Nirma University

Institute of Technology

Computer Science and Engineering department

B.Tech. Computer Science and Engineering

Semester: VI, **Academic Year:** 2020-21**, Term:** EVEN

CEM253 Data Structures

List of Experiments

Sr. No.	Topic	Hour (s)	Mapped CLO's
1.	**Array and Structures** a) Create a two dimensional array and perform insertion, deletion and update operation using pointer. b) Create an array of structure and perform insertion, deletion and update operation using pointers.	**02**	**CLO2, CLO4**
2.	**Stack** a) Create a Program to Implement Stack Operations: Push , Pop , Peek and reverse a given string using Stack b) Write a program to convert fully parenthesized infix expression to postfix expression and Evaluate Postfix expression using stack.	**04**	**CLO4**
3.	**Queue** a) Write a program to simulate printer spooler application. Assume maximum 5 users are using this printer. Use appropriate data structure to implement the system. b) Write a program to implement priority queue using an array.	**04**	**CLO4**
4.	**Singly Linked List** a) Write a program to implement singly Linked List's operation. Insertion, Deletion and Traversal b) Write a program to reverse a singly linked list. *	**02**	**CLO1**

<table>
<tr><td></td><td>c) Students enrolled for a course in computer science opt for two theory courses, an elective course and two laboratory courses from a list of courses offered for the programme. Design a multiply linked list with the following node structure:

<table><tr><td>ROLLNO</td><td>NAME</td><td>THEORY1</td><td>THEORY2</td><td>LAB1
LAB2</td><td>ELECTIVE</td></tr></table>
A student may change his/her elective course within a week of the enrollment. At the end of the period, the department takes count of the number of students who have enrolled for a specific course in the theory, laboratory and elective options.</td><td></td><td></td></tr>
<tr><td>5.</td><td>Linked List application

Implement an addition of two polynomial equations using linked list.</td><td>04</td><td>CLO4,</td></tr>
<tr><td>6.</td><td>Sorting

a) Write a program to implement Quick sort for sorting a given set of integers in ascending order.
b) Write a program to implement merge sort for sorting a given set of integers in ascending order. *</td><td>04</td><td>CLO3</td></tr>
<tr><td>7.</td><td>Implement heap sort with the assumption that the smallest element of the list floats to the root during the construction of heap. * (<u>Cognitive</u> - Understand and Apply)</td><td>02</td><td>CLO3</td></tr>
<tr><td>8.</td><td>Searching
Implement Binary search operation on a given set of integers.</td><td>02</td><td>CLO3</td></tr>
<tr><td>9.</td><td>Binary Search Tree

Write a program to implement phone book dictionary using Binary Search Tree which provides following operations: (a) add new entry in phone book, (b) remove entry from phone book, (c) search phone number (d) list all entries in ascending order of name and (e) list all entries in descending order of name.</td><td>04</td><td>CLO4</td></tr>
<tr><td>10.</td><td>Graph
a) Write a program to perform BFS.

b) Design and implement an algorithm to obtain a spanning tree of a connected, undirected graph using breadth first or depth first traversal.* (C<u>ognitive</u> - Understand and Apply)</td><td>04</td><td>CLO2, CLO4</td></tr>
<tr><td></td><td>Total</td><td>32</td><td></td></tr>
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<u> indicates extra exercises for practice.</u>*