AI1110 Assignment 6

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Question

Two balls are drawn at random with replacement from a box containing 10 black and 8 red balls. Find the probability that
(i) both balls are red.
(ii) first ball is black and second is red.
(iii) one of them is black and other is red.

Solution

Solution:

Let X = outcome of 1st draw and Y = outcome of 2nd draw.

X, Y are elements of set $\{B, R\}$ where B stands for black ball and R stands for red ball.

$$\text{(i) } P(X = R \cap Y = R) = \frac{8}{18} \times \frac{8}{18} = \frac{16}{81} \tag{1}$$

$$\text{(ii) } P(X = B \cap Y = R) = \frac{10}{18} \times \frac{8}{18} = \frac{20}{81} \tag{2}$$

$$\begin{aligned}\text{(iii) } P(X = R \cap Y = B) + P(X = B \cap Y = R) \\ = \frac{8}{18} \times \frac{10}{18} + \frac{10}{18} \times \frac{8}{18} \\ = \frac{40}{81}\end{aligned} \tag{3}$$

Codes

The python code `codes/Q13.py` produces a theoretical probability distribution.