CSC171 — Homework 5

Objects

The goal of this assignment is to give you experience with object-oriented programming: designing and using classes that represent real-world objects.

For the following questions, "define a class" means the following:

- Create an appropriately-named file containing the Java `class` definition, including the following:
  - A block comment describing the file (and hence the class), as always
  - Any instance variables, as required by the question
  - Accessor (getter) and mutator (setter) methods for any instance variables
  - Constructors as appropriate or as required by the question
  - A `toString` method that prints instances of the class informatively
  - Any additional methods as required by the question. All methods other than getters and setters MUST have a descriptive comment before their definition.
- Create a separate appropriately-named file containing a different Java class with a `main` method that tests your new class by doing the following:
  - Create at least two instances of the class.
  - Change at least one of them using the class' methods.
  - Print all the objects informatively

If you prefer, you may write one class with a `main` method to test all the classes defined in this homework. In fact, your TAs would probably appreciate it since it's easier to test. Just make sure it's clear what's going on (good comments in code, good content in output).

As always, be sure to document how to run your code and interpret the output in your README.txt file.

Questions

1. Define a class `Person` that represents a person. People have a name, an age, and a phone number. Since people always have a name and an age, your class should have a constructor that has those as parameters.

2. Define a class representing physical elements (like hydrogen, helium, lithium, etc.). Elements have a name, a symbol, an integer atomic number, and an atomic weight (which may be fractional). Your class should have a constructor that sets all the properties. In your test program, create and print several real elements using the real values for their properties.

3. Pick an animal and define a class to represent it. You class must have at least two instance variables and at least one method other than the getters and setters. Think of something that your type of animal does, that may or may not use and/or change the instance variables. Be creative. Document your method with a clear comment.

4. Define a class to represent a baseball player. If you don't know the game of baseball, don't worry—you can look it up at Wikipedia. For this question, baseball players will have played in some number of games, during which they will have had some number of at bats, made some number of hits, and scored some number of runs. Your class should include methods that compute and return a player's batting average (hits per at bat) and runs per game. Your test program should show these methods in use (with informative output).

Grading Scheme

Equal weight for each part.

Doesn't compile or is trivial	$< 50\%$
Compiles and is non-trivial	$\geq 50\%$
Complete and correct with good style and comments	100%
Incomplete, incorrect, bad style, no comments	$< 100\%$

Submission Requirements

Your submission **MUST** include a file named "`README.txt`" with your name, your NetID, the assignment number, and your lab section. This file should explain anything we need to know

about how to build and run your project. In particular, be sure to explain how to run what parts of your submission for each question in the assignment.

Submit your solution as a single ZIP archive to BlackBoard before the deadline.

Late homeworks will not be graded and will receive a grade of 0.

All assignments and activities associated with this course must be performed in accordance with the University of Rochester's Academic Honesty Policy.