Assignment3

CS20Btech11035 -NYALAPOGULA MANASWINI

Download python code from

https://github.com/N−Manaswini23/assignment3/blob/main/assignment3.py

Download latex code from

https://github.com/N−Manaswini23/assignment3/blob/main/assignment3.tex

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 2decimal places)

SOLUTION

Box-S has 2 white and 4 black balls.
Box-T has 5 white and 3 black balls.

Event	definition
A	Event of transfering white ball from box-S to box-T
B	Event of transfering black ball from box-S to box-T
C	Event of drawing white ball from box-T
$\Pr(C\|A)$	Probability of drawing whiteball from box-T after transfering white ball to box-T.
$\Pr(C\|B)$	Probability of drawing whiteball from box-T after transfering black ball to box-T.

TABLE 0: Table 1

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 2

From Baye's theorem

$$\Pr(\text{drawn ball is white}) = \Pr(C) \tag{0.0.1}$$
$$= \Pr(C|A) \times \Pr(A) + \Pr(C|B) \times \Pr(B) \tag{0.0.2}$$

Substiting values from table (0) in (0.0.2)

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

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