G - 1077 (Pages : 03) COMP 4-6 (RC)

[Total No. of Questions : 8]

S.E. (Comp.) (Semester - IV) Examination, May/June 2011
OBJECT ORIENTED PROGRAMMING AND DESIGN USING C++

Duration : 3 Hours **Total Marks : 100**

Instructions : *1) Assume suitable data if necessary.*
2) Answer any five questions attempt at least one question from each Module.
3) Draw neat diagrams if required.
4) Write question numbers legibly while answering.
5) Only concentrate on main logic required in the program rather than completeness of the program.

MODULE - I

Q1) a) Create a class INTEGER that contains the one integer data member. Overload all the four arithmetic operators so that they operate on the objects of INTEGER. **[10]**

b) Create an abstract base class shape with two members base and height, a member function for initialization and a pure virtual function to compute area ( ). Derive two specific classes Triangle and Rectangle which override the function area ( ). Use these classes in a main function and display the area of a triangle and a rectangle. **[10]**

Q2) a) Assume that a bank maintains two kinds of accounts for customers. One called as savings account and the other as current account. The savings account provides compound interest and withdrawal facility but no cheque book facility . The current account provides cheque book but no interest. Current account holders should also minimum balance and if the balance falls below this level a service charge is imposed.

Create a class account that stores customer name , account number and type of account. From this derive the classes current_account and savings_account to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks:

i) Accept deposit from a customer and update the balance
ii) Display the balance
iii) Compute and deposit interest.
iv) Permit withdrawal and update the balance
v) Check for minimum balance, impose penalty, if necessary, and update the balance.

Do not use any constructors. Use member functions to initialize the class members. **[14]**

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b) Create a class hierarchy for the Worker and Supervisor using C++. The Worker class should include details like worker ID, Name, address of the worker, department ID and Supervisor ID. The classes should have necessary functions to input the required information and a polymorphic function to print the details of the workers or supervisors. For the worker's this print function should output the worker ID, Name and Supervisor ID. Whereas for the supervisor's this function should output the Name and department ID of the supervisor. Please note that a supervisor is also a worker. Make and state suitable assumptions, if any. **[6]**

MODULE - II

Q3) a) Write a program that reads a text file and creates another file that is identical except that every sequence of consecutive blank spaces is replaced by a sing space. Also explain briefly about opening files using different methods. **[10]**

b) Write a program which reads a text from a file and displays the following information on the screen in three columns.

i) Numbers of lines

ii) Number of words

iii) No of characters. **[10]**

Q4) a) How is a exception handling performed in C++? Write a program that throws an arithmetic exception as and when a number input is greater than 9999. **[8]**

b) Write a C++ template function, called exchange ( ) that accepts two arguments of generic type and swaps their contents. **[6]**

c) Explain the concept of Stack Unwinding incase of exception handling with appropriate example program. **[6]**

MODULE - III

Q5) a) A palindrome is a word or group of words that read the same forward and backward. For example "madam" or "wow." Write a program that takes a string object from keyboard and, using the member functions defined standard C++ library string class, to determine whether the string was a palindrome or not. **[10]**

b) Define using STL , a vector v with a maximum size of 10.

i) Sets the first element to of v to 100

ii) Sets the last element of to 200

iii) Sets the other elements to 10

iv) Displays the contents of v. **[10]**

Q6) a) What is an algorithm? How STL algorithms are different from the conventional algorithms? **[6]**

b) Distinguish between the following :

i) Lists and vectors

ii) Sets and maps

iii) Maps and multimaps

iv) Queue and deque

v) Arrays and vectors **[8]**

c) Compare the performance characteristics of the three sequence containers. **[6]**

MODULE - IV

Q7) a) Explain the following with reference to the class diagram

i) Specialization

ii) Generalization

iii) Multiplicity

iv) Relationships

With appropriate example you know. **[10]**

b) What are USE CASES? Who are stakeholders of these diagrams? Explain with sample application you know. **[10]**

Q8) a) What are different ways be which UML diagrams used in the software development process? **[10]**

b) Explain the purpose of the following diagrams **[10]**

i) Deployment diagrams

ii) Package diagrams

iii) Interaction diagrams

iv) State chart diagrams

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