CIS 36A, Spring 2015
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LAB 1 (part X)
Optional (extra credit)

Use the project named **lab1** that you created in part B for your work in this part. (Copy your files from part A into this project so that you have one thing to submit for lab 1 work). Make a package to contain your Java files.

This is an optional part of Lab 1.

1. Lychrel numbers

Wikipedia defines a *lychrel num*ber as "a natural number that cannot form a palindrome through the iterative process of repeatedly reversing its digits and adding the resulting numbers." Read the page to understand how lychrel numbers are determined.

You need to design a Java class that can determine whether a number is a lychrel number or not.

- The class should have a single constructor that takes a single, integer argument. This is the potential lychrel number.
- There should be a **public** method **isLychrel()** which returns a **bool true** if the number is a lychrel, and **false** if it isn't. You'll likely need helper methods to correctly determine whether the number is lychrel or not; keep those **private**. Use the simple rule: if after 100 "reverse-and-add" iterations the number hasn't become a palindrome, then declare it a lychrel.
- Your "reverse-and-add" iterations might make very large numbers that you won't be able to store as **long**s. You will need to use the Java class **java.math.BigInteger**, which can store arbitrary size integers. Cool!
- Reversing is easiest when your number is stored as a **String**, though, not a **BigInteger**. Consider the class **java.lang.StringBuilder** for reversing; converting between **String** and **BigInteger** is easy.
- Be careful that you don't immediately declare a palindrome a lychrel number. For example, when **4994** is passed to your constructor, **isLychrel()** should return **true**.

You need another 'runner' class that will print out the first 1000 numbers and report whether each is a lychrel number or not. Run this class and save its console output in a file named **lychrel_output.txt**. Put this file in your NetBeans package, so be submitted in the same zip file.

Put these classes in a separate package from your other lab 1 work.

There are several potential solutions available on the internet, although they don't necessarily follow the above constraints. Feel free to look at these, of course, but make sure you do and submit your own work. I'll be checking!