As250: Stellar Population
Problem set 1 - Intro to probability and Stats

Lucy Jia

Problem 1

(a) Since you are randomly given one from each bag, there are two possible models for this problem: 1. yellow is from 1994 and green is from 1996. 2. yellow if from 1996 and green is from 1994. So we can make a probability table as showed in Table **??**.

Table 1: Probability table for where yellow M&M come from

M&M model	$P(\theta)$	$P(D\|\theta)$	$P(\theta) \times P(D\|\theta)$
yellow-1994, green-1996	0.5	0.2*0.2=0.04	0.5*0.04=0.02
yellow-1996, green-1994	0.5	0.14*0.1=0.014	0.5*0.014=0.007

From Table **??**, we can calculate the relative probability that the yellow M&M came from the 1994 bag is 0.02, compared to the probability that the yellow M&M came from 1996 bag is 0.007.

(b)

$$Evidence = \sum P(\theta) \times P(D|\theta) = 0.02 + 0.007 = 0.027$$

$$\text{Normalized probability : } P(\text{yellow-1994}) = 0.02/0.027 = 0.74$$