statistics

Definition:- field of collection, organization, analysis, interpretation and presentation of the data.

Type of Statistics

Descriptive stats

It is consist of organize and summerize of data

1. measure of center Tendency
2. measure of Dispersion
3. measure of shape
4. measure of position

Inferential stats

collection data
↓
Conclusion or influence by using some experiment

Z-test, t-test,

F-test, chi-square

↓

Population / Sample

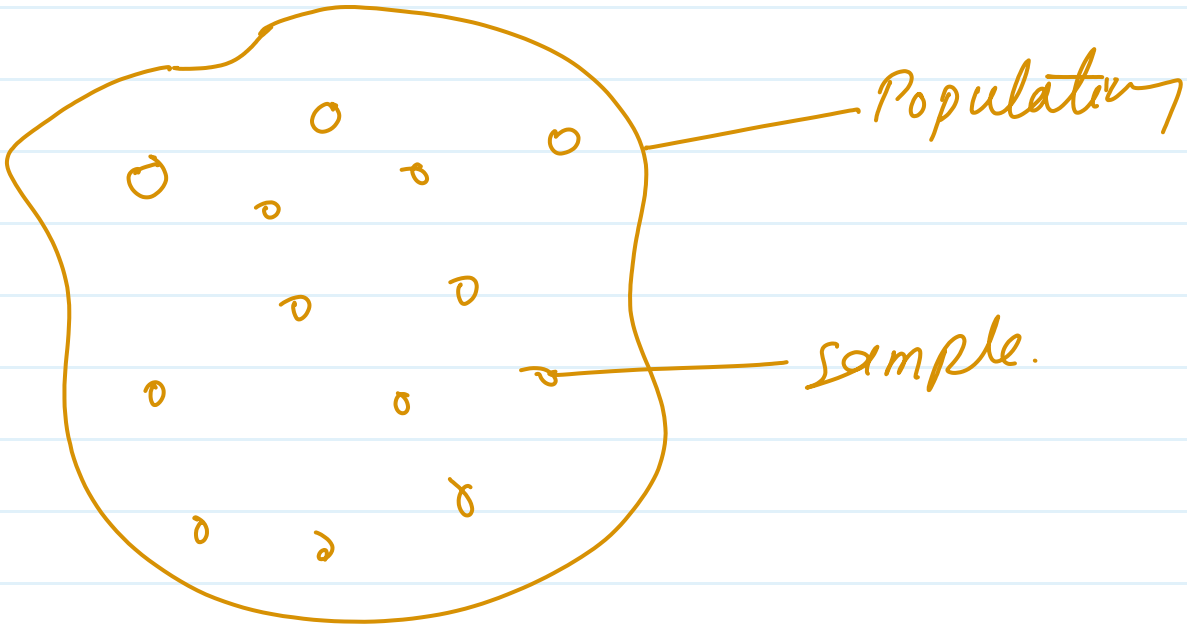
Hypothesis testing.

H_0 / H_L

Population

→ Entire data available is a population

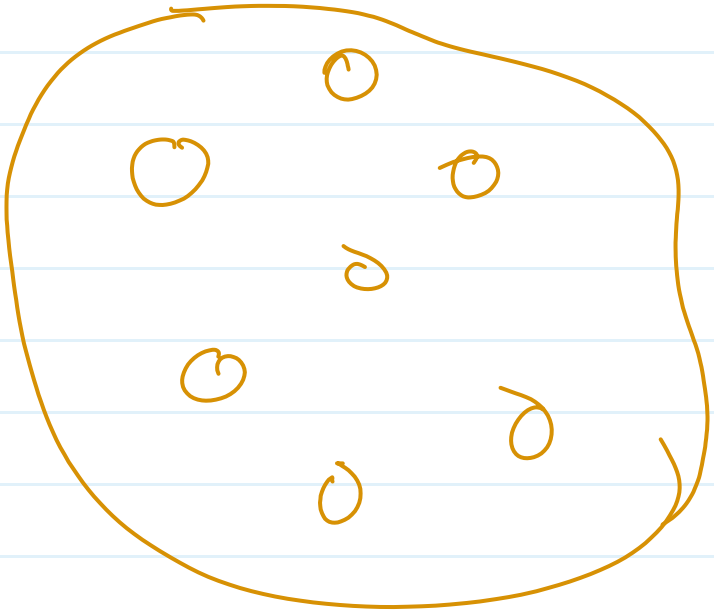
→ From the entire data we take some data is called sample data.



