Reg. No. :

Question Paper Code: 41832

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

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)

1. Abstract data type is defined as

    (a) Set of operations   (b) Mathematical abstractions

    (c) Extension of modular design   (d) All of the above

2. A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as

    (a) queues   (b) stacks   (c) trees   (d) deque

3. The number of paths from a root to a node in a tree

    (a) At least one   (b) Exactly one   (c) More than one   (d) Cannot be determined

4. The complexity of searching an element from a set of n elements using Binary search algorithm is

    (a) O(n)   (b) O(log n)   (c) O(n2)   (d) O(n log n)

5. In an AVL tree the height of the left sub-tree and right sub-tree at each node differ by

    (a) At most one   (b) Exactly one   (c) At least one   (d) Cannot be determined

6. An element with the greatest key of heap is always consider as

    (a) leaf   (b) root

    (c) first node of left sub tree   (d) 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. An equivalence relation satisfies following properties

    (a) Reflexive, Transitive and Symmetric   (b) Reflexive, Commutative and Symmetric

    (c) Symmetric, Transitive and Associative   (d) None of the above

9. An adjacency matrix representation of a graph cannot contain information of

    (a) nodes   (b) edges   (c) direction of edges   (d) parallel edges

10. A undirected graph is bi connected when

    (a) Removal of one vertex will disconnect the rest of the graph

    (b) Removal of one edge will disconnect the rest of the graph

    (c) Removal of one vertex will not disconnect the rest of the graph

    (d) Removal of one edge will not disconnect the rest of the graph

<center>PART - B (5 x 2 = 10 Marks)</center>

11. Draw the structure of a doubly circularly linked list.

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.

<center>PART - C (5 x 16 = 80 Marks)</center>

16. (a) (i) Explain the linked list implementation of stack ADT.   (8)

       (ii) Demonstrate the application of stack in evaluating a postfix expression.   (8)

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Or

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

17. (a) (i) Explain about threaded binary trees in detail. (8)

        (ii) What are the tree traversal techniques? Compare the performance of tree traversal techniques with an example. (8)

Or

    (b) (i) Write an algorithm to insert, delete, find minimum and maximum element from a binary search tree. (10)

        (ii) Discuss about expression tree. (6)

18. (a) Describe the structure of a B-Tree with a neat diagram. Perform insertion and deletion on the B-Tree with a suitable example. (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) Discuss smart union algorithm and path compression in detail with an example. (16)

20. (a) (i) Describe the shortest path algorithms. (8)

        (ii) Illustrate the stages in computing the shortest path using Dijktra's algorithm with a suitable example. (8)

Or

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

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