Assignment 11

Satya Sangram Mishra

Download all python codes from

https://github.com/satyasm45/Summer−Internship/tree/main/Assignment−11/Codes

and latex-tikz codes from

https://github.com/satyasm45/Summer−Internship/tree/main/Assignment−11

1 Question No. 2.1

Bag I contains 3 red and 4 black balls and Bag II contains 4 red and 5 black balls. One ball is transferred from Bag I to Bag II and then a ball is drawn from Bag II. The ball so drawn is found to be red in colour. Find the probability that the transferred ball is black.

2 Solution

Let the input variables $X \in \{0,1\}$ and $Y \in \{0,1\}$ be defined according to the table 2.1 .

Input Variable	Value	Description
X	0	Ball drawn from Bag II is Red
	1	Ball drawn from Bag II is Black
Y	0	Transferred ball from Bag I is Red
	1	Transferred ball from Bag I is Black

TABLE 2.1: Input Variables

Given data of the question in terms of probability is presented in the table 2.2 . Hence,probability that the transferred ball from Bag I is Black given that the ball drawn from Bag II is Red is,

S.No.	Expression	Value
1.	$\Pr(X=0\|Y=0)$	$\frac{1}{2}$
2.	$\Pr(X=0\|Y=1)$	$\frac{4}{10}=\frac{2}{5}$
3.	Pr(Y=0)	$\frac{3}{7}$
4.	Pr(Y=1)	$\frac{4}{7}$

TABLE 2.2: Given Data

$$\Pr(Y=1|X=0)=\frac{\Pr(X=0|Y=1)\Pr(Y=1)}{\sum_{i=0}^{1}\Pr(X=0|Y=i)\Pr(Y=i)} \tag{2.0.1}$$

$$=\frac{\frac{2}{5}\times\frac{4}{7}}{\frac{1}{2}\times\frac{3}{7}+\frac{2}{5}\times\frac{4}{7}} \tag{2.0.2}$$

$$=\frac{16}{31} \tag{2.0.3}$$