



II Year-I Semester		T	P	C
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DATA STRUCTURES LAB (RT21055)				

PrerequisiteCourse:

Computer Programming in C

Course Description and Objectives:

- To develop skills to design and analyze simple linear and non linear data structures
- To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To Gain knowledge in practical applications of data structures

Course Outcomes:

Upon completion of the course,the student will be able to achieve the following outcomes.

Cos	Course Outcomes	POs
1	Apply recursion and non- recursion for given problems.	6
2	Develop programs for various sorting techniques for given problems.	5
3	Develop a stack data structure using arrays and linked list.	8
4	Develop Queue data structure using arrays and linked list.	7
5	Develop arrays and linked list data structures applications.	6
6	Develop & Describe binary tree, BST, tree traversals.	6

Syllabus:

Exercise 1:

Write recursive program which computes the nth Fibonacci number, for appropriate values of n. Analyze behavior of the program Obtain the frequency count of the statement for various values of n.

Exercise 2:

Write recursive program for the following

- Write recursive and non recursive C program for calculation of Factorial of an integer
- Write recursive and non recursive C program for calculation of GCD (n, m)
- Write recursive and non recursive C program for Towers of Hanoi : N disks are to be transferred from peg S to peg D with Peg I as the intermediate peg.

Exercise 3:

- Write C program that use both recursive and non recursive functions to perform Linear search for a Key value in a given list.
- Write C program that use both recursive and non recursive functions to perform Binary search for a Key value in a given list.
- Write C program that use both recursive and non recursive functions to perform Fibonacci search for a Key value in a given list.

Exercise 4:

- Write C program that implement Bubble sort, to sort a given list of integers in ascending order
- Write C program that implement Quick sort, to sort a given list of integers in ascending order
- Write C program that implement Insertion sort,to sort a given list of integers in ascending order

Exercise 5:

- a) Write C program that implement heap sort, to sort a given list of integers in ascending order
- b) Write C program that implement radix sort, to sort a given list of integers in ascending order
- c) Write C program that implement merge sort, to sort a given list of integers in ascending order

Exercise 6:

- a) Write C program that implement stack (its operations) using arrays
- b) Write C program that implement stack (its operations) using Linked list

Exercise 7:

- a) Write a C program that uses Stack operations to Convert infix expression into postfix expression
- a) Write C program that implement Queue (its operations) using arrays.
- b) Write C program that implement Queue (its operations) using linked lists

Exercise 8:

- a) Write a C program that uses functions to create a singly linked list
- b) Write a C program that uses functions to perform insertion operation on a singly linked list
- c) Write a C program that uses functions to perform deletion operation on a singly linked list

Exercise 9:

- d) Adding two large integers which are represented in linked list fashion.
- e) Write a C program to reverse elements of a single linked list.
- f) Write a C program to store a polynomial expression in memory using linked list
- g) Write a C program to representation the given Sparse matrix using arrays.
- h) Write a C program to representation the given Sparse matrix using linked list

Exercise10:

- a) Write a C program to Create a Binary Tree of integers
- b) Write a recursive C program for Traversing a binary tree in preorder, inorder and postorder.
- c) Write a non recursive C program for Traversing a binary tree in preorder, inorder and postorder.
- d) Program to check balance property of a tree.

Exercise 11:

- a) Write a C program to Create a BST
- b) Write a C program to insert a node into a BST.
- c) Write a C program to delete a node from a BST