EXERCISE - STATISTICS FOR AI
Summer Semester 2025 (Mag. Thomas Forstner)

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1. Tick only the **false** statements:

   - o An observational unit is an entity whose characteristics are measured, and synonyms for it include case, object, or subject.
   - o A parameter of a population can be estimated based on a sample statistic.
   - o Calculating an estimator for the average age of a population based on collected sample data is part of inductive statistics.
   - o In the case of quantitative scaled attributes, the distance between two measurements provides useful information, that can be interpreted objectively.

2. Tick only the **false** statements:

   - o A raw data list contains the attribute values of objects in uncompressed form.
   - o Graphical presentation of collected data of a population is part of descriptive statistics.
   - o An empirical population is an arbitrary set of objects.
   - ☒ Calculating an estimator for the share of votes of a political party is part of descriptive statistics.

3. Tick only the **false** statements:

   - ☒ A nominal scaled parameter always has the properties of an ordinal scaled parameter.
   - ☒ In the case of ordinal scaled data, the attribute values are always integer values.
   - ☒ Calculating the probability for winning in a lottery is part of inductive statistics.
   - o Attributes are specific characteristics of the objects of an empirical population.

4. Tick only the **false** statements:

   - o A metric scaled parameter always has the properties of a nominal scaled parameter.
   - ☒ A metric continuous attribute can be measured with infinite precision.
   - o A metric scaled parameter always has the properties of an ordinal scaled parameter.
   - ☒ If attribute values can be ranked based on a „natural objective order", this kind of data is called „comparative data".

5. State the level of measurement (nominal, ordinal, metric discrete, metric continuous) of the following attributes:

   - marital status (single, married, divorced, widowed, …) NOMINAL
   - pain rating (no, mild, moderate, severe) ORDINAL
   - customer satisfaction rating (very unsatisfied, unsatisfied, neutral, satisfied, very satisfied) ORDINAL
   - language ability (beginner, intermediate, fluent) ORDINAL

6. State the level of measurement (nominal, ordinal, metric discrete, metric continuous) of the following attributes:

   - achieved points on an exam METRIC DISCRETE
   - calendar years (1990, 2000, 2010, ...) METRIC DISCRETE
   - type of pet (dog, cat, bird, fish, ...) NOMINAL
   - number of siblings (0, 1, 2, 3, ...) METRIC DISCRETE

7. State the level of measurement (nominal, ordinal, metric discrete, metric continuous) of the following attributes:

   - blood type (A, B, AB, O) NOMINAL
   - monthly income in Euro METRIC DISCRETE
   - length of a movie in minutes METRIC DISCRETE
   - volume of water in a tank in liters METRIC CONTINUOUS

8. A survey among students asks the following questions: (I) how old are you, (II) how often did you eat at the university canteen last week, (III) how much did you spend on food last week?

   a) Define a statistically appropriate empirical population for this survey.
   STUDENT ENROLLED DURING THE SEMESTER OF INTERVIEW

   b) What is the level of measurement of these questions?
   I: METRIC DISCRETE II: METRIC DISCRETE III: METRIC DISCRETE (CENTS)

   c) State an example of an attribute value for each question.
   I: 23 y.o. II: 4 TIMES III: 90 €

9. State, if the following entities are a "population", an "attribute" or an "attribute value".

   - favorite type of cuisine ATTRIBUTE
   - 180 cm (height of a student in a specific class) ATTRIBUTE VALUE
   - eye color ATTRIBUTE
   - number of books read in a year ATTRIBUTE

10. A university is interested in understanding the commuting habits of its students. A survey is conducted on a specific date with 150 randomly selected students regarding the following points:

    State the level of measurement of these attributes:

    - satisfaction with the current commute: (1 = very high, ... , 5 = very low) ORDINAL
    - number of cars in the student's household METRIC DISCRETE
    - distance between student's place of residence and university campus METRIC CONTINUOUS
    - primary mode of transport to the university campus NOMINAL

11. Assess the quality in a "statistical sense" of the two charts on the next page.

Assessment Chart A: ABSOLUTE VALUES INSTEAD OF NORMALIZED DATA +
CIRCLES ON MAP NOT SCALED +
NO TIME REFERENCE AND NO SOURCE
⇒ QUALITY: IT CAN BE BIAS/MISLEADING

Assessment Chart B: SCALE DOES NOT START FROM 0%
DIFFICULT TO COMPARE REGULATIONS/TIME IN 1950S AND 2010S
SOURCE IS PRESENT
⇒ COMPARABLE NUMBERS ⇒ BETTER THAN CHART A