Course Code	**:**	**BCSL-033**
Course Title	**:**	**Data and File Structures Lab**
Assignment Number	**:**	**BCA(III)/L-033/Assignment/2026-27**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**31st October, 2026 (for July 2026 Session)**
	:	**30th April, 2027 (for January 2027 Session)**

There are 8 questions of 10 marks each in this assignment, carrying a total of 80 marks. The remaining 20 marks are for viva voce. Please go through the guidelines regarding assignments given in the Programme Guide for the format of the presentation. Write all the programs in the C' language.

Q1: **(10 Marks)**

Write an algorithm and program that accepts the following list of integers and uses Bubble Sort to sort and print them:

Q2: **(10 Marks)**

Write a program in the C language to accept a string as input and print the modified string having only the consonant letters of the input string. Do not use any built-in string-related functions.

Q3: **(10 Marks)**

Write a program to implement a doubly linked list for integers (user input) and perform the following operations on it:

(i) Count and display the number of even and odd integer nodes separately.
(ii) Sort the nodes in ascending order and display them.

Q4: **(10 Marks)**

Write a program using a linked list that accepts two polynomials as input from the user and displays the resultant polynomial after performing the multiplication operations on the user input polynomials.

Q5: **(10 Marks)**

Write a program in the C language to insert user input integers into an initially empty BST. Make assumptions, if necessary.

Q6: **(10 Marks)**

Write a program in C to sort user input data using the selection sort method. Also, print the number of swaps and comparison operations performed for sorting the given data set.

Q7: **(10 Marks)**

Write a program to convert a postfix expression to an infix expression. Use an appropriate data structure.

Q8: **(10 Marks)**

Write a program in the C language for the traversal of a Binary Search tree.

Q1: (10 Marks)

Write an algorithm and program that accepts the following list of integers and uses Bubble Sort to sort and print them:

Answer

The question sheet does not actually print the list of integers after the colon. Therefore, the program accepts any user-entered list. For the execution shown below, the illustrative list is 64, 34, 25, 12, 22, 11, 90.

Algorithm

Step 1. Read the number of integers, n, and store the integers in an array.

Step 2. For each pass i from 0 to n - 2, start with swapped = 0.

Step 3. Compare adjacent entries a[j] and a[j + 1] for j from 0 to n - i - 2.

Step 4. If the left entry is larger, exchange the two entries and set swapped = 1.

Step 5. Stop early when a pass makes no exchange; otherwise continue the next pass.

Step 6. Print the elements of the array in ascending order.

C program

```
#include <stdio.h>

int main(void) {
    int a[100], n, i, j, temp, swapped;
    printf("Enter number of elements (1-100):\n");
    if (scanf("%d", &n) != 1 || n < 1 || n > 100) {
        printf("Invalid size.\n");
        return 1;
    }
    printf("Enter %d integers:\n", n);
    for (i = 0; i < n; i++) {
        if (scanf("%d", &a[i]) != 1) return 1;
    }
    for (i = 0; i < n - 1; i++) {
        swapped = 0;
        for (j = 0; j < n - i - 1; j++) {
            if (a[j] > a[j + 1]) {
                temp = a[j];
                a[j] = a[j + 1];
                a[j + 1] = temp;
                swapped = 1;
            }
        }
        if (!swapped) break;
    }
    printf("Sorted list: ");
```