Assignment 2 Machine Learning

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Task 1)

a) Let A denote the event that Box 1 is chosen,
B that Box 2 is chosen

So $P(A) = P(B) = \frac{1}{2}$

Let C denote the event that an apple is picked

Here $P(C|A) = \frac{8}{12}$ and $P(C|B) = \frac{10}{12}$

So $P(C) = P(C|A) \cdot P(A) + P(C|B) \cdot P(B)$

$$= \frac{8}{24} + \frac{10}{24} = \frac{9}{12}$$

And $$P(A|C) = \frac{P(C|A) \cdot P(A)}{P(C)} = \frac{\frac{8}{12} \cdot \frac{1}{2}}{\frac{9}{12}}$$

$$= \frac{8}{24} \cdot \frac{12}{9} = \frac{8}{18}$$

b) Let A = Bag 1 from 94, Bag 2 from 96
B = Bag 1 from 96, Bag 2 from 94
C = Yellow from Bag 1, Green from Bag 2

Then $P(C|A) = \frac{20}{100} \cdot \frac{20}{100} = \frac{4}{100}$

$$P(C|B) = \frac{10}{100} \cdot \frac{14}{100} = \frac{14}{1000}$$

$$P(A) = P(B) = \frac{1}{2}$$

$$P(C) = \frac{1}{2} \cdot \frac{4}{100} + \frac{1}{2} \cdot \frac{14}{1000} = \frac{4}{200} + \frac{14}{2000} = \frac{54}{2000}$$

$$= \frac{27}{1000}$$

The prob. , that yellow is from 94 and green from 96 is

$$P(A|C) = \frac{P(C|A) \cdot P(A)}{P(C)}$$

$$= \frac{\frac{4}{100} \cdot \frac{1}{2}}{\frac{27}{1000}} = \frac{4}{200} \cdot \frac{1000}{27}$$

$$= \frac{4000}{5400} = \frac{20}{27}$$