Code: 13A05301

B.Tech II Year I Semester (R13) Regular & Supplementary Examinations December 2015

DATA STRUCTURES
(Computer Science and Engineering)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
   (a)   Write down the applications of stacks.
   (b)   What is abstract data type? Write the abstract data type for stack.
   (c)   Give brief description on the variations of insertion.
   (d)   List the various representations of a tree? Give example for each.
   (e)   Write an algorithm to determine the connected components.
   (f)   Which data structure is used efficiently to reduce the ordered map? What is its average time complexity?
   (g)   Write the class definition of a double – ended priority queue.
   (h)   Let r be the root of the leftist tree that has n (internal) nodes. Prove that $n \geq 2^{shortest(r)} - 1$.
   (i)   What are the different types of characterization rotations available for AVL trees?
   (j)   Define a B – tree. List the properties of B – trees.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2   With the help of a neat sketch, explain Software Development Life Cycle.
         Give brief description about the linked representation of stacks.
OR
3   (a) What is linked list? Explain insertion of a new node into single linked list at various possible positions.
    (b) Distinguish between tree, binary tree and binary search tree.

UNIT – II

4   What is time complexity? Derive the average case time complexity for quick sort.
OR
5   What is meant by traversal? With the help of an example, explain the various tree traversal techniques.

UNIT – III

6   List the applications of graphs? Explain the common graph representation techniques.
OR
7   When dynamic hashing will be used? Describe the various dynamic hashing techniques with suitable example.

UNIT – IV

8   What are Meldable priority queues? Explain them with suitable example.
OR
9   Give brief description about the Binomial Heaps.

UNIT – V

10   Construct optimal binary search tree from the data: Let n = 4 and (a_1, a_2, a_3, a_4) = (10, 15, 20, 25). Let (p_1, p_2, p_3, p_4) = (3, 3, 1, 1) and $(q_0, q_1, q_2, q_3, q_4)$ = (2, 3, 1, 1, 1).
OR
11 (a) Distinguish between B – tree and B^+ – Tree.
    (b) Write short notes on Red – Black trees.

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