

ASSIGNMENT-1

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SUBJECT: Python

CODE: CSA0898

1. Converting Roman Numbers to integers?

main.py	Output
<pre>1 def roman_to_int(s): 2 roman_dict = {'I': 1, 'V': 5, 'X': 10, 'L': 50, 'C': 100, 'D': 500, 'M': 1000} 3 result = 0 4 prev_value = 0 5 6 for char in s: 7 value = roman_dict[char] 8 result += value 9 if value > prev_value: 10 result -= 2 * prev_value 11 prev_value = value 12 13 return result 14 print(roman_to_int("IV")) 15 print(roman_to_int("IX")) 16 print(roman_to_int("LVIII")) 17 print(roman_to_int("MCMXCIV")) 18</pre>	<pre>4 58 1994 === Code Execution Successful ===</pre>

2.

main.py	Output
<pre>1 def longestCommonPrefix(strs): 2 if not strs: 3 return "" 4 5 prefix = strs[0] 6 7 for s in strs[1:]: 8 while s[:len(prefix)] != prefix: 9 prefix = prefix[:-1] 10 if not prefix: 11 return "" 12 13 return prefix 14 15 16 print(longestCommonPrefix(["flower", "flow", "flight"])) 17 print(longestCommonPrefix(["dog", "racecar", "car"])) 18</pre>	<pre>f1 === Code Execution Successful ===</pre>

3.

main.py	Run	Output
<pre>1 class TreeNode: 2 def __init__(self, val=0, left=None, right=None): 3 self.val = val 4 self.left = left 5 self.right = right 6 7 def hasPathSum(root: TreeNode, targetSum: int) -> bool: 8 if not root: 9 return False 10 if not root.left and not root.right: 11 return root.val == targetSum 12 return hasPathSum(root.left, targetSum - root.val) or hasPathSum(root .right, targetSum - root.val) 13 root1 = TreeNode(5) 14 root1.left = TreeNode(4) 15 root1.right = TreeNode(8) 16 root1.left.left = TreeNode(11) 17 root1.left.left.left = TreeNode(7) 18 root1.left.left.right = TreeNode(2) 19 root1.right.left = TreeNode(13) 20 root1.right.right = TreeNode(4) 21 root1.right.right.right = TreeNode(1) 22 23 print(hasPathSum(root1, 22))</pre>	<div>Run</div>	<pre>True False === Code Execution Successful ===</pre>

4. Given the root of a binary tree and an integer of targetsum return true if the tree has a root to leaf such that adding up all the values

```
main.py  [Icons] [Share] [Run] Output
1 class TreeNode:
2     def __init__(self, val=0, left=None, right=None):
3         self.val = val
4         self.left = left
5         self.right = right
6
7 def hasPathSum(root: TreeNode, targetSum: int) -> bool:
8     if not root:
9         return False
10    if not root.left and not root.right:
11        return root.val == targetSum
12    return hasPathSum(root.left, targetSum - root.val) or hasPathSum(root
        .right, targetSum - root.val)
13 root1 = TreeNode(5)
14 root1.left = TreeNode(4)
15 root1.right = TreeNode(8)
16 root1.left.left = TreeNode(11)
17 root1.left.left.left = TreeNode(7)
18 root1.left.left.right = TreeNode(2)
19 root1.right.left = TreeNode(13)
20 root1.right.right = TreeNode(4)
21 root1.right.right.right = TreeNode(1)
22
23 print(hasPathSum(root1, 22))
```

True
False
=== Code Execution Successful ===

5. bit reversing?

main.py	Output
<pre>1 def reverseBits(n: int) -> int: 2 result = 0 3 for i in range(32): 4 result = (result << 1) (n & 1) 5 n >>= 1 6 return result 7 8 9 num = 43261596 10 reversed_num = reverseBits(num) 11 print(reversed_num) 12</pre>	<pre>964176192 === Code Execution Successful ===</pre>

6. convert sorted array to binary search tree?

main.py	Output
<pre>1 class TreeNode: 2 def __init__(self, value=0, left=None, right=None): 3 self.value = value 4 self.left = left 5 self.right = right 6 7 def sorted_array_to_bst(nums): 8 if not nums: 9 return None 10 11 mid = len(nums) // 2 12 root = TreeNode(nums[mid]) 13 14 root.left = sorted_array_to_bst(nums[:mid]) 15 root.right = sorted_array_to_bst(nums[mid + 1:]) 16 17 return root 18 19 20 def print_bst_inorder(root): 21 if root: 22 print_bst_inorder(root.left) 23 print(root.value) 24 print_bst_inorder(root.right)</pre>	<pre>Inorder traversal of the BST: -10 -3 0 5 9 === Code Execution Successful ===</pre>

7. given a binary tree, determine if it is height-balanced?

```
main.py  [Icons] [Share] [Run] Output
1 class TreeNode:
2     def __init__(self, value=0, left=None, right=None):
3         self.value = value
4         self.left = left
5         self.right = right
6
7     def is_balanced(root):
8         def check_height(node):
9             if not node:
10                return 0
11
12                left_height = check_height(node.left)
13                if left_height == -1:
14                    return -1
15
16                right_height = check_height(node.right)
17                if right_height == -1:
18                    return -1
19
20                if abs(left_height - right_height) > 1:
21                    return -1
22
23                return max(left_height, right_height) + 1
24
```

Is the tree balanced? True

=== Code Execution Successful ===

8. Climbing stairs?

```
main.py  [Icons] [Share] [Run] Output
1 def climb_stairs(n):
2     if n <= 1:
3         return 1
4
5
6     dp = [0] * (n + 1)
7
8
9     dp[0] = 1
10    dp[1] = 1
11
12
13    for i in range(2, n + 1):
14        dp[i] = dp[i - 1] + dp[i - 2]
15
16    return dp[n]
17
18
19 n = 5
20 print("Number of ways to climb the stairs:", climb_stairs(n))
21
```

Number of ways to climb the stairs: 8

=== Code Execution Successful ===

9. best time to buy and sell stock?

main.py	Run	Output
<pre>1 def max_profit(prices): 2 if not prices or len(prices) < 2: 3 return 0 4 5 min_price = float('inf') 6 max_profit = 0 7 8 for price in prices: 9 10 if price < min_price: 11 min_price = price 12 13 14 profit = price - min_price 15 16 17 if profit > max_profit: 18 max_profit = profit 19 20 return max_profit 21 22 23 prices = [7, 1, 5, 3, 6, 4] 24 print("Maximum profit:", max_profit(prices))</pre>		<pre>Maximum profit: 5 === Code Execution Successful ===</pre>

10.sum of two binary strings?

main.py	Run	Output
<pre>1 def add_binary(a: str, b: str) -> str: 2 3 int_a = int(a, 2) 4 int_b = int(b, 2) 5 6 7 sum_int = int_a + int_b 8 9 10 return bin(sum_int)[2:] 11 12 13 binary_str1 = "1010" 14 binary_str2 = "1101" 15 print("Sum of binary strings:", add_binary(binary_str1, binary_str2)) 16</pre>		<pre>Sum of binary strings: 10111 === Code Execution Successful ===</pre>