CSDS 440: Assignment 6

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Problem 27

Base on *Problem 25*, we now have $P(T = 1, 2) = 0.1$ and $P(T = 3) = 0.8$. Now substitute this finding in to the following equation.

$$P(T = i \mid c_1, \ldots, c_N) = \frac{\prod\limits_{j=1}^{N} P(c_j \mid T = i) \cdot P(T = i)}{\sum\limits_{i \in \{1,2,3\}} \left(\prod\limits_{j=1}^{N} P(c_j \mid T = i) \cdot P(T = i) \right)}$$
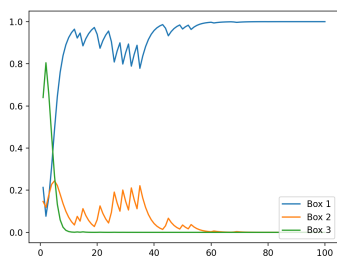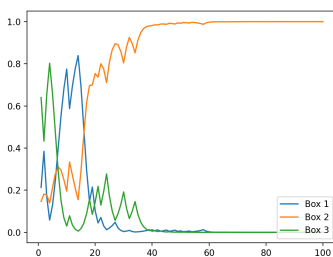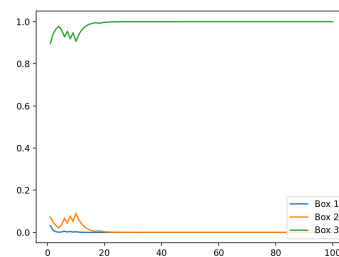

Figure 1: Box 1

Figure 2: Box 2

Figure 3: Box 3

In comparision to *Problem 25*. In *Problem 27* we have each box having an initial probablity of $\{0.1, 0.1, 0.8\}$ instead of $\frac{1}{3}$ in *Problem 25*. Reflecting the setting of the questions.

Also it is observable that as more candies were picked, which box we are picking from becomes clear; reflecting the change of decision boundary. Also, boxes with better similiarity (in terms of candy distribution) with the box we picking from will maintain a higher probablity for a longer period time comparing to boxes lack of similiarity to the box we picking from. e.g. When we are picking from Box 1, Box 2 has a higher probablity than Box 3 for a longer period of time before it goes to 0. This is because Box 1 and Box 2 have similar distribution, while Box 3 has the almost opposite distribution to Box 1.