



EASTERN UNIVERSITY, SRI LANKA

FIRST YEAR SECOND SEMESTER EXAMINATION IN SCIENCE (2005/2006& 2006/2007)

(MARCH/ APRIL, 2008)

CS 104 – OBJECT ORIENTED PROGRAMMING TECHNIQUES

(REPEAT)

Answer all Questions

Time: 01 Hour

Question- 01

(I)

Considering the following class definition and answer the questions given below :

```
class University
{
    int NOC ;           // Number of Colleges
protected :
    char Uname[25] ;   // University Name
public :
    University( ) ;
    char State[25] ;
    void EnterData( ) ;
    void DisplayData( ) ;
}

class College : public University
{
    int NOD ;           // Number of Departments
    char Uname[25] ;   // College Name
protected :
    void Affiliation( ) ;
public :
    College( ) ;
    void Enrol (int, int) ;
    void Show( ) ;
}

Class Department : public College
{
    char Dname[25] ;   // Department
    int Nof ;          // No of facult members
public :
    Department( ) ;
    void Display( ) ;
    void Input( ) ;
}
```

(i) Which class's constructor will be called first at the time of declaration of an object of class Department?

(ii) Name the member function(s), which are accessed from the object(s) of class Department.

(iii) Name the data member(s), which are accessible from the object(s) of class College.

(II)

(i) Define *Polymorphism* in C++. Explain early binding, late binding in *Polymorphism*.

(ii) Explain early function overloading, operator overloading in *Polymorphism*

(iii) Considering the following specifications :

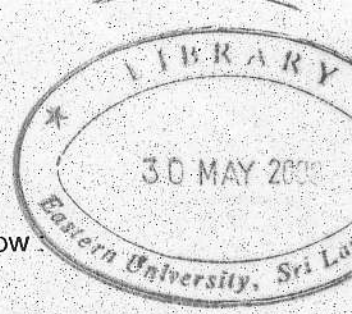
Class Name	Data	Type	Size
Name	first	array of character	40
	mid	array of character	40
	last	array of character	60
Phone	area	array of character	4
	exch	array of character	4
	numb	array of character	6

Class Name	Data	Type
P_rec	name	Name
	phone	Phone

(a) Declare classes in C++ for Name and Phone.

(b) Declare a class for P_rec.

(c) Define the constructor (outside the class P_rec) that gathers information from the user for the above two classes Name and Phone.



(III)

Consider the following class declaration and answer the questions below.

```
class SmallObj
{
    private :
        int some,
        more ;
        void err_1( ) {cout << "error" ; }
    public :
        void Xdata(int d) {some = d ; more = d++ ; }
        void Ydata( ) {cout << some << " " << more ; }
};
```

- (i) Write the name that specifies the above class.
- (ii) Write the data of the class with their access scope.
- (iii) Write all member functions of the class along with their access scope.
- (iv) Indicate the member function of the SmallObj that sets data.

Question- 02

(a)

- (i) What is a class? How does it accomplish data hiding?
- (ii) What are objects? How are they created?
- (iii) How do you define member function of a class?
- (iv) How do we invoke a constructor function?
- (v) What is the parameterized constructor?
- (vi) Can we have more than one constructor in a class?
If yes, explain the need for such a situation.
- (vii) What does it mean by *inheritance* in object – oriented environment?
Explain multilevel and multiple *inheritances*.
- (viii) Give a table showing the access modes of inherited members of a subclass depending on their access modes in the base class and their corresponding mode of inheritance.

An educational institution offers several basic courses. It also offers some special courses with project components. Design a base class **course** with the private or protected data members for `course_number`, `course_name`, `duration` and `staff_in_charge`. Also design the sub class named **special** with some additional private data members for `project duration` and `supervisor`.

At least the following public methods are to be included in the design :

- ⇒ Constructors for both classes
- ⇒ Destructors for both classes
- ⇒ An integer function to return the total duration for both classes
- ⇒ A void function to display the details of both classes.

Write a *main* program to test the above problem.