Lab Acitivity 7 —Implementation and UML Modeling

Objectives:

Simple case studies would be discussed and their codes would be implemented to clarify the concepts of Inheritance, Association, Aggregation and Composition

Examples:

1. A person, identified by a unique social security number and a surname, can own at most one vehicle at any given time. A vehicle is given a maker's name and a registration number. In addition a person must also be able to disown a vehicle and should be able to display details of any vehicle owned. Show how a person could own a vehicle, display its details then disown it. Similarly show how the same person could own a replacement vehicle and then display its details.

2. A country has many cities. Each city has a name and a population, while a country has a name and a capital city. It is a requirement that a country should display,on request, its capital city through the operation displayCapital as well as the names of all its cities through the operation displayCities. In addition, it should display the total population of the country through the operation displayTotalPopulation, and the average city population through the operation displayAveragePopulation.Model this system showing how the capital city, the names of the cities and the average city population of a country could be ascertained.

3. A teaching block consists of several rooms each with a unique room number and specified seating capacity. Rooms may be booked on a particular day for lectures. Each booking must start on the hour and can be of any duration. It must be possible to book a room in the teaching block if it is free and generate a display of the status of each room in the teaching block for a particular day.Construct a model showing how a room in the teaching block could be booked.

Practice:

A computer game consists of several players who compete with each other to build a beetle. A complete -beetle has two antennae, a head, a neck, a body, six legs and a tail. When a player's beetle is complete that player's name is displayed and he leaves the game. The game continues until each player's beetle is completed.
The rules of the game are that a beetle:
• cannot have an antennae unless it has a head
• cannot have a head unless it has a neck
• cannot have a neck until it has a body
• cannot have a leg unless it has a body and
• cannot have a tail until it has a body

During the game, each player takes it in turn to be given a random number representing the throw of a die with which to construct his beetle. An integer in the range 1 to 6 represents an antennae, head, neck, body, leg and tail respectively. There should also be a display of the configuration of a player's beetle before and after his turn. Construct a model for the game.

---------- The End ☺----------