

# AI1110 ASSIGNMENT-2

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**Abstract—This document contains the solution for Assignment 1 ( ICSE 12 2018, Question 1x)**

## I. QUESTION 1X

In a race, the probabilities of A and B winning the race are  $\frac{1}{3}$  and  $\frac{1}{6}$  respectively. Find the probability of neither of them winning the race ?

## II. SOLUTION

Given,

$$P(A) = \frac{1}{3} \quad (1)$$

$$P(B) = \frac{1}{6} \quad (2)$$

We know that,

The Probability of two independent events A and B occurring simultaneously is given by the expression

$$P(A \cap B) = P(A)P(B) \quad (3)$$

From the above venn diagram, we can clearly see that,

$$P(\bar{A} \cap \bar{B}) = 1 - P(A) - P(B) + P(A \cap B) \quad (4)$$

(since,  $P(A \cap B)$  is removed twice, we need to add it once)

Now putting (1), (2), (3) in (4), we get

$$P(\bar{A} \cap \bar{B}) = 1 - \frac{1}{3} - \frac{1}{6} + \frac{1}{3} \times \frac{1}{6} \quad (5)$$

$$P(\bar{A} \cap \bar{B}) = 1 - \frac{1}{3} - \frac{1}{6} + \frac{1}{18} \quad (6)$$

$$P(\bar{A} \cap \bar{B}) = 1 - \frac{8}{18} \quad (7)$$

$$P(\bar{A} \cap \bar{B}) = \frac{10}{18} \quad (8)$$

so, The probability of neither of them winning the race is  $\frac{10}{18}$