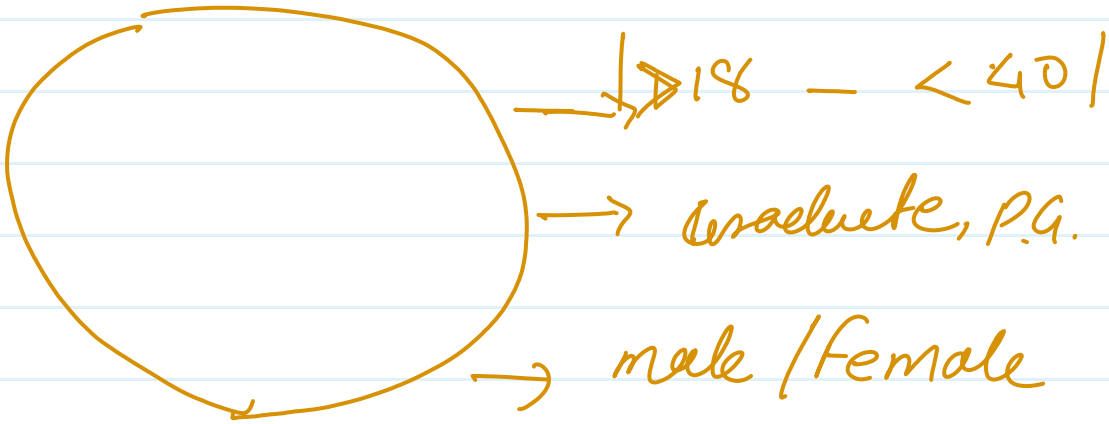
Sampling method:

