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Question Paper Code : 77093

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Third Semester

Computer Science and Engineering

CS 6301 — PROGRAMMING AND DATA STRUCTURES — II

(Common to Information Technology)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Which is used for achieving Data Hiding in C++? List its types.

2. With which concept, visibility and lifetime of the variables differ in C++? List its types.

3. Define copy constructor and its use.

4. What are the special properties of virtual functions?

5. Give the various file stream classes needed for file manipulation.

6. Is Abstract base class, used to create objects? Justify your answer in brief.

7. How Fibonacci heaps differ from binomial heaps?

8. What is Amortized Analysis? Show that the stack operation MULTIPOP costs O(1) amortized time.

9. What are the different ways to represent the graph? Explain each of them.

10. What is the principle behind Bellman-Ford algorithm to detect the negative weight cycles?

PART B — (5 × 16 = 80 marks)

11. (a) (i) List the C++ programming features and explain in brief, how each of those are achieved. (8)

(ii) What do you understand by static member and static function? How to declare them? Illustrate with an example program. (8)

Or

(b) (i) What are the differences between pointer to constant and constant pointers? Give an example program and explain it. (10)

(ii) Explain the role of *this* pointer with a suitable program. (6)

12. (a) (i) Explain how memory is dynamically allocated and recovered in C++? Illustrate with an example program. (8)

(ii) List the rules associated with operator overloading? What are the operators that cannot be overloaded? Write a program to overload any one of the binary operators. (8)

Or

(b) (i) Define a class Shape with constructor, destructor and pure virtual functions GetArea(), GetPerim() and Draw(). Derive classes Circle and Rectangle from Shape. Derive another class Square from Rectangle. Implement this hierarchy with essential functions and write a main. (10)

(ii) Define a class Area to identify the area of square and rectangle using constructor and destructor. Use the parameters length(l) and breadth(b) for the constructor functions. (6)

13. (a) (i) Write a program to implement stack operations using class template. (8)

(ii) Write a template function to sort the elements of an array. (4)

(iii) What is an exception? Explain how the control is transferred and handled in C++ programs. (4)

Or

(b) (i) Write a program to write the text in a file. Read the text from the file, from end of the file. Display the contents of file in reverse order. Append the contents to the existing file. (10)

(ii) Discuss about the different components in STL. (6)

14. (a) (i) Perform the splaying operation on a binary search tree obtained by inserting the key values 1, 2, 3, 4, 5, 6, 7, 8 in this order into an initially empty tree. Write the code to do the same (splay & insert). (10)

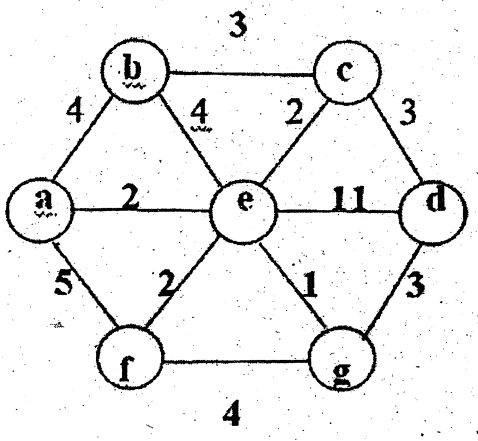
(ii) On an initially empty binomial heap, carry out the following sequence of operations: insert(27) insert(17) insert(19) insert(20) insert(24) insert(12) insert(11) insert(10) insert(14) insert(18), deletemin. After each operation draw the resulting structure of the binomial heap. (6)

Or

(b) (i) Construct an AVL tree with the values 3, 1, 4, 5, 9, 2, 8, 7, 0 into an initially empty tree. Write the code for inserting into an AVL tree. (10)

(ii) Construct a B-Tree with order m = 3 for the key values 2, 3, 7, 9, 5, 6, 4, 8, 1 and delete the values 4 and 6. Show the tree in performing all operations. (6)

15. (a) Explain Prim's and Kruskal's algorithm. Find the minimum spanning tree for the following graph using any one of the algorithms. (16)



Or

(b) For the given graph,

(i) Find the shortest path from vertex 1 to all other vertices. (8)

(ii) Find the shortest path from each vertex to all other vertices. (8)

Mention and use the appropriate algorithms.