

AI1103-Assignment 1

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Download all python codes from

<https://github.com/asishcs2011010/demo/blob/main/assignment-1/assignment-1.py>

and latex-tikz codes from

<https://github.com/asishcs2011010/demo/blob/main/assignment-1/assignment.tex>

QUESTION

A box of oranges is inspected by examining three randomly selected oranges drawn without replacement. if all the three oranges are good, the box is approved for sale, otherwise, it is rejected. find the probability that a box containing 15 oranges out of which 12 are good and 3 are bad ones will be approved for sale

SOLUTION

Given, there are 15 orange out of which 12 are good one sand 3 are bad

- 1) Let A be the event of getting good orange from the first draw (oranges are drawn without replacement)

$$Pr(A) = \frac{\text{number of good oranges in box}}{\text{total number of oranges in box}} \quad (0.0.1)$$

$$Pr(A) = \frac{12}{15} = 0.8 \quad (0.0.2)$$

- 2) let B be the event of getting good orange from the second draw (oranges are drawn without replacement)

$$Pr(B) = \frac{\text{number of good oranges in box}}{\text{total number of oranges in box}} \quad (0.0.3)$$

$$Pr(B) = \frac{11}{14} = 0.7857 \quad (0.0.4)$$

- 3) let C be the event of getting good orange from the third draw (oranges are drawn without replacement)

$$Pr(C) = \frac{\text{number of good oranges in box}}{\text{total number of oranges in box}} \quad (0.0.5)$$

$$Pr(C) = \frac{10}{13} = 0.7692 \quad (0.0.6)$$

now as A,B,C are independent events(occurrence of one does not effect the outcome of other)

For approval to sale, we need 3 oranges to be good
so, we need events A,B,C to occur.

$$Pr(A \cap B \cap C) = Pr(A) \cdot Pr(B) \cdot Pr(C)$$

$$Pr(A \cap B \cap C) = (0.8) * (0.7857) * (0.7692) = 0.4835$$

The probability that a box containing 15 oranges out of which 12 are good and 3 are bad ones will be approved for sale = 0.4835