Assignment 4

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Download all python codes from

https://github.com/tyagio/AI1103/tree/main/assignment4/codes

and latex-tikz codes from

https://github.com/tyagio/AI1103/tree/main/assignment4/assignment4.tex

1 Problem

P and Q are considering to apply for a job.The probability that P applies for the job is 1/4 ,the probability that P applies for the job given that Q applies for the job is 1/2, and the probability that Q applies for the job given that P applies for the job is 1/3.Then the probability that P does not apply for the job given that Q does not apply for the job is

(A) 4/5 (B)5/6 (C)7/8 (D)11/12

2 Solution

Let A be the event that P is applying for the job.
Let B be the event that Q is applying for the job.
Using values given in question

$$\Pr(B|A) = \frac{\Pr(AB)}{\Pr(A)} \tag{2.0.1}$$

$$\implies \Pr(AB) = \frac{1}{12} \tag{2.0.2}$$

$$\Pr(A|B) = \frac{\Pr(AB)}{\Pr(B)} \tag{2.0.3}$$

$$\implies \Pr(B) = \frac{1}{6} \tag{2.0.4}$$

TABLE 0: Probability for random variables

$\Pr(A)$	1/4	$\Pr(B)$	1/6
$\Pr(A\|B)$	1/2	$\Pr(B\|A)$	1/3
$\Pr(AB)$	1/12		

Now using above values and De Morgan's Laws

$$\Pr(A'|B') = \frac{\Pr(A'B')}{\Pr(B')} \tag{2.0.5}$$

$$\implies \frac{1-\Pr(A+B)}{1-\Pr(B)} \tag{2.0.6}$$

$$\implies \frac{1-\Pr(A)-\Pr(B)+\Pr(AB)}{1-\Pr(B)} \tag{2.0.7}$$

$$\implies \Pr(A'|B') = \frac{4}{5} \tag{2.0.8}$$

The probability that P doesn't apply given Q doesn't apply is 0.8