

AI1103-Assignment 1

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Download all python codes from

<https://github.com/DineshAvulaMohanaDurga/AI1103/tree/main/codes>

and latex codes from

<https://github.com/DineshAvulaMohanaDurga/AI1103/blob/main/main.tex>

So the probability that 10 items does not have more than 1 defective item

$$= (0.95)^{10} + {}^{10}C_1 \times (0.95)^9 \times (0.05) \\ = 0.9139 \\ = 91.39\%$$

\therefore the probability of n mutually exclusive events such that one of them happens
 $= p_1 + p_2 + \dots + p_{n-1} + p_n$

\therefore the the probability that 10 items does not have more than 1 defective item is 91.39%

1 PROBLEM 1.10

Given Question:-

There are 5% defective items in a large bulk of items. What is the probability that a sample of 10 items will not contain more than one defective items.

Given data:-

Given percentage of defective items in a bunch of items = 5

$$\Rightarrow \text{probability of an item to be defective} = 5\% \\ = 0.05 \\ \Rightarrow \text{probability of an item to be non-defective} = 95\% \\ = 1 - 0.05$$

Required to find :- Probability that a sample of 10 items will not contain more than 1 defective items. Lets assume that we are given 10 items.

probability that all of them are non defective = $(0.95)^{10}$

\therefore probability of n independent events happening simultaneously = $p_1 \times p_2 \times \dots \times p_{n-1} \times p_n$

probability that one of them is defective = ${}^{10}C_1 \times (0.95)^9 \times (0.05)$

- here ${}^{10}C_1$ indicates choosing one out of 10 items which is defective
- 0.05 indicates the probability that the chosen item to be defective
- $(0.95)^9$ indicates the probability that the rest 9 items are non-defective
- \therefore probability of n independent events happening simultaneously = $p_1 \times p_2 \times \dots \times p_{n-1} \times p_n$