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Question Paper Code : 10288

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2012.

Third Semester

Electronics and Communication Engineering

EC 2202/147301/EC 33/10144 EC 303/080290009 — DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING IN C++

(Regulation 2008)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Highlight the advantages of static data member and static function in C++.

2.   Mention the operators that cannot be overloaded.

3.   Define pure virtual function and mention its usage.

4.   Write the benefits of using the template functions in C++.

5.   What are the limitations of linear queues? How are they overcome using circular queues?

6.   What is meant by underflow and overflow condition in a stack?

7.   Mention the types of rotations performed on AVL trees.

8.   When is a Binary Search tree a heap? Justify.

9.   Differentiate stable and unstable sorts.

10. For what type of graphs, spanning trees do not exist?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the concept of "passing array of objects as an argument" with an example. (8)

   (ii) Write a program to evaluate the equation, $A = B * C$ using classes and objects where A, B and C are objects of the same class. (8)

Or

   (b) (i) Illustrate the working of constructors and destructors with an example. (8)

   (ii) Explain the characteristics of object oriented programming in detail. (8)

12. (a) (i) Create an base class named, 'shape' with two members base and height, a member function for initialization and a virtual function to compute area ( ). Derive two specific classes Triangle and Rectangle which override the function area ( ). Use these classes in the main function and display the area of a triangle and a rectangle using virtual functions. (8)

   (ii) Define inheritance. Mention its types. Write a C++ program to illustrate the concept of multiple inheritance. (8)

Or

   (b) (i) Write a program to do the following string handling functions in C++.

      (1) Concatenate two strings.

      (2) Search a substring in a string. (8)

   (ii) Define Exception handling. Mention the keywords used to implement the exception handling concept. Also illustrate the working of the exception handling mechanism with an example. (8)

13. (a) Write the pseudo code for the following :

   (i) Split a stack into two. The first contains the bottom half elements and the second contains the remaining elements. (8)

   (ii) Combine two stacks by placing all elements of the second stack on top of those in the first stack. (8)

Or

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(b) Write an algorithm to perform each of the following operations

    (i) Reverse a list, so that the last element comes first and so on.   (5)

    (ii) Return the sum of integers in a list.   (6)

    (iii) Delete every third element from a list.   (5)

14. (a) Create a Binary Search Tree (BST) for the following alphabets. Start from an empty BST

R, F, G, B, Z, U, P, K, L

Delete keys B, U and L one after the other and show the trees at each stage.   (16)

Or

(b) Write the algorithm to search an element in a B-tree. Illustrate searching the number 28 in B-tree of order 3 with the following key values. 20, 40, 30, 10, 25, 28, 27, 32, 36, 34, 35, 8, 6, 2 and 3.   (16)

15. (a) (i) Illustrate inserting an element into a heap with the following numbers 10, 7, 21, 3, 5.   (8)

    (ii) Explain the stages of Heap sort.   (8)

Or

(b) Explain how divide and conquer is applied to merge sort. Trace the algorithm for the following set of data. 25, 0, 8, 78,6, 34, 56, 90,100.   (16)

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