C

Reg. No. :

Question Paper Code: 53802

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Third Semester

Information Technology

15UIT302 - DATA STRUCTURES AND ALGORITHMS

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. _____ is very useful in situation when data have to stored and then   CO1- R
    retrieved in reverse order

    (a) Stack   (b) Queue   (c) List   (d) Linked list

2. The property of binary tree is   CO2- R

    (a) The first subset is called left sub tree   (b) The second sub tree is called right sub tree

    (c) The root cannot contain NULL   (d) Any note in a tree can have almost 2 children

3. In a Priority queue, insertion takes place at _____   CO3- R

    (a) Front, rear end   (b) Only at rear end   (c) Only at front end   (d) Any position

4. The search technique that takes 0 (log n) time to find a data is   CO4- R

    (a) Linear search   (b)Binary search   (c)Hashing   (d) Tree search

5. Topological sort can be implemented by   CO5- R

    (a) Using depth first search   (b) Using breadth first search

    (c) Using depth and breadth first search (d) None of the mentioned

6. List the applications of Queue. CO1- R

7. Traverse the given tree using in order, Preorder and post order traversals CO2- App
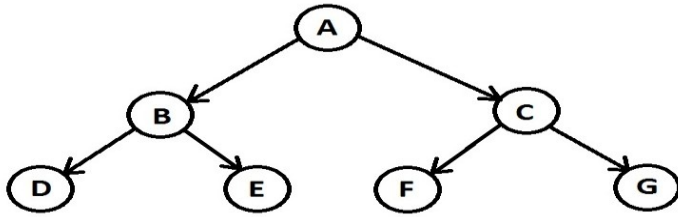
8. What are the properties of binary heap? CO3- R

9. Write the importance of hashing. CO4- R

10. Differentiate BFS and DFS CO5- R

PART – C (5 x 16= 80Marks)

11. (a) (i) Write an algorithm for Push and Pop operations on Stack using Linked List.   CO1- App   (8)

(ii) Explain the addition and deletion operations performed on a circular queue with necessary algorithms.   CO1- App   (8)

Or

(b) (i) Write the insertion and deletion procedures for singly linked lists.   CO1- App   (8)

(ii) Write the algorithm for the deletion and reverse operations on doubly linked list.   CO1- App   (8)

12. (a) (i) Construct an expression tree for the expression A+(B-C)*D+(E*F)   CO2- App   (8)

(ii) Explain the algorithm to convert a postfix expression into an expression tree with an example.   CO2- App   (8)

Or

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(b)	(i) Write the algorithm for pre-order and post-order traversals of a binary tree.	CO2- Ana	(8)

(ii) Suppose the following sequences list nodes of a binary tree T in preorder and inorder, respectively :   CO2- Ana   (8)

       Preorder : A, B, D, C, E, G, F, H, J
       Inorder : D, B, A, E, G, C, H, F, J
       Draw the diagram of the tree.

13. (a) (i) Describe in detail about the binary heaps. Construct a min heap tree for the following : 4,1,3,2,16,9,10,14,8,7.   CO3- App   (8)

     (ii) Explain implementation of priority queue.   CO3- App   (8)

Or

(b) Define AVL tree? Construct AVL tree for following data 1, 2, 3, 4, 8, 7, 6, 5, 11, 10, 12.   CO3- App   (16)

14. (a) (i) Formulate an ADT to perform for the Union and find operations of disjoint sets.   CO4-App   (8)

     (ii) Describe about Union-by-rank and Find with path compression with code.   CO4-App   (8)

Or

(b) (i) Formulate an ADT to implement separate chaining hashing scheme.   CO4-App   (8)

     (ii) Show the result of inserting the keys 2, 3, 5, 7, 11, 13, 15, 6, 4 into an initially empty extendible hashing data structure with M = 3.   CO4-App   (8)

15. (a) (i) Write routines to find shortest path using Dijkstra's algorithm.   CO5-App   (8)

     (ii) Explain Prim's algorithm to construct a minimum spanning tree from an undirected graph.   CO5-App   (8)

Or

(b) Explain BFS and DFS algorithm with example.   CO5-App   (16)

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