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MCA DEGREE I SEMESTER EXAMINATION NOVEMBER 2014**CAS 2101 DATA STRUCTURES AND ALGORITHMS***(2014 Revision - Regular)*

Time: 3 Hours

Maximum Marks: 50

PART A
(Answer *ALL* questions)

(15 × 2 = 30)

- I. (a) How to represent a sparse matrix. Give one example.
(b) What are features of a good hashing function?
(c) Give a sorting algorithm which take linear time complexity.
- II. (a) Explain insertion operation in a circular list.
(b) Explain the role of stack while implementing recursion with one example.
(c) How to perform deletion operation in a dequeue?
- III. (a) Draw a binomial heap B_5 .
(b) With an example show how to create tree if its postorder traversal and inorder traversal are given.
(c) Give properties of fibonacci heap.
- IV. (a) How to represent a threaded binary tree?
(b) What are the properties of red-black tree?
(c) How to represent a graph-using list? Give one example.
- V. (a) Why don't we allow a minimum degree of Btree as 1?
(b) Draw a B+ Tree with level 3.
(c) Write an algorithm to find Indegree or outdegree of a graph.

PART B

(5 × 4 = 20)

- VI. Explain count sorting algorithm with an example.
OR
- VII. Explain fibonacci search algorithm with one example.
- VIII. Implement a stack using 2 queues.
OR
- IX. Perform insertion/deletion of dequeue.
- X. Show extract minimum operation in binomial heap with example.
OR
- XI. How to create fibonacci heap. Give an example.
- XII. Show deletion operation in binary search tree through an example.
OR
- XIII. Show the red black tree that result after successively inserting the keys 41, 38, 31, 12, 19, 8, in to an initially empty red black tree.
- XIV. A directed graph $(G = V, E)$ is singly connected if there is atmost one simple path from u to v , for all vertices $u, v \in V$. Give an efficient algorithm to determine whether or not a directed graph is singly connected or not.
OR
- XV. Give an algorithm that determines whether or not a given undirected graph $G = (V, E)$ contains a cycle.