# Statistics:

Statistics is the discipline that concerns the collection, organization, analysis, interpretation and presentation of data. In applying statistics to a scientific, industrial, or social problem, it is conventional to begin with a statistical population or a statistical model to be studied. Populations can be diverse groups of people or objects such as "all people living in a country" or "every atom composing a crystal". Statistics deals with every aspect of data, including the planning of data collection in terms of the design of surveys and experiments.

# Types of Statistics

**Descriptive**

Statistics used to describe things, frequently groups of people.

- Central Tendency
- Variability
- Relative Standing
- Relationship

**Inferential**

Statistics used to make inferences and draw conclusions.

- Parametric (t-test, ANOVA, multiple regression)
- Non-Parametric (chi-square)

# Types of statistics

- 2 major types of statistics
- **Descriptive statistics**- It consists of methods for organizing and summarizing information.
  - Includes- graphs, charts, tables & calculation of averages, percentiles

- **Inferential statistics**- It consists of methods for drawing and measuring the reliability of conclusions about population based on information obtained.
  - Includes- point estimation, interval estimation, hypothesis testing.

- Both are interrelated. Necessary to use methods of descriptive statistics to organize and summarize the information obtained before methods of inferential statistics can be used.

## Basis of statistical inference

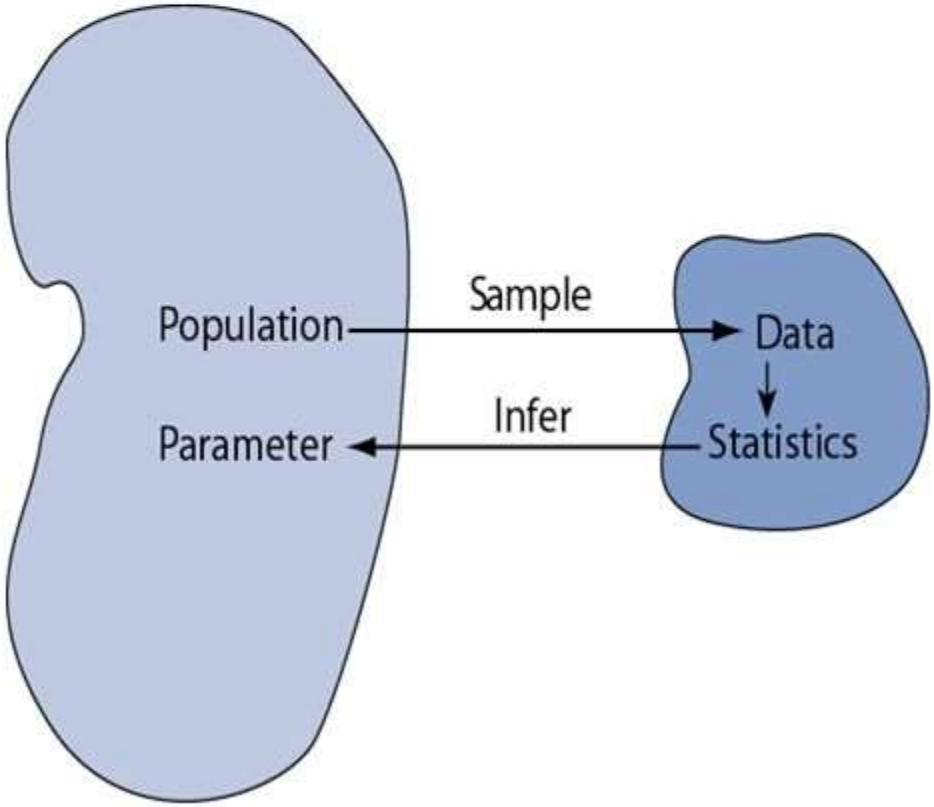
Statistical inference is the branch of statistics which is concerned with using probability concept .to deal with uncertainly in decision making

It refers to the process of selecting and using a sample to draw inference about population from .which sample is drawn

