

PUNE INSTITUTE OF COMPUTER TECHNOLOGY

DHANKAWADI, PUNE – 43.

## LIST OF LAB EXPERIMENTS

ACADEMIC YEAR: 2021-22

DEPARTMENT: COMPUTER ENGINEERING

Date: 14/08/2021

CLASS: S.E.

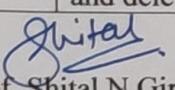
SEMESTER: I

SUBJECT: DATA STRUCTURES LABORATORY

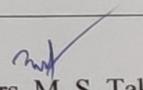
Sr. No.	PROBLEM STATEMENT
1.	<p>In second year, computer engineering class, group A student's play cricket, group B students play badminton and group C students play football. Write a <b>Python</b> program using functions to compute following: -</p> <ul style="list-style-type: none"><li>a) List of students who play both cricket and badminton</li><li>b) List of students who play either cricket or badminton but not both</li><li>c) Number of students who play neither cricket nor badminton</li><li>d) Number of students who play cricket and football but not badminton.</li></ul> <p>(Note- While realizing the group, duplicate entries should be avoided, do not use SET built-in functions)</p>
2.	<p>Write a <b>Python</b> program to compute following operations on <b>String</b>:</p> <ul style="list-style-type: none"><li>a) To display word with the longest length</li><li>b) To determine the frequency of occurrence of particular character in the string</li><li>c) To check whether given string is palindrome or not</li><li>d) To display index of first appearance of the substring</li><li>e) To count the occurrences of each word in a given string</li></ul>
3.	<p>Write a <b>Python</b> program to compute following computation on <b>matrix</b>:</p> <ul style="list-style-type: none"><li>a) Addition of two matrices</li><li>b) Subtraction of two matrices</li><li>c) Multiplication of two matrices</li><li>d) Transpose of a matrix</li></ul>
4.	<ul style="list-style-type: none"><li>a) Write a <b>Python</b> 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 <b>Linear search</b> and <b>Sentinel search</b>.</li><li>b) Write a <b>Python</b> 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 <b>Binary search</b> and <b>Fibonacci search</b>.</li></ul>

5.	Write a <b>Python</b> program to store second year percentage of students in array. Write function for sorting array of floating-point numbers in ascending order using <b>a) Insertion sort</b> and <b>b) Shell Sort</b> and display top five scores.
6.	Write a <b>Python</b> program to store first year percentage of students in array. Write function for sorting array of floating-point numbers in ascending order using <b>Quick sort</b> and display top five scores.
7.	<p>The ticket booking system of Cinemax theatre has to be implemented using <b>C++</b> program. There are 10 rows and 7 seats in each row. <b>Doubly circular linked list</b> 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</p> <ul style="list-style-type: none"> <li>a) The list of available seats is to be displayed</li> <li>b) The seats are to be booked</li> <li>c) The booking can be cancelled.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p>Write <b>C++</b> program for storing binary number using <b>doubly linked lists</b>. Write functions-</p> <ul style="list-style-type: none"> <li>a) To compute 1's and 2's complement</li> <li>b) Add two binary numbers</li> </ul>
8.	<p>Write <b>C++</b> program for storing appointment schedule for day. Appointments are booked randomly using <b>linked list</b>. Set start and end time and min and max duration for visit slot. Write functions for-</p> <ul style="list-style-type: none"> <li>a) Display free slots</li> <li>b) Book appointment</li> <li>c) Cancel appointment (check validity, time bounds, availability)</li> <li>d) Sort list based on time</li> <li>e) Sort list based on time using pointer manipulation</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p>Second year Computer Engineering class, set A of students like Vanilla Ice-cream and set B of students like butterscotch ice-cream. Write <b>C++</b> program to store two sets using <b>linked list</b>. compute and display-</p> <ul style="list-style-type: none"> <li>a) Set of students who like both vanilla and butterscotch</li> <li>b) Set of students who like either vanilla or butterscotch or not both</li> <li>c) Number of students who like neither vanilla nor butterscotch</li> </ul>
9.	In any language program mostly syntax error occurs due to unbalancing delimiter such as (), {}, []. Write <b>C++</b> program using <b>stack</b> to check whether given expression is well parenthesized or not.
10.	Implement <b>C++</b> program for expression conversion as infix to postfix and its evaluation using <b>stack</b> based on given conditions: 1. Operands and operator, both must be single character. 2. Input Postfix expression must be in a desired format. 3. Only '+', '-', '*' and '/' operators are expected.

11.	<b>Queues</b> 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.
12.	Write program to implement a <b>priority queue</b> in C++ using an inorder list to store the items in the queue. Create a class that includes the data items (which should be template) and the priority (which should be int). The inorder list should contain these objects, with operator <= overloaded so that the items with highest priority appear at the beginning of the list (which will make it relatively easy to retrieve the highest item.)
13.	A <b>double-ended queue (deque)</b> 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.

  
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**Subject Coordinator**

  
Mrs. M. S. Takalikar

**HOCD**