

# AI1103 : Assignment 1

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Download all python codes from

<https://github.com/Manojbhargav1305/AI1103/tree/main/Assignment1/codes>

and latex codes from

<https://github.com/Manojbhargav1305/AI1103/blob/main/Assignment1/Assignment1.tex>

$$\begin{aligned}
 Pr(H = 1|M = 1) &= \frac{Pr(M = 1|H = 1) \cdot Pr(H = 1)}{\sum_{i=0}^1 Pr(M = 1|H = i) \cdot Pr(H = i)} \\
 &= \frac{Pr(M = 1|H = 1) \cdot Pr(H = 1)}{Pr(M = 1|H = 1) \cdot Pr(H = 1) + Pr(M = 1|H = 0) \cdot Pr(H = 0)} \\
 &= \frac{0.3 \cdot 0.4}{0.3 \cdot 0.4 + 0.6 \cdot 0.7} \\
 &= \frac{12}{54} \\
 &= 0.23
 \end{aligned}$$

## PROBLEM(2.8)

Two groups are competing for the position on the board of directors of a corporation. The probabilities that the first and the second groups will win are 0.6 and 0.4 respectively. Further, if the first group wins, the probability of introducing a new product is 0.7 and the corresponding probability is 0.3 if the second group wins. Find the probability that the new product introduced was by the second group.

The probability that the new product introduced by the second group B is 0.23.

## SOLUTION

Let  $H \in \{0, 1\}$  be the random variable denoting which the group A wins, with  $H = 0$  representing group A wins. Let  $M \in \{0, 1\}$  be the random variable denoting whether the product being introduced, with  $M = 0$  representing that the product is not introduced by A. We are given that:

$$Pr(H = 0) = 0.6$$

$$Pr(M = 1|H = 0) = 0.42$$

$$Pr(M = 1|H = 1) = 0.12$$

, by Bayes Theorem, we say that:

TABLE 0

	$H = 0$	$H = 1$
$M = 0$	0	0.12
$M = 1$	0.42	0