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Question Paper Code : 71673

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

Third Semester

Computer Science and Engineering

CS 6301 — PROGRAMMING AND DATA STRUCTURE

(Common to Information Technology)

(Regulations 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   List the features of Object Oriented C++ programming.

2.   What is the role of 'this' pointer.

3.   Define multiple inheritance, Give example.

4.   List different operators of C++ that can be overloaded. Give one example.

5.   Define abstract class. Give example.

6.   State the uses of templates in C++ programming.

7.   Define Balance Factor of AVL Tree.

8.   List the properties of Red Black Tree.

9.   State the principle of Topological Sorting.

10. Write procedure for Depth First search algorithm.

PART B — (5 × 13 = 65 marks)

11. (a) Define class and object. Explain different types of constructors using C++ Program.

Or

     (b) Explain the different types of storage classes of C++ using suitable examples.

12. (a) Demonstrate the following string operations using C++ program - (i) finding the length of string (ii) finding the substring from the string (iii) replace a given substring in a string (iv) concatenate two strings (v) compare two strings (vi) insert a substring in a given string.

Or

(b) Assume the classes Person Student and PartTimeStudent are inherited from one another. Define classes with suitable data members (common and special attributes) and methods using C++ program to demonstrate the types of inheritance.

13. (a) (i) Define STL. Explain its key components and types. (5)

(ii) Write C++ code using function template to sort the items of an array. (8)

Or

(b) (i) Write C++ file handling routine to copy one content of file into another file. (7)

(ii) Explain the use of exception handling in C++ with suitable example. (6)

14. (a) (i) Merge the given Binomial heaps. Write procedure for merge operation. (5+3)
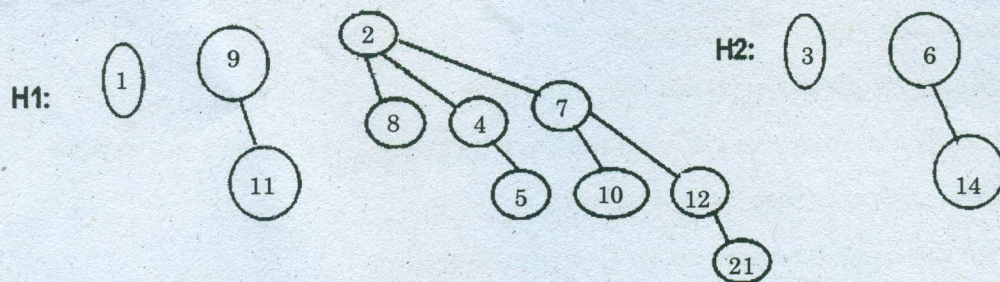
(ii) Delete three elements from the merged Binomial Queue. (5)

Or

(b) (i) Draw B-tree of order m = 5 for the keys
{K, O, S, V, M, F, B, G, T, U, W}. (6)

(ii) Delete the keys K and G in order. (4)

(iii) Justify the number of splits needed for insert/delete with proper reasons. (3)

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15. (a) Consider the following graph. Determine the shortest distance to all other nodes using Dijikstra's algorithm. Write Procedure. (10+3)
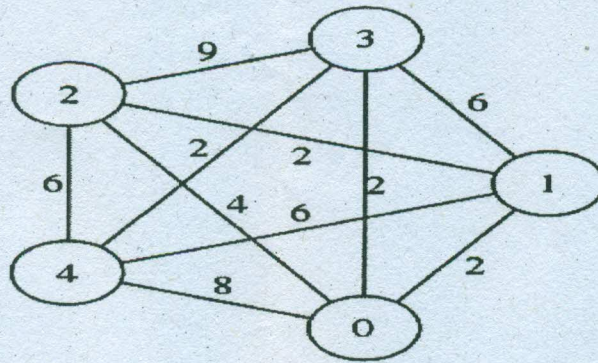
Or

(b) Determine the minimum spanning tree of a given Graph using Kruskal's algorithm. Write Kruskal's MST algorithm. (10+3)
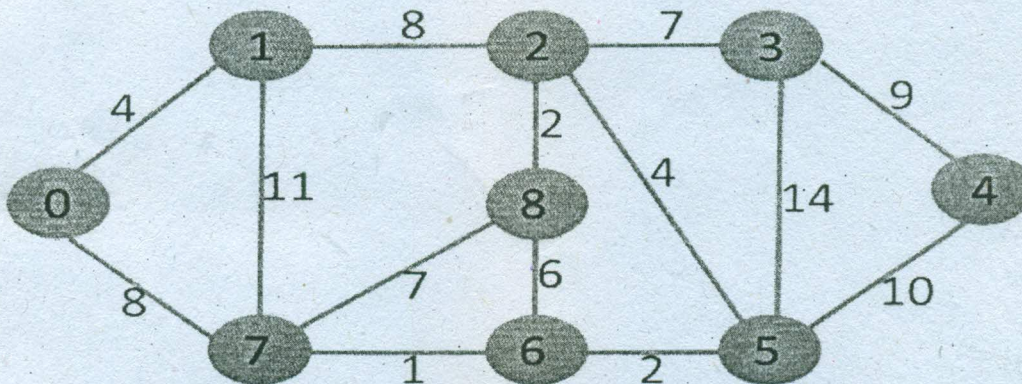
PART C — (1 × 15 = 15 marks)

16. (a) Assume the following keys form the Binary Search tree {50, 30, 60, 40, 35, 80, 90}. Analyze the time complexity involved in searching the keys 90 and then 80, when the given BST is converted into AVL or Splay tree. Identify the suitable tree data structure for representing this data and justify your answer with valid reasons.

Or

(b) The Manager class is derived from Employee class. Use C++ virtual function to calculate salary of Employee/Manager class. Increments for employees differ based on their category. Assume suitable common and special attributes for the classes. Implement this scenario using C++ code to calculate the monthly and annual payment of each employee category.