Assignment 4 (200 points)
Each question is worth 100 points.

Note, in addition to points being taken off for accuracy, points may also be taken off for lack of organization and failure to use Excel formulas and appropriate Cell referencing/addressing within the spreadsheets.

Instructions:
1. Markov Chain
Start with a Blank Excel file and build the model from scratch.
Question is originally from: April 2014, OR/MS, page 16: http://www.orms-today.org/

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Spy catcher

Your government has lost track of a high profile foreign spy and they have requested your help to track him down. As part of his attempts to evade capture, the spy has employed a simple strategy. Each day the spy moves from the country that he is currently in to a neighboring country.

The spy cannot skip over a country (for example, he cannot go from Chile to Ecuador in one day). The movement probabilities are equally distributed among the neighboring countries. For example, if the spy is currently in Ecuador, there is a 50 percent chance he will move to Colombia and a 50 percent chance he will move to Peru. The spy was last seen in Chile and will only move about countries that are in South America. He has been moving about the countries for several weeks.

Question:

Which country is the spy most likely hiding in and how likely is it that he is there?

Send your answer to puzzlor@gmail.com by June 15. The winner, chosen randomly from correct answers, will receive a $25 Amazon Gift Card. Past questions can be found at puzzlor.com. **OR**MS

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Where is the spy hiding?

Questions: Which country is the spy most likely hiding in and how likely is it that he is there? Also, what is the long-term probability that the spy is in each (individual) country?

2. Simulation
Start with a Blank Excel file and build the model from scratch.
The Harriet Hotel in downtown Boston has 100 rooms that rent for $150 per night. It costs the hotel $30 per room in variable costs (cleaning, bathroom items, etc.) each night a room is occupied. For each reservation accepted, there is a 5% chance that the guest will not arrive. If the hotel overbooks, it costs $200 to compensate guests whose reservations cannot be honored. How many reservations should the hotel accept if it wants to maximize the average daily profit? [Use Microsoft Excel, use Random Numbers to simulate guest show/no-show, create a Data Table, and use 1000 replications.]

Bonus (up to 25 points):
Solve Question 2 using R or Python (or another software of your choice). Submit your code and input/output. Note, there are a number of packages available for either R or Python.