Weeks 5-6 Lab Part 1

Do a Class Creation exercise plus Chapter 5 Practice Programs **2**
(a *Counter* class) and **4** (a *Trivia* class); for extra credit, do Chapter 5 Practice Program **5** (a *Beer* class).

Start with any existing program you like or create these from scratch:

Create a class of your own and use a test program to try it out

- Pick any class you want to create, but <u>not</u> a Person class.
- The class you pick should have <u>at least 3 instance variables</u>, not all of the same type (that is, not all *int* or *double* or *String*, but a <u>mixture</u>)
- Download **Person.java**, edit it in Atom (or whatever), and save it as *NewClassname*.java, then change the class name to your new name and create all of the *private* instance variables you chose
- <u>Modify</u> the *readInput()* and *writeOutput()* methods in the class to set and print out the instance variables as appropriate
- Now download **TestPerson.java from the Chapter 5 Source Code** folder, edit it in Atom, save it as *TestNewClassname*.java, change the class name to match, and modify it to create an object from your new class and to call only that object's *readInput()* and *writeOutput()* methods
- Finally, use **javac** and **java** to compile and run that demo program

2. (*Counter class*) Define a class called *Counter*.
   <u>An object of this class is used to count things</u>, so it records a count that is a <u>nonnegative whole number</u>. Include methods to <u>set the counter to 0</u>, to <u>increase the count by 1</u>, and to <u>decrease the count by 1</u>. **Be sure that no method allows the value of the counter to become negative.**

   Also include an *accessor* method that <u>returns the current count value</u>, and a method that <u>displays the count on the screen</u>.
   Do <u>not</u> define input or *mutator* methods. <u>The only method that directly sets the counter is the one that sets it to zero.</u>

   Also write a separate program to test your class definition.

   Hint: **You need only one instance variable, *private int count*.**

4. (*Trivia class*) Define and test a *Trivia* class:
   Define a *Trivia* class that contains information about a <u>single trivia question</u>. **The question and answer should be defined as instance variables of type *String*.**

   Create *accessor* and *mutator* methods. In your *main()* method <u>create two Trivia objects with questions and answers of your choice</u>. Then for each Trivia object have your program ask the question (print it using its *accessor*), read an answer, compare that answer to the actual answer (using <u>its</u> *accessor*), and tell the user if their answer was correct or incorrect.
   Hint*: use String's *compareToIgnoreCase* or *equalsIgnoreCase

   Your *main()* method can either be in the *Trivia* class or in a separate test program.

5. (*Beer class* – **extra credit**) Create and test a *Beer* class:
   Define a *Beer* class that contains the following instance variables, <u>both having accessors and mutators</u> (getters and setters):

   ```
   String name; // the beer's name and
   double alcohol; // the alcohol %, eg, .05 for 5%
   ```

   Also add the following method to calculate the number of 12 ounce drinks of beer required for a person of a given weight to become intoxicated at .08 blood alcohol – this is the <u>only</u> method needed beyond the getters and setters:

   ```
   public double intoxicated(double weight)
   {
       double numDrinks;
       // this is a simplification of the
       // Widmark formula
       numDrinks = (0.08 + 0.015) * weight /
                       (12 * 7.5 * alcohol);
       return numDrinks;
   }
   ```

   Write code in a *main* method that <u>creates two *Beer* objects with different alcohol percentages</u>. For each *Beer* object, invoke (call) the *intoxicated()* method for a <u>light individual</u> and a <u>heavy individual</u> and print the estimated number of drinks for them to become legally intoxicated. <u>Light</u> could be 110 pounds, <u>heavy</u> could be 250 pounds.

Show me how you have completed these exercises.