

B.E/B.Tech DEGREE EXAMINATION, NOV/DEC 2012
ELECTRONICS AND COMMUNICATION ENGINEERING
THIRD SEMESTER

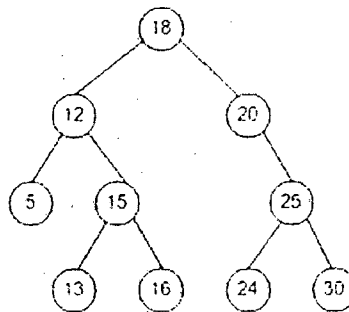
CS9211 DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING IN C++

Time: Three Hours

Maximum: 100 Marks

PART-A (10 X 2 = 20 Marks)

1. When is a friend function compulsory? Give example.
2. Give the use of the following terms in C++ : Static, Const , New
3. List the various types of inheritance.
4. How do you handle Exceptions? Give example.
5. Write a routine and give the necessary conditions for insertion in a Circular Queue (array implementation).
6. What is Doubly Link list? Give its advantage.
7. What is Bi-connectivity?
8. Access 16 in the following SPLAY tree.



9. What is Dynamic programming?
10. What is Indirect sorting? And when do you use this?

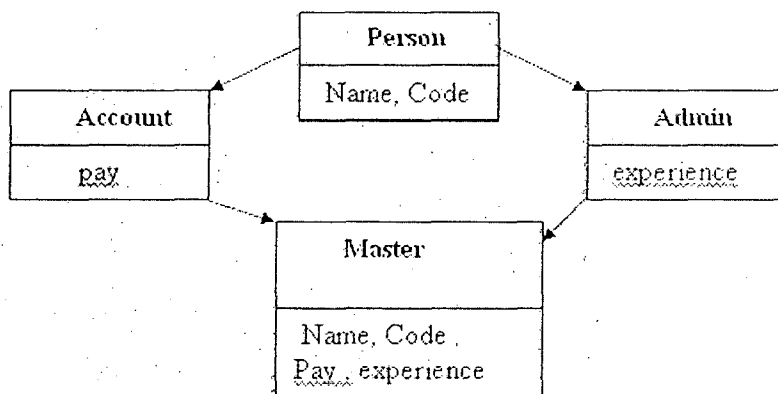
PART-B (5 X 16 = 80 Marks)

11. Define a Class Time (Hrs and Mins) as a user defined type. Write a the program to test your class to see that it does the following tasks
 - a. Initialize the members of the class Time i.e. Hrs and Mins using all the type of constructors. (6)
 - b. Write a code to perform the following type conversion (4)
Time T1 (3, 50);

int duration = T1; // duration is total mins of T1

- c. Write a code to overload the following $T1=T2+T3$ using friend function (T1,T2 and T3 are Time objects) (6)

12. a) i) Consider the following class hierarchy. The class master derives information from both account and admin classes which in turn derive information from the class person. Define all the four classes. What will be the problem in this class hierarchy and how do you solve it. Also write a program to create, update and display the information contained in master objects.



- ii) Two files DATA1 and DATA2 contain sorted list of integers. Write a program to produce a third file DATA which holds a single sorted, merge list of these two lists.

(OR)

- b) i) Write a class template to represent a generic vector. Include the member functions to perform the following tasks: (8)

- To create the vector
- Find the minimum element and return that element.
- Write a function template for swap. Sort the elements using swap function.

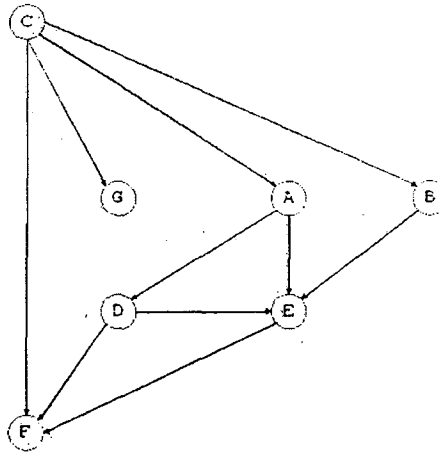
- ii) How do you achieve Runtime Polymorphism? With example code explain runtime polymorphism. (8)

13. a) i) Write a routine for insertion and deletion in a Queue. Check for necessary condition before doing the operation. (8)

- ii) Given Input {4371, 1323, 6173, 4199, 4121, 4344; 9679} and a hash function $h(x) = X \bmod 10$, show the resulting : (8)
- Open addressing hash table using linear probing (4)
 - Open addressing hash table using quadratic probing (4)

(OR)

- b) i) Create a min heap using the following elements: 10, 12, 1, 14, 6, 5, 8, 15, 3, 9, 7, 4, 2. Also perform delete min operation twice in the above min heap and show the resultant heap. (8)
- ii) Convert the following infix expression to postfix expression and also evaluate the expression using stack. $3 + 5 * 4 + 2 * 7$ (8)
14. a) i) Write routines to implement the following basic binary search tree operations. (10)
- Insertion (3)
 - Deletion (3)
 - Show the result of inserting 2, 1, 4, 5, 9, 3, 6, 8, 7 into an empty binary search tree. (4)
- ii) Show the result of applying topological sort to the following graph (6)

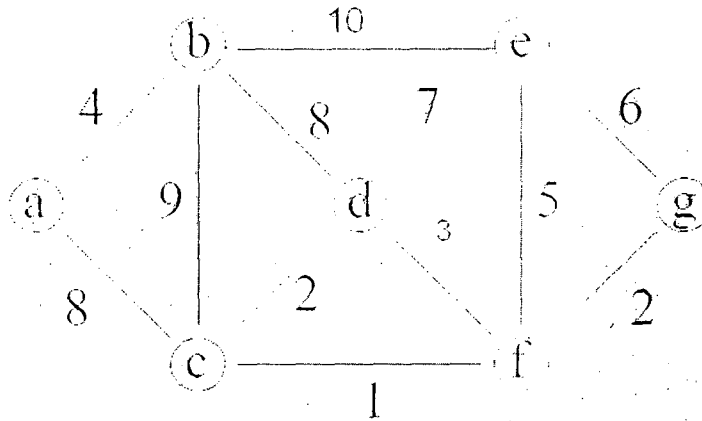


(OR)

- b) i) Insert the following elements in the initially empty AVL tree and how do you balance the tree after each element insertion? (6)

Elements – 3, 5, 4, 6, 9, 7, 8, 2, 1, 12, 10

- ii) Write a routine to find minimum spanning tree (Prim's/ Kruskal's) in a graph.
 Find the minimum spanning tree in the following undirected graph (Show the result of each stage) (10)



15. a) i) What is divide and conquer technique? Write a routine and explain how the divide and conquer technique used in merge sort. (10)
- ii) Show the result of running shellsort on the input 10,12,9,8,7,6, 11, 5, 3, 4, 2, 1 using the increments {6, 3, 1} (6)

(OR)

- b) i) Write a routine and explain the quick sort algorithm with example. (10)
- ii) Sort the sequence 3, 8, 5, 2, 9, 4, 1, 6, 7 using Insertion sort. (6)