

Programming Paradigms Lab Assignment (CS453)

Assignment Sheet 5 : Inheritance and Polymorphism using C++

Time : Two weeks

Develop the below mentioned programs using these concepts wherever applicable -

- Any C++ concepts as mentioned in Assignment Sheet 4
- Inheritance
- Polymorphism

Problems

1. Complete the classes below with suitable data members and methods. In client program take instance of these classes and demonstrate various functionality of these objects.

```
Class Vehicle {  
    private :  
        // Price  
        // Manufacturer  
    public :  
        // Default constructor  
        // Parametrized constructor  
        // Copy constructor  
        // Assignment operator  
        // Read data  
        // Display data  
};
```

```

Class Car : public Vehicle {
    private :
        // Color
        // NumberOfSeats
        // Model
    public :
        // Default constructor
        // Parametrized constructor
        // Copy constructor
        // Assignment operator
        // Read data
        // Display data
};

```

2. Write a program to design Classes for Student, Clerk, Professor. Each of these Classes should contain below mentioned attributes. Make sure proper class hierarchy is designed following the principle of inheritance.

Provide a mechanism to display the profile/detail of various kind of Object of these class.

Student : Name, Age, Gender, Dept, Year

Clerk : Name, Age, Gender, WorkLoad, Salary

Professor : Name, Age, Gender, Dept, CourseLoad, Salary

3. A plot is broken into different geometric shapes like Triangle, Rectangle and Circle of different size of arbitrary number. Provide a mechanism to sum up total area covered by these shapes.

Once problem 1, 2 and 3 are completed, then attempt problem 4.

4. Reuse the code from program # 3 above and implement below program -

Design a class ShapeStack that can store various kinds of geometric shapes like Triangle, Rectangle and Circle. Make sure Push(...) and Pop(...) operations are not overloaded (such as single interface per operation). Also provide Display(...) and TotalAreaCovered(...) method under ShapeStack class.