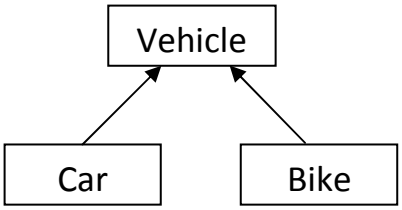
Unit 5 – WS03 Method Overriding and Polymorphism

Name: _____

The goal of this assignment is to begin to build your set of classes that represents the following inheritance hierarchy:



Problem #1 – Create 4 new classes: one called Vehicle, one called Car, one called Bike, and one called vehicleMain.

Problem #2 – Build the superclass Vehicle. It should have one instance variable speed that tracks the vehicle's speed and is set to zero when when a Vehicle object is created (referring to the constructor method).

Problem #3 – Add three more methods to the Vehicle class using the following as a guideline:

on( ) … displays that the vehicle is running.
off( ) … displays that the vehicle is now off.
getSpeed( ) … returns the current vehicle speed.

Problem #4 – Edit the Car class so that it inherits the Vehicle class and adds three more instance variables: year (to track the year the car was made), make (who makes the car), and model (type of car).

Problem #5 – The Car class should have a constructor method that retrieves the superclass instance variable(s) and requires three parameters (year, make, and model) when constructing a car.

Problem #6 – Add three more methods to the Car class using the following as a guideline:

speedUp( ) … adds 8 to the speed of the car.
slowDown( ) … subtracts 11 from the speed.
… do not allow negative speed.
getVehicle( ) … prints vehicle year, make, model

Problem #7 – Make the Bike class a subclass and give it a new instance variable type. The Bike constructor method should call the superclass instance variable(s) and should require a parameter to determine the type of the Bike object upon creation.

Problem #8 – Add 5 more methods to the Bike class:

speedUp( ) … adds 3 to the speed of the bike.
slowDown( ) … subtracts 5 from the speed.
getVehicle( ) … displays the type of bike.
on( ) … overrides superclass, displays bike ready
off( ) … overrides superclass, displays not ready

Problem #9 – Edit your classes so the vehicleMain code below yields the exact output shown after the code:

```
public class vehicleMain {
  public static void main(String[] args) {
    Vehicle thisThing = new Vehicle();
    thisThing.on();
    System.out.println("Speed is: "+thisThing.getSpeed());
    thisThing.off();
    System.out.println("\n");
    Car car1 = new Car(2014,"Toyota","Carolla");
    car1.on();
    System.out.println("Speed is: "+car1.getSpeed());
    for(int i=1;i<=5;i++)
    car1.speedUp();
    System.out.println("Speed is: "+car1.getSpeed());
    car1.slowDown();
    System.out.println(car1.getSpeed());
    car1.getVehicle();
    car1.off();
    System.out.println("\n");
    Bike bike1 = new Bike("Mountain");
    bike1.on();
    System.out.println("Speed is: "+bike1.getSpeed());
    bike1.speedUp();
    bike1.speedUp();
    bike1.slowDown();
    System.out.println("Speed is: "+bike1.getSpeed());
    System.out.println("Type of bike: "+bike1.type);
    bike1.off();
  }
}
```

Output:

```
The vehicle is now running...
Speed is: 0
The vehicle is now off...
The vehicle is now running...
Speed is: 0
Speed is: 40
29
A 2014 Toyota Carolla
The vehicle is now off...
On the bike and ready to pedal...
Speed is: 0
Speed is: 1
Type of bike: Mountain
Nobody is on the bike, it can't go...
```