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Question Paper Code: 43202

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Third Semester

Computer Science and Engineering

14UCS302 - DATA STRUCTURES

(Regulation 2014)

Duration: 1.15 hrs

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

- Which of the following operations is performed more efficiently by doubly linked list than by singly linked list?
 - Deleting a node whose location is given
 - Searching of an unsorted list for a given item
 - Inverting a node after the node with given location
 - Traversing a list to process each node
- The data structure required to check whether an expression contains balanced parenthesis is
 - stack
 - queue
 - tree
 - array
- The prefix form of an infix expression $a + b - c * d$ is
 - $+ ab - *cd$
 - $- +abc * d$
 - $- +ab * cd$
 - $- + * abcd$
- The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal
 - ABFCDE
 - ADBFEC
 - ABDECF
 - ABDCEF

5. Which amongst the following cannot be a balance factor of any node of an AVL tree?
 (a) 1 (b) 2 (c) 0 (d) -1
6. In a heap, element with the greatest key is always in the _____ node.
 (a) Leaf (b) Root
 (c) First node of left sub tree (d) First node of right sub tree
7. If unions are done by size, if a node is initially at depth 0, the depth of any node is never more than
 (a) $n-1$ (b) $\log n$ (c) n (d) $n/2$
8. A union find data-structure is commonly applied while implementing
 (a) A depth-first search traversal of a graph
 (b) A breadth-first search traversal of a graph
 (c) Computing the minimum spanning tree of a graph using the Kruskal algorithm
 (d) Computing the all-pairs shortest path in a graph
9. To implement Dijkstra's shortest path algorithm on un-weighted graphs so that it runs in linear time, the data structure to be used is
 (a) Queue (b) Stack (c) Heap (d) B-Tree
10. In a graph if $e=[u, v]$, Then u and v are called
 (a) endpoints of e (b) adjacent nodes (c) neighbors (d) all the above

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Explain the Linked implementation of stack and queue. How will you represent a Polynomial using an array? (8)
12. List the different types of tree traversal. Develop an algorithm for traversing a Binary tree. Validate the algorithm with a suitable example. (8)
13. Briefly explain the single and double rotation of AVL tree with examples. (8)

14. Given the following keys {4371, 1323, 6173, 4199, 4344, 9679, 1989} and a hash function $h(X) = X \pmod{10}$, construct.
- (i) separate chaining table
 - (ii) an Open addressing hash table using linear probing
 - (iii) an Open addressing hash table using quadratic probing
 - (iv) an Open addressing hash table with second hash function $h_2(X) = 7 - (X \pmod{7})$. (8)
15. Explain Euler circuit with suitable example. (8)