CS201 Computer Science I
Homework 5
Due: 11/13, 11:59pm

This homework corresponds to materials up to conditional execution. Answer each of the following questions clearly. For every program, follow the format of className.java, use meaningful variable names and comment your code well for readability. Email your .zip file to ctsai@iona.edu.

1. Write a structured program with procedures which provides the options of converting a number from base 8 to 10 and from base 10 to 8. It is a good idea to have a procedure for each option. Assuming the user only input integers, the program should make sure the input number is valid, and return an error message if a mistake is made. For example, 967 is invalid for a number of base 8.

   Hint: Make use of the pre-defined string functions as much as possible (http://java.sun.com/j2se/1.4.2/docs/api/). The algorithms for conversion between bases are in *3_primitive-data*. For coding, to convert '0' (a character) to 0 (a number), do the following:

   ```
   (int)'0'-48
   ```

   To convert an integer i to a string do:

   ```
   Integer.toString(i);
   ```

2. Write a structured program with procedures to implement the amortization calculator discussed at the end of the series on Managing Complexity. The formula for the calculator is:

   $$MP = \frac{P \times R}{1 - (1 + R)^{-N}},$$

   where

   - MP = monthly payment
   - P = principal
   - R = monthly interest rate
   - N = total number of payment

   Fix the interest rate to 8% APR. The program should allow the user to chose one of monthly payment, principal, and total number of payment to be calculated and prompt for the input for the remaining items. The output is the amortization schedule shown in class (6_managing-complexity). You may leave out the first line for month 0 in the output.