**Homework 2: Control Flow**

1. Airport statistics

a. Download the data set airport.csv. Read it into R, attach the data, and look at the first few lines of data to see the format of the data. This data set contains data on all 135 medium and large airports in the US in 1990.

(Dataset: “US Airport Statistics,” submitted by Larry Winner, University of Florida. Dataset obtained from the Journal of Statistics Education (http://www.amstat.org/publications/jse). Accessed 3 June 2015. Used by permission of author.)

Use control flow to

b. Print a list of airports at which the number of scheduled departures was less than the number of departures performed.

c. find the total number of passengers on flights from the airports in part b.

Submit your R code to parts a-c to GitHub. Copy and paste the list of airports (for part b) and total number of passengers (for part c) into a separate text file and submit it to GitHub.

2. Cheeseburger, Yum!

Write a program that prints the numbers 1 to 100, but when you get to a number that’s divisible by 3, print “Pepsi” instead. When you get to a number that’s divisible by 5, print “Cheeseburger” instead. For numbers divisible by both 3 and 5, print “Yum!”

Submit your code to GitHub.

3. Mortgage Calculator

(Developed by Peter Bui, modified by Abra Brisbin and Ursula Whitcher)

In this problem, you will a mortgage calculator that takes as input the principal loan amount, interest rate, and monthly payment, and generates an amortization table and computes how many years and months it took to pay off the mortgage, and the total amount of payments over that time.

Buying a house is one of the biggest financial transactions that many people ever undertake. Even a small difference in interest rates or monthly payments can make a large difference in how much you ultimately pay for your mortgage. However, these details are often buried in masses of paperwork--so it pays to be able to calculate the long-term cost of a mortgage yourself.

In a mortgage, the bank lends you a certain amount of principal to purchase a house at a certain interest rate. Every month, the amount you owe (the balance) first increases due to interest: 1/12 of the interest rate times the current balance. Then the balance decreases due to your monthly payment.

For example, suppose you borrow $100,000 at 5% annual interest, with $500 monthly payments. In the first month, the interest increases the balance by $416.67, and then your payment reduces it by $500, for a remaining balance of $99,916.67. In the second month, the interest charge is $416.32, and the remaining balance is $99,832.99.

If you continue this process, you get an amortization table like this:



…



You can also compute the total amount of time and money to pay off the mortgage:



Here are some things to consider when implementing the calculator:

1. Start with some simple examples that only take a few payments, so you can verify your results by hand.

2. For dollar values, only display two digits of precision after the decimal point.

3. The final payment will almost certainly be smaller than the others, so be careful to check for that case so you don’t end up with a negative balance.

4. If the monthly payment is too small, the balance will go up every month! If this happens, the program should stop and display an appropriate error message.

5. If you accidentally create an infinite loop, try to interrupt or restart the kernel.

6. Use the modulus or %% operator to separate the years and months.

Submit:

* Your code to GitHub.
* Answers to the following questions, in a Word or other text document to the dropbox on D2L:

1. Describe in your own words how the mortgage calculator works. What are the step you are computing? What are you keeping track of in each iteration?
2. If you had a mortgage with a principal of $250,000, and interest rate of 4%, and a monthly payment of $1000, how long would it take you to pay it off? How much will you have paid in total?