1. Simple random sample
2. Stratified sampling
3. Systematic sampling
4. Convience sampling

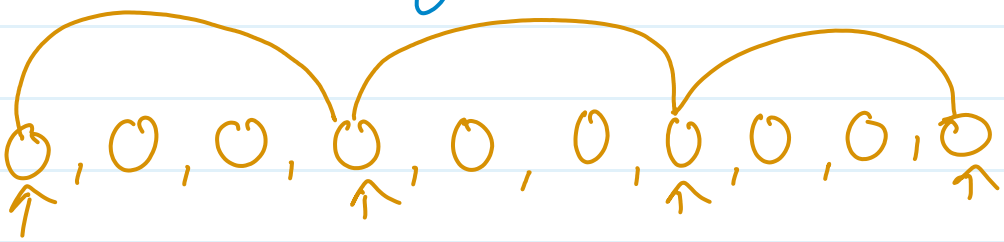
① Simple Random Sampling :-



② stratified sampling

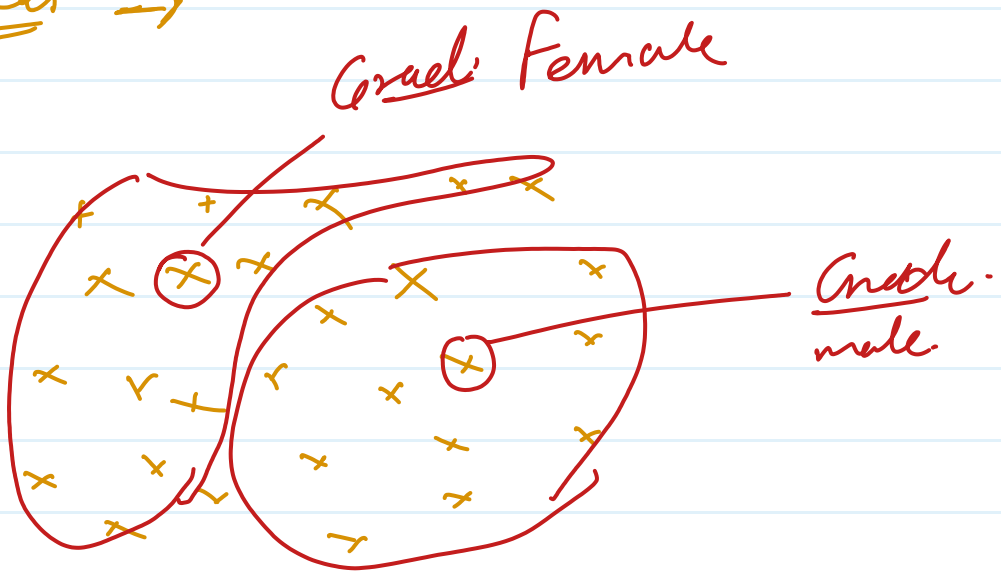


③ Systematic sampling :-



(4) Convenience Sampling :-

Eg ⇒



population - N

Sample - n

Measure of Center Tendancy

(1) mean

Population = μ

Sample = $\bar{x}$

Data = $\{2, 4, 5, 7, 8, 3\}$

✓ $\mu = \frac{29}{6} \Rightarrow 4.8$

$\bar{x} = \frac{29}{6} \Rightarrow 4.8$

$$\mu = \sum_{i=1}^{N} \frac{x_i}{N}$$

$$\bar{x} = \sum_{i=1}^{n} \frac{x_i}{n}$$

(2) median –

Data should be in order

{ 2, 3, 4, 5, 7, 8 }

median ⇒ $\frac{4+5}{2}$ ⇒ 4.5

(3) mode :–

{ 2, 3, 4, 5, 3, 4, 4, 6 }

mode → 4

mode → 3, 4

Measure of Dispersion

① Variance :-

Population variance

$$\sigma^2 = \sum_{i=1}^{N} \frac{(x_i - \mu)^2}{N}$$

Sample variance

$$s^2 = \sum_{i=1}^{n} \frac{(x_i - \bar{x})^2}{n-1}$$

$(n-1)$ = Degree of freedom

or

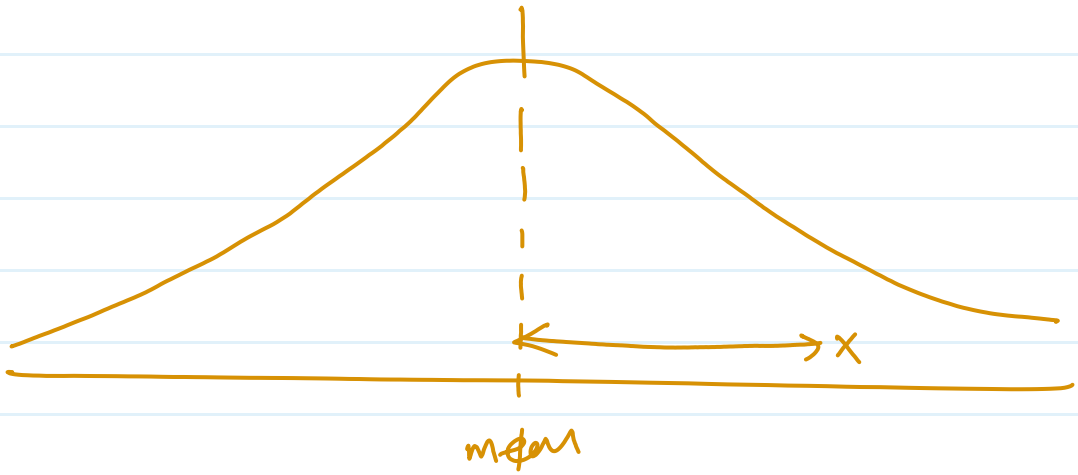
Besils correction

② Standard Deviation :-

Population $$\sigma = \sqrt{\sum_{i=1}^{N} \frac{(x_i - \mu)^2}{N}}$$

Sample $$s = \sqrt{\sum_{i=1}^{n} \frac{(x_i - \bar{x})^2}{(n-1)}}$$

SD - How far data point is away from its mean.



③ Range :-

$\{2, 4, 11, 13, 15, 19, 27\}$

min = 2
max = 27

Range = max - min = 25