*Chapter 1:

* **Statistics** (الإحصاء): → collect (جمع), organize (تنظيم), analyze (تحليل) → making decision (قرار)

* **Population** (مجتمع): → set of all elements (جميع العناصر)

* **Sample** (عينة): → subset (جزء) of population. (part)

Variable (المتغير هما)

- **Qualitative** (نوعية)
  - نوع - type of...
  - جنس - gender.
  - جنسية - nationality
  - حالة اجتماعية - marital status
  - الوان - Colors...
  - رقم الطالب - Student ID.
  - تصنيف - ranking...
- **Quantitative** (كمية)
  - **Discrete** (منفصل) — لا يحتوي كسور
    - number of cars.
    - number of students.
    - family size.
  - **Continuous** (متصل) — يحتوي كسور
    - time
    - age
    - سرعة - speed
    - وزن - weight
    - كمية - amount
    - راتب - Salary

Qualitative (نوعي)

- **nominal** → لا يتم الترتيب → gender, nationality
- **ordinal** (ترتيبي) → يتم الترتيب → grade (A, B, ...), ranking (1st, 2nd)

Size (S, M, L)

Sample → statistics

population → parameter

Level of Measurement مستويات القياس: ②

[1] Nominal (اسمي): يأتي مع كلمات وأحداد ولا يوجد ترتيب

ex: ① gender (جنس) ② nationality ③ Student ID

[2] ordinal (ترتيبي): يأتي مع كلمات وحروف ورتب ويهتم للترتيب

ex: ① rank (تصنيف) ② rating (تقييم) scale ③ Size (S,M,L)
④ grade (A,B,..)

[3] interval (فترة): يأتي مع الأعداد والصفر غير حقيقي.

① temperature (حرارة) ② IQ (اختبار ذكاء) ③ SAT

[4] ratio (نسبة): يأتي مع الأعداد والصفر حقيقي.

① time, ② weight ③ speed ④ salary
⑤ age.

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of manufactured items, software

Definition 1.1. **Statistics** is the art and science of collecting, organizing, presenting, analyzing, interpreting and predicting data to assist in making more effective decision.

Definition 1.3. A data set is the data collected in a particular study and each value in the data set is called data value.

Definition 1.4. A data set consists of the following components:

1. **Elements:** The entities on which data are collected.
2. **Variable:** A characteristic of interest for the elements.
3. **Observation:** The set of measurements obtained for a particular element.

2) The *inferential statistics.*

نوعي الاحصاء

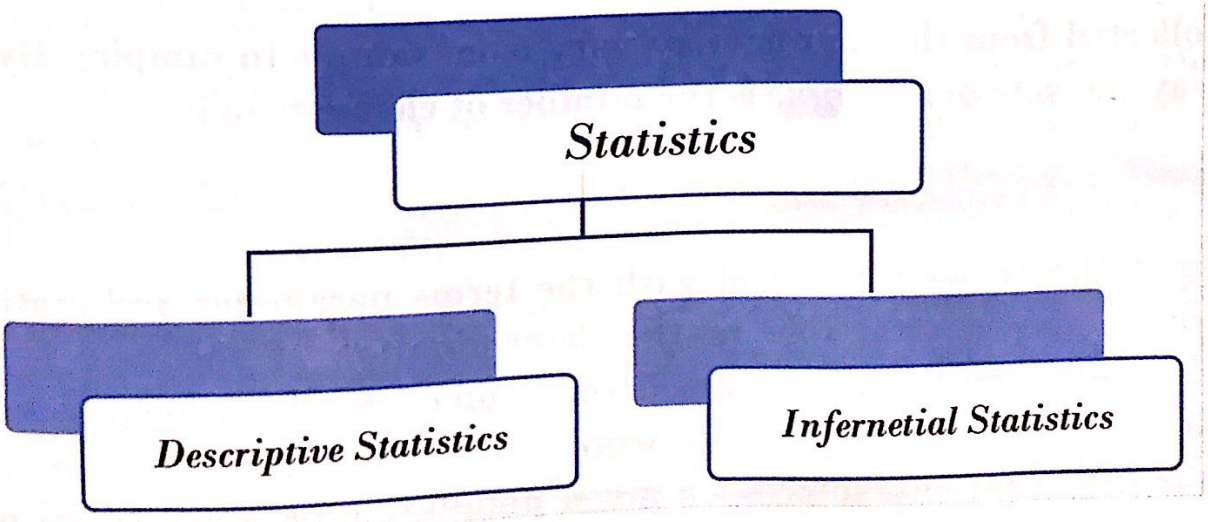
احصاء وصفي

Definition 1.7. The descriptive statistics is the methods of organizing, summarizing, and presenting data in an informative way.

