Course Code: CSA0821	**Course Name:** Python Programming from Fundamentals	
Branch: CSE	**Slot:** D	**Date:** 01/03/2024

Session 1: 8.00AM to 9.30AM

Q. No.	Question
1	Given an array of integer nums and an integer target, return indices of the two numbers such that they add up to the target. You may assume that each input would have exactly one solution, and you may not use the same element twice. You can return the answer in any order. **Test Case 1:** **Input:** nums = [2,7,11,15], target = 9 **Output:** [0,1] **Test Case 2:** **Input:** nums = [3,2,4], target = 6 **Output:** [1,2]
2	Given an integer x, return true if x is a palindrome and false otherwise. **Test Case 1:** **Input:** x = 121 **Output:** true **Test Case 2:** **Input:** -121 **Output:** false
3	Write a function to find the longest common prefix string amongst an array of strings. If there is no common prefix, return an empty string "". **Test Case 1:** **Input:** strs = ["flower","flow","flight"] **Output:** "fl" **Test Case 2:** **Input:** strs = ["dog","racecar","car"] **Output:** ""
4	Given a string s containing just the characters '(', ')', '', '', '[' and ']', determine if the input string is valid. An input string is valid if: Open brackets must be closed by the same type of brackets. Open brackets must be closed in the correct order. Every close bracket has a corresponding open bracket of the same type. **Test Case 1:** **Input:** s = "()[]" **Output:** true **Test Case 2:** **Input:** s = "(]" **Output:** false
5	You are given the two sorted lists, list 1 and list 2. Merge the two lists into one sorted list. The list should be made by splicing together the elements of the first two lists. Return the merged list. **Test Case 1:** **Input:** list1 = [1,2,4], list2 = [1,3,4] **Output:** [1,1,2,3,4,4] **Test Case 2:** **Input:** list1 = [], list2 = [0] **Output:** [0]
6	Given an integer array of nums and an integer value, remove all occurrences of val in nums in place. The order of the elements may be changed. Then, return the number of elements in nums that are not equal to value. Consider the number of elements in nums which are not equal to val be k, to get accepted, you need to do the following things: Change the array nums such that the first k elements of nums contain the elements which are not equal to val. The remaining elements of nums are not essential, nor is the size of nums. Return k. **Test Case 1:** **Input:** nums = [3,2,2,3], val = 3 **Output:** 2, nums = [2,2,_,_] **Test Case 2:** **Input:** nums = [0,1,2,2,3,0,4,2], val = 2 **Output:** 5, nums = [0,1,3,0,4,_,_,_]

Session 2: 11.00AM to 12.30PM

Q. No.	Question
7	Given two strings, needle and haystack, return the index of the first occurrence of needle in a haystack, or -1 if the needle is not part of the haystack. **Test Case 1:** **Input:** haystack = "sadbutsad", needle = "sad" **Output:** 0 **Test Case 2:** **Input:** haystack = "leetcode", needle = "leeto" **Output:** -1
8	Given a sorted array of distinct integers and a target value, return the index if the target is found. If not, return the index where it would be if inserted in order. You must write an algorithm with O(log n) runtime complexity. **Test Case 1:** **Input:** nums = [1,3,5,6], target = 5 **Output:** 2 **Test Case 2:** **Input:** nums = [1,3,5,6], target = 2 **Output:** 1
9	Given a string s consisting of words and spaces, return the length of the last word in the string. A word is a maximal substring consisting of non-space characters only. **Test Case 1:** **Input:** s = "Hello World" **Output:** 5 **Test Case 2:** **Input:** s = " fly me to the moon " **Output:** 4
10	You are given a large integer represented as an integer array of digits, where each digit [i] is the ith digit of the integer. The digits are ordered from most significant to least significant in left-to-right order. The large integer does not contain any leading 0s. Increment the large integer by one and return the resulting array of digits. **Test Case 1:** **Input:** digits = [1,2,3] **Output:** [1,2,4] **Test Case 2:** **Input:** digits = [4,3,2,1] **Output:** [4,3,2,2]
11	Given two binary strings a and b, return their sum as a binary string. **Test Case 1:** **Input:** a = "11", b = "1" **Output:** "100" **Test Case 2:** **Input:** a = "1010", b = "1011" **Output:** "10101"
12	Given a non-negative integer x, return the square root of x rounded down to the nearest integer. The returned integer should be non-negative as well. It would help if you did not use any built-in exponent function or operator. **Test Case 1:** **Input:** x = 4 **Output:** 2 **Test Case 2:** **Input:** x = 8 **Output:** 2

Session 3: 1.30PM to 2.00PM

Discussion: NumPy Package.

Session 4: 2.00PM to 3.00PM

Set: 1

Q. No.	Question
1	You are climbing a staircase. It takes n steps to reach the top. Each time, you can climb either 1 or 2 steps. In how many distinct ways can you rise to the top? **Test Case 1:** **Input:** n = 3 **Output:** 3 **Test Case 2:** **Input:** n =5 **Output:** 8
2	Given an integer numRows, return the first numRows of Pascal's triangle. In Pascal's triangle, each number is the sum of the two numbers directly above it **Test Case 1:** **Input:** numRows = 5 **Output:** [[1],[1,1],[1,2,1],[1,3,3,1],[1,4,6,4,1]] **Test Case 2:** **Input:** numRows = 1 **Output:** [[1]]
3	Given a non-empty array of integers nums, every element appears twice except for one. Find that single one. You must implement a solution with a linear runtime complexity and use only constant extra space. **Test Case 1:** **Input:** nums = [2,2,1] **Output:** 1 **Test Case 2:** **Input:** nums = [4,1,2,1,2] **Output:** 4
4	Given an array nums containing n distinct numbers in the range [0, n], return the only number in the range that is missing from the array. **Test Case 1:** **Input:** nums = [3,0,1] **Output:** 2 **Test Case 2:** **Input:** nums = [9,6,4,2,3,5,7,0,1] **Output:** 8

