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B.E / B.Tech (Full Time) ARREAR EXAMINATIONS, APRIL / MAY 2013

ELECTRONICS AND COMMUNICATION ENGINEERING

Third Semester

CS9211 Data Structures and Object Oriented Programming in C++

(Regulation 2008)

14

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Define inline function. What is the advantage of using them?
2. What is a static data member? Give a scenario in which it is required.
3. When and how do we make a class virtual?
4. What are exceptions? How are they handled in C++?
5. List the advantages of linked list over array implementation of list.
6. Show the result of inserting keys {89, 18, 49, 58, 69} into a hash table of size 10 using quadratic probing as the collision resolution method.
7. What is the basic idea of splay tree?
8. What is topological sort? Give an application of topological sort.
9. What is the principle of dynamic programming?
10. Give two methods for choosing the pivot element.

Part – B (5 x 16 = 80 marks)

11. (i) Give the algorithm for merge sort and illustrate with an example. (8)
(ii) Explain the principle of greedy algorithm with an example. (8)

12. a) Write an application in C++ for matrix addition and subtraction. Use the following C++ features:
Use constructors for initializing the matrix objects, operator overloading member function for matrix addition, non-member function for matrix subtraction whose arguments are two matrix objects (16)

OR

- b) Define two classes, polar and rectangle to represent points in the polar and rectangular coordinate systems and write a main function to test the following functions.
Use conversion routines to convert from one system to the other, overloaded + operator to add two objects of polar. (16)

13. a) Write a C++ application for the class network shown in figure 13 (a):

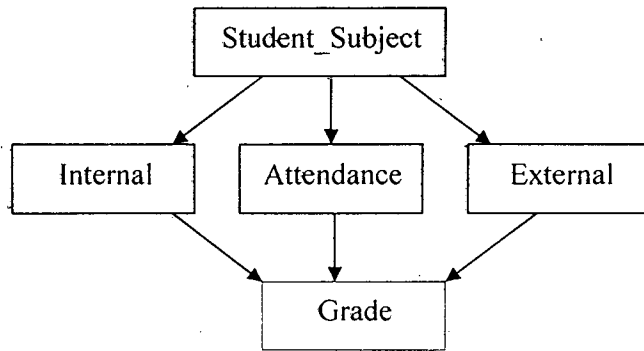


Figure 13 (a)

Compute the grades for 3 subjects and -GPA. (Assumption: Weightage for Internal, Attendance and External are 45, 5 and 50 respectively.) Inputs are student details, subject id, % of attendance, % of marks obtained for each subject in Internal and external. (16)

OR

- b) Write a class template to represent a vector. Include member functions to perform the following tasks and write a main function to test all the functions: To create the vector, modify the value of a given element, multiply by a scalar value, add two vectors. (16)

14. a) (i) Write the pseudocode for various operations on stack ADT. (8)

(ii) Show the result of inserting the following set of numbers into an initially empty minheap: 142, 543, 123, 65, 453, 879, 572. Also, show the result of first deletion. (8)

OR

- b) (i) Write the pseudocode for various operations on queue ADT. (8)

(ii) Write the algorithm for evaluation of postfix expression. Illustrate with an example. (8)

15. a) Explain the concept of AVL tree and show the result of inserting the following elements into an initially empty AVL tree: 2, 1, 4, 5, 9, 3, 6, 7. Show the result of deleting 5. (16)

OR

- b) Find a minimum spanning tree for the graph shown in figure 15 (b) using Prim's algorithm. (16)

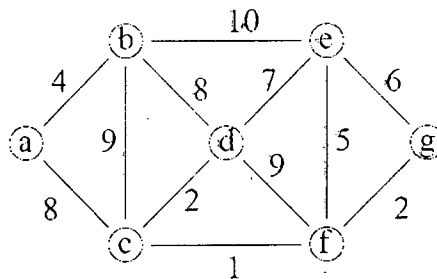


Figure 15 (b)