PUNE INSTITUTE OF COMPUTER TECHNOLOGY

DHANKAWADI, PUNE – 43.

LIST OF LAB EXPERIMENTS

ACADEMIC YEAR: 2018-2019

DEPARTMENT: COMPUTER ENGINEERING   Date: 15/06/2018

CLASS: S.E.   SEMESTER: I

SUBJECT: DATA STRUCTURES LABORATORY

Sr. No.	PROBLEM STATEMENT
1	Write C/C++ program to store marks scored for first test of subject 'Data Structures and Algorithms' for N students. Compute I. The average score of class II. Highest score and lowest score of class III. Marks scored by most of the students IV. list of students who were absent for the test
2	Write C++ program for storing matrix. Write functions for • Check whether given matrix is upper triangular or not • Compute summation of diagonal elements • Compute transpose of matrix • Add, subtract and multiply two matrices • Check saddle point is present or not. OR Write C++ program with class for String. Write a function • Copy, Concatenate, check substring, Equal, Reverse and Length. • Frequency that determines the frequency of occurrence of particular character in the string. • Delete that accepts two integers, start and length. The function computes a new string that is equivalent to the original string, except that length characters being at start have been removed. • Chardelete that accepts a character c. The function returns the string with all occurrences of c removed. • Replace to make an in-place replacement of a substring w of a string by the string x. note that w may not be of same size of x . • Palindrome to check whether given string is palindrome or not

		(Note: Make use of character array to perform all operations)
	3	Write C++ program for sparse matrix realization and perform following operations on it: • Fast Transpose • addition of two matrices OR Write a C++ program to realize polynomial equation and perform operations. Write function • To input &output polynomials represented as $b_m x^{em} + b_{m-1} x^{em-1} + \ldots + b_0 x^{e0}$. Your functions should overload the << and >> operators. • Evaluates a polynomial at given value of x • Add two polynomials. • Multiplies two polynomials.
	4	Department of Computer Engineering has student's club named 'Pinnacle Club'. Students of Second, third and final year of department can be granted membership on request. Similarly one may cancel the membership of club. First node is reserved for president of club and last node is reserved for secretary of club. Write C++ program to maintain club member's information using singly linked list. Store student PRN and Name. Write functions to • Add and delete the members as well as president or even secretary. • Compute total number of members of club • Display members • Display list in reverse order using recursion • Two linked lists exists for two divisions. Concatenate two lists Sort the singly linked list. OR Department of Computer Engineering has student's club named 'Pinnacle Club'. Students of Second, third and final year of department can be granted membership on request. Similarly one may cancel the membership of club. First node is reserved for president of club and last node is reserved for secretary of club. Write C++ program to maintain club member's information using singly linked list. Store student PRN and Name. Write functions to • Add and delete the members as well as president or even secretary. • Compute total number of members of club • Display members • Display list in reverse order using recursion • Two linked lists exists for two divisions. Concatenate two lists • Merge two sorted singly linked lists.
	5	Write C++ program for storing binary number using doubly linked lists. Write functions

	• To compute 1's and 2's complement • Add two binary numbers
	OR The ticket booking system of Cinemax theater has to be implemented using C++ program. There are 10 rows and 7 seats in each row. Doubly circular linked list has to be maintained to keep track of free seats at rows. Assume some random booking to start with. Use array to store pointers (Head pointer) to each row. On demand • The list of available seats is to be displayed • The seats are to be booked • The booking can be cancelled.
6	Second year Computer Engineering class, set A of students like Vanilla Ice-cream and set B of students like butterscotch ice-cream. Write C/C++ program to store two sets using linked list. compute and display • Set of students who like either vanilla or butterscotch or both Set of students who like both vanilla and butterscotch • Set of students who like only vanilla not butterscotch • Set of students who like only butterscotch not vanilla • Number of students who like neither vanilla nor butterscotch. OR Write a C++ program to realize polynomial equation using circular link list and perform following operation • To input &output polynomials • Evaluates a polynomial at given value of x • Add two polynomials.
7	In any language program mostly syntax error occurs due to unbalancing delimiter such as (),{},[]. Write C++ program using stack to check whether given expression is well parenthesized or not.
8	Implement C++ program for expression conversion as infix to postfix and its evaluation using stack based on given conditions: Operands and operator, both must be single character, Input Postfix expression must be in a desired format, Only '+', '-', '*' and '/ ' operators are expected.
9	Queues are frequently used in computer programming, and a typical example is the creation of a job queue by an operating system. If the operating system does not use priorities, then the jobs are processed in the order they enter the system. Write C++ program for simulating job queue. Write functions to add job and delete job from queue. OR Queues are frequently used in computer programming, and a typical example is the creation of a job queue by an operating system. If the operating system uses priorities,

	then the jobs are processed based on priority order. Write C++ program for simulating job queue. Write functions to add job and delete job from priority queue.
10	A double-ended queue (deque) is a linear list in which additions and deletions may be made at either end. Obtain a data representation mapping a deque into a one-dimensional array. Write C++ program to simulate deque with functions to add and delete elements from either end of the deque.
11	a) Write C++ program to store roll numbers of student in array who attended training program in random order. Write function for searching whether particular student attended training program or not using linear search and sentinel search. b) b) Write C++ program to store roll numbers of student array who attended training program in sorted order. Write function for searching whether particular student attended training program or not using binary search and Fibonacci search.
12	Write C++ program to store first year percentage of students in array. Write function for sorting array of floating point numbers in ascending order using a) Selection Sort b) Bubble sort and display top five scores. OR Write C++ program to store second year percentage of students in array. Write function for sorting array of floating point numbers in ascending order using a) Insertion sort b) Shell Sort and display top five scores.
13	Write C++ program to store first year percentage of students in array. Write function for sorting array of floating point numbers in ascending order using quick sort and display top five scores.
14	Mini Project

Prof. B. D. Zope

Subject Coordinator

Dr. R. B Ingle

HOCD