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Question Paper Code : 71724

23/05/2017 FN

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017

Third /Fourth Semester

Electronics and ~~Communication~~ Engineering

EC 6301— OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES

(Common to Biomedical Engineering, Medical Electronics Engineering, Robotics and Automation Engineering)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the benefits of using static class data. Give an example of a class with static members.
2. What operation is performed when the default assignment operator = is applied to objects?
3. When is the protected access specifier used in a class?
4. State the purpose of virtual base classes.
5. Write a procedure to insert an element in the beginning of a list ADT implemented using a singly linked list.
6. List the advantages in the linked list implementation of stack.
7. The inorder traversal of a binary tree resulted in E A C K F H D B G. What would its preorder traversal return?
8. What is a graph? List the two ways to represent a graph.
9. State the drawbacks of insertion sort.
10. Give the algorithm to search an element in an array using linear search.

PART B — (5 × 13 = 65 marks)

11. (a) (i) What is function overloading? Explain with example, why it is important? (6)

(ii) Write a program in C++ using friend function to find the product of two complex numbers. (7)

Or

(b) (i) What is a container? Explain the types of sequence containers with examples. (7)

(ii) Write a program in C++ to demonstrate the addition of two complex numbers by overloading + operator. (6)

12. (a) (i) Demonstrate the order of invocation and execution of constructors and destructors in multi level inheritance with an example. (7)

(ii) Explain overriding of member functions with an example. (6)

Or

(b) (i) Write a C++ program to find the area of a rectangle and a triangle using virtual functions. (8)

(ii) Demonstrate with an example, how a member function can find out the address of the object to which it belongs using this pointer. (5)

13. (a) (i) Represent two polynomials using singly linked lists and develop procedures to add them. (6)

(ii) Develop algorithms to perform insertion, deletion and search operations in a Queue implemented using singly linked lists. (7)

Or

(b) Develop procedures to perform push and pop operation on an array implementation of stack and use the same to evaluate a postfix expression 1 2 3 * – 4 +. (13)

14. (a) (i) How can binary trees be represented using arrays? Write routines to perform insertion and deletion in a tree. (7)

(ii) Write routines to convert a set as a tree and perform find operation on the elements. Illustrate with examples. (6)

Or

(b) With necessary algorithms, explain the two graph traversal methods. Demonstrate with examples. (13)

15. (a) Write a recursive algorithm for quick sort and apply the same to sort the elements 12, 3, 2, 26, 5, 21, 18, 25 and 50 and trace the output. (13)

Or

(b) (i) Sort the elements 12, 3, 2, 26, 5, 21,18, 25 and 50 using merge sort and trace the output. (6)

(ii) Develop an algorithm to perform binary search on an array of elements and demonstrate with an example. (7)

PART C — (1 × 15 = 15 marks)

16. (a) Design an algorithm to convert an infix expression to postfix expression using stacks and apply to the expression (a + b – d * e + (f * g + h) *i).

Or

(b) Design procedures to count the number of connected components and the number of vertices in each component of a graph. Illustrate with examples.

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