**ECON 327: Advanced Econometrics**

**Problem Set #**

**The Candy Factory**

In the following questions, you will apply knowledge about Bayesian statistics to address different questions. Submit your .do code and your graphs/explanations in a Word or PDF file. A code outline is provided for assistance.

Thomas Bayes hires you at The Bayesian Candy Factory which makes Halloween Candy Boxes that contain a mix of yummy (Y) and crummy (C) candy. You know that each Box is one of three types:

1. 80% Y and 20% C

2. 55% Y and 45% C

3. 30% Y and 70% C.

You open a Box and start munching candies. Let the ith candy you munch be denoted by . Generate one sample Box with 100 candies for each type with a fixed order of munching.

1. Mr. Bayes picks a random box off the shelf and hands you candy one at a time. He wants to know which Box type it is as he hands you the candy.

For each Box, plot the probability of a Box being a specific type given your previous munches, , on a graph. N ranges from 1 to 100. (You should have three graphs and each graph will have three curves).

2. Now, your boss wants to know the probability that the next candy will be yummy (since he wants to eat it).

For each Box, plot the probability that a candy will be yummy or crummy given the already pulled candies, where N ranges from 1 to 99.

3. Suppose your boss says he makes most of the boxes crummy to save money. He tells you that 80% of the boxes are type 3 (30% Y, 70% C) and the rest are evenly divided between type 1 and type 2.

Replot the graphs from question 1, , taking this prior knowledge into account for each of the 3 Boxes. Explain the changes in your results.