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Question Paper Code : 21500

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

Third Semester

Electrical and Electronics Engineering

EE 2204/EE 36/080300003/10133 EE 306 – DATA STRUCTURES AND
ALGORITHMS

(Common to Electronics and Instrumentation Engineering/Instrumentation and
Control Engineering)

(Regulation 2008/2010)

(Also common to PTEE 2204 – Data Structures and Algorithms for B.E. (Part-Time)
Second Semester/Fourth Semester – EEE – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is a circular queue?
2. List the applications of stacks.
3. Define tree. List the tree traversal techniques.
4. Differentiate a binary tree from a binary search tree.
5. Define a hash function.
6. State the need for indexing.
7. Define digraph.
8. How breadth first search and depth first search is implemented on a computer?

9. Insert the following letters into an empty B-tree of order 5: C N G A H E K Q
M F W L T Z.
10. Find the Breadth First Search (BFS) for the following instance of a graph.

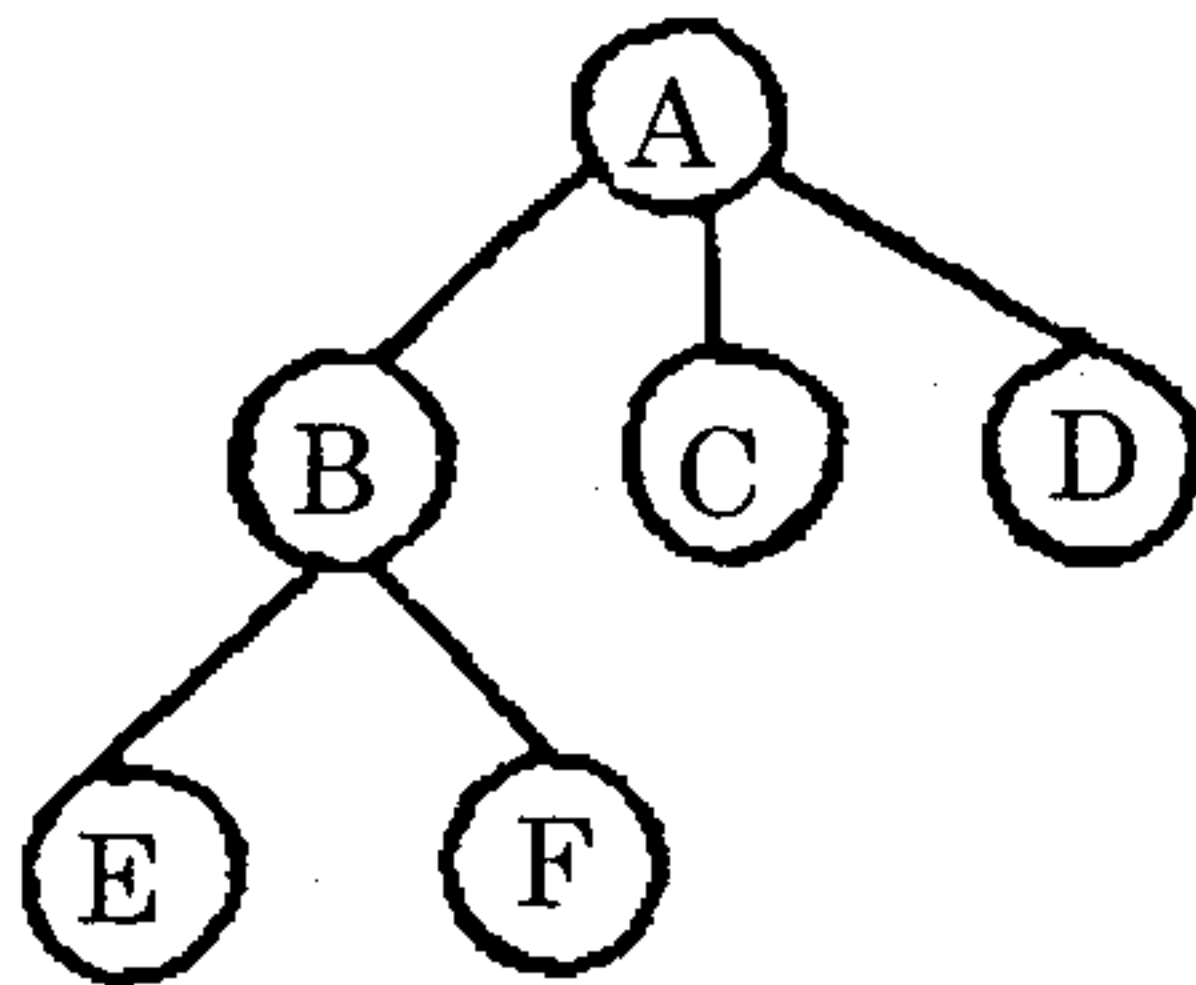


Fig. 1

PART B — (5 × 16 = 80 marks)

11. (a) (i) What is a linked list? Explain the cursor implementation of linked lists. (8)
- (ii) Explain with an algorithm and diagrammatic illustrations how insertions and deletions can be performed on a doubly linked list. (8)

Or

- (b) (i) Explain with an algorithm and diagrammatic illustrations, the various operations that can be performed on a Stack ADT. (8)
- (ii) Explain with an algorithm and diagrammatic illustrations, the various operations that can be performed on a Queue ADT. (8)
12. (a) (i) Discuss how a node could be inserted in a binary tree. (8)
- (ii) Write a procedure in C to find the K^{th} element in binary tree. (8)

Or

- (b) (i) Derive the expression tree for the expression $(a + b + c) + ((d * e + f) * g)$. Explain the construction procedure for the above. (6)
- (ii) Write routines to implement the basic binary search tree operations. (10)
13. (a) Explain the different types of AVL rotations with an example.

Or

- (b) Explain the different methods to avoid collision while hashing.

14. (a) (i) Explain how to find shortest path using Dijkstra's algorithm with an example. (10)
- (ii) Explain the application of DFS. (6)

Or

- (b) (i) Describe biconnectivity with an example. (8)
- (ii) With an example, explain the algorithm for topological sort of a graph. (8)
15. (a) Write an algorithm for basic operations on stack. Formulate an algorithm to check for balanced parenthesis.

Or

- (b) What is a max heap? Explain the steps involved in inserting elements into a heap with an example. Write an algorithm to insert an element into max heap.