TERM END EXAMINATIONS (TEE) – August 2024

Programme	:	B.Tech.[BCE,MIM BEY]	Semester	:	Fall Semester 2024-2(
Course Name	:	Data Structures And Algorithms	Course Code	:	CSE2002
Date/Session	:	28 Aug 2024/Session-I	Slot	:	B22+B23+D24+E21+
Time	:	3 Hrs.	Max. Marks	:	100

Answer ALL the Questions

Q. No.		Question Description	Marks
		PART A – (60 Marks)	

1	(a)	"Why space and time complexity are important for solving computational problems? Write characteristics of a good algorithm. Find time and space complexity of the following code snippet in terms of big-O notation.":
		int a = 0, b = 0;
		for (i = 0; i < N; i++) {
		a = a + rand();
		}
		for (j = 0; j < M; j++) {
		b = b + rand();
		}
			12

		OR	
	(b)	Prove that i. $n^2/2-3n= O(n^2)$ ii. $3n^3=O(n^4)$ iii. $4n^3 + 3n^2 + 2n + 1= \Theta(n^3)$	12
2	(a)	Write pseudocode or function for Merge Procedure of Merge sort. Apply Merge sort for following set of keys: 4,3,8,4,6,5,9,1,40,10	12
		OR	
	(b)	Write pseudocode or function for Partition Procedure of Quick sort. Apply Quick sort for following set of keys: 4,3,8,2,6,5,9,1,40,10,7	12
3	(a)	Write Procedure for PUSH and POP operation in stack. The Six items A, B, C, D, E and F are pushed in a stack one after the other starting from A. The stack is popped 4 times and each element is inserted in a queue then 2 elements are deleted form the queue and pushed back on the stack. Now 1 item is popped from the stack. What is the popped item? Show all steps.	12

OR

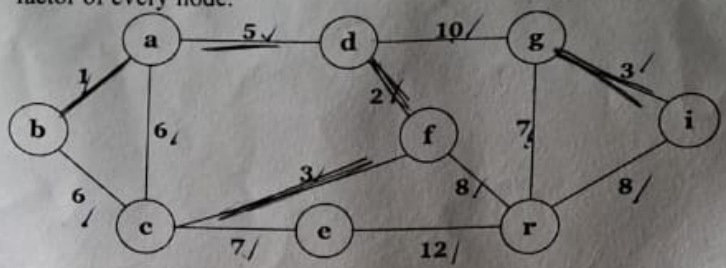
(b) Write Procedure for ENQUEUE and DEQUEUE operation in Circular Queue. Give its applications. 12

4 (a) A binary tree T has 9 nodes. The in-order and pre-order traversals of T yield the following sequences of nodes: In Order: EACKFHDBG Pre order: FAEKCDHGB Draw it. Write recursive function for post-order traversal in Binary Tree. 12

OR

(b) Define AVL tree. Construct an AVL tree having the following elements: H, I, J, B, A, E, C, F, D, G, K, Show each step with balance factor of every node. 12

5 (a) 12



Apply Kruskal's method for finding MST in above instance of Graph.

OR

(b) Apply Prim's method for finding MST in an instance of Graph. Use figure of 5(a). 12

PART B – (40 Marks)

6 What do you mean by data structure? Give features of good data structures. 8

7 "Differentiate between singly and doubly linked list. Write a program to insert a node at last/end in a singly linked list." 8

8 Explain Insertion sort with example. 8

9 Explain B tree properties. Why degree of B tree can't be one? 8

10 "Briefly explain how we can store graphs in memory so that the existence of a vertex or an edge can be searched easily." 8

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