Suppose we choose 2 balls at random from a box of 6 balls, of which 3 are Red and 3 are Blue.

(1) What is the conditional probability that the 2nd ball is Red, given that the 1st ball is Blue?

$$\mathbb{P}(\textbf{2nd is Red}|\textbf{1st is Blue}) = \frac{3}{5}$$

(2) What is the conditional probability that the 2nd ball is Blue, given that the 1st ball is Blue?

$$\mathbb{P}(\textbf{2nd is Blue}|\textbf{1st is Blue}) = \frac{2}{5}$$

(3) A flu test (correctly) indicates the presence of flu 0.9 of the times when the patient actually has flu (this is called the true positive rate). The same test (incorrectly) indicates the presence of flu 0.1 of the times when flu is not actually present (this is called the false positive rate). Currently 0.1 of the population has the flu. What is the probability that a random person actually has the flu, given that the flu test is positive?

$$\frac{0.9 \cdot 0.1}{0.9 \cdot 0.1 + 0.1 \cdot 0.9} = \frac{1}{2}$$

End of the quiz