NMK20703 OBJECT ORIENTED PROGRAMMING LAB MODULE 5

INHERITANCE

FACULTY OF ELECTRONIC ENGINEERING TECHNOLOGY

Universiti Malaysia Perlis

TASK 1
Question
1. Mark the following statements as TRUE or FALSE.
   a. The constructor of a subclass specifies a call to the constructor of the superclass in the heading of the constructor's definition.

   b. The constructor of a subclass specifies a call to the constructor of the superclass using the name of the class.

   c. A subclass must define a constructor.

   d. In Java, polymorphism is implemented using late binding.

2. Draw a class hierarchy in which several classes are subclasses of a single superclass.

3. Identify the superclass and the subclass in each of the following pairs of classes.
   a. Employee, Person

   b. Vehicle, Truck

   c. Circle, Cylinder

   d. BankAccount, SavingAccount

   e. GradStudent, Student

   f. Dog, Animal

4. Draw the inheritance hierarchy diagram that shows the inheritance relationship between the classes Person, Student, Employee and Instructor.

TASK 2
Question

a. A point in the x-y plane is represented by its x-coordinate and y-coordinate. Design the **class** Point that can store and process a point in the x-y plane. You should then perform operations on a point, such as setting the coordinates of the point, printing the coordinates of the point, returning the x-coordinate, and returning the y-coordinate. Also, write a test program to test various operations on a point.

b. Every circle has a center and a radius. Given the radius, we can determine the circle's area and circumference. Given the center, we can determine its position in x-y plane. The center of a circle is a point in the x-y plane. Design the **class** Circle that can store the radius and center of the circle. Because the center is a point in the x-y plane and you designed the class to capture the properties of a point in Task 2 (a) above, you must derive the **class** Circle from the **class** Point. You should be able to perform the usual operations on a circle, such as setting the radius, printing the radius, calculating and printing the area and circumference and carrying out the usual operations on the center.

c. Every cylinder has a base and height, where the base is a circle. Design the **class** Cylinder that can capture the properties of a cylinder and perform the usual operations on a cylinder. Derive this class from the **class** Circle designed in Task 2 (b) above. Some of the operations that can be performed on a cylinder are as follows, calculate and print the volume, calculate and print the surface area, set the height, set the radius of the base, and set the center of the base.