2016

COMPUTER SCIENCE AND TECHNOLOGY

CSIT 410
ADVANCED DATA STRUCTURES
(Old Course)

Full Marks : 80
Time : 3 Hrs

Figures in the right hand margin indicate full marks for the question

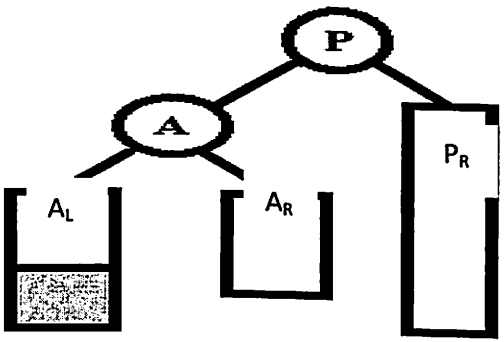
A. Answer the following (1 mark each): 1X10

1. Define Tree.
2. What is a Heap?
3. What is height balanced Binary Search Tree?
4. Write the Process of working of Quick Sort Algorithm.
5. What is a Decision Tree?
6. Define complete and full binary tree?
7. Define height and level of a tree?
8. Define θ notation.
9. What is a linear search?
10. What is an AVL tree?

B. Answer the following (2 marks each): 2X5

1. Describe Bubble Sort Algorithm, with an example?
2. Define Binary Tree.What are the two possible situations of a Binary tree?
3. Write an Algorithm for Searching an element "*ITEM*", in a Binary Search Tree.
4. Suppose the In order and Pre order traversals of a Binary Tree are as follows:
   In order : D B H E A I F J C G
   Pre order : A B D E H C F I J G
   Construct the Binary tree.

5. Balance the AVL tree which has been unbalanced due to the insertion in
6. the left sub-tree of the left child of the pivot node: (pivot node is P)



C. Answer any SIX from the following (10 marks each): 10X6

1. Sort the following elements
   348 143 361 423 539 128 321 543 366 using (5+5)
   i. Quick Sort.
   ii. Selection Sort.
2. Write the Algorithm for Binary Search. Search K=8, using Binary Search, in the following Array
   33 16 50 41 92 8 10 04 11.
3. Explain with examples, the process of Deleting a Node form a Binary Search Tree, when the node is in following cases: (5+5)
   i. The node has exactly one child.
   ii. The node has maximum number of children.
4. What is Traversing. Explain all the orders of Traversing a Binary Tree, with examples.
5. Write the process of Inserting a node into a Red-Black Tree. In a Red-Black Tree, Insert a node "x" where its parent is Red and the sibling of the Parent is also Red and then rearrange the tree such that the properties of the Red-Black tree are maintained.

6. Write the process of Deleting a node from a Linked List, which is under following situations: (5+5)
   i. The node is not the first node.
   ii. The node has a given ITEM of information.
7. Explain with an example (max heap) the process of Sorting using Heap Tree.
8. Define B Tree. Construct a B Tree for the Key values given below

   10 20 30 40 50 60 70 80

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