# 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

| No. Of black balls | 10 |
|---|---|
| No. Of red balls | 8 |
| Total balls | 18 |
| | |
| Prob. Of drawing red ball | 8/18 |
| Prob. Of drawing black ball | 10/18 |

## Solution

Solution:

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

$X, Y$ are elements of set $\{0, 1\}$ where 0 denotes black ball and 1 denotes red ball.

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

$$\text{(ii) } P(X = 0, Y = 1) = \frac{10}{18} \times \frac{8}{18} = \frac{20}{81} \tag{2}$$

$$\text{(iii) } P(X = 1, Y = 0) + P(X = 0, Y = 1)$$
$$= \frac{8}{18} \times \frac{10}{18} + \frac{10}{18} \times \frac{8}{18} \tag{3}$$
$$= \frac{40}{81}$$

# Codes

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