Computer Science 220
Program Assignment 1

Learning objectives:

- Create a Python program on your own.
- Develop a simple Python program that asks for input, does arithmetic, and provides output.

Assignment:

You and many of your friends will be buying cars and homes within the next few years. As a result you have decided to write a Python program to calculate the principal payments and help everyone realize exactly how much interest they will pay over the period of their loans. In order to perform the appropriate calculations, you will need to know the initial loan amount ("principal"), the number of months of the loan ("months"), and the interest rate ("interest"). Your program should calculate the principal payment for each month, the amount paid over the life of the loan, and the total interest paid.

The formulas you will need are:

```
rate = interest / 1200

                    principal (rate ((1+rate)^months)
monthly payment =  ------------------------------
                             (1+rate)^months - 1
```

Note: have the user input the interest rate as it appears before dividing it by 100. For example, if the interest rate is 5.3% the user should enter 5.3 NOT .053.

Save your program as `mortgage.py`.

Guidance:

You may be wondering if there are any Express II classes that sound enjoyable as you contemplate dropping CSCI220. Don't leave yet! While the problem may seem difficult, applying the software development cycle will help. Ask yourself, and write the answers to, the following questions. Add your answers as a comment to your .py file.

1. What will the program do? (Purpose statement)

2. What will be the inputs and outputs? (Part of header.)

3. Provide a step-by-step list of what your program must do, aka an algorithm. (Remember this is in English! Add these to body of your code as comments for the code.)

4. Implement your code.

5. Test your program using the sample runs below.

Principal/ Loan Amount	Months	Interest	Monthly Payment (calculated)	Total amount paid (calculated)	Total interest paid (calculated)
$ 1000	36	5%	$ 29.9708971047	$ 1078.95229577	$ 78.952295768
$ 40000	60	7.5%	$ 801.517943825	$ 48091.0766295	$ 8091.0766295
$ 250000	360	7%	$ 1663.25623795	$ 598772.245661	$ 348772.245661
$ 10000	120	5.5%	$ 108.52627796	$ 13023.1533553	$ 3023.15335526

File to be submitted:

`Mortgage.py`

Policies:

The following policies are in effect for this and all assignments:

- Programming assignment grades will be based on design and style as well as correctness of result.
- Assignments are to be submitted by uploading to OAKS.
- Late assignments will not be accepted.
- Collaboration policy for CSCI 220 assignments:
    1. You may discuss the problem and how to solve it with others, but you may not look at, copy, or use any code that was written by anyone other than yourself. If I have evidence that you have shared program code or used code found anywhere, the grade your grade will be zero.
    2. If you do discuss the problem and how to solve it with others, you must document that in the program code.
    3. Not following these rules is in violation of the Student Honor Code and instances of such violations will be reported to the Honor Board.
- Please see the assignment policy on OAKS/content/ CSCI220 Syllabus-Fall 2018.pdf to discover all policies for all homework submissions in 220.

Documentation and formatting within your program:

The following comments should appear in your program as the first lines in the file. Items in angle brackets are either to be removed or replaced with what is specified within the brackets:

```
##
## Name: <your name goes here – first and last minimum>
## <ProgramName>.py
##
```

```
## Purpose: <Brief, one or two sentence description of the
##           problem that this program solves, in your own words.>
##
## Certification of Authenticity:
##   <include one of the following>
##   I certify that this lab is entirely my own work.
##   I certify that this lab is my own work, but I
##   discussed it with: <Name(s)>
##
## Input: <what will the inputs to the program be>
## Output: <what information will the program output/return>
```

All identifiers should be meaningful. Include your design (pseudocode) as comments in your program.