# CSC 150: Computer Science I

# Assignment 4

Repetition and Loop Statements

**Learning Objectives**

* To understand why repetition is an important control structure in programming
* To learn about loop control variables and the three steps needed to control loop repetition
* To learn how to use the C for , while , and do-while statements for writing loops and when to use each statement type
* To learn how to accumulate a sum or a product within a loop body

Write a program to create an output file containing a customized loan amortization table. Your program will prompt the user to enter the amount borrowed (the principal), the annual interest rate, and the number of payments (n).

To calculate the monthly payment, it will use the formula

where

*P* = principal (the amount you borrow)

*i* = monthly interest rate (1/12 of the annual rate)

*n* = total number of payments

This payment must be rounded to the nearest cent. After the payment has been rounded to the nearest cent, the program will write to the output file n lines showing how the debt is paid off. Each month part of the payment is the monthly interest on the principal balance, and the rest is applied to the principal. Because the payment and each month’s interest are rounded, the final payment will be a bit different and must be calculated as the sum of the final interest payment and the final principal balance. Here is a sample table for a $1000 loan borrowed at a 9% annual interest rate and paid back over 6 months.

Principal $1000.00

Annual interest 9.0%

Payment $171.07

Term 6 months

|  |  |  |  |
| --- | --- | --- | --- |
| Payment | Interest | Principal | Principal Balance |
| 1 | 7.50 | 163.57 | 836.43 |
| 2 | 6.27 | 164.80 | 671.63 |
| 3 | 5.04 | 166.03 | 505.60 |
| 4 | 3.79 | 167.28 | 338.32 |
| 5 | 2.54 | 168.53 | 169.79 |
| 6 | 1.27 | 169.79 | 0.00 |
| Final payment | 171.06 |  |  |

Compile, run and test your program.

Submit the working .c file in the Assignment 4 Dropbox.