عرض

احصاء استدلالي

Definition 1.8. The inferential statistics is the methods used to determine something about a population based on a sample.



In the following we will define the popula...

مجتمع

Definition 1.9. A population is the collection or set of all objects or measurements that are of interest to the collector.

There are several reasons why we don't work with populations. They are usually large, and it is often impossible to get data for every object we're studying. Therefore, we cannot examine all members of a population due to time, cost, and other constraints. We examine only a portion of the population and try to extend the obtained conclusions from the sample to the whole population. This smaller portion is called the sample.

جزء من المجتمع

Definition 1.10. The sample is a subset of data selected from a population.

measurement describing some characteristic of a sample.

Definition 1.11. A parameter is a numerical measure that describes a characteristic of a population.

Definition 1.12. A statistic is a numerical measure that describes a characteristic of a sample.

جمع معلومات كل المجتمع.

Definition 1.13. Census is the collection of information from the whole population (or refers to collection of data from every member of group or population).

For example, if we collected data about degree of every student in a certain class, then it is recorded as "a class census".

جمع معلومات العينة.

Definition 1.14. Survey is the collection of information from a sample.

EXERCISES

1.1. Choose the correct answer,

- The gender (male and female) is an example of a _____ variable.

  (a) discrete (b) continuous (c) ordinal (d) nominal

- The number of students is considered to be a _____ variable.

  (a) discrete (b) continuous (c) ordinal (d) nominal

- The rank (instructor, assistant professor, etc.) is _____ data.

  (a) qualitative (b) quantitative (c) discrete (d) continuous

- Levels of education (Primary, Middle…) are _____ data.

  (a) qualitative (b) quantitative (c) discrete (d) continuous

- The distance between two cities is 400 kilometer is example of _____ variable.

  (a) discrete (b) continuous (c) ordinal (d) nominal

- _____ is the set of all elements.

  (a) sample (b) parameter (c) census (d) population

- _____ is a numerical measurement describing some characteristic of a sample.

  (a) data (b) parameter (c) census (d) population (e) statistic

- _____ data can be either numeric or non-numeric.

  (a) qualitative (b) quantitative (c) discrete (d) continuous

- _____ is collecting data for a sample.

  (a) data (b) statistics (c) population (d) sample survey

1.2. Identify the type of data in each of the following:

Variable	Qualitative	Quantitative
Weight of a person		✓
Color of hair	✓	
Body temperature		✓
Shirt size	✓	
Number of cars		✓
Type of defective present	✓	
Number of defective items		✓
Salaries of employees		✓
Number of students in a class		✓
Age		✓
Mass of bearing		✓
The time of day		✓
Students degree in stat exam		✓

1.3. Identify the levels of measurement for the following variables:

Variable	Nominal	Ordinal	Interval	Ratio
Weight of a person				✓
Score on Stat quiz			✓	
Body temperature			✓	
Sat score			✓	
Number of cars				✓
Type of defective present	✓			
Number of defective items				✓
Salaries of employees				✓
Number of students in a class				✓
Age				✓
Mass of bearing				✓
The time of day				✓
Students degree in stat exam				✓
Letter grade		✓		

1.4. Choose the correct answer

1) ***Which of the following is an example of nominal data? (one correct choice)***

a. Number of people on a course

b. Cancer staging scale

c. List of different species of bird visiting a garden over the past week

d. Heart rate

2) ***Which of the following are examples of Interval / Ratio data? (two correct choices)***

a. Number of people on a course

b. Cancer staging scale

c. List of different species of bird visiting a garden over the past week

d. Popularity rating of UK top ten television programmers

e. Heart rate

3) ***Which of the following are examples of Ordinal data? (two correct choices)***

a. Number of people on a course

b. Cancer staging scale

c. List of different species of bird visiting a garden over the past week

d. Popularity rating of UK top ten television programmers

e. Heart rate

4) ***Which of the following is the correct listing of data from the simplest to the most complex?***

a. Nominal -> Ordinal -> Interval -> Transcendental

b. Nominal -> Ordinal -> Interval -> Ratio

c. Qualitative -> Ordinal -> Interval -> Discrete

d. Qualitative -> Ordinal -> Interval -> Ratio

5) ***The weights of students in a college is a***

a. Discrete Variable

b. Continuous Variable

c. Qualitative Variable

d. None of these

6) ***The number of acci ts in a certain city is***

a. Discrete variable

b. Continuous variable

c. Qualitative variable

d. Constant

7) ***Which of these represent qualitative data***

a. Height of a student

b. Liking or disliking of (500) persons of a product

c. Income of a government servant in a city

d. Yield from a wheat plot

8) ***Life of a T.V picture tube is a***

a. Discrete variable

b. Continuous variable

c. Qualitative variable

d. Constant