

Al-Mustaqbal University College

Chemical Engineering and Petroleum Industries department



Statistics

Chapter (1) Introduction

- **Statistics** : Is concerned with scientific methods for collecting, organizing, summarizing, presenting and analysis data, as well as drawing valid conclusions and making reasonable decisions on the basis of such analysis.
- **Population** : Set of all possible measurements.
- **Finite** : All bots produced in a factory, catalyst pellets.
- **Infinite** : All possible outcomes (heads, tails) in successive tosses of a coin.
- **Sample** : A set of measurements taken to represent an infinite or large finite population, which is selected randomly.
- **Random sample** : Is selected so that all elements of the pop. have an equal chance of being measured.
- **Sample array** : Is the set of measurements of sample elements.

Type of statistics

Statistics can be divided two types: **descriptive statistic** and **inferential statistic**.

1. Descriptive statistics

Descriptive statistic consists of methods for organizing, displaying, and describing data by using tables, graphs, and summary measures.

2. inferential statistics

Inferential statistics of methods consists that use sample results to help make decisions or predictions about a population.

Variable

A variable is a characteristic under study that assumes different values for different elements.

A variable may be classified as **quantitative** or **qualitative**.

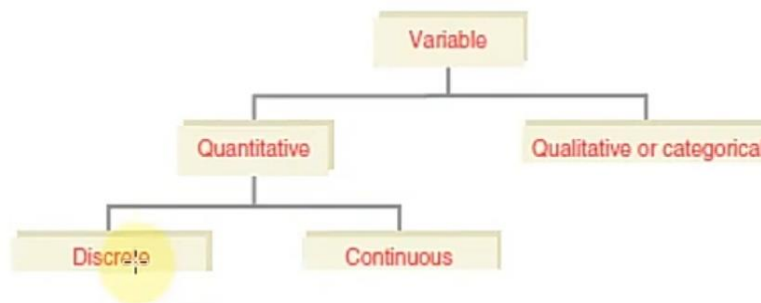


Figure (1.1): Types of Variables.

1. Quantitative Variable

A variable that can be measured numerically. The data collected on a quantitative variable are called quantitative data.

Example: Income, height, gross sales, prices of homes, number of cars owned, and number of accidents.

Quantitative Variable may be classified as either **discrete variables** or **continuous variables**.

- **Discrete variables**

A variable whose values are countable. In other words, a discrete variable can assume only certain values with no intermediate values.

Example: the number of cars sold on any given day at a car dealership is a discrete variable because the number of cars sold must be 0, 1, 2, 3 ... and we count it. The number of cars sold cannot be between 0 and 1, or between 1 and 2.

- **Continuous variables**

A variable that can assume any numerical value over a certain interval or intervals.

Example The time taken to complete an examination, it can assume any value, let us say, between 30 and 60 minutes. The time taken may be 42.6 minutes, 42.67 minutes, or 42.674 minutes.

2. **Qualitative Variable**

A variable that cannot assume a numerical value but can be classified into two or more nonnumeric categories. The data collected on such a variable are called qualitative data.

Example: The gender of a person, the brand of a computer, the opinions of people, and male of a car.

Size of data: Number of measurement.

Range: Highest – Lowest measurement.