CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
CHANDUBHAI S. PATEL INSTITUTE OF TECHNOLOGY
U. & P. U. Patel Department of Computer Engineering

Subject Name : Data Structures & Algorithms
Subject Code : CE245
Class : B.Tech. (IV Sem)
Academic year : 2018-2019

Practical List

Sr. No.	Aim of the Practical	Hours	COs	POs	PEOs
SEARCHING					
	Scenario Let say you are a cashier in PQR Bank, people come to you when they want to withdraw money from their respective account. People have to come with their ADHAR CARD Photocopy. Prakash came and withdraw money from his account, of course by submitting adhar card photocopy, but on the second day he felt that submitted adhar card photocopy was not his, but adhar card no. he knew, which is (89891245).		1,2,3	1,6,8,9	1,2,3
1.	How will you find that particular adhar card? (Suppose total 15 people withdrew their money on that day). Assume there is no fix pattern in all adhar cards.	2			
2.	How will you find that particular adhar card? (Suppose total 20 people withdrew their money on that day). Assume there is a pattern in all adhar cards, all are in ascending order (89891235 To 89891254). Develop this program using Iterative as well as Recursive approach.	2			
	Question: 1. Compare linear search and Binary search. 2. Differentiate Iteration and Recursion approach.				
ARRAY					
3.	Find K^{th} largest and smallest element in an array.	1	2,3	1,2,4,5,6	2,3,4
4.	Find duplicate elements in an array.	1	2,3	1,2,4,5,6	2,3,4
SORTING					
	Scenario 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.		1,2,3	2,3,8,9	1,5

	(ex. : preference in std. 1 is 1.1<1.2<1.3<1.4)				
5.	Preferred Applicable for above scenario: Bubble Sort, Selection Sort, Insertion Sort	2			
6.	Implement Quick Sort (by taking first or last element as a pivot element)	2			
	Question: 1. **Categorize above sorting methods based on stability and in-place.**				
STACK					
7.	Write a program that enters Infix expression, verify validity and convert it into Postfix expression (if valid) using appropriate data structure.	2	2,3	1,2,3,4	2,5
8.	Write a program that enters valid Postfix/Prefix expression and evaluate the expression using appropriate data structure.	2	2,3	1,2,3,4,5	3,4
	Question: 1. List out applications of the stack.				
QUEUE					
9.	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	1,2,3	3,4,5,6	2,3
10.	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: (1) Insert 10, 50, 40, 80 (2) Delete (3) Insert 200, 70, 150 (4) Delete (5) Delete (6) Delete	2	2,3	4,5,6,7	3,4
	Question: 1. List out the applications of Queue. 2. Compare Stack and Queue Data Structure. 3. Compare Simple queue and Circular queue.				
LINKED LIST					
11.	A faculty stored data of 10 students of a class having ID from 01 to 10 in ascending order and the faculty allows all students sit in the class randomly. Each student has two information: ID and location of next present student of the class. In the class, all the students are present accept ID 03 and 08. After 10 minutes, ID 03 arrives. He/ She sits at random in the class. Write a program such that all student data is arranged in ascending order using suitable data structure.	2	1,2,3	6,7,8,9	1,5
12.	Write a program to implement Doubly Linked List with insert and delete operations.	3	2,3	8,9	3,4
	Question: 1. List out Advantages and Disadvantages of Doubly linked list over Singly Linked List.				
TREE					

13.	Write a program to construct Binary Search Tree of your mobile phone number and apply different tree traversal techniques on BST. Also search particular digit in BST. If that digit is available in BST than prints its predecessor and successor.	3	1,2,3	6,7,8	2,5
	Question: 1. Draw BST for given Preorder and In-order traversal Preorder: 7,10,4,3,1,2,8,11 In-order: 4,10,3,1,7,11,8,2 2. List out applications of Tree.				
GRAPH					
14.	Write a program to implement BFS and DFS Graph traversal techniques.	2	2,3	6,7,8	1,3,4
	Question: 1. Compare BFS and DFS. 2. List out applications of Graph.				
HASHING					
15.	In an array of 20 elements, arrange 15 different values, which are generated randomly between 1,00,000 to 9,99,999. 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	2,3		2,3,4
	Question: 1. What is hashing? Explain any three hashing techniques example.				

Additional Practical List

1.	Implement stack using queue.
2.	Implement queue using stack.
3.	Implement dynamic stack.
4.	Implement dynamic queue.
5.	Implement Merge Sort. (Extended to parallel merge sort)
6.	Write a program to prepare adjacency matrix and adjacency list for the given graph.
7.	Given a graph G, write a C program to find whether it contains cycle or not.