1.What is the difference between **Descriptive** and **Inferential Statistics**?

-> The main difference between descriptive and inferential statistics is in their purpose and use. **Descriptive statistics** is used to **organize, summarize, and present data** in a meaningful way. It deals with things like averages, percentages, charts, and graphs to help us understand what the data shows. On the other hand, **inferential statistics** is used to **draw conclusions or make predictions about a larger population** based on a sample of data. It includes methods like hypothesis testing and confidence intervals. While descriptive statistics describes the data we have, inferential statistics helps us make decisions or predictions beyond the available data.

2. Define the following terms:

• Population

• Sample

-> **Population:**  
A population is the **entire group of individuals or items** that we want to study or collect information about. It includes **all members** that share a common characteristic.  
*Example:* All students in a school or all citizens in a country.

-> **Sample:**  
A sample is a **subset of the population**, selected to **represent the whole group**. We use samples because studying the entire population is often **too time-consuming or expensive**.  
*Example:* 100 students selected from a school to represent all students.

3. Define **mean**, **median**, and **mode**. How are they different from each other?

**->Mean, median, and mode** are measures of central tendency used to describe a set of data.

* The **mean** is the average value, found by adding all the numbers together and dividing by the total number of values.
* The **median** is the middle value when the data is arranged in order; if there is an even number of values, the median is the average of the two middle numbers.
* The **mode** is the number that appears most often in the dataset.
* These three measures are different because the mean takes all values into account, the median shows the center value and is not affected by extreme values (outliers), and the mode represents the most frequent value. Each measure gives different insights depending on the nature of the data.

4.What is a Random Variable? What are its types?

->A **random variable** is a variable that takes on different values based on the outcome of a random event or experiment. It assigns numerical values to the results of a random process, such as rolling a die or flipping a coin. There are **two main types of random variables**: **Discrete** and **Continuous**. A **discrete random variable** has a countable number of possible values, such as the number of students in a class or the outcome of a dice roll. A **continuous random variable** can take any value within a given range, such as height, weight, or temperature, and is measured rather than counted.