Computing I
Programming Assignment 1

Program 1a: Write a program that determines whether a meeting room is in violation of fire law regulations regarding the maximum room capacity. The program will read in the maximum room capacity and the number of people to attend the meeting, meaning the user has to enter both of these values. If the number of people is less than or equal to the maximum room capacity, the program announces that it is legal to hold the meeting and tells how many additional people may legally attend. If the number of people exceeds the maximum room capacity, the program announces that the meeting cannot be held as planned due to fire regulations and tells how many people must be excluded in order to meet the fire regulations. Write your program so that it allows the calculation to be repeated as often as the user wishes by allowing the user to answer the question, "Do you wish to continue?", with a single character 'y' or 'Y' for yes and 'n' or 'N' for no after each run.

Program 1b: You have just purchased a stereo system at the cost of $1,000 on the following credit plan: no down payment, an interest rate of 18% per year (and hence 1.5% per month), and monthly payments of $50. The monthly payment of $50 is used to pay the interest, and any remainder is applied to the principal. Hence, the first month you pay 1.5% of $1,000 in interest ($15). Then, the remaining $35 is deducted from the principal, which leaves a balance of $965. The next month you pay interest of 1.5% of $965.00, which is $14.48, and $35.52 (which is $50 - $14.48) is deducted from the principal. Write a program that will tell you how many months it will take to repay the loan, as well as the total amount of interest paid over the life of the loan. You should also display the exact amount of your final payment. Use a loop to calculate the amount of interest and the remaining principal after each monthly payment has been applied. (Your final program should not output these values, but you may want to write a preliminary version of the program that shows the results of these intermediate values.) Use a variable to count the number of loop iterations, and hence the number of months, until the balance is zero. You may want to use other variables as well. Also, note that the last payment may be less than $50. Finally, do not forget the interest on the last payment. If you owe $50, then your monthly payment of $50 will not satisfy the debt, although it will come close. One month's interest on $50 is only 75 cents.

Submissions: Submit your work using the submit program on the computer science Linux cluster. A separate email will detail the submission process.

Be sure to submit the correct files the first time. All programs that you turn in should have a comment section at the beginning giving the date, your name, the file name, time spent on the project, and the purpose of the program. You will be graded on the correctness of your program, comments, and general layout of your code (indentation etc.) according to the following scale.

Correctness - 75 %
Comments – 10%
General layout and coding style – 15%

A program that does not compile or link will not be graded.

A sample initial comment section is given below:

```
/*************************************************************************
        Program:    program1A.cpp
        Author:     Mortimer Sneed
        Date:       December 25, 2042
        Time spent: 5 hours 7 minutes
        Purpose:    The purpose of this program is to demonstrate an acceptable
                    comment section for my program.  My code does not actually
                    do anything.
*************************************************************************/
int main ( int argc, char* argv[])
{
        /*Your code goes here. */
        return 0;
}
```

Ideally your code should be self documenting. That means that your variable names are selected such that their names alone help the reader know what the purpose of that variable is and what value it may contain. If this is not true of your variable names then you will need a comment to help explain what that variable is. For example the variable names distance, rate, and time are better than x, y and z for computing distance.

Your variables should begin with a lower case letter.
Any time you start a block of code using a ‘{‘ character then all of your code in that block should be indented uniformly as above in the sample main program.
If you have a number that occurs in your code more than one time and the number is not zero or one, then that number should probably be made into a constant variable and given

a name. Constants are written so that their names are in ALL_CAPITAL_LETTERS and have the keyword const in front of their declaration. Once they have been initialized, the compiler will not let you modify their value. The following is an example.

```
const int MEL_OTT_HOME_RUNS = 511;
```