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Question Paper Code : X60496

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Third Semester
Electrical and Electronics Engineering
EE2204/EE36/080300003/10133EE306 -DATA STRUCTURES AND ALGORITHMS
(Common to Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)
(Regulations 2008/2010)
(Also common to PTEE2204 – Data Structures and Algorithms for B.E. (Part – Time) Second Semester/Third Semester – EEE - Regulations 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. Draw the expression tree for (a + b*c) + ((d*e + f)*g).
4. Write the pseudo code to insert an element at the end of the linked list.
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. 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) Given two sorted lists, L1 and L2, write a procedure in pseudo-code to compute L1I 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) 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)**

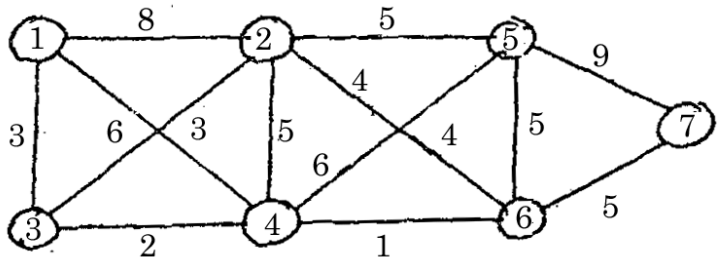
13. a) Develop an algorithm for constructing an AVL tree. Include routines for insertion and deletion. Illustrate the same with an example. **(16)**

(OR)

b) Explain closed hashing with an example. **(16)**

14. a) i) Define Graph. Briefly explain the graph traversal algorithms with an example. **(8)**

ii) Find the shortest path from node 1 to 7 using shortest path algorithm. **(8)**



(OR)

b) With an example, explain Kruskal's algorithm for finding minimum spanning tree. **(16)**

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.

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