

Asansol Engineering College

Sub. Name **Data Structure & Algorithm Lab** Sub. Code: **PCC-CS391**

Dept- **IT**

CHAPTER	TITLE
A: Linear Data Structure (Array)	<ol style="list-style-type: none">1. Write a program to delete an element from an array.2. Write a program to display the unique elements of the array.3. Write a program to display the duplicate elements of the array4. Take two sorted arrays and merge them in such a way that the merged array will also be sorted. Print all the elements of all arrays.
B: Linear Data Structure (Stack) and Applications of the Stack	<ol style="list-style-type: none">1. Write a menu-driven program for Stack implementation (PUSH, POP, DISPLAY) using Array.2. Write a program to reverse a String using the Stack data structure.3. Write a program to check whether brackets have been given properly or not in an expression. <div><div>a. Case1:</div><div>Input: { { ([] []) } () }</div><div>Output: Balanced Brackets</div><div>b. Case2:</div><div>Input: ([]]</div><div>Output: Unbalanced Brackets</div></div>

C: More Applications of the Stack Data Structure	<ol style="list-style-type: none"> 1. Write a program to evaluate the Postfix Expression. 2. Write a program to convert Infix Expression to Postfix Expression.
D: Linear Data Structure (Queue)	<ol style="list-style-type: none"> 1. Write a menu-driven program to implement a Queue (ENQUE, DEQUE, and DISPLAY) using Array. 2. Write a program to implement Circular Queue Using Array
E: Application of the Queue Data Structure	<ol style="list-style-type: none"> 1. The famous car manufacturing company, NavaVista, launching their Battery Operated subsidized 6-seater Car this 1st December. For that NavaVista had opened the booking for 100 customers only. Your job is to maintain the booking details on a First book First get basis. You have to accept the following details from the customers : (Name, AadharNo, MobileNo, City). Write a menu-driven program to accept a booking, show the customers details, and sequence in which booking will be served on 1st December.

F: Recursion	<ol style="list-style-type: none"> Find the GCD of two numbers recursively by using Euclid's algorithm which states $\begin{aligned} \text{GCD}(a, b) &= b, && \text{if } b \text{ divides } a \\ &= \text{GCD}(b, a \bmod b), && \text{otherwise} \end{aligned}$ Find X^Y $\begin{aligned} \text{EXP}(X, Y) &= 1, && \text{if } Y = 0 \\ &= X * \text{EXP}(X, Y-1), && \text{otherwise} \end{aligned}$ Print the Fibonacci series up to nth term $\begin{aligned} \text{FIB}(n) &= 0, && \text{if } n = 0 \\ &= 1, && \text{if } n = 1 \\ &= \text{FIB}(n-1) + \text{FIB}(n-2), && \text{otherwise} \end{aligned}$
G: Single Link List	<ol style="list-style-type: none"> Write a menu-driven program to implement the Single Link List and perform the following operations <ol style="list-style-type: none"> Creation Insertion <ol style="list-style-type: none"> After a Specific Node Before a specific Node Searching Traversing Reversing the list Deletion of a particular node

H: Circular Link List	<ol style="list-style-type: none"> 1. Write a menu-driven program to implement the Circular Link List and perform the following operations <ol style="list-style-type: none"> a. Creation b. Insertion <ol style="list-style-type: none"> i. After a Specific Node ii. Before a specific Node c. Searching d. Traversing e. Deletion of a particular node
I: Double Link List	<ol style="list-style-type: none"> 1. Write a menu-driven program to implement the Double Link List and perform the following operations <ol style="list-style-type: none"> a. Creation b. Insertion <ol style="list-style-type: none"> iii. After a Specific Node iv. Before a specific Node c. Searching d. Traversing e. Reversing the list f. Deletion of a particular node
J: Non-Linear Data Structure (Tree:: Binary Search Tree)	<ol style="list-style-type: none"> 1. Write a program to implement Binary Search Tree and do the following operations <ol style="list-style-type: none"> a. Creation b. Insertion c. Traversing (IN, PRE, POST Order) d. Searching

K: Searching Techniques	<ol style="list-style-type: none"> 1. Write a program to implement a Linear search algorithm. 2. Write a program to implement a Binary search algorithm. 3. Write a program to implement an Interpolation search algorithm.
L: Sorting Algorithms [Bubble sort, Selection sort, Insertion sort]	<ol style="list-style-type: none"> 1. Write a menu-driven program to Implement the following Sorting Algorithms <ol style="list-style-type: none"> i. Bubble ii. Selection iii. Insertion <p>Write input() function to take input in the Array, display() function to show the array elements, and also write a separate function unsort() which will randomize the positions of the elements in the Array.</p>
M: Sorting Algorithms [Merge sort, Quick sort, Heap sort]	<ol style="list-style-type: none"> 1. Write the program to Implement the Merge Sort Algorithm. 2. Write the program to Implement the Quick Sort Algorithm. 3. Write the program to Implement the Heap Sort Algorithm.

<p>N: Concept of Hashing</p>	<ol style="list-style-type: none"> 1. Suppose you have to store the 100 frequently used words list. Write a menu-driven program to store those words through Hashing mechanism so that searching for those words can be fast. You can use the following function <pre> MyHash(string :: key) { k= length of String key initialize u = 0,n = 0; for each character , key[i], do: n = ASCII (key[i]) u += i*n%31; next character return u%139; } </pre> <p>A few examples of frequently used words are given below: EOD,FAQ, AKA, ASAP, DIY,LMGTFY, NP, N/A, OOO,TIA</p> <p>EOD: End of day FAQ: Frequently asked question AKA: Also known as ASAP: As soon as possible DIY: Do it yourself LMGTFY: Let me Google that for you NP: No problem N/A: Not applicable or not available OOO: Out of office TIA: Thanks in advance</p>
<p>O: Graph</p>	<ol style="list-style-type: none"> 1. Write a program to implement BFS 2. Write a program to implement DFS