

Assignment3

CS20Btech11035 -NYALAPOGULA MANASWINI

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<https://github.com/N-Manaswini23/assignment3/blob/main/assignment3.py>

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GATE XE-C QUESTION 17

Box-S has 2 white and 4 black balls and box-T has 5 white and 3 black balls. A ball is drawn at random from box-S and put in box-T. Subsequently, the probability of drawing a white ball from box-T is? (rounding off to 2 decimal places)

SOLUTION

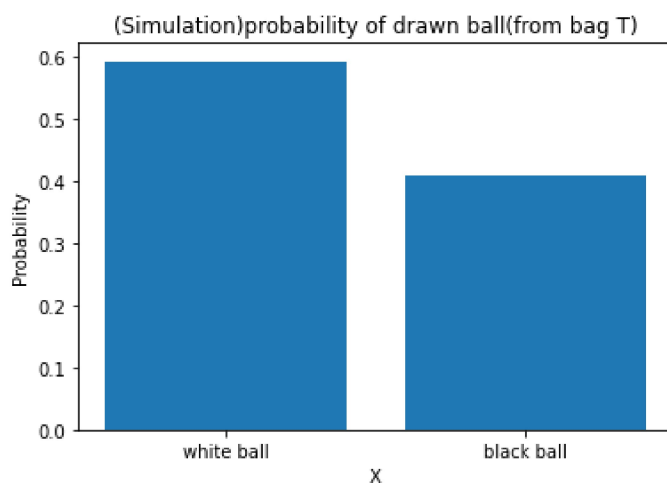
Box-S has 2 white and 4 black balls.

Box-T has 5 white and 3 black balls.

Let A : Event of transferring white ball from box-S to box-T

Let B : Event of transferring black ball from box-S to box-T

Let C: Event of drawing white ball from box-T



$\Pr(C|A)$ =Probability of drawing whiteball from box-T after transferring white ball to box-T.

$\Pr(C|B)$ =Probability of drawing whiteball from box-T after transferring black ball to box-T.

Probability	$\Pr(A)$	$\Pr(B)$	$\Pr(C A)$	$\Pr(C B)$
value	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{6}{9}$	$\frac{5}{9}$

TABLE 0: Table 1

From Baye's theorem

$$\begin{aligned}\Pr(\text{drawn ball is white}) &= \Pr(C) & (0.0.1) \\ &= \Pr(C|A) \times \Pr(A) \\ &\quad + \Pr(C|B) \times \Pr(B) & (0.0.2)\end{aligned}$$

Substiting values from table (0) in (0.0.2)

$$\begin{aligned}\Pr(C) &= \frac{6}{9} \times \frac{1}{3} + \frac{5}{9} \times \frac{2}{3} & (0.0.3) \\ &= \frac{16}{27} & (0.0.4)\end{aligned}$$

\therefore Probability of drawing white ball from box-T = $\Pr(C) = \frac{16}{27} = 0.59$

