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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 weekly 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 $\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} \ldots$ (8)

(ii) Write an algorithm to generate and print the first n terms of the Fibonacci series where n>=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)