**CS201 Lab 5**

**35 points**  **Due**: 02/23/15

**Problem:** We just learned how to convert between binary and decimal numbers. Wouldn’t it be great to have your own program to use to test your results? Let’s make one! But here’s the catch: let’s also convert to another numbering system too, called octal.

**Purpose:** This lab gives you practice with:

* Conversion between binary and decimal numbers
* Using a switch statement
* Using repetition in your code (loops)

**Details:**

Your user gets to choose between two options: converting from binary to decimal, and converting from octal to decimal. After the user makes a choice, you must use a **switch** statement to perform the given action. *You may assume that the user always enters an unsigned 8-bit binary number.*

What is octal? Octal is base 8. So, 1238 is 3\*80+2\*81+1\*82 = 3\*1 + 2\*8 + 1\*64 = 8310

All of the processes we learned for binary are true for octal, except where we used 2s we now use 8s.

*HINT:* When converting from binary or octal to decimal, you may find it helpful to read the binary number in as a String and then using the .charAt( ) method to get an individual character and then convert it to a number. If you have a char variable holding the value ‘1’ but you want the numeric value 1, you can do:

char a = ‘1’; //for example’s sake

int value = Character.getNumericValue(a); //converts it to 1, just like Integer.parseInt does with Strings

**Steps:**

1. You have a start of an algorithm in your Lab5 repository folder. Complete the algorithm and get the professor’s approval before starting to code.
2. Create a new Java file and save it to your Lab5 repository folder.
3. Write your Java code following the above algorithm. **Remember to use a switch statement.**
4. Write comments in your code to make it clear what it is doing.
5. Draw a flowchart of your code
6. Label the control paths in your flowchart
7. List the test cases based on your control paths.
8. Test your program. Think about special cases.
9. Include an updated version of the header comments. Many lines should change!

**Submit:**

1. To GitHub:
   * Your algorithm in the provided Word document
   * Your .java file
   * Your test cases, labeled by control path
2. On paper in class:
   * A short reflection about what you learned in lab, what it was like working with your partner, and what gave you the most trouble. (1 per person)
   * A hardcopy of your flowchart with control paths labeled (1 copy per pair)