Scales of Measurement

Data can be measured or classified in different ways depending on the nature of the variable. There are **four main scales of measurement**:

1. Nominal Scale

- **Definition:** Data is categorized without any order or ranking.
- **Nature:** Qualitative, categorical.
- **Examples:**
    - Gender (male, female)
    - Colors (red, blue, green)
    - Types of fruit (apple, banana, mango)
- **Key Point:** No order or hierarchy; only labels.

2. Ordinal Scale

- **Definition:** Data is categorized **with a meaningful order**, but differences between ranks are not consistent or measurable.
- **Nature:** Qualitative or quantitative.
- **Examples:**
    - Class ranks (1st, 2nd, 3rd)
    - Customer satisfaction (poor, good, excellent)
- **Key Point:** Order matters, but exact differences are unknown.

3. Interval Scale

- **Definition:** Numerical data with **meaningful differences** between values, but no true zero point.
- **Nature:** Quantitative.
- **Examples:**
    - Temperature in Celsius or Fahrenheit
    - Calendar years (2000, 2010, 2020)
- **Key Point:** Differences are meaningful; ratios are **not** meaningful (e.g., 20°C is not "twice as hot" as 10°C).

4. Ratio Scale

- **Definition:** Numerical data with **both meaningful differences and a true zero** point.

- **Nature:** Quantitative.
- **Examples:**
    - Height, weight, age
    - Income, number of items
- **Key Point:** Differences and ratios are meaningful (e.g., 40 kg is twice as heavy as 20 kg).

Summary Table:

Scale	Nature	Order	True Zero	Examples
Nominal	Qualitative	No	No	Gender, Colors, Types of fruit
Ordinal	Qualitative/Quantitative	Yes	No	Class rank, Satisfaction
Interval	Quantitative	Yes	No	Temperature, Years
Ratio	Quantitative	Yes	Yes	Height, Weight, Age, Income