PHYSICAL MODELING IN MATLAB

EXERCISE 3.2

This problem is an extension of problem 3.1. In this problem, the values of A and B will be plotted versus the number of times computed. The values of A will be plotted with red circles; the values of B will be plotted with blue diamonds. Note: The values of A and B will be plotted as they are computed - perhaps not the most efficient way to do this.

Write a script, called *car_loop_graph*, that automatically updates the number of cars in Albany and Boston from one week to the next. The input, A and B, will be the number of cars in Albany and Boston, respectively, at the beginning of the week; the output will be the number of cars that are at each site at the start of the next week given that 5 percent of the cars rented in Albany get returned in Boston and that 3 percent of the cars rented in Boston get returned in Albany.

Refer to Exercise 2.3 for more details.

The MATLAB script *car_loop_graph* contains:

```
% Exercise 3.2 - script car_loop_graph
%
% Refer to Exercise 2.3. This script ultilizes the script written
% for exercise 2.3 but places it in a for loop to run 52 times and
% will plot the value of A (in red circles) and B (in blue diamonds)
% versus the value if i. (The values of A and B will be plotted
% as they are computed.)
%
% Will compute the number of rental cars at Albany and Boston at
% from week to week.
%
% It has been determined that each week 5% of the cars rented in
% Albany are dropped off in Boston and that 3% of the cars rented in
% Boston are dropped off in Albany.
%
% Will use the round function to round the computed number of cars
% at each location to the nearest integer
%
for i = 1:52
    %
    % The number of cars in Albany from week to week is given by the
    % number of cars at the start of the week, minus the number of cars
    % that get returned in Boston, plus the number of cars that were
    % rented in Boston and get returned in Albany
    %
    % A is the number of cars at the start of the week in Albany
    % Anext is the number of cars in Albany at the start of the next
    % week
    Anext = A - A*0.05 + B*0.03;
    %
    % The number of cars in Boston from week to week is given by the
    % number of cars at the start of the week, minus the number of cars
    % that get returned in Albany, plus the number of cars that were
    % rented in Albany that get returned in Boston
    %
```

```
    % B is number of cars at the start of the week in Boston
    % Bnext is the number of cars in Boston at the start of the next
    % week
    Bnext = B - B*0.03 + A * 0.05;
    %
    % Display the number of cars in each location at the start of the
    % next week
    A = round(Anext)
    B = round(Bnext)
    % now plot the values of A and B (individually)
    plot(i,A,'ro')
    hold on;
    plot(i,B,'bd')
end
```

To run:

```
% initialize A and B
A = 150;
B = 150;
% call the script to update the car totals and plot the values
car_loop_graph;
% The displayed values of A and B reflect the new totals
```