Assignment 2

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Question 10: Bag A contains 4 white balls and 3 black balls, while Bag B contains 3 white balls and 5 black balls. Two balls are drawn from Bag A and placed in Bag B. Then, what is the probability of drawing a white ball from Bag B?

Solution: See Tables (I) and (II) for the input

Event	Description
$X_1 = 1$	Both balls drawn are white from bag A
$X_2 = 1$	Both balls drawn are black from bag A
$X_3 = 1$	Balls drawn are white and black from bag A
$X_4 = 1$	Ball drawn from bag B is white

TABLE I

tained from Table (II) as

$$\Pr(X_4 = 1) = \sum_{i=1}^{3} \Pr(X_4 = 1 | X_i = 1) \times \Pr(X_i = 1) \tag{1}$$

$$= \frac{5}{10} \times \frac{^4C_2}{^7C_2} + \frac{3}{10} \times \frac{^3C_2}{^7C_2} + \frac{4}{10} \times \frac{^4C_1 \times {}^3C_1}{^7C_2} \tag{2}$$

$$= \frac{5}{10} \times \frac{4 \times 3}{7 \times 6} + \frac{3}{10} \times \frac{3 \times 2}{7 \times 6} + \frac{4}{10} \times \frac{4 \times 3 \times 2}{7 \times 6} \tag{3}$$

$$= \frac{10}{70} + \frac{3}{70} + \frac{16}{70} \tag{4}$$

$$= \frac{29}{70} \tag{5}$$

Hence, the probability of drawing a white ball from bag B is $\frac{29}{70}$.

Probability	Value
$\Pr(X_1 = 1)$	$\frac{^4C_2}{^7C_2}$
$\Pr(X_2 = 1)$	$\frac{^3C_2}{^7C_2}$
$\Pr(X_3 = 1)$	$\frac{^4C_1 \times {}^3C_1}{^7C_2}$
$\Pr(X_4 = 1 | X_1 = 1)$	$\frac{5}{10}$
$\Pr(X_4 = 1 | X_2 = 1)$	$\frac{3}{10}$
$\Pr(X_4 = 1 | X_3 = 1)$	$\frac{4}{10}$
$\Pr(X_4 = 1)$	?

TABLE II

probabilities. The desired probability is then ob-