$$P(K \text{ and } 8) = P(K) * P(8/K)$$

$$= \frac{4}{52} * \frac{4}{51}$$

$$= 0.07$$

$$= 7\% \text{ chance.}$$

Permutation and Combinations (P&C)

Ex:- Dosa, Idly, Vada, Puri

Dosa Idly	Vada Dosa
Dosa Vada	Vada Idly
Idly Dosa	Vada Puri
Idly Vada	Puri Dosa
Idly Puri	Puri Vada
Dosa Puri	Puri Idly

Permutation :-

$$^{n}P_{r} = \frac{n!}{(n-r)!} = \frac{4!}{(4-2)!} = \frac{4 \times 3 \times 2!}{2!} = 12$$

n = no. of items
r = no. of set of items

Definition of P&C :-

Permutations are about arranging a set of items in a specific order, while combinations are about selecting items from a set. where the orders does not matter.

⇒ Permutation :- refers to to the different way in which a set of items can be arranged in orde and permutation, the orders of the items matte but not items.

Combination:-

Dosa Idly
Dosa vada
Dosa puri
Idly vada
Idly puri
vada puri

$$n_{C_r} = \frac{n!}{(n-r)!\,r!}$$

$n = 4$
$r = 2$

$$n_{C_r} = \frac{4!}{(4-2)!\,2!} = \frac{4 \times 3 \times 2!}{2!\,2!} = \frac{12}{2} = 6$$

⇒ It refers to the different way of selecting item from a set where the order of selection doesn't not matters, but items should not repeat.

Hypothesis Testing:- It is based on P-values.

→ Null Hypothesis [H_0 / H_N]

→ Alternative (H_1 / H_A) Hypothesis

⇒ Null Hypothesis :- True statement

Ex:- H_0 : The avg height of Indian man is 5.7

→ Alternative Hypothesis:- [Accept or Reject H_0]

H_A : NO .... O... is not 5.7 (for above state)

H_0 :- True Statement

H_A :- It will helps to find either we have to accept (or) reject H_0.

P-value

P-value :-

If $p <= \alpha$ we can reject H_0

If $p > \alpha$ we can have to accept the H_0.

⇒ Accept and rejection based on the p-value.

α :- significance value

CI :- Confidence Interval

$\alpha = 1 - CI$

If CI is 68%, what is the α is 0.32

for 95%

$\alpha = 1 - 0.95$

$\alpha = 0.05$

If CI is 95% then α is 0.05

If CI is 99.7% then α is 0.003

for 83%

$\alpha = 1 - 0.83$

$\alpha = 0.17$

$CI = 1$

default Interval is 95%

P-value formula :-

$$Z = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0(1-P_0)}{n}}}$$

$\hat{P}$ – Sample proportion

P_0 – Assumed population proportion in the H_0

n – Sample Size.

⇒ Hypothesis Testing is a framework for making inferences about data and models in machine learning. It helps in modern Evaluation, feature selection, asumption Validation and Ensuring the robustness and reliability of Conclusions drawn from a models

(Taken)

→ Type I and Type II Error :-

In Reality H_0 is True, Decision made on H_0 is True.

R H_0 is True, D H_0 is False → Type I Error

R H_0 is False, D H_0 is True → Type II Error

R H_0 is False, D H_0 is False ⇒ ✓

Type I Error :-

If you failed to accept the null hypothesis H_0 is type I error.

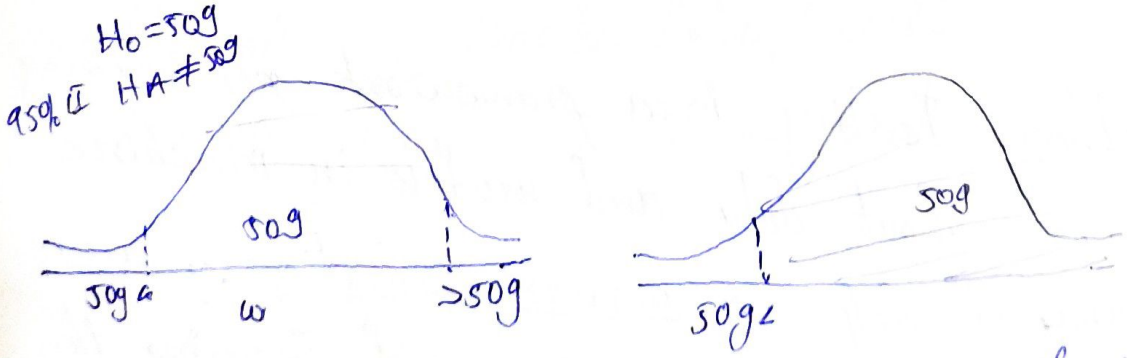
Type II Error :-

If you failed to reject the null hypothesis, H_0 is type II error and it is most dangerous.

One tail test and two tail test :-

H_0 :- The chips packet weight is 50g

H_A :- The chips packet weight is not 50g



H_0 : The chips packet weight is more than 50g

H_A :- No the chips packet weight is not more than 50g - one tail