CS 1713
Introduction to Computer Programming II
Assignment 2
Due Friday February 10

1. (100 pts) Write a program to produce a table of decimal numbers and roman numerals from 1 to 1000. The romans used a special method of showing numbers based on the following symbols I,V,X,L,C,D and M representing 1,5,10,50,100,500 and 1000 respectively.

   There are a few rules for roman numerals

   (a) To write a roman numeral each of the nonzero digits should be treated separately. For example, to write 651=500+100+50+1, D=500,C=100,L=50,I=1, we have DCLI.

   (b) The symbols I,X,C and M (symbols representing powers of 10) can be repeated at most 3 times in succession. D, L and V (symbols not representing powers of 10) can never be repeated.

   (c) I can be subtracted from V and X only. X can be subtracted from L and C only. C can be subtracted from D and M only. In other words, symbol representing 10^x can be subtracted from symbol representing $5 * 10^x$ and $10 * 10^x$. V, L and D can never be subtracted. In other words, symbols not representing powers of 10 can never be subtracted.

   Your program should produce a table of decimal numbers and corresponding roman numerals. As a starting point find how a decimal number can be represented using numbers which has a roman equivalent. Given a decimal number n find the values of a, b, c, d, e, f, g which satisfies

   $$n = a * 1000 + b * 500 + c * 100 + d * 50 + e * 10 + f * 5 + g * 1$$

   This will give you a roman numeral representation which will be correct in most cases. For example, $752 = 500 + 2 * 100 + 50 + 2 * 1$ can be converted into $DCCLII$. Since we have 2*100 C repeats and since we have 2*1, I repeats. After that you can take care of the special cases where a symbol appears 4 or more times or a nonrepeating symbol appears two or more times. Your final program will have several if-else statements.

   Sample output for this assignment is as follows

```
1 I
2 II
3 III
4 IV
5 V
6 VI
7 VII
8 VIII
.
```

```
.
.
1000 M
```

Name your program *assign2.c* and leave a single space between a decimal number and the roman numeral. You can save your output to a file using redirection. You can compare 2 files using linux command *diff* as shown below to see which lines differ.

```
fox01> diff romans1.txt romans2.txt
```

Submit your program electronically using the blackboard system

The program you submit should be your own work. Cheating will be reported to office of academic integrity. Both the copier and copiee will be held responsible.