8 – THROBAC

In 1937 Claude Shannon showed how Boolean logic could be expressed in electronic circuits leading to computers as we know them. For fun he created Throbac (THrifty ROman-numerical BAckward-looking Computer), a calculator that did arithmetic with Roman numerals (pictured above)—a useless, but whimsical device. In this project, you will write a program that performs addition with Roman numerals, just like Throbac.

Roman numerals have values, but are not positional like our number system, and there is no zero (zero arrived in the west circa 1000 AD). To keep things simpler, we will use five of the seven symbols: I = 1, V = 5, X = 10, L = 50, and C = 100.

Numbers are formed by combining symbols together and adding their values—only whole numbers. For example, CLXVII is 100+50+10+5+1+1 = 167. Generally, symbols are placed in order of value, starting with the largest values. When smaller values precede larger values, the smaller values are subtracted from the larger values, and the result is added to the total. For example, in XLIV the smaller X before L means subtract X from L as 50-10 to get 40, and the I before V means subtract I from V as 5-1 to get 4, so the final number is 44. Some call that the "subtraction rule." A useful restriction of the subtraction rule is that there can never be more than one smaller value. That is, XL is valid, but XXL is not: thirty is represented by XXX.

Hint: Solve the problem for Roman Numerals that don't use the subtraction rule, e.g. assume input is something like LXXII and not numbers like XLIV. After you get that working, introduce the subtraction rule. Assume that the values will be less than 380.

Your program will:

1. Prompt for two Roman Numerals.
2. Convert both numbers to integers.
3. Find the sum of the two integers.
4. Print the sum as a Roman Numeral.

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### ECO CS 18 ##
### Project 8 ##

Enter First Roman Number (no spaces): XLIV
Value of XLIV : 44
Enter Second Roman Number (no spaces): CCLXV
Value of CCLXV : 265
Digital sum is: 309
Roman sum is: C C C I X
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