**Homework 5**

### **CMP 326: Programming Methods II**

Lehman College, City University of New York

Fall 2019

In this assignment you will use the classes (**Animal**, **Mammal** and **Dog**) from [Homework 4](https://drive.google.com/open?id=1x-LeS0ngL1gSVmihXXn627pIL4vgSOZqTlQy06OL47Y).

[**Homework 5-1 Textbook Section 10.7**](https://learn.zybooks.com/zybook/CUNYCMP326Fall2019/chapter/10/section/7)

Create a class to represent a **Food** object. Use the description provided below in UML.

Food

* name : String
* calories : int
* Food(String, int) // The only constructor. **Food name** and **calories** must be

// specified

* setName(String) : void // Sets the **name** of the **Food**
* getName() : String // Returns the **name** of the **Food**
* setCalories(int) : void // Sets the **calories** of the **Food**
* getCalories() : int // Returns the **calories** of the **Food**
* toString() : String @Override //see Note1:
* equals(Object) : boolean @Override //see Note2:

**NOTE1:**

**toString()** method returns a String with the following format:

“Food - name: %10s | calories: %4d”

**NOTE2:**

Two instances of Food are equal if, and only if, their names are equal and their calories are equal.

[**Homework 5-2 Textbook Section 10.8**](https://learn.zybooks.com/zybook/CUNYCMP326Fall2019/chapter/10/section/8)

Change the **Animal** class from [**Homework 4-1 Section 9-9**](https://learn.zybooks.com/zybook/LEHMANCUNYCMP326Spring2019/chapter/9/section/9), to an **abstract** class and add the following to it:

Implement the [Eater](http://comet.lehman.cuny.edu/sfakhouri/teaching/cmp/cmp326/s19/hw/hw5/homework5/solution/Eater.html) Interface.

*Animal* // the class becomes an **abstract** class

* caloriesConsumed: int // this field is initialized to zero and will always increase
* caloriesAccumulator: int // this field is initialized to zero and is an accumulator

// that is reset when **metabolizeAccumulatedCalories()**

// (see below)

* getCaloriesConsumed() : int
* setCaloriesConsumed(int) : void
* getCaloriesAccumulator() : int
* setCaloriesAccumulator(int) : void
* *metabolizeAccumulatedCalories() : double* // an **abstract** method that returns a **double**

// representing the amount of weight gained.

// Classes that inherit from Animal will have to implement this method.

// Weight gain is calculated based on the number of accumulated calories

// represented by **caloriesAccumulator**.

// Every Animal uses a different formula for weight gain.

// In addition to returning the amount of weight gained, this method will update

// the Animal’s weight and zero out **caloriesAccumulator**.

Change the **Mammal** class from [**Homework 4-2 Section 9-10**](https://learn.zybooks.com/zybook/LEHMANCUNYCMP326Spring2019/chapter/9/section/10), to an **abstract** class.

[**Homework 5-3 Textbook Section 10.9**](https://learn.zybooks.com/zybook/CUNYCMP326Fall2019/chapter/10/section/9)

Modify the **Dog** class from [**Homework 4-3 Textbook Section 9.11**](https://drive.google.com/open?id=1x-LeS0ngL1gSVmihXXn627pIL4vgSOZqTlQy06OL47Y) as follows:

* Implement the **abstract** method **metabolizeAccumulatedCalories()**. Please note that **DOG**s gain one pound for every 2000 accumulated calories.
* Implement the [Speaker](http://comet.lehman.cuny.edu/sfakhouri/teaching/cmp/cmp326/s19/hw/hw5/homework5/solution/Speaker.html) Interface. **DOG**s say **“woof”**.

[**Homework 5-4 Textbook Section 10.10**](https://learn.zybooks.com/zybook/CUNYCMP326Fall2019/chapter/10/section/10)

Create a class to represent a **Cat** object that inherits from (**extends**) the **Mammal** class. The **Cat** class will:

* Implement the **abstract** method **metabolizeAccumulatedCalories()**. Please note that **Cat**s gain one pound for every 1000 accumulated calories.
* Implement the [Speaker](http://comet.lehman.cuny.edu/sfakhouri/teaching/cmp/cmp326/s19/hw/hw5/homework5/solution/Speaker.html) Interface. **Cat**s say **“meow”**.

[**Homework 5-5 Textbook Section 10.11**](https://learn.zybooks.com/zybook/CUNYCMP326Fall2019/chapter/10/section/11)

Create a class to represent a **Cow** object that inherits from (**extends**) the **Mammal** class. The **Cow** class will:

* Implement the **abstract** method **metabolizeAccumulatedCalories()**. Please note that **Cow**s gain one pound for every 500 accumulated calories.
* Implement the [Speaker](http://comet.lehman.cuny.edu/sfakhouri/teaching/cmp/cmp326/s19/hw/hw5/homework5/solution/Speaker.html) Interface. **Cow**s say **“moo”**.

**This work must be completed in your textbook**  [**ZYBooks -- CMP-326: Programming Methods I**](https://learn.zybooks.com/zybook/CUNYCMP326Fall2019/)**I**

**No other forms of submission will be accepted.**