Assignment1

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CS20BTECH11012

March 2021

Q 1.17 Determine P(E/F), if two coins are tossed once, where
(i) E : tail appears on one coin, F : one coin shows head
(ii) E : no tail appears, F : no head appears

solution
(i) Let X denotes the number of heads shown up during the simultaneous toss of two coins,so

$$P(F) = P(X \geq 1) = P(X = 1) + P(X = 2)$$

By binomial distribution

$$P(X = 1) = \binom{2}{1}\left(\frac{1}{2}\right)^2$$

$$P(X = 2) = \binom{2}{2}\left(\frac{1}{2}\right)^2$$

$$\text{hence} P(F) = \binom{2}{1}\left(\frac{1}{2}\right)^2 + \binom{2}{2}\left(\frac{1}{2}\right)^2$$

$$P(F) = \frac{1}{2} + \frac{1}{4} = \frac{3}{4}$$

$$P(EF) = P(X = 1) = \binom{2}{1}\left(\frac{1}{2}\right)^2$$

$$P(EF) = \frac{1}{2}$$

$$P(E/F) = \frac{2}{3}$$

(ii)
$$P(F) = P(X = 2) = \binom{2}{2}\left(\frac{1}{2}\right)^2 = \frac{1}{4}$$

$$P(EF) = 0$$

$$P(E/F) = 0$$