

Resources and Data Combination

DEFINITION

Statistics *Statistics* is a group of methods used to collect, analyze, present, and interpret data and to make decisions. Every day we make decisions that may be personal, business related, or of some other kind. Usually these decisions are made under conditions of uncertainty. Many times, the situations or problems we face in the real world have no precise or definite solution. Statistical methods help us make scientific and intelligent decisions in such situations. Decisions made by using statistical methods are called *educated guesses*. Decisions made without using statistical (or scientific) methods are *pure guesses* and, hence, may prove to be unreliable. For example, opening a large store in an area with or without assessing the need for it may affect its success.

Like almost all fields of study, statistics has two aspects: theoretical and applied. *Theoretical* or *mathematical statistics* deals with the development, derivation, and proof of statistical theorems, formulas, rules, and laws. *Applied statistics* involves the applications of those theorems, formulas, rules, and laws to solve real-world problems.

Types of Statistics:

1- Descriptive Statistics

Suppose we have information on the test scores of students enrolled in a statistics class. In statistical terminology, the whole set of numbers that represents the scores of students is called a **data set**, the name of each student is called an **element**, and the score of each student is called an **observation**.

A data set in its original form is usually very large. Consequently, such a data set is not very helpful in drawing conclusions or making decisions. It is easier to draw conclusions from summary tables and diagrams than from the original version of a data set. So, we reduce data to a manageable size by constructing tables, drawing graphs, or calculating summary measures such as averages. The portion of statistics that helps us do this type of statistical analysis is called **descriptive statistics**.

Definition

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

2- Inferential Statistics

In statistics, the collection of all elements of interest is called a population. The selection of a few elements from this population is called a sample.

A major portion of statistics deals with making decisions, inferences, predictions, and forecasts about populations based on results obtained from samples. For example, we may make some decisions about the political views of all college and university students based on the political views of 1000 students selected from a few colleges and universities. As another example, we may want to find the starting salary of a typical college graduate. To do so, we may select 2000 recent college graduates, find their starting salaries, and make a decision based on this information. The area of statistics that deals with such decision-making procedures is referred to as inferential statistics. This branch of statistics is also called inductive reasoning or inductive statistics.

Definition

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

The availability of accurate and appropriate data is essential for deriving reliable results. Data may be obtained from internal sources, external sources, or surveys and experiments.

Many times data come from *internal sources*, such as a company's personnel files or accounting records. For example, a company that wants to forecast the future sales of its product may use the data of past periods from its records. For most studies, however, all the data that are needed are not usually available from internal sources. In such cases, one may have to depend on outside sources to obtain data. These sources are called *external sources*.

A large number of government and private publications can be used as external sources of data. The following is a list of some government publications.

1. *Statistical Abstract of the States*
2. *Employment and Earnings*
3. *Handbook of Labor Statistics*
4. *Source Book of Criminal Justice Statistics*
5. *Economic Report of the President*
6. *County & City Data Book*
7. *State & Metropolitan Area Data Book*

8. *Digest of Education Statistics*

9. *Health Organization*

10. *Agricultural Statistics*

EXERCISES

CONCEPTS AND PROCEDURES

1. Briefly describe the two meanings of the word statistics.
2. Briefly explain the types of statistics.
3. Briefly describe internal and external sources of data.