Set: 2

Q. No.	Question
1	Given the head of a sorted list, delete all duplicates so each element appears only once. Return the linked list sorted as well. **Test Case 1:** **Input:** head = [1,1,2] **Output:** [1,2] **Test Case 2:** **Input:** head = [1,1,2,3,3] **Output:** [1,2,3]
2	You are given an array of prices where prices[i] is the price of a given stock on the ith day. You want to maximize your profit by choosing a single day to buy one stock and a different day to sell that stock in the future. Return the maximum profit you can achieve from this transaction. If you cannot accomplish any profit, return 0. **Test Case 1:** **Input:** prices = [7,1,5,3,6,4] **Output:** 5 **Test Case 2:** **Input:** [7,6,4,3,1] **Output:** 0

Q. No.	Question
3	Write a function that takes the binary representation of an unsigned integer and returns the number of '1' bits it has (also known as the Hamming weight). **Test Case 1:** **Input:** n = 00000000000000000000000000001011 **Output:** 3 **Test Case 2:** **Input:** n = 00000000000000000000000010000000 **Output:** 1
4	Given an integer array nums, move all 0's to the end of it while maintaining the relative order of the non-zero elements. Note that you must do this in-place without making a copy of the array. **Test Case 1:** **Input:** nums = [0,1,0,3,12] **Output:** [1,3,12,0,0] **Test Case 2:** **Input:** nums = [0] **Output:** [0]

Set: 3

Q. No.	Question
1	You are given two integer arrays, nums1, and nums2, sorted in non-decreasing order, and two integers, m, and n, representing the number of elements in nums1 and nums2, respectively. Merge nums1 and nums2 into a single array, num1 sorted in non-decreasing order. **Test Case 1:** **Input:** nums1 = [1,2,3,0,0,0], m = 3, nums2 = [2,5,6], n = 3 **Output:** [1,2,2,3,5,6] **Test Case 2:** **Input:** nums1 = [1], m = 1, nums2 = [], n = 0 **Output:** [1]
2	A phrase is a palindrome if it reads the same forward and backward after converting all uppercase letters into lowercase letters and removing all non-alphanumeric characters. Alphanumeric characters include letters and numbers. Given a string s, return true if it is a palindrome or false otherwise. **Test Case 1:** **Input:** s = "A man, a plan, a canal: Panama" **Output:** true **Test Case 2:** **Input:** s = "race a car" **Output:** false
3	Given an integer n, return an array ans of length n + 1 such that for each i (0 ¡= i ¡= n), ans[i] is the number of 1's in the binary representation of i. **Test Case 1:** **Input:** n = 2 **Output:** [0,1,1] **Test Case 2:** **Input:** n = 5 **Output:** [0,1,1,2,1,2]
4	Given a pattern and a string s, find if s follows the same pattern. Here follow means a full match, such that there is a bijection between a letter in pattern and a non-empty word in s. **Test Case 1:** **Input:** pattern = "abba", s = "dog cat cat dog" **Output:** true **Test Case 2:** **Input:** pattern = "abba", s = "dog cat cat fish" **Output:** false

Assignment

Q. No.	Question
1	Given an integer n, return true if it is a power of three. Otherwise, return false. An integer n is a power of three if an integer x exists such that n == 3x. **Test Case 1:** **Input:** n = 27 **Output:** true **Test Case 2:** **Input:** n = 0 **Output:** false
2	Given an integer n, return true if it is a power of four. Otherwise, return false. An integer n is a power of four, if an integer x exists such that n == 4x. **Test Case 1:** **Input:** n = 16 **Output:** true **Test Case 2:** **Input:** n = 5 **Output:** false
3	Write a function that reverses a string. The input string is given as an array of characters s. You must modify the input array in place with O(1) extra memory. **Test Case 1:** **Input:** s = [”h”,”e”,”l”,”l”,”o”] **Output:** [”o”,”l”,”l”,”e”,”h”] **Test Case 2:** **Input:** s = [”H”,”a”,”n”,”n”,”a”,”h”] **Output:** [”h”,”a”,”n”,”n”,”a”,”H”]
4	Given a string s, reverse only all the vowels in the string and return it. The vowels are ’a’, ’e’, ’i’, ’o’, and ’u’, and they can appear in lower and upper cases, more than once. **Test Case 1:** **Input:** s = ”hello” **Output:** ”holle” **Test Case 2:** **Input:** s = ”leetcode” **Output:** ”leotcede”
5	Given two integer arrays nums1 and nums2, return an array of their intersection. Each element in the result must be unique and you may return the result in any order. **Test Case 1:** **Input:** nums1 = [1,2,2,1], nums2 = [2,2] **Output:** [2] **Test Case 2:** **Input:** nums1 = [4,9,5], nums2 = [9,4,9,8,4] **Output:** [9,4]
6	Given a positive integer num, return true if num is a perfect square or false otherwise. A perfect square is an integer that is the square of an integer. In other words, it is the product of some integer with itself. **Test Case 1:** **Input:** num = 16 **Output:** true **Test Case 2:** **Input:** num = 14 **Output:** false