Assignment 1

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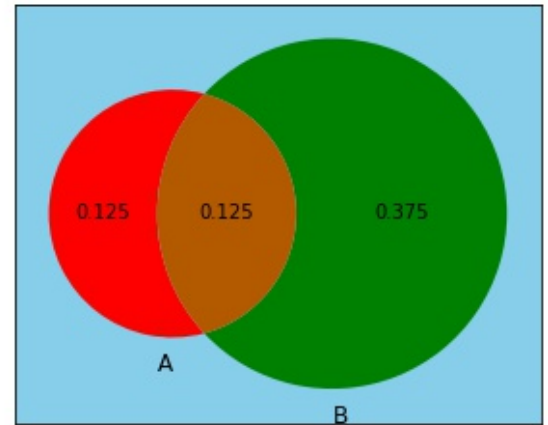
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1 PROBLEM

If A and B are two events such that $\Pr(A) = \frac{1}{4}$, $\Pr(B) = \frac{1}{2}$ and $\Pr(AB) = \frac{1}{8}$. find $\Pr(notAandnotB)$.

2 SOLUTION

$\Pr(notAandnotB)$ is equivalent to $\Pr(A'B')$.
from De-morgan's law,

$$(A'B') = (A + B)' \qquad (2.0.1)$$
$$(2.0.2)$$

So,

$$\Pr(A'B') = \Pr((A + B)') \qquad (2.0.3)$$
$$\Pr((A + B)') = 1 - \Pr(AB) \qquad (2.0.4)$$
$$= 1 - (\Pr(A) + \Pr(B) - \Pr(AB)) \qquad (2.0.5)$$
$$= 1 - \left(\frac{1}{4} + \frac{1}{2} - \frac{1}{8}\right) \qquad (2.0.6)$$
$$= \frac{3}{8} \qquad (2.0.7)$$
$$(2.0.8)$$

Therefore,

$$\Pr((A + B)') = \frac{3}{8} \qquad (2.0.9)$$
$$\implies \Pr(A'B') = \frac{3}{8} \qquad (2.0.10)$$
$$(2.0.11)$$

So, $\Pr(\text{not A and not B}) = \frac{3}{8}$

Here,The sky blue colored region is the required and that is $\Pr(\text{not A and not B})$.