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Question Paper Code : 31394

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Third Semester

Electrical and Electronics Engineering

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

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

(Regulation 2008/2010)

(Common to PTEE 2204 – Data Structures and Algorithms B.E. (Part – Time)– Second Semester Electrical and Electronics Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define an Abstract Data Type? Give example.
2. What is the postfix form of the expression $A + B * (C - D) / (P - R)$?
3. What is a binary tree? Give example.
4. Represent the expression $A + B * (C - D) / E$ as a binary tree.
5. Define a hash function.
6. State the need for indexing.
7. Define in - degree and out degree of a graph.
8. What is meant by strongly connected and weakly connected in a graph?
9. What is back tracking?
10. What is meant by program testing, and proof of termination?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Given two sorted lists, L1 and L2, write a procedure in pseudo-code to Compute $L1 \cap L2$ using only the basic list operations. (8)
- (ii) What is a stack? Write down the procedure for implementing various stack operations. (8)

Or

- (b) Write a function to add two polynomials. Do not destroy the input. Use a linked list implementation. If the polynomials have M and N terms respectively, what is the time complexity of your program? (16)
12. (a) Explain with examples Binary tree and Binary- search tree ADT. (16)

Or

- (b) (i) With an example explain the algorithm to convert a general tree to binary tree. (8)
- (ii) With an example, explain the algorithms of inorder and postorder traversals on a binary search tree. (8)
13. (a) (i) Explain two techniques to overcome hash collision. (8)
- (ii) Write a function to delete the minimum element from a binary heap. (8)

Or

- (b) Explain with an example the algorithm for insertion into AVL Trees. (16)
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) Write short notes on Biconnectivity. (8)
- (ii) With an example explain the algorithm for Topological Sort of a graph. (8)
15. (a) (i) Design an algorithm to evaluate the function $\sin(x)$ as defined by the infinite series expansion $\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} \dots$ (8)
- (ii) Write an algorithm to generate and print the first n terms of the Fibonacci series where $n \geq 1$ the first few terms are 0, 1, 1, 2, 3, 5, 8, 13. (8)

Or

- (b) Explain in detail about Divide and conquer algorithm and Greedy algorithm with an example for each. (16)