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Question Paper Code : 91437

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

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 – 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. What is a complete binary tree? Give example.
4. Represent the infix expression $A + (B - C) * D / E$ as a binary tree.
5. State the need for indexing.
6. What is a hash function? Give example.
7. What is a directed graph? Give example.
8. List the applications of graph.
9. For what type of problems greedy algorithms are best suited?
10. State how dynamic programming solves complex problems.

PART B — (5 × 16 = 80 marks)

11. (a) (i) What is a linked list? Explain with an example 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) Develop an algorithm for constructing a binary tree. Include routines for inorder, preorder and postorder traversals. Illustrate the same with an example. (16)

Or

- (b) Develop an algorithm for constructing a binary search tree. Include routines for insertion and deletion. Illustrate the same with an example. (16)
13. (a) Develop an algorithm for constructing an AVL tree. Include routines for insertion and deletion. Illustrate the same with an example. (16)

Or

- (b) (i) What is a binary heap? Explain with an example. (4)
- (ii) Explain closed hashing with an example. (12)
14. (a) (i) Explain with an example breadth first search traversal of a graph. (6)
- (ii) Explain single-source shortest-path problem with an example. (6)
- (iii) What are Euler circuits? Explain with an example. (4)

Or

- (b) What is a minimum spanning tree? Explain with an example Kruskal's algorithm for constructing a minimum cost spanning tree. (16)
15. (a) Explain with an example how a greedy approximation algorithm can be used for a simple scheduling problem. (16)

Or

- (b) What is backtracking? Explain the turnpike reconstruction problem with an example. (16)