CSU101
Summer 2009
Lab Assignment 2

To complete this assignment you must submit an electronic copy by the due date using Blackboard.

Problem 1:

Select the MLBStats spreadsheet tab at the bottom of the workbook. This sheet is similar to the one used for Lab 1, except that American League and National League players are no longer separated into two columns. Instead, the league is indicated next to each players name, in the column marked "League" (AL = American League; NL = National League).

Your job is to calculate the On Base Percentage (OBP), as you did in Lab 1. Recall that the formula for OBP is:

$$OBP = \frac{H + BB}{AB + BB + SF}$$

Make sure you round all OBP values to 3 decimal places, and format the cells so that 3 decimal places are always displayed, as in Lab 1.

Next, separate the data by league using an IF function. Put all OBPs from American League players in the "AL OBP" column, and OBPs from National League players in the "NL OBP" column. Be sure that your function will work if the data (including a player's league) is changed later.

Once the data is separated, you should complete this sheet the same way Lab 1 was completed. First, name the AL_OBP and NL_OBP ranges (note that the addresses will be different from the last lab). Then, answer the same questions from problem 3 of Lab 1. Space is provided in cells M13:O19 for your answers. ***Be sure to use the range names in all of these functions.***

Problem 2:

Select the CDs spreadsheet tab at the bottom of the workbook. This sheet should be empty; you will have to design this spreadsheet to solve the following problem:

Two roommates, Adam and Bob, move into an apartment. Each brings 1000 CDs. Since they both have such extensive music collections they decide not to buy, steal or borrow any additional CDs from the outside world, but they each lend CDs back and forth between them.

After a time they notice that at the end of any week, 25% of the CDs in Adam's room have migrated to Bob's room, and 12% of the CDs in Bob's room have migrated to Adam's room. *It is never the case that a fraction of a CD moves from one room to another.*

Questions:
1. Assuming this continues, what will happen?
2. Will all the CDs end up in one room?
3. If not, is there a steady state, so many in one room and so many in the other?
4. If so, how many CDs end up in each room?
5. How many weeks does it take to reach steady state?
6. Suppose we change the percentages to 20% and 8%. Does the number of weeks to achieve steady state change?
7. What is it?

Build a spreadsheet to solve this problem.
1. Make sure that you isolate the parameters of the problem to their own cells and label them.
2. Have your spreadsheet model the process of CDs going from room to room each week.
3. Remember that only whole CDs move, nothing like ¼ of a CD should move. If it looks like a fraction of a CD needs to move to satisfy the conditions of the problem, round the number of CDs to the nearest whole CD. So instead of 23.45 CDs we get 23, and instead of 23.69 CDs we get 24.
   HINT: Make sure that the total number of CDs in both rooms never changes (new CDs don't come in, and old ones don't go out). Calculating the total CDs each week might be a good idea.
4. Answer all of the **questions** above in a vertical series of labeled cells, with labels "Question 1", "Question 2", etc. Start the labels at A50. (Labels should go in the A column, and your answers in the B column)

Extra Credit:

Suppose that each of these fellows destroys a certain percent of the CDs in his room in a given week, and once a CD is destroyed it is no longer part of the process. We might imagine that Adam has a cat that eats CDs, and Bob has a CD player that eats CDs. Suppose in any given week Adam destroys 2.67% of the CDs in his room and Bob destroys 1.25%.

Also suppose that Adam and Bob lend some CDs to other friends, and thus they are not part of the calculations for a single week (they will not be destroyed or sent to the other room). All the CDs are returned the next week, to the same room from which they came (i.e., If Adam lends a CD, it will come back to Adam's room). Suppose in any given week Adam lends out 2% of the CDs in his room, and Bob lends 4%.

On the sheet labeled "Extra Credit," copy your solution from the CD sheet, and then modify it to account for these additional complications. How does this affect the outcome of the process? Answer in a sentence or two in a cell below your data. Please use the original values of 25% and 12% to determine the number of CDs that change rooms for this part.