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**Question Paper Code: 31082**

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

Third Semester

Information Technology

01UIT302 – PROGRAMMING WITH DATA STRUCTURES

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Write any two applications of stack.
2. Write a simple algorithm for balancing symbols (parenthesis, brackets and braces) using stack.
3. Define depth of a node  $n_i$  in a tree.
4. Define threaded binary tree. Give an example.
5. What are the applications of binary heaps?
6. What are the two properties of a heap?
7. Mention the strategy used by extendible hashing.
8. What are the applications of disjoint set data structure?
9. Differentiate breadth first traversal and depth first traversal.
10. Define Euler circuits.

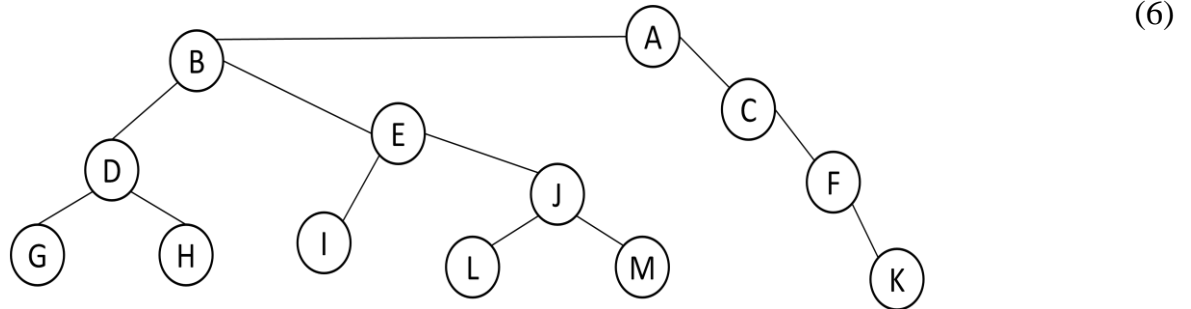
PART - B (5 x 16 = 80 Marks)

11. (a) Explain the implementation of doubly linked list with suitable routines and discuss how it simplifies deletion when compared to singly linked list. (16)

Or

- (b) Explain the applications of stack with suitable examples. (16)

12. (a) (i) For the tree given below

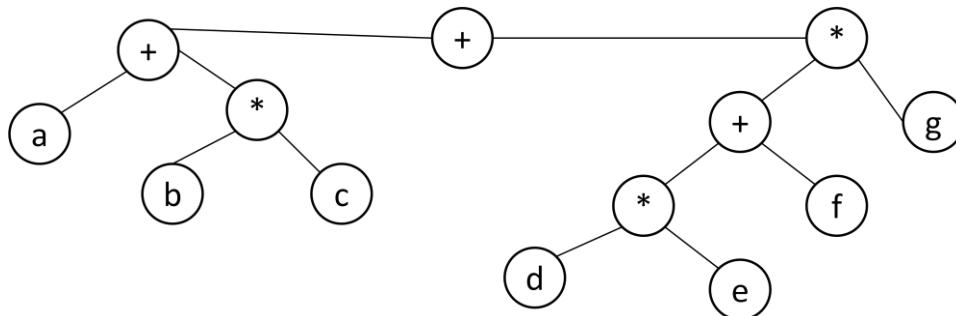


- Which node is the root?
- Which nodes are leaves?
- Compute the depth of node *L*.
- Compute the height of node *F*.
- What is the depth of the tree?
- Write the path from node *A* to node *M*.

- (ii) What is a binary search tree? Write routines for deletion of a node with one child and with two children. (10)

Or

- (b) (i) For the given tree below, construct infix expression, postfix expression and prefix expression. (4)



- (ii) Explain the most popular application of tree traversal (Preorder directory listing). (12)

13. (a) Explain the single rotation and double rotation of AVL tree in detail with suitable examples. (16)

Or

- (b) With the help of the structural properties of a B-Tree construct a tree. Explain the *Find* and *Insert* operations with suitable examples. (16)

14. (a) What is the disadvantage of open hashing? Explain an alternative technique to resolve collisions in hashing. (16)

Or

- (b) Explain the following:

(i) Smart union algorithms (8)

(ii) Path compression (8)

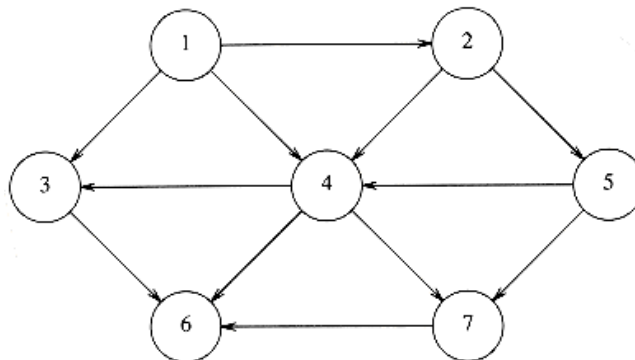
15. (a) Explain the following:

(i) Topological sort (8)

(ii) Biconnectivity (8)

Or

- (b) (i) Give the adjacency list representation of the graph given below (4)



- (ii) How to find the minimum spanning tree of a graph  $G$ ? Explain with suitable algorithms. (12)

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