WORKSHEET 5

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Branch: BE-CSE   **Section/Group:** 22BCS_NTPP-602-A

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

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

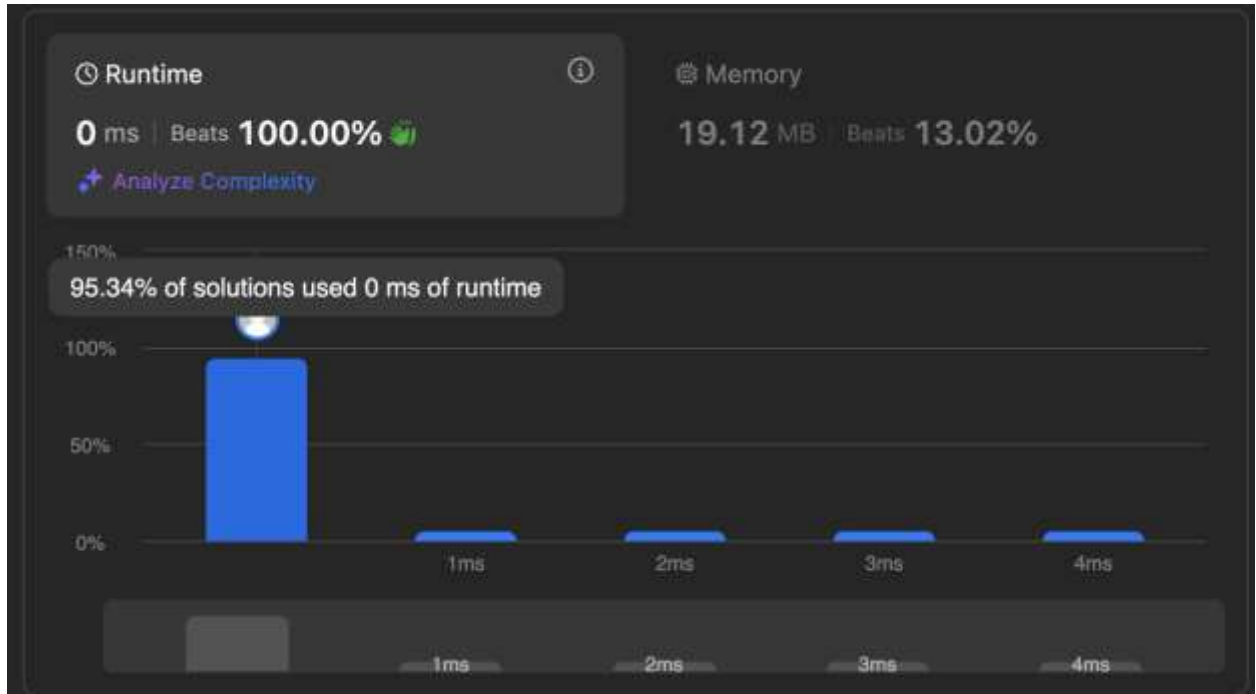1. **Aim:** Given the root of a binary tree, return *its maximum depth*.
   A binary tree's **maximum depth** is the number of nodes along the longest path from the root node down to the farthest leaf node.

2. **Source Code:**

```python
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:

```python
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:
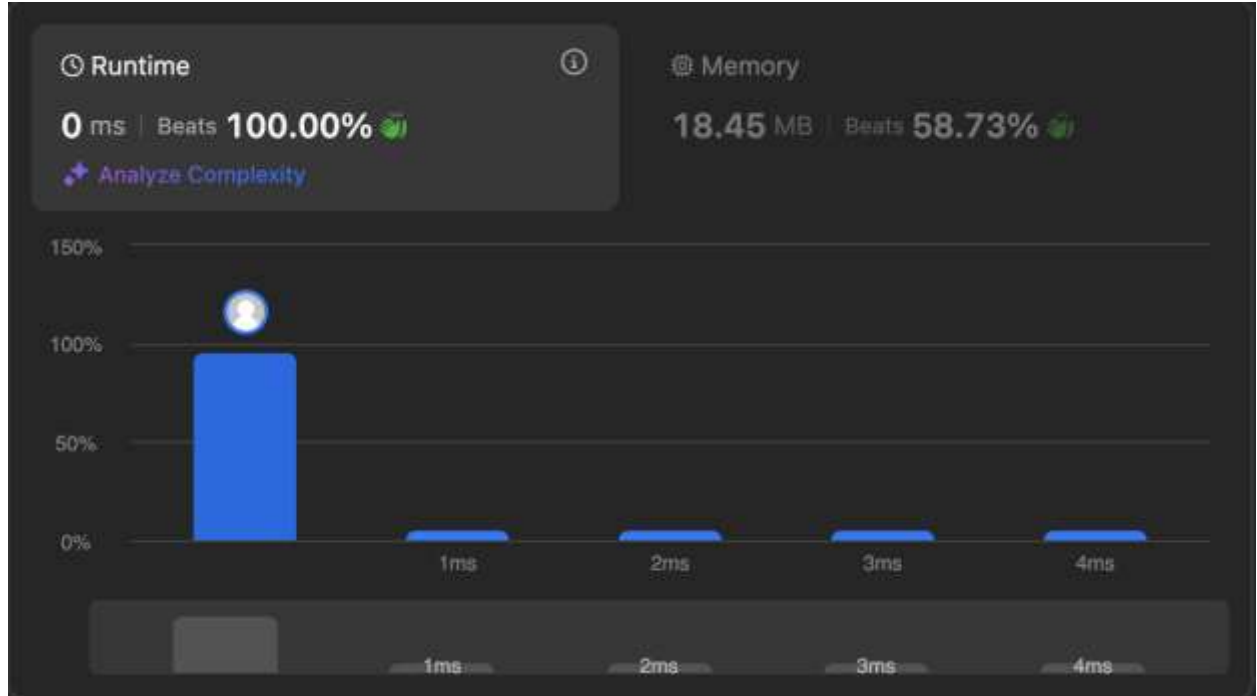
3.

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:

```python
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: