Reg. No. :

Question Paper Code: 91R01

M.E. DEGREE EXAMINATION, NOV 2019

First Semester

Computer Science and Engineering

19PCS101 – ADVANCED DATA STRUCTURES AND ALGORITHMS

(Regulation 2019)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART - A (10 x 2 = 20 Marks)

1.	Define splay tree. List its properties.	CO1- U	(2)
2.	Differentiate Binary search tree and B tree.	CO1- U	(2)
3.	Give the properties of Binomial heap.	CO2- U	(2)
4.	Brief out the Heap Data Structure.	CO2- U	(2)
5.	What is hash function and its types with example.	CO3- U	(2)
6.	Compare and contrast lock-based and lock free concurrent skip list.	CO3- U	(2)
7.	Define graph. How it differs from Tree?	CO4- U	(2)
8.	What is Greedy Approach?	CO4- U	(2)
9.	Differentiate Approximate Algorithm and Randomized Algorithms.	CO5- U	(2)
10.	Differentiate Quick sort and Parallel Quick sort.	CO5- U	(2)

PART - B (5 x 16 = 80 Marks)

11. (a) Insert the following sequence of elements into an AVL tree, starting with an empty tree: 10, 20, 15, 25, 30, 16, 18, 19.
Delete 30 in the AVL tree. Write the procedures to implement AVL Single and Double Rotations.   CO1-App (16)

Or

(b) Consider using a b-tree with minimum degree t = 2. Compare this data structure with a red-black tree. Is this data structure better, worse, or the same as a red-black tree in terms of time complexity? Briefly justify your answer.   CO1-App (16)

12. (a) Assume that items a through m with keys CO2-App (16)
3,5,2,7,4,10,8,6,3,6,1,2,9 inserting in alphabetical order into a
Fibonacci heaps. Show the heap following the insertions. Then
do a delete in and show the resulting heap state. Write for
insertion and deletion of Fibonacci heap.

Or

(b) Construct the Binomial heap for the following sequence of CO2-App (16)
numbers 7,2,4,17,1,11,6,8,15,10,20. Also apply the operation of
extracting the minimum key in the resulting binomial Heap.
Write the procedure for insertion and deletion of binomial heap.

13. (a) Explain in detail Collision Resolution Techniques with suitable CO3- U (16)
example.

Or

(b) Briefly discuss about concurrent heap with suitable example. CO3- U (16)

14. (a) Consider a phone network design. You have a business with CO4-App (16)
several offices; you want to lease phone lines to connect them
up with each other; and the phone company charges different
amounts of money to connect 7 pairs of cities. Find a set of lines
that connects all your offices with a minimum total cost and
explain the algorithm in detail.

Or

(b) Derive Ford-Fulkerson algorithm for finding the maximum flow CO4-App (16)
in a network with suitable example.

15. (a) Illustrate Approximation Algorithms with an Example. CO5- U (16)

Or

(b) Explain in detail Parallel algorithms with suitable Example. CO5- U (16)

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