Code: 15A05201

R15

B.Tech I Year II Semester (R15) Regular & Supplementary Examinations May/June 2017
DATA STRUCTURES
(Common to CSE and IT)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
- (a) What is best case and worst case performance?
- (b) Let P be a singly linked list and Q be the pointer to an intermediate node x in the list. What is the worst-case time complexity of the best known algorithm to delete the node x from the list?
- (c) Assume that the operators +, -, x are left associative and ^ is right associative. The order of precedence (from highest to lowest) is ^, x, +, -. What is the postfix expression corresponding to the infix expression a + b x c - d ^ e ^ f?
- (d) What are the prerequisites for implementing the queue using array?
- (e) Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?
- (f) Define transitive closure of a graph.
- (g) Consider a file sorted in the reverse order. Calculate the total number of comparisons when the file is sorted using insertion sort.
- (h) Suppose we have a O(n) time algorithm that find median of an unsorted array. Now consider a Quick Sort implementation where we first find median using the above algorithm, then use median as pivot. What will be the worst case time complexity of this modified Quick Sort?
- (i) Write non recursive pseudo code for binary search.
- (j) What are the ways in which rehashing can be implemented?

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

UNIT – I

2   Describe different notations used to represent complexities.

OR

3   Write an algorithm to delete a node having minimum value from a single linked list.

UNIT – II

4   Write an algorithm to convert infix expression into polish notation.

OR

5   Write the procedure to insert and delete a data in queue. Illustrate with an example.

UNIT – III

6   Construct a binary tree given the pre-order and in-order sequences as below:
       Pre order : a b c e l f j d g h k l
       In order : e i c f j b g d k h l a

OR

7   Write and explain Dijkstra's algorithm for finding shortest path. Give an example.

UNIT – IV

8   Trace the quick sort algorithm to sort the list J, N, T, U, A in alphabetical order.

OR

9   Explain heap sort algorithm. Illustrate with an example.

UNIT – V

10   Illustrate the idea of searching a hash table using chaining techniques.

OR

11   Compare bucket hashing with open hashing and closed hashing. Write algorithm to search key value, insert key value and delete a key value in bucket hashing.

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