AI1103 ASSIGNMENT 1

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Download all the python code from $https$: $//github.com/sachinkarumanchi/probability_and_random_variables/blob/assignment1/assignment1.py$ and the latex-tikz code from

1 Problem-2.16

An urn contains 10 black and 5 white balls.Two balls are drawn from the urn one after the other without replacement.What is the probability that both balls are black?

2 Solution-2.16

Let's take two events A and B.
A:The first ball is black
B:The second ball is black
We are required to find the probability of both the first and second balls to be black.
The required probability is $P(A \cap B)$.
The probability of taking first ball as black will be,

$$P(A) = \frac{10}{15} = \frac{2}{3} \tag{2.0.1}$$

The probability of event B to be true given A is true(taking a black ball from 9 black and 5 white balls containing urn) will be,

$$P(B|A) = \frac{9}{14} \tag{2.0.2}$$

By the definition of conditional probability,

$$P(B|A) = \frac{P(A \cap B)}{P(A)} \tag{2.0.3}$$

$$\implies P(A \cap B) = \frac{3}{7} = 0.428571428571.. \tag{2.0.4}$$

Hence,the required probability is 0.428571