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Question Paper Code: 43202

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

Third Semester

Computer Science and Engineering

14UCS302 - DATA STRUCTURES

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- Which of the following data structure is linear data structure?
(a) trees (b) graphs (c) arrays (d) none of above
- A queue is a
(a) FIFO (b) LIFO (c) FILO (d) LOFI
- The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal
(a) ABFCDE (b) ADBFEC (c) ABDECF (d) ABDCEF
- The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal
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- In _____ tree, the heights of the two child sub trees of any node differ by at most one.
(a) Binary tree (b) Red Black tree
(c) Splay tree (d) AVL tree

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. The maximum degree of any vertex in a simple graph with n vertices is
- (a) $n-1$ (b) $n+1$ (c) $2n-1$ (d) n
10. A technique for direct search is
- (a) binary search (b) linear search (c) tree search (d) hashing

PART - B (5 x 2 = 10 Marks)

11. Define an ADT.
12. Define a threaded binary tree.
13. Express the percolate up strategy in Heap tree ADT?
14. Define an equivalence relation.
15. Define connected components of a graph .write its uses.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Define double linked list? State the advantages of using doubly linked list
Write an algorithm to add and delete an element from the doubly linked list.

(16)

Or

(b) Write an algorithm to convert infix to postfix notation and prefix notation using stack. (16)

17. (a) Illustrate expression tree for the given expression $(a+b*c)+((d*e+f)*g)$ and show post order tree traversal. (16)

Or

(b) List the different types of tree traversal. Develop an algorithm for traversing a binary tree. Validate the algorithm with a suitable example. (16)

18. (a) Develop an algorithm to implement binary heap and validate with an example. (16)

Or

(b) (i) What are expression trees? Represent the following expression using a tree. Comment on the result that you get when this tree is traversed in Preorder, Inorder and Postorder. $(a-b)/((c*d)+e)$. (8)

(ii) What is a Binary Search Tree (BST)? Make a BST for the following sequence of numbers. 45, 36, 76, 23, 89, 115, 98, 39, 41, 56, 69, 48. (8)

19. (a) Express Smart Union algorithms in detail. (16)

Or

(b) (i) Illustrate the smart union algorithm with suitable example. (8)

(ii) Discuss about the dynamic equivalence problem with example. (8)

20. (a) Describe the process of depth first traversal and breadth with an example. (16)

Or

(b) Explain Euler circuit with suitable example. (16)

