Question: Recall the simple example from Appendix A of Module 1. Suppose we have one red and one blue box. In the red box we have 2 apples and 6 oranges, whilst in the blue box we have 3 apples and 1 orange. Now suppose we randomly selected one of the boxes and picked a fruit. If the picked fruit is an orange, what is the probability that it was picked from the blue box?

Answer. The abbreviation used in the answer are:

1. B=Box
2. F=Fruit
3. a=Apple
4. r=Red
5. b=Blue
6. o=Orange

1. Probability of picking red box is: -

   $P(B=r) = 6/10 = 0.6$

2. Probability of picking blue box is: -

   $P(B=b) = 4/10 = 0.4$

   *In the red box we have 2 apples and 6 oranges.

3. Probability of picking apple, given the box is red: -

   $P(F=a|B=r) = 2/8$

4. Probability of picking orange, given the box is red: -

   $P(F=o|B=r) = 6/8$

5. Probability of picking apple, given the box is blue: -

   $P(F=a|B=b) = 3/4$

6. Probability of picking orange, given the box is blue: -

   $P(F=o|B=b) = 1/4$

7. Probability that fruit is orange: -

   $P(F=o) = [p(F=o|B=r)*p(B=r)] + [p(F=o|B=b)*p(B=b)] = 6/10 *3/4 + 4/10*1/4 = 0.55$

   Therefore,

   $p(B=b|F=o) = p(F=o|B=b)*P(B=b)\}\{p(F=o) = (0.4*0.25)/0.55$

   Answer=0.181818