# 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-0 has 2 white and 4 black balls.
Box-1 has 5 white and 3 black balls.

| Event | definition |
|---|---|
| W | Event of transfering white balls from box-0 to box-1 |
| B | Event of transfering black balls from box-0 to box-1 |
| C | Event of drawing white balls from box-1 |
| $\Pr(W=1)$ | Probability of transfering one whiteball from box-0 to box-1 |
| $\Pr(B=1)$ | Probability of transfering one blackball from box-0 to box-1 |
| $\Pr(C=1\|W=1)$ | Probability of drawing a whiteball from box-1 after transfering white ball to box-1. |
| $\Pr(C=1\|B=1)$ | Probability of drawing a whiteball from box-1 after transfering black ball to box-1. |

TABLE 0: Table 1

| Probability | value |
|---|---|
| $\Pr(W=1)$ | $\frac{1}{3}$ |
| $\Pr(B=1)$ | $\frac{2}{3}$ |
| $\Pr(C=1\|W=1)$ | $\frac{6}{9}$ |
| $\Pr(C=1\|B=1)$ | $\frac{5}{9}$ |

TABLE 0: Table 2

$$\Pr(\text{drawn ball is white}) = \Pr(C=1) \tag{0.0.1}$$

(0.0.2)

From Baye's theorem

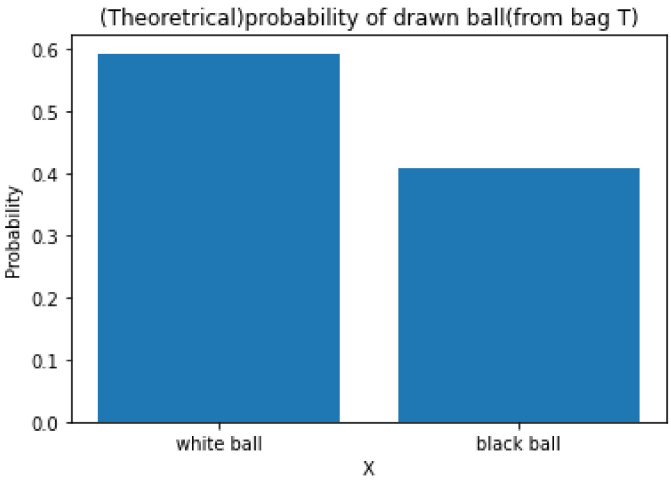
$$\Pr(C=1) = \Pr(C=1|W=1)\times\Pr(W=1) + \Pr(C=1|B=1)\times\Pr(B=1) \tag{0.0.3}$$

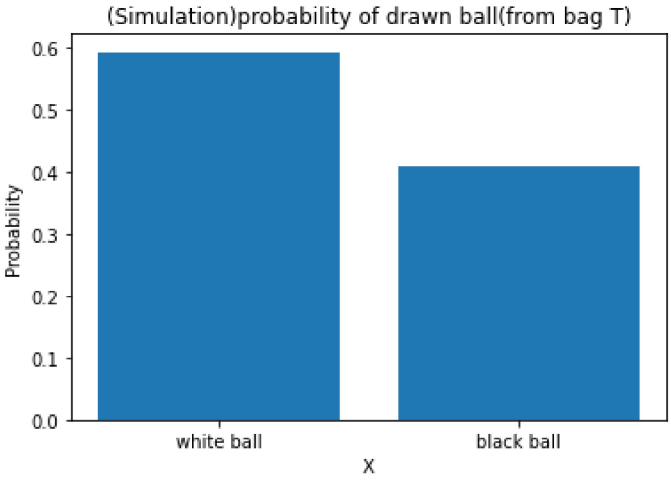
Substiting values from table (0) in (0.0.3)

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

$$= \frac{16}{27} \tag{0.0.5}$$

$\therefore$ Probability of drawing white ball from box-1 $= \Pr(C=1) = \frac{16}{27} = 0.59$
P.T.O


(Theoretrical)probability of drawn ball(from bag T)
Probability
0.0
0.1
0.2
0.3
0.4
0.5
0.6
white ball
black ball
X


(Simulation)probability of drawn ball(from bag T)
Probability
0.0
0.1
0.2
0.3
0.4
0.5
0.6
white ball
black ball
X