Q1. What is statistics ... explain?

⟹ - Statistics is a branch of mathematics that deals with collecting, analyzing, interpreting, presenting and organizing data.
- It provides methods and tools to make sense of large amounts of data and to draw meaningful conclusion from it.
- Descriptive statistics :-
  - Summerize and describe the main features of dataset.
  - Tools :- Measures of central Tendancy, Measures of dispersion and graphical representations.
- Inferential statistics :-
  - Make predictions or interfaces about a population based on a sample of data.
  - Tools :- Hypothesis testing, confidence intervals, regression analysis.
- Data collection Methods :-
  - Gather data in systematic and relieble manner
  - Tools :- Surveys, experiments, observational studies and sampling techniques.

Q2. Explain Measures of central tendancy with exeamples.

⟹ - Measures of central tendancy are statistical metrics used to determine the center of a data set.
- 1. Mean (Average) :-
  - The mean is the sum of all the data points divided by the number of data points.
  - It's useful to find overall average value.

• Example :- dataset: [4, 8, 6, 5, 3]

$$\text{Mean} = \frac{4+8+6+5+3}{5} = 5.2$$

- 2. Median :-
  - The median is the middle value when the data points are arranged in ascending order.
  - If number of data points are even, the median is average of two middle values.
  - Example :- dataset : [3, 4, 5, 6, 8]
    ∴ Median :- 5
- 3. Mode :-
  - The mode is the most Frequently occuring value in the data set.
  - A dataset may have one mode, more than one mode or no mode at all.
  - Example :- dataset [4, 4, 5, 5, 6, 8, 8, 8]
    ∴ Mode :- 8 (3 times).

Q3. What are the Different types of Variables? Explain with exeamples.

⟹ 1. Quantitative Variables :-

- Quantitative variables are numerical can be measured or counted.
- They are further divided into two types :

[a] Discrete Variables :-

- Variables that take on a Finite or countable number of values.
- The number of students in classroom.

[b] Continous Variables :-

- Variable that can take any value within a given range and are measurable.
- Ex. Height of students.

2. Qualitative (Categorical) Values :-
- Qualitative variables are non-numerical and represent categories or groups.
- They are Further divide in two types :
  [a] Nominal Variables :-
    - Variables that represent categories with no intrinsic ordering.
    - Ex. Types of Fruits.
  [b] ordinal Variables :-
    - Variables that represent categories with meaningful order but not Fixed interval between them.
    - Ex. Education level.

Q4. Which method is used to display statistics of data frame? Write the code.

⟹ In python, using "pandas", you can display statistics of a DataFrame using the "describe()" method.

```
# Code.
import pandas as pd
data = {
  'A': [1, 2, 3, 4, 5],
  'B': [10, 20, 30, 40, 50],
  'C': [100, 200, 300, 400, 500]
}

df = pd.DataFrame(data).

statistics = df.describe()        -- will display
print(statistics).                   statistics
```