Homework #3
Loans and Interest

Assigned: September 13, 2017
Due: Sep. 20 by 11:59:59 PM

Requirements:

- Name the source file for your program **program3.cpp**

- It must prompt the user to enter, and accept their input, for the amount of the loan, the interest rate, and the monthly payment.

- For the first three years of the loan repayment, for each month of the year: calculate the interest, apply the payment, and calculate the ending balance still owed on the loan. As these calculations are done each month, add up the total interest paid and the total principal paid for the year. **Note:** The interest rate entered by the user is the annual interest rate. Interest is compounded monthly.

- For each year, display a table with each month's interest and principal payments, and at the end of the year the total interest and total principal paid that year, and ending balance, in the format shown below.

- The user may enter numbers with or without a fractional part.

- You may ignore any issues relating to financial transactions being rounded to a whole cent and simply store the amounts as floating point numbers. However, when displaying numbers that represent amounts of money, they should be displayed with two decimal places.

- A sample run of your program should look like:

```
Enter amount of loan:   20000
Enter interest rate:    6
Enter monthly payment: 386.66

Year 1          Interest        Principal
         ---    --------       ---------
    1:      100.00             286.66
    2:       98.57             288.09
    3:       97.13             289.53
    4:       95.68             290.98
    5:       94.22             292.44
    6:       92.76             293.90
    7:       91.29             295.37
    8:       89.82             296.84
```

```
      9:          88.33              298.33
     10:          86.84              299.82
     11:          85.34              301.32
     12:          83.83              302.83
     ---        --------          ---------
Year 1 totals:   1103.81            3536.11
Remaining balance at year end: 16463.89

Year 2            Interest        Principal
     ---        --------          ---------
      1:          82.32              304.34
      2:          80.80              305.86
      3:          79.27              307.39
      4:          77.73              308.93
      5:          76.19              310.47
      6:          74.63              312.03
      7:          73.07              313.59
      8:          71.51              315.15
      9:          69.93              316.73
     10:          68.35              318.31
     11:          66.76              319.90
     12:          65.16              321.50
     ---        --------          ---------
Year 2 totals:    885.71            3754.21
Remaining balance at year end: 12709.68

Year 3            Interest        Principal
     ---        --------          ---------
      1:          63.55              323.11
      2:          61.93              324.73
      3:          60.31              326.35
      4:          58.68              327.98
      5:          57.04              329.62
      6:          55.39              331.27
      7:          53.73              332.93
      8:          52.07              334.59
      9:          50.40              336.26
     10:          48.71              337.95
     11:          47.02              339.64
     12:          45.33              341.33
     ---        --------          ---------
Year 3 totals:    654.16            3985.76
Remaining balance at year end:  8723.91
```

Hints:

- You do **not** need to know any financial formulas regarding interest to do this assignment – the easiest way to do it is to directly calculate the interest owed each month and get the principal paid that month from (monthly payment) - (interest paid).

- Remember that inside a loop can be any other statement, including another loop. This program has a natural structure like this:

```
for_each_year {
    print_year_heading

    for_each_month_of_the_year
    {
        calculate_and_print_values_for_this_month
    }

    print_year_totals
}
```

- The columns of numbers can be lined up right-aligned as required using the `setw` method from the <iomanip> library as shown in the class notes.

Reminders:

- Be sure that your program includes your name, ID, description, etc. as shown in the General Homework Requirements Handout

- Use good style including indentation, comments, etc. Part of the grade will be for style and quality.

- Carefully test your program.

- You are welcome to write your program at home. If you do, be sure to compile and test it in the lab before submitting it.

- Compile your program using `g++ -Wall -o prog3.cpp program3.cpp`

How to submit your program:

- Submit the file `program3.cpp` electronically using `~cs211a/bin/handin 3 program3.cpp`