Assignment1

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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
where $i = 1, j = 2$ n : number of coins = 2 and p: the probability of getting a head is $\frac{1}{2}$ By binomial distribution

$$\begin{aligned} P(F) &= P(X \geq 1) \\ &= P(X = i) + P(X = j) \quad (1) \end{aligned}$$

$$P(X = i) = \binom{n}{i} p^2 \quad (2)$$

$$P(X = j) = \binom{n}{j} p^2 \quad (3)$$

$$\text{hence} P(F) = \binom{n}{i} p^2 + \binom{n}{j} p^2 \quad (4)$$

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

$$P(EF) = P(X = i) = \binom{n}{i} p^2 \quad (5)$$

$$P(EF) = \frac{1}{2} \quad (6)$$

$$P(E/F) = \frac{2}{3} \quad (7)$$

X	0	1	2
P(X)	$\binom{2}{0}(0.5)^2 = \frac{1}{4}$	$\binom{2}{1}(0.5)^2 = \frac{1}{2}$	$\binom{2}{2}(0.5)^2 = \frac{1}{4}$

Table 1: Probability of number of heads shown on the coins

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$$\begin{aligned} P(F) &= P(X = k) \\ &= \binom{n}{k} p^2, k = 2 \\ &= \frac{1}{4} \quad (8) \end{aligned}$$

$$P(EF) = 0 \quad (9)$$

$$P(E/F) = 0 \quad (10)$$