

Assignment 4

Sujal - AI20BTECH11020

Download all python codes from

https://github.com/sujal100/Probability_and_Random_variable/tree/main/exercise_4/codes

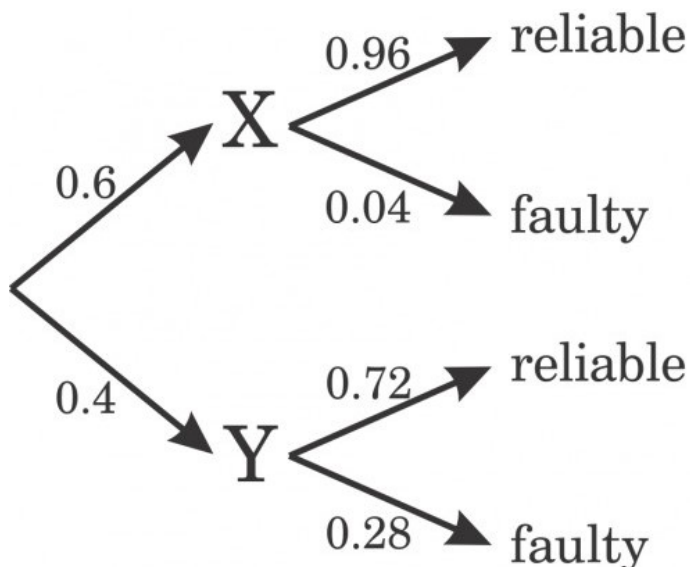
and latex codes from

https://github.com/sujal100/Probability_and_Random_variable/blob/main/exercise_4/exercise_4_main_tex.tex

1 PROBLEM [GATE(2012)CS-63]

An automobile plant contracted to buy shock absorbers from two suppliers X and Y. X supplies 60% and Y supplies 40% of the shock absorbers. All shock absorbers are subjected to a quality test. The ones that pass the quality test are considered reliable. Of X's shock absorbers, 96% are reliable. Of Y's shock absorbers, 72% are reliable. The probability that a randomly chosen shock absorber, which is found to be reliable, is made by Y is (A) 0.288 (B) 0.334 (C) 0.667 (D) 0.720

2 SOLUTION



	Refer to probability that product	Result
$Pr(X = 1)$	from supplier X	0.6
$Pr(Y = 1)$	from supplier Y	0.4
$Pr(R = 1)$	is reliable	
$Pr(R = 0)$	is faulty	
$Pr(R = 1/X = 1)$	from supplier X is reliable	0.96
$Pr(R = 1/Y = 1)$	from supplier Y is reliable	0.72

TABLE 0: probability of random variables.

Let Consider, Bernoulli random variables say X, Y and R . Required probability is $Pr(Y = 1|R = 1)$. So,

$$Pr(Y = 1|R = 1) = \frac{Pr(Y = 1, R = 1)}{Pr(R = 1)} \quad (2.0.1)$$

$$= \frac{Pr(Y = 1)Pr(R = 1/Y = 1)}{Pr(X = 1)Pr(R = 1/X = 1) + Pr(Y = 1)Pr(R = 1/Y = 1)} \quad (2.0.2)$$

$$= \frac{(0.4)(0.72)}{(0.6)(0.96) + (0.4)(0.72)} = 0.334 \quad (2.0.3)$$

Hence (B) is correct option.

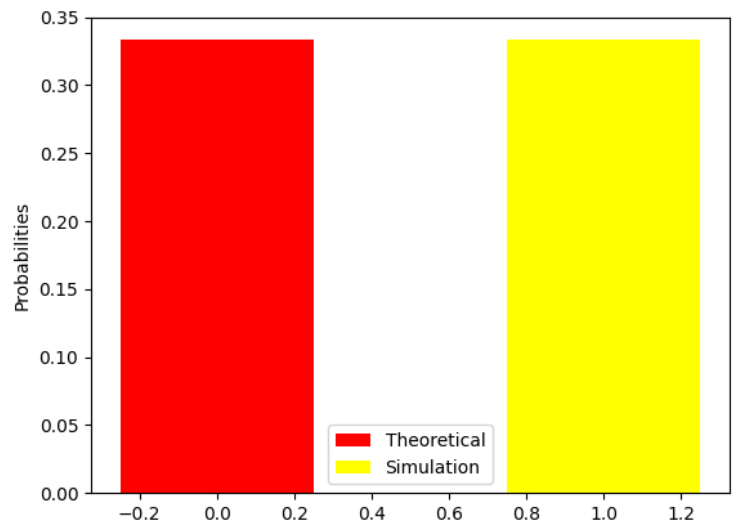


Fig. 0: Theoretical Vs Simulation