Introduction to Statistics

🎯 **Goal:**

To understand what statistics is, its types, importance, and how different types of data are categorized.

◆ 1. What is Statistics?

Definition:
Statistics is the science of **collecting**, **organizing**, **analyzing**, and **interpreting** data to make informed decisions.

💡 It helps us **understand patterns**, **compare things**, and **make predictions**.

◆ 2. Types of Statistics

There are **two main branches** of statistics:

➤ *Descriptive Statistics*

- Deals with **summarizing** and **organizing** data.
- Examples:

    - Average marks of a class
    - Percentage of population vaccinated
- Tools:
    - Mean, Median, Mode
    - Charts, Graphs, Tables

➤ *Inferential Statistics*

- Deals with **making conclusions or predictions** about a population based on a sample.
- Examples:
    - Predicting election results using surveys
    - Estimating average income of a country using a sample
- Tools:
    - Hypothesis Testing
    - Confidence Intervals
    - Regression, t-test, ANOVA

◆ 3. Why is Statistics Important?

Statistics is used in:

- **Business**: Market trends, customer behavior
- **Medicine**: Drug effectiveness
- **Education**: Student performance analysis
- **Research**: Testing scientific hypotheses
- **Government**: Census, unemployment rate, GDP

◆ 4. Types of Data

To analyze data, you must first understand its type. There are two major types:

➤ *1. Qualitative Data (Categorical)*

- Describes **qualities** or **categories**
- No numerical meaning
- Examples: Gender, Color, Nationality

➤ *2. Quantitative Data (Numerical)*

- Measurable and countable
- Divided into:
  - **Discrete**: Whole numbers (e.g., number of children)
  - **Continuous**: Any value in a range (e.g., height, weight)

◆ 5. Scales of Measurement

Data can be further classified using **4 scales**:

Scale	Description	Example
Nominal	Categories only, no order	Gender (Male/Female)
Ordinal	Categories with order	Education Level (High School < College < PhD)
Interval	Numbers with equal spacing, **no true zero**	Temperature (°C, °F)
Ratio	Like interval, **with true zero**	Weight, Height, Age

📝 Quick Summary Table

Concept	Description
Statistics	Science of data collection, analysis, interpretation
Types	Descriptive & Inferential
Data Types	Qualitative (categorical) & Quantitative (numerical)
Measurement Scales	Nominal, Ordinal, Interval, Ratio

✅ Practice Task for You:

1. Look at a real-world dataset (even 5-6 rows in Excel).
2. Identify:
    - Which columns are qualitative and which are quantitative?
    - What measurement scale does each use?