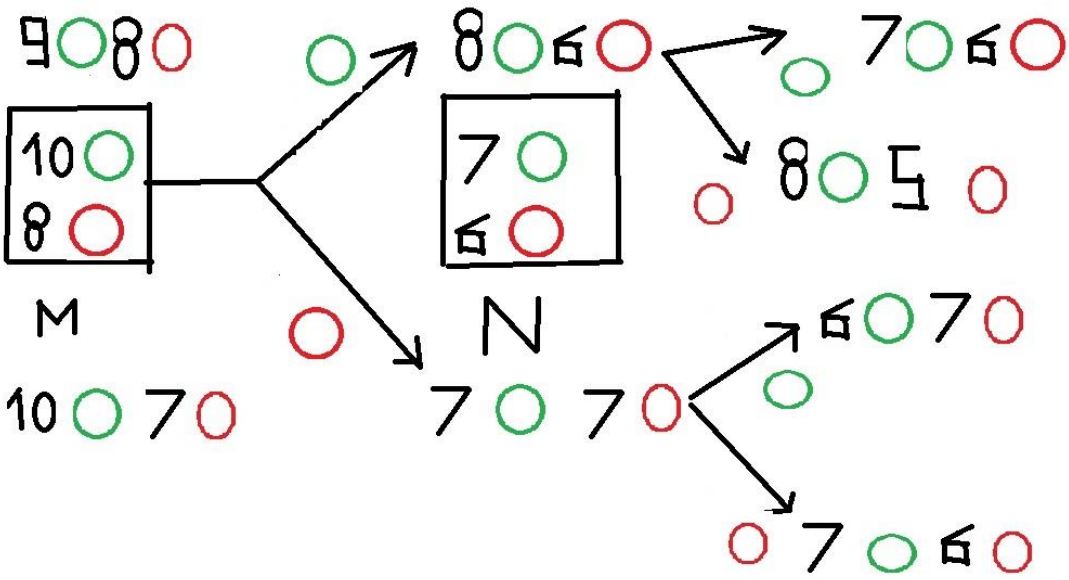
Answer on Question #43463 – Math - Statistics and Probability

Two bags marked M and N contain identical pen drives. Bag M contains 10 green pen drives and 8 red pens drives. Beg N contains 7 green pen drives and 6 red pen drives. A pen drive is randomly selected from bag M and put into bag N. Then, another pen drive is randomly selected from bag N.
(a) If a red pen drive is selected from bag N, find the probability a green pen drive is selected from bag M.

Solution



Let H_1 ="a green pen drive is selected from bag M", H_2 = "a red pen drive is selected from bag M", D="a red pen drive is selected from bag N", $(H_1|D)$ =" a green pen drive is selected from bag M given a red pen drive is selected from bag N"

The corresponding probabilities are $P(H_1) = \frac{10}{18}$, $P(H_2) = \frac{8}{18}$.

By total probability formula, $P(D) = P(D|H_1)P(H_1) + P(D|H_2)P(H_2)$.

By Bayes` formula,

$$P(H_1|D) = \frac{P(D|H_1)P(H_1)}{P(D)} = \frac{P(D|H_1)P(H_1)}{P(D|H_1)P(H_1)+P(D|H_2)P(H_2)} = \frac{\frac{6}{14}*\frac{10}{18}}{\frac{6}{14}*\frac{10}{18}+\frac{7}{14}*\frac{8}{18}} = \frac{60}{60+56} = \frac{60}{116} = \frac{15}{29} \approx 0.52.$$