COSC 211 - Homework 3 (Inheritance) – Calculator – Due February 12th, 2016

You are to design and implement a Roman numeral calculator. The subtractive Roman numeral notation commonly in use today was used only rarely during the time of the Roman Republic and Empire. For ease of calculation, the Romans most frequently used a purely additive notation in which a number was simply the sum of its digits (4 equals IIII in this notation, not IV). Each number starts with the digit of highest value and ends with the digit of smallest value. This is the notation you will use in this program.

Your program inputs two Roman numbers and an arithmetic operator and displays the result of the operation, also as a Roman number. The values of the Roman digits are as follows:

I 1

V 5

X 10

L 50

C 100

D 500

M 1000

Thus, the number MDCCCCLXXXXVI represents 1996, because 1996 is really consists of:

1000 + 500 + 100 + 100 + 100 + 100 + 50 + 10 + 10 + 10 + 10 + 5 + 1.

M + D + C + C + C + C + L + X + X + X + X + V + I

The arithmetic operators that your program should recognize in the input are +, -, \*, % and /. These should perform the Java operations of INTEGER addition, subtraction, multiplication, modulus and division, respectively.

One way of approaching this problem is to convert the Roman numbers into integers, perform the required operation, and then convert the result back into a Roman number for displaying.

The following might be a sample run of the program:

MCCXXVI 1226

LXVIIII 69

The desired arithmetic operation: +

MCCLXXXXV 1295

The program should check for errors in the input, such as illegal digits or arithmetic operators, and display an error message when these errors are found. Assume that the input numbers are in purely additive form – this is, digits are followed only by digits of the same or lower value.

REQUIREMENTS: This program is to be done by creating two classes, the first class is called Roman which includes the following methods:

setRoman( )

getRoman( )

convert\_Roman\_To\_Int( )

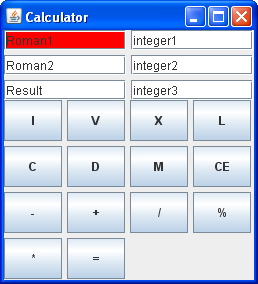
convert\_Int\_To\_Roman( )

display\_Roman( )

add more methods if needed, also add the appropriate constructors and instance variables.

The other class RomanCalculator extends from JFrame and implements ActionListeners.

The calculator will be a frame with 3 text boxes for data entry, 3 labels for the display and 14 buttons, 7 buttons for the roman numbers, 5 buttons for the operations, one button for the equal, one button for clearing the textboxes and the labels,

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**Sample calculator**

As you can see in the sample image, the calculator has 3 text boxes, Roman1, Roman2, and Result. Next to each textbox there is a label that will be used to display the integer value of each roman number. The result textbox, will have the result of the two Romans based on the operation chosen. The CE button will clear everything.

The result and the labels should be not editable.

Turn in:

1. The Roman class
2. The CalculatorRomanClass
3. Screen shots of the output