

## HOMEWORK – ROMAN NUMBERS

Design a program using a flowchart that converts between Roman Numbers and positive decimal numbers, then implement that design in C++. See Programming Exercises P3.6 (which includes the specification for Roman Numbers), P4.12, and P4.13 as references.

Your program should:

- Display a friendly greeting to the user.
- Give the user a choice of three options: Roman → Decimal, Decimal → Roman, and Exit
- Accept the choice from the keyboard.
- If the choice is not one of the three, display a snarky message and exit
- Prompt the user for a string in the appropriate format.
- Accept that string.
- Test the string to ensure that it adheres to the required format.
- If the string does not adhere to the appropriate format, display a message explaining that the user should more carefully read the specifications and exit.
- Convert the input string to the desired output string by invoking a function.
- If the conversion fails, output an appropriate error message and display the choice menu again.
- Display the appropriately-formatted output.
- Display the choice menu again.

Note that your input, for both Roman *and* decimal, is `string`. That way you can test the input for valid format. If the user enters an invalid integer and you accept it into an `int`, your program just crashes.

Your program should include at least two functions:

```
bool convertRomanToDecimal(string s, int & d);  
bool convertDecimalToRoman(int d, string & s);
```

The functions return `true` if the conversion was successful and `false` otherwise. Note the two reference parameters; that's how you get your answers back. You may make use of any other helper functions (such as the one recommended in P4.12) as you see fit. Going beyond their specifications (larger values, non-standard Roman Numerals) would be a Good Thing.

Sample Run (user input in **bold**):

```
c:>Welcome to Roman Number Conversion!  
c:>Please enter 1 (Roman to Decimal), 2 (Decimal to Roman), or 3 (exit): 1  
c:>Please enter a Roman Number: MCMLXXVII  
c:>MCMLXXVII (Roman) = 1977 (Decimal)  
c:>Please enter 1 (Roman to Decimal), 2 (Decimal to Roman), or 3 (exit): 3  
c:>Thank You for playing Roman Number Conversion!
```

Submit two documents: your design (a series of flowcharts) and the `.cpp` file.