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Question Paper Code: 41832

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Third Semester

Information Technology

14UIT302 – PROGRAMMING WITH DATA STRUCTURES

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- Abstract data type is defined as
 - Set of operations
 - Mathematical abstractions
 - Extension of modular design
 - All of the above
- A mathematical-model with a collection of operations defined on that model is called
 - Data structure
 - Abstract data type
 - Primitive data type
 - Algorithm
- The number of paths from a root to a node in a tree
 - At least one
 - Exactly one
 - More than one
 - Cannot be determined
- A full binary tree with $2n+1$ nodes contain
 - n leaf nodes
 - n non-leaf nodes
 - $n-1$ leaf nodes
 - $n-1$ non-leaf nodes
- In an AVL tree the height of the left sub-tree and right sub-tree at each node differ by
 - At most one
 - Exactly one
 - At least one
 - Cannot be determined
- An element with the greatest key of heap is always consider as
 - leaf
 - root
 - first node of left sub tree
 - first node of right sub tree

7. Which of these hashing techniques is dynamic?
- (a) Open hashing (b) Closed hashing
(c) Extendible hashing (d) Rehashing
8. The goal of hashing is to produce a search that takes
- (a) $O(1)$ time (b) $O(n^2)$ time (c) $O(\log n)$ time (d) $O(n \log n)$ time
9. Spanning in minimal spanning tree means
- (a) Covering every node (b) Covering both node and edges
(c) Covering every edge (d) None of these
10. An adjacency matrix representation of a graph cannot contain information of
- (a) nodes (b) edges
(c) direction of edges (d) parallel edges

PART - B (5 x 2 = 10 Marks)

11. What are the applications of Stack and Queue?
12. Compare and contrast binary tree and binary search tree.
13. List the two properties of a binary heap.
14. List the merits and demerits of open hashing and closed hashing.
15. Define biconnectivity.

PART - C (5 x 16 = 80 Marks)

16. (a) Write and explain the ADT operations for array implementation of a stack. (16)

Or

- (b) Describe the routines for searching, inserting and deleting a node in a linked list using neat diagrams. (16)

17. (a) What are the tree traversal techniques? Compare the performance of tree traversal techniques with an example. (16)

Or

- (b) Create an expression tree for the expression $(a + b * c) + ((d * e + f) * g)$. (16)

18. (a) Analyze an algorithm to insert the following elements 2, 1, 4, 5, 9, 3, 6, 7 in an initial empty AVL tree. (16)

Or

(b) Demonstrate the basic operations on a binary heap data structure and also state its applications. (16)

19. (a) What is hashing? Explain the different types of hashing techniques in detail with example. (16)

Or

(b) Explain the smart union algorithm used to perform effective union in the dynamic equivalence problem. (16)

20. (a) Develop an algorithm to compute the shortest path using Dijkstra's algorithm. Validate the algorithm with a suitable example. (16)

Or

(b) Describe the two algorithms used to solve the minimal spanning tree problem. (16)
