THE OPEN UNIVERSITY OF SRI LANKA
B.Sc DEGREE PROGRAM : LEVEL 05
FINAL EXAMINATION 2007/2008
CSU 3279 – OBJECT ORIENTED PROGRAMMING – Paper II
DURATION : Two and Half hours

Date: 18/01/2008   Time: 9.30 am – 12.00 noon

Answer **Four** Questions Only.

(01) a) What do you mean by overloading constructors in a class? What types of overloading are you aware of? Discuss using function prototypes.

b) Define a default constructor to a class Called Car and overload it with direction and speed.

c) Define appropriate methods to select and modify (get and set) the attributes in the car class.

d) Using methods defined in b) and c) complete the Car class so that one can enter values of the attributes through the keyboard and print the current state of an instance of the Car class.

(02) A typical University consists of staff of **Academic, Administrative** and **Minor Staff**. An information system for the University is sought to be set up. For all the staff members their **name, age, department attached to,** and **date of the appointment** is stored. Apart from that, academics have their **highest degree** recorded and the administrative staff has information whether they are **language proficient** or not. Minor staff category has his or her **employment history** and the **number of hours** each employee worked as **overtime**.

a) Give a suitable classification (i.e. inheritance) hierarchy to represent the above information.

b) Write down suitable class definitions for the classification hierarchy defined in part a). They should consist methods to initialize and display information.

c) Write a driver program to initialize, and test the classes you defined in part b).

(03) (i). When do we use the **protected** visibility specifier to a class member?
           Give a suitable example,

      (ii) Consider the following class definitions (attributes only)

Class book   Class magazine
{   {
private: private:
        char title[30];   char title[30];
        char author[3 0];   char editor[3 0];
        char publisher[30];   char publisher[30];
        char ISBN[20];   };
        };

   (a). Using generalization, put them into an appropriate classification (inheritence)
         hierarchy so that they both inherit from a common base class.

   (b) Show how user defined constructor could be used for the above classes and give their
        implementation.

04). (a) Discuss the role of inheritance in object-oriented programming.

   (b) What is public and private derivation?

   (c) Consider the following:
        Al is a base class containing public member data **vall** and **val2**. **Bl** inherits class
        Al as public.

      (i) Implement a constructor for class **Al** to initialize the values of **vall** and
           val2.

      (ii) Can the values of **vall** and **val2** be accessed in the derived class? Justify
            your answer.

      (iii) Can the values **vall** and **val2** be updated via the interface of the base and
             derived classes? Justify your answer.

(iv) How would you modify these classes so that **val1** and **val2** cannot be updated via the interface of the base and derived classes but still be accessed in the derived class.

Note: You may assume a suitable data type for **val1 and val2.**

05) (i) explain the concept of friend functions.

(ii) There are two classes, **professor** and **consultancy.** The class **professor** has private member data **name, institute, salary** and two public member functions **insert** and **display.** The class **consultancy** has private member data **type** and **salary** (i.e. consultancy fee) and two public member functions **insert** and **display.** The member function **insert** initializes the member data and the member function **display** prints out the details of the member data. Both classes have another public member function called **total.** The purpose of **total** is to find the sum of the salary earned as a **professor** and as a **consultant.** Using friend function define suitable C++ classes for **professor** and **consultancy.** Give the implementation of the functions.

06). (i) Explain the concept of inline functions with examples. Explain the advantages and disadvantages of using inline functions.

(ii) What do you mean by operator overloading? Give a suitable example.

(iii) What is the purpose of *this* pointer?

(iv) Discuss two ways of qualifying a pointer with **const.**

(v) What is the purpose of the *new* and *delete* operators?

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