CSC220 Lab 3
Inheritance

The goal of this week's lab is:

1. Practice the concept of inheritance

2. Start using JavaDoc.

Things you must do:

1. There are many details in this lab. Make sure you read and follow this instruction carefully and do things in order.

2. Always remember Java is case sensitive.

3. You must use file names, class names, package names as instructed.

4. You must include all the functions you have written during the lab when you are submitting your assignment.

Things you must not do:

1. You must not change the signature of any of these methods (name, parameters, …). Just fill in the missing code inside them.

2. You must not create any different class.

In this lab we are going to construct a program for libraries that allows books to be checked in and out electronically. A book is represented by an ISBN, an author, and a title, all of which cannot change once the book has been created. (Please note that ISBNs are unique.) A library book is a book together with a holder (representation of the person who has the book checked out) and a due date, both of which can change as needed. (Please note that for our purposes, all holders are unique.) For this lab, the holders are represented by their name as a String.

Part 0 - Create a project for this lab in Eclipse

1. You are going to create a new project for this (and each of the remaining labs). You learned how to create a project in Eclipse before. Create a new Java project and call it **Lab03** (with no space and no other name – notice the capital 'L')

2. Create a package inside your project and call it **lab03** (no space and no other name – all lowercase).

3. Create a class (or Java file) in this package and call it: **Book.java** (nothing else). This file will contain the representation of a book.

4. Create a class (or Java file) in this package and call it: **Library.java** (nothing else). This file will contain the representation of a library (a collection of library books).

5. Create another Java file called: **LibraryTest.java** (nothing else). This file will contain the client code in which you will create and manipulate objects and test your class implementation.

6. Log into Blackboard and grab the three Java files from Lab3 folder and place them in the "src" folder of the project you just created.

7. Refresh your Eclipse to make sure you are looking at the template code.

Part 1 – Complete Book class

The base class **Book** has been started for you. The equals method is left for you to fill in. Do not make any other changes to the Book class. This is similar to what you have done for your last assignment. The difference is that you first need to make sure the Object we are comparing to is a Book and then 'cast' it to a 'Book'.
Use 'instanceof', if you don't know how to use it consult the slides.
Do not worry about the errors in **Library.java**. They would be taken care of as soon as you get to Part 2.

Part 2 – LibraryBook class

1. Construct a class **LibraryBook** derived from Book and containing the library book's holder (a String) and due date represented by a GregorianCalendar. Consult JavaDoc page for how to use Objects from this class: http://docs.oracle.com/javase/6/docs/api/java/util/GregorianCalendar.html

2. Make sure to add the following line at the top of your class so that you can use `GregorianCalendar`.

   `import java.util.GregorianCalendar`

3. The **LibraryBook** class must include the following methods (you may add other methods as needed but not required).

   - public LibraryBook(long isbn, String author, String title)
   - public String getHolder()
   - public GregorianCalendar getDueDate()
   - public void checkIn()
     - If a library book is checked in, its holder and due date should be set to null.
   - public void checkOut(String holder, GregorianCalendar dueDate)
     - If a library book is checked out, its holder and due date should be set accordingly.
   - **Do not override the equals method in Book.**
   - write tests in **LibraryTest.java** to make sure the implementation of your methods in LibraryBook is correct. There is sample book information for you under "lab03 – part 1 samples". Don't forget to check the `equal` method in Book.java!

Part 3 – Library class

The **Library** class has been started for you. Fill in the method implementations as indicated. **Do not change the method signatures. Do not change the ones that have been implemented for you already.** There are many functions in this class to fill in. For the lab, you only require to finish two of them.

- `public String lookup (long isbn)`
- `public Boolean checkOut(long isbn, String holder, int month, int day, int year)`

Test your Library implementation (so far) in LibraryTest.java. Remove anything **you have** added to the main function and uncomment the code under "lab03 – part 2 test". If you have implemented everything properly you should see "`Testing done`" after running your program. If you see any "`TEST FAILED …`" you need to go back and debug your code.