**44-542 Object Oriented Programming**

**Inheritance and Polymorphism KEY**

1. Suppose we have the following classes with the relationships described.
   1. **Person**
   2. **Employee** extends **Person**
   3. **Student** extends **Person**
   4. **Professor** extends **Employee**
   5. **Classroom**

Draw a UML diagram representing these classes and relationships. Include the **Object** class in the hierarchy.

**SOLUTION**



2) Identify any illegal statements below, and explain why each one is illegal.

**Person person1 = new Person(); //OK**

**Employee emp1 = new Employee(); //OK**

**Student stu1 = new Student(); //OK**

**Professor prof1 = new Professor(); //OK**

**Classroom class1 = new Classroom(); // OK**

**Object obj1 = new Object(); // OK**

**emp1 = stu1; // A student may not be an employee**

**person1 = emp1; // OK**

**emp1 = person1; // A person may not be an employee**

**emp1 = prof1; // OK**

**prof1 = emp1; // An employee may not be an professor**

**obj1 = class1; // OK**

**class1 = obj1; // An object may not be a classroom**

**person1 = stu1; // OK**

**stu1 = person1; //A person may not be a student**

**Person person2 = new Employee(); // OK**

**Employee emp2 = new Person(); // A person may not be an employee**

**Professor prof2 = new Object(); // An object may not be a professor**

**Object obj2 = new Professor(); // OK**