

**SDM College of Engineering and Technology, Dharwad – 580002**

**Department of Computer Science and Engineering**

**Course: Data Structures and Applications Lab (22UCSL303)**

**Semester: III (A & B)**

**Academic Year: 2023 – 2024 (ODD SEM)**

**DSA- Laboratory**

**Note:** The programs should be well *indented* and *commented* appropriately.

<b>1.</b>	Write a C program to convert a valid infix expression to postfix expression. (Expression includes operators +, -, * and /)
<b>2.</b>	Write a C program to check whether the given expression is balanced expression or not. Hint: Expression involving ( ), { }, [ ]
<b>3</b>	Write a C program to evaluate the given postfix expression.
<b>4.</b>	Write a C program to determine if an input string is of the form x C y where x is a string consisting of letters A and B and y is the reverse of x. Implement using stacks. [Examples: <b>ABBCBBA</b> and <b>ABBACABBA</b> are some of the strings of the given form. <b>ABCAB</b> and <b>BAACABA</b> are some of the strings <b>not</b> of the given form.]
<b>5.</b>	Write a C program to implement the following on circular queue: i. insert() ii. delete() iii. display()
<b>6.</b>	Write a C program to implement the following on priority queue, consisting of three queues: i. insert() – start inserting the elements into the queues from the first queue. ii. delete() - start deleting the elements from the first queue. iii. display()
<b>7.</b>	Write C program to implement an Ascending Priority Queue accepting integers as an input and ensure priority at the time of insertion.
<b>8.</b>	Write C program to implement Descending Priority Queue accepting integers as an input

	and ensure priority at the time of insertion.
9.	Write a C program to implement queue operations using input Restricted Deque (double ended queue) works.  insertqfront(), remvleft(), remvright(), displayq()
10.	Write a C program to implement stack operations using input Restricted Deque (double ended queue) works.  insertqfront(), remvleft(), remvright(), displayq()
11.	Write a C program to implement queue operations using Ouput Restricted Deque (double ended queue) works.  insertqfront(), insertqrear(), remvleft(), displayq()
12.	Write a C program to implement stack operations using Ouput Restricted Deque (double ended queue) works.  insertqfront(), insertqrear(), remvleft(), displayq()
13.	Write a C program to simulate stack and queue using linked list.
14.	Write a C program to concatenate two singly linked lists and display the result.
15.	Write a C program to search an element in the list and print the position of the element if found otherwise add the element to the list.
16.	Write a c function <b>search(l,x)</b> that accepts a pointer 'l' to a list of integers and an integer x and returns a pointer to a node containing x, if it exists and the null pointer otherwise. Write another function srchinsrt(l,x), that adds 'x' to 'l' if it is not found and always returns a pointer to a node containing 'x'. Develop C program for the same.
17.	Write a C program to create an ordered (ascending) linked list for the given set of data.
18.	Write a c program to reverse the elements of a given linked lists.
19.	Write a c program to delete an element from the given position of the linked list.
20.	Write a c program to insert an element at a given position of the linked list.
21.	Write a C program to construct a binary search tree and perform the following operations. i. Search an element ii. Inorder traversal

	iii. postorder traversal iv. preorder traversal
22.	Write a C program to construct a binary expression tree for a given postfix expression and evaluate the expression and print the result.
23.	In a bank, the customers entering for the cash transactions are made to sit in a row of chairs. Every customer entering for the transaction gets a token and he/she sits on a chair beside the customer at the tail end. The customer who is sitting at the initial chair in that row will be called for the transaction and is the first to leave the chair. Write C program to simulate this scenario.
24.	Write a c program to perform following operations using doubly linked list. i. Insert at front ii. Delete at front
25.	Show how to implement a queue of integers using an array q[10], where q[0] is used to indicate the front of the queue, q[1] is used to indicate its rear and q[2] through q[9] are used to contain queue elements. Also, show how to initialize such an array to represent empty queue and write routines dequeue, enqueue and empty for such an implementation.
26.	Show how to implement a stack of integers in C by using an array int s[stacksize] where s[0] is used to contain the index of the top element of the stack and s[1] through s[stacksize-1] contain the elements on the stack. Write C declaration and functions push(), pop() empty() for this implementation.
27.	Write a C program to remove duplicates from a given list of 'n' elements using BST.

### **Note:**

1. Students should choose one question from the above list.
2. Evaluation Rubrics:
  - Write-Up : 20 Marks
  - Execution : 20 Marks
  - Viva –voce : 10 Marks
3. Change of a question is allowed.
  - a. If change is opted by the student then, he/she will be evaluated for 40 marks.
  - b. Change of question will be made by picking a chit by the student.
  - c. Change is permitted within first half an hour of the start of the examination.
  - d. Once a change is taken, he/she cannot revert to the previous question.
  - e. Maximum number of changes a student can take is one.