

GE U111 ENGINEERING PROBLEM SOLVING & COMPUTATION, SPRING 2004
HOMEWORK #5 - REVISED

DATE ASSIGNED: February 25, 2004
DATE DUE: March 15, 2004 (at the beginning of class)
READING: Chapter 4 (JK)

PART A

Write a C++ program that will prompt the user to enter a list of at most 50 integer numbers. You may ask the user how many integers they will be entering. Your program should then call three functions called “largest,” “smallest,” and “average” that will return the largest, smallest, and average of the numbers in the list. The main function should then report what the largest and smallest numbers are as well as print the average of all the numbers in the list. Test your program on the following inputs: 3, 4, 6, 7, 8, 10, 12, 24, 45, 67, 76, 34, 23, 4.

PART B

Develop a flowchart and C++ program for the following program.

Roman numerals use capital letters for numeric values, as in the following table:

Roman	Decimal
I	1
V	5
X	10
L	50
C	100
D	500
M	1000

The decimal equivalent of a roman numeral string is accumulated from the values of its characters. If the decimal value of a character is higher than or the same as the character on its right, that value is added to the sum; if it is lower, it is subtracted from the sum. The value of the last (rightmost) character is always added to the sum.

Write a function **int** roman (**char** x) that returns the value of a character according to the table. If the character is non-roman (i.e., none of the 7 shown in the table), the function should return 0.

Then write a main() function that prompts the user for a roman numeral string; invokes roman to convert the characters to an array of decimal values; calculates the decimal value of the roman numeral string; prints it out; and then prompts the user for a new input.

Assume that each roman numeral is at most 10 characters long. A non-roman character (one that is not in the table) in the middle of the string terminates the conversion, returns the value of the string up to that character, and then prompts the user for the next input. Entering a non-roman character as the first character in the input terminates the program.

Please run your code for the following input strings:

MMIIL5XXV
LIL
VIIM
XVII
CCCIL
D
IDI
MIM
MCMXCIX
MMMMMMIIIIV
4I

WHAT TO TURN IN

1. Submit the following items in a folder properly labeled and bound. Be sure that both your name and class section appear on the front of the folder. Assignments presented otherwise will be returned with penalty.
 - a. Correspondence page (cover letter, memo, fax sheet)
 - b. List of contents
 - c. Printed copy of your **commented** source file for Part A (HW5Axxx.cpp, where xxx are your initials)
 - d. Printout of terminal window for the inputs specified for Part A.
 - e. Flowchart for Part B.
 - f. Printed copy of your **commented** source file (HW5Bxxx.cpp, where xxx are your initials)
 - g. Printouts of the terminal windows for the inputs specified for Part B.
 - h. Diskette with both program files. (HW5Axxx.cpp and HW5Bxxx.cpp)

2. Email copies of both program files (HW5Axxx.cpp and HW5Bxxx.cpp) to Stephen Frechette at sfrechet@ece.neu.edu by the start of class on the assignment due date. In the subject line, type the following: "Your last name, GE U111-Section X, HW 5".