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Question Paper Code: 41849

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Fourth Semester

Electrical and Electronics Engineering

(Common to Electronics and Instrumentation Engineering and

Instrumentation and Control Engineering)

01UIT424 - DATA STRUCTURES AND ALGORITHMS

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. List the characteristics of Constructor
2. What is friend function?
3. What are objects and how they are created?
4. Name the various types of multiple inheritance.
5. Define ADT.
6. Define algorithm.
7. Define connected components of a graph. Write its uses.
8. What is complete binary tree?
9. What do you mean by greedy algorithms?
10. How many comparisons does the quick sort algorithm do if the file is already sorted?

PART - B (5 x 16 = 80 Marks)

11. (a) Explain overloading concept with unary and binary operators with examples. (16)

Or

(b) What is meant by overloading? How is operator overloading works? Write a program to add 2 complex numbers using operator overloading. What are the operators that cannot be overloaded. (16)

12. (a) (i) What is exception handling? Explain. (8)

(ii) With suitable example program explain the concept of virtual function. (8)

Or

(b) Develop a C++ program for Library Management system using the concept of Hybrid Inheritance. (16)

13. (a) (i) Write the algorithms for the operations of linked queues. (8)

(ii) Explain the representation of priority queue. (8)

Or

(b) (i) Write the insertion and deletion operation in doubly linked list. (10)

(ii) Write a function to insert an element into circular singly linked list. (6)

14. (a) Define NP complete problem. Where it is applied? Discuss one application with example. (16)

Or

(b) (i) Write the routine to insert an element into an AVL tree and show the result of inserting the following keys 3, 1, 4, 5, 9, 2, 6, 8, 7, 10. (8)

(ii) Construct a Binary tree for the given expression and perform all the traversals.
Expression: $a*(b + c) / d - e$. (8)

15. (a) Apply the diminishing incremental sorting concepts using a suitable sorting algorithm and sort the following elements 77, 62, 14, 9, 30, 21, 80, 25, 70, 55 and write its algorithm. (16)

Or

(b) Compare merge sort and insertion sort algorithms with examples. (16)