CS150 Assignment 3
Mortgage Calculator

Date Assigned: Friday, September 20, 2013
Date Due: Monday, September 30, 2013 1:00 pm
Total Points: 30 pts

After graduation, one of the biggest purchases you will ever make is buying your first home. When buying a home in today's market, you are expected to put a down payment of 20%. If you are unable to put 20% down on the purchase of your home, you will need to purchase private mortgage insurance where rates can range from 0.5% to 6% of the principal of the loan per year based on factors such as percent of loan insured, fixed or variable mortgage rate, credit score, …. The rate may be paid in a single lump sum, annually, monthly, or some other combination.
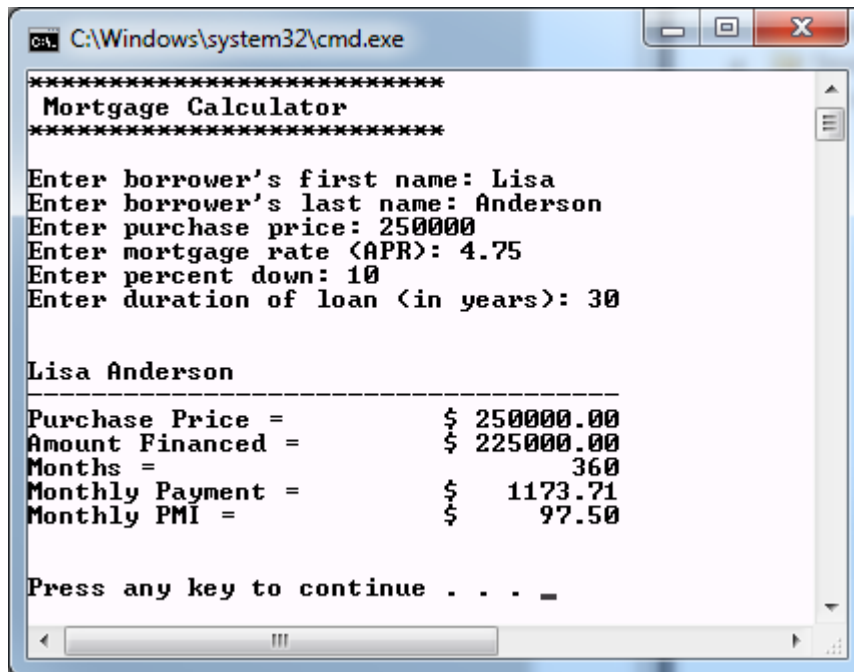
Your program must ask for the following:
1. borrower's first and last name
2. purchase price of the house
3. mortgage rate (APR)
4. percent down
5. duration of the loan (in years)

As output, you are to print the following:
1. purchase price
2. amount financed
3. months the loan is for
4. monthly payment
5. montly amount of private mortgage insurance

Sample Output:

```
C:\Windows\system32\cmd.exe

****************************
 Mortgage Calculator
****************************

Enter borrower's first name: Lisa
Enter borrower's last name: Anderson
Enter purchase price: 250000
Enter mortgage rate (APR): 4.75
Enter percent down: 10
Enter duration of loan (in years): 30


Lisa Anderson
-------------------------------------
Purchase Price  =        $ 250000.00
Amount Financed =        $ 225000.00
Months  =                        360
Monthly Payment =        $    1173.71
Monthly PMI  =           $      97.50


Press any key to continue . . . _
```

Here are some specifics regarding mortgages and how they work.

1. The following formula is used to calculate the fixed monthly payment **P** for a loan of **L** dollars for **n** months at a
<u>monthly</u> interest rate of **c**. Before even starting your program, you need to make sure you fully understand this
formula and can produce the results on the previous page using a calculator.

$$P = L(c(1+c)^n) / ((1+c)^n - 1)$$

2. You will need a function to compute some value raised to a power. The following program segment shows how to
compute 2.0 raised to the 3.0 power in C++.

```
#include <cmath>

double value;
value = pow (2.0, 3.0);
```

3. As for calculating private mortgage insurance (PMI), we will use the table found at
http://www.abacusmortgagetraining.com/webex/pmipacket.pdf for this assignment. You only need to examine page 1
of this pdf. If you are interested in any other information in the document, please feel free to stop by. I love talking
about this kind of stuff.

To complete this assignment you must submit the following:

1. **An electronic copy of your program on Turing**

    a. Add a new project named **03_MortgageCalculator** to your previously created assignment solution called
    PUNetIDAssignments. It is *vital* that you name your project correctly!

    b. Type your program (fully documented/commented) into the project. The comment block at the top of the
    program needs to contain your name, the date the assignment is due, the class name, assignment number
    and name, and a brief description of the program.

    c. Pay attention to the example output! Your program's output must look **exactly** like the example output!
    The spacing and newlines in your output must match exactly.

    d. Your program *must* use **if statements**, **constants, and logical operators**. There must be no magic
    constants in your solution.

    e. Make sure that your program compiles and runs correctly. If you get any errors, double check that you
    typed everything correctly. Be aware that C++ is case-sensitive.

    f. Once you are sure that the program works correctly it is time to submit your program. You do this by
    logging on to Turing and placing your complete solution folder in the **CS150-01 Drop** folder. This
    solution folder must contain: 01_Fraction, 02_LongDistance, and 03_MortgageCalculator.

    g. The program must be in the drop folder by 1:00pm on the day that it is due. Anything submitted after that
    will be considered late.

2. **A hard copy of your program**

    a. The hard copy must be placed on the instructor's desk by 1:00pm on the day that it is due.

    b. The hard copy must be printed in color, double-sided, and stapled in the upper-left corner if necessary. I
    do not bring a stapler to class.

THIS ASSIGNMENT IS DIFFICULT AND TIME CONSUMING. DO NOT BLOW OFF THIS
WEEKEND!!!!
Good luck! And remember, if you have any problems, come and see straight away.☺