Course Code	**:**	**BCSL-045**
Course Title	**:**	**Introduction to Algorithm design Lab**
Assignment Number	**:**	**BCA(IV)/L-045/Assignment/2024-25**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last date of Submission	**:**	**31st October, 2024 (For July Session)**
	:	**30th April, 2025 (For January Session)**

Note: Answer all the questions which carry 40 marks. All questions are of equal marks.The rest 10 marks are for viva voce. You are required to write programs in C-language for all the problems , execute and show the results. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Make suitable assumption if necessary.

Q1. Implement the Insertion Sort algorithm for sorting the following list of numbers in the ascending order, showing the list obtained at each step:

27, 15, 42, 3, 9, 29, 81, 54, 0, 13

Also calculate the total number of exchange operations and how many times the loop will execute in this algorithm. **(8 Marks)**

Q2. Write a C program to implement the binary search algorithm. The program should first sort an array using any sorting algorithm and then search for a given element. Also, understand its efficiency. **(8 Marks)**

Q3. Write a program to implement to reverse the following a given 5-digit number and calculate the total number of times the loop construct executed. **(8 Marks)**

Q4. Write a C program to implement ***a stack*** using a linked list with push, pop, and display operations. **(8 Marks)**

Q5. Write a C program to implement a binary tree and perform in-order, pre-order, and post-order traversals. Also, understand the efficiency of the program. **(8 Marks)**