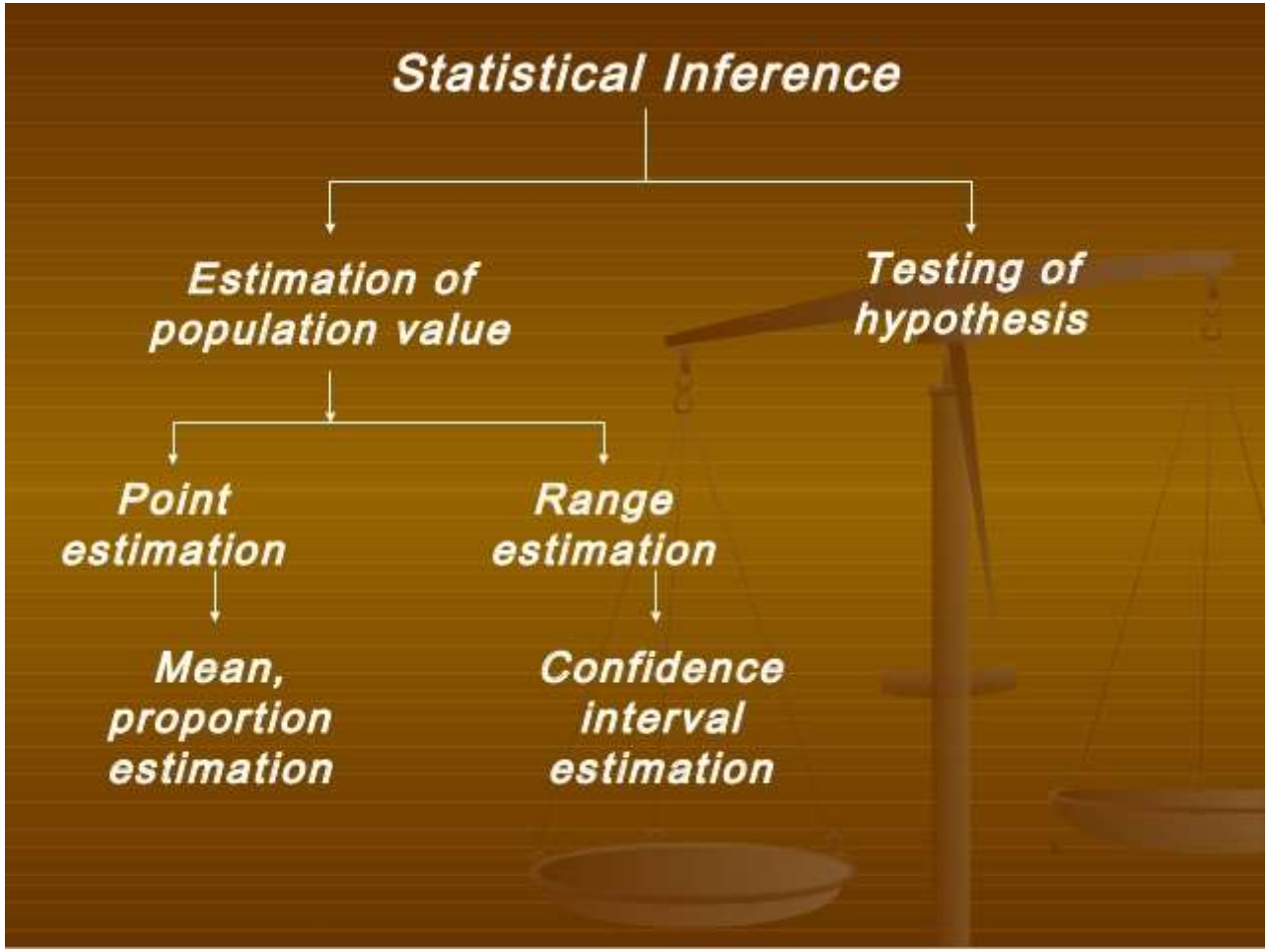
# Statistical Inference

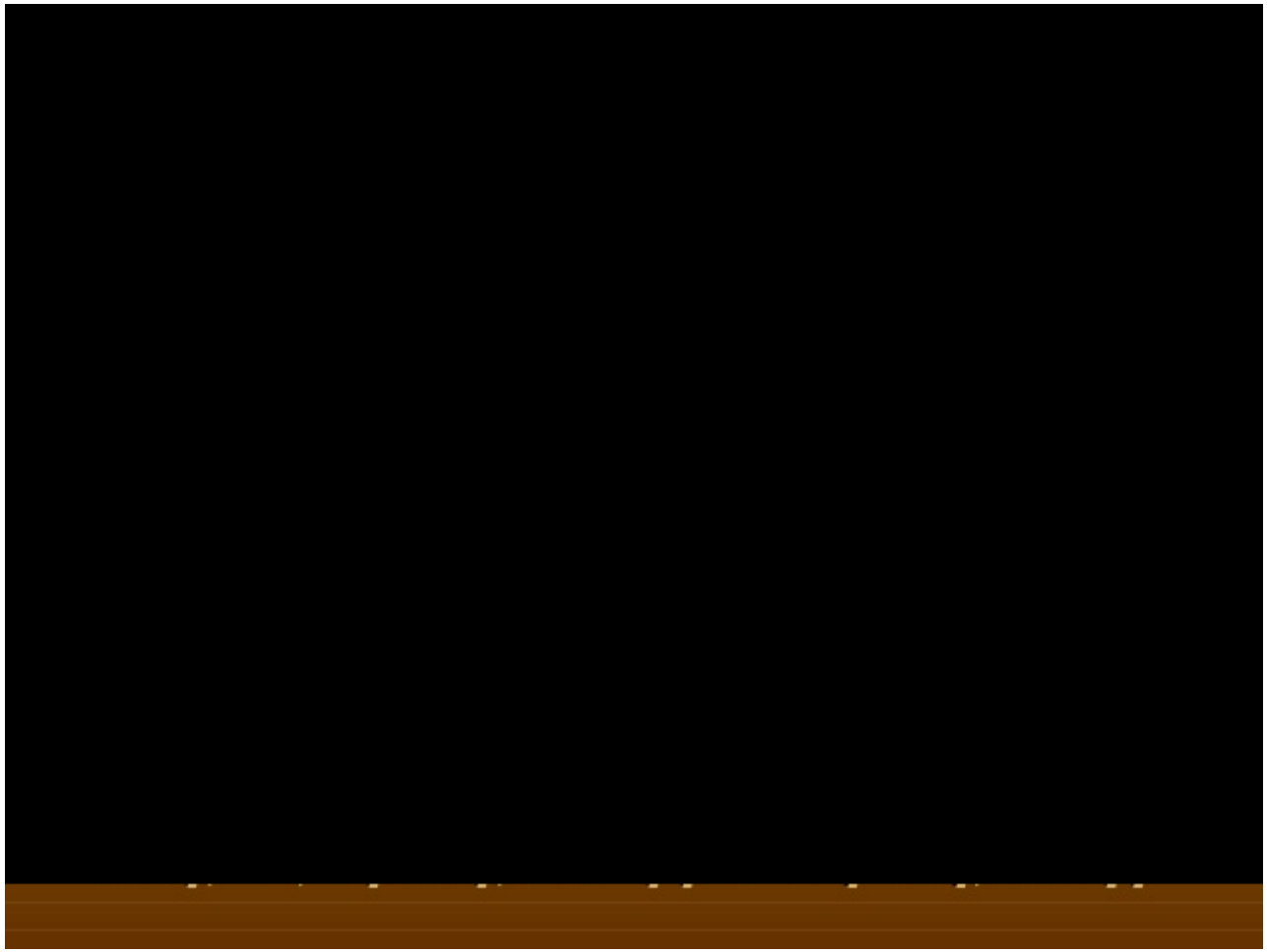
**Statistical inference** is the act of generalizing from a **sample** to a **population** with calculated degree of certainty.

We want to learn about population *parameters* …




using statistics calculated in the *sample*


Statistical Inference
Estimation of population value
Testing of hypothesis
Point estimation
Range estimation
Mean, proportion estimation
Confidence interval estimation



## *Hypothesis and hypothesis testing*

The null hypothesis is symbolized as Ho and .alternative hypothesis is symbolized as $H_1$ or $H_A$

In hypothesis testing we proceed on the basis of null hypothesis. We always keep alternative .hypothesis in mind

The null hypothesis and the alternative hypothesis are chosen before the sample is .drawn