AI1103-Assignment 1

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Download all python codes from

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https://github.com/Sravanth-k27/AI1103-Assignment-1/Codes
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and latex-tikz codes from

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https://github.com/Sravanth-k27/AI1103-Assignment-1/Assignment-1.tex
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QUESTION(2.13):

A die is thrown three times. Events A and B are defined as below:

1) A : 4 on the third throw.
2) B : 6 on the first and 5 on the second throw.

Find the probability of A given that B has already occurred?

SOLUTION(2.13):

1) Probability of happening of event A =P(A)
$$P(A) = \frac{1}{6} \tag{0.0.1}$$
2) Probability of happening of event B =P(B)
$$P(B) = \frac{1}{6} \times \frac{1}{6} = \frac{1}{36} \tag{0.0.2}$$
Since event A depends on third throw and event B depends on first and second throws.So occurrence of event A doesn't influence the event B.As well as occurrence of event B doesn't influence the event A.So events A,B are independent.
We know that for independent events
$$\rightarrow P(AB) = P(A)P(B) = \frac{1}{6} \times \frac{1}{36} = \frac{1}{216} \tag{0.0.3}$$
Since we have to find probability of A given that event B has already happened.
So we have find conditional probability that is $P(A|B)$
By Bayes rule,
3) $P(A|B) = \frac{P(AB)}{P(B)}$ From 0.0.2 and 0.0.3 we get
$$P(A|B) = \frac{P(AB)}{P(B)} = \frac{(\frac{1}{216})}{(\frac{1}{36})} = \frac{1}{6}$$
so
$$P(A|B) = \frac{1}{6} \tag{0.0.4}$$

Therefore probability of A given that B has already happened is $\frac{1}{6}$