Reg. No. : | | | | | | | | | | |

Question Paper Code: 41382

B.E. / B.Tech. DEGREE EXAMINATION, NOVEMBER 2015

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. ADT used with file request operation in a computer network

   (a) Stack (b) Queue (c) List (d) None of the above

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 average depth of an binary tree is estimated as

   (a) O(n) (b) O($\sqrt{n}$) (c) O(n log n) (d) O(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. All non-leaf nodes except root of an B Tree of order m has

   (a) m children (b) m/2 to m children

   (c) m/2 children (d) 2 to m children

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. Spanning in minimal spanning tree means

(a) Covering every node (b) Covering both node and edges

(c) Covering every edge (d) None of the above

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

PART - B (5 x 2 = 10 Marks)

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

12. Compare and contrast binary tree and binary search tree.

13. Define splaying.

14. List the merits and demerits of open hashing and closed hashing.

15. Differentiate weighted and un-weighted path length.

PART - C (5 x 16 = 80 Marks)

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

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

Or

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

17. (a) Explain the insertion and deletion operation in a binary search tree with suitable example. (16)

Or

(b) (i) Summarize the details on a binary tree. (8)

(ii) Create an expression tree for the expression (a + b * c) + ((d * e + f) * g). (8)

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) (i) Discuss about the significance of hashing. (8)

(ii) Explain the different hashing techniques using examples. (8)

Or

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