CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY AND ENGINEERING
Department of Computer Engineering

Subject Name: Data Structures & Algorithm   **Semester :** IV
Subject Code: CE245   **Academic year:** 2019-20

Practical List

Sr. No.	Aim Of the Practical	Hrs.
1.	Write a program to store roll numbers of student in array who attended training program in random order. Write function for a) Searching whether particular student attended training program or not using linear search and sentinel search. b) Searching whether particular student attended training program or not using binary search and Fibonacci search.	2
2.	Mark purchased Books from books store of standard 1 to 7. He purchased 4 books for each standard(for std.1 books are 1.1,1.2,1.3,1.4 and for std. 2 books are 2.1,2.2,2.3,2.4 and so on..). When he reached home, he opens the bag and sees that all the books got mixed. So, how he will sort all the books, according to the standards and their preference in that particular standard. (ex. : preference in std. 1 is 1.1<1.2<1.3 2.1: **SELECTION SORT** that arranges in descending order 2.2: INSERTION SORT that arranges in ascending order	4
3	Implement a menu driven program that performs following sorting algorithms 3.1 QUICK SORT that arranges in ascending order 3.2 MERGE SORT that arranges in descending order	4
4.	Perform following programs using Stack data structure: 4.1 Sometimes a program requires two stack containing the same type of items. If the two stacks are stored in separate arrays. Then one stack might overflow while there was considerable unused space in the other. A neat way to avoid the problem is to put all the space in one array and let one stack grow from one end of the array and the other stack start at the other end and grow in opposite direction i.e., toward the first stack, in this way, if one stack turns out to be large and the other small, then they will still both fit, and there will be no overflow until all the space is actually used. Declare a new structure type Double stack that includes the array and the two indices top A and top B, and write functions Push A, Push B, Pop A and Pop B to handle the two stacks with in one Double Stack. 4.2 Implement Tower of Hanoi Problem using Recursion.	4
5.	We are developing software for a call center. When a client calls, his/her call should be stored until there is a free service representative to pick the call. Calls should be processed in the same order they are received. Select appropriate data structure to build call center software system.	2
6.	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	2

	president of club and last node is reserved for secretary of club. Write a program to maintain club member 's information using singly linked list. Store student PRN and Name. Write functions to a) Add and delete the members as well as president or even secretary. b) Compute total number of members of club c) Display members d) Display list in reverse order using recursion e) Two linked lists exists for two divisions. Concatenate two lists.	
7.	Write a program to implement Circular Queue with all operations. Check the queue contents and conditions with different combinations of insert and delete operations. Show the content of circular queue with front and rear pointer after each operation. Initially, the queue is empty. The size of the queue is 5. The sequence of operation given below: • Insert 10, 50, 40, 80 • Delete • Insert 200, 70, 150 • Delete • Delete • Delete	2
8.	Implement the program display Linked List in Reverse	2
9.	Implement a city database using a BST to store the database records. Each database record contains the name of the city (a string of arbitrary length) and the coordinates of the city expressed as integer x- and y-coordinates The BST should be organized by city name. Your database should allow records to be inserted, deleted by name or coordinate, and searched by name or coordinate. Another operation that should be supported is to print all records within a given distance of a specified point. Collect running-time statistics for each operation. Which operations can be implemented reasonably efficiently (i.e., in$\Theta(logn)$time in theaverage case) using a BST? Can the database system be made more efficient by using one or more additional BSTs to organize the records by location?	2
10.	Write a program that enters vertices, edges of a **Graph** and display sequence of vertices to traverse the graph in Depth First Search method.	2
11.	In an array of 20 elements, arrange 15 different values, which are generated randomly. Use **hash function** to generate key and linear probing to avoid collision. $H(x) = (x \bmod 18) + 2$. Write a program to input and display the final values of array.	2