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 I 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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