Inheritance---Interface and Polymorphism

50 points

Governments and companies worldwide are becoming increasingly concerned with carbon footprints from buildings burring various types of fuels for heat, vehicles burning fuels for power, and the like. Many scientists blame these greenhouse gases for the phenomenon called global warming. Create three small classes unrelated by inheritance—classes Building, Car and Bicycle.

Write an interface CarbonFootprint with a getCarbonFootprint method. Have each of your classes implement that interface, so that its getCarbonFootprint method calculates an appropriate carbon footprint for that class.

Write an application that creates objects of each of the three classes, places references to those objects in an array, then iterates through the array, polymorphically invoking each object’s getCarbonFootprint method. For each object, print some identifying information and the object’s carbon footprint.

Class Building:

instance variables:

* square feet
* Boolean values for each of these wood, basement, concreate, steel

constant variables

* wood frame = 50
* basement = 20
* concrete = 47
* steel = 17

Method:

* Constructor that accepts all the instance variables
* getCarbonFootprint- outputs the carbon footprint by adding all the constant values who have a true value together and multiplying by square footage:

square footage \* (wood frame + basement + concrete + steel)—assuming all are true

Class Car:

instance variable:

* gallons

constant variable:

* CO2 yields

Method:

* Constructor that accepts gallons
* getCarbonFootprint- outputs the carbon footprint by multiplying gallons by CO2 yields

class Bicycle:

Method:

* getCarbonFootprint- outputs the carbon footprint as 0

interface CarbonFootprint

This will contain a single method header for getCarbonFootprint

CarbonFootprintDriver

* Create an array to store CarbonFootprints of size 3.
* Add one or more of each element to the list
* Output the carbon footprint for each item in the array
* Building conditions are displayed with correct formatting (commas between items, with in front of the first item

Bicycle: 0

Building with 2500 square feet with wood frame, concrete, steel 285,000

Car that has used 10.00 gallons of gas: 200

Building with 1000 square feet with basement 20,000

Car that has used 40.60 gallons of gas: 812

Grading Criteria:

5 points- correct Bicycle class

5 points- correct Car class

5 points- correct Building class

5 points- correct CarbonFootprint Interface

5 points- correct Driver class

10 points- correctly calculates emissions for each class

5 points- correctly uses array

10 points- correctly displays building features with correct formatting