of outputs:**