Assignment 1

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Download all python codes from

https://github.com/sachinkarumanchi/probability_and_random_variables/blob/assignment1/assignment1.py

and latex-tikz codes from

https://github.com/sachinkarumanchi/probability_and_random_variables/blob/assignment1/Assignment1.tex

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

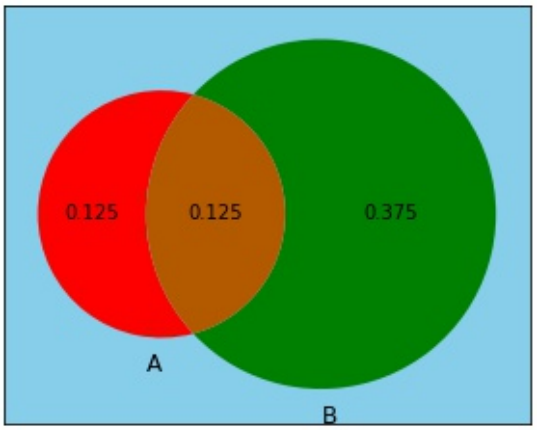
$\Pr(notAandnotB)$ is equivalent to $\Pr(A'B')$.
from De-morgan's law,

$$(A'B') = (A+B)' \tag{2.0.1}$$
$$So, \Pr(A'B') = \Pr((A+B)') \tag{2.0.2}$$
$$\Pr((A+B)') = 1 - \Pr(AB) \tag{2.0.3}$$
$$= 1 - (\Pr(A) + \Pr(B) - \Pr(AB)) \tag{2.0.4}$$
$$= 1 - \left(\frac{1}{4} + \frac{1}{2} - \frac{1}{8}\right) \tag{2.0.5}$$
$$= \frac{3}{8} \tag{2.0.6}$$
$$\tag{2.0.7}$$

Therefore,

$$\Pr((A+B)') = \frac{3}{8} \tag{2.0.8}$$
$$\implies \Pr(A'B') = \frac{3}{8} \tag{2.0.9}$$
$$\tag{2.0.10}$$

So, $\Pr(notAandnotB) = \frac{3}{8}$



Here,The sky blue colored region is the required and that is $\Pr(notAandnotB)$