

## Population and sample data

### Population

Definition: A population is the entire set of individuals or objects of interest in a particular study. It includes all members of a defined group that we are studying or collecting information on.

### Characteristics

- 1) Complete Set:  
Contains all the observation of interest
- 2) Parameter: A numerical value summarizing the entire population  
[example population mean, population variance]

1) Population mean ( $\mu$ )

2) Population variance ( $\sigma^2$ )

### Examples

#### 1) Population in a school study

- i) All students enrolled in a school.
- ii) Determine the average height of student, population mean.

#### 2) Population in market research

- i) All consumers in a city.
- ii) To understand the purchasing behaviour of all consumers.

#### 3) Population in a medical study

- i) All the patients with a specific disease.
- ii) To study the effectiveness of a drug.

### Sample data

Definition: A sample is a subset of the population that is used to represent the entire group. Sampling involves selecting a group of individuals or observations from the population to draw conclusions about the whole population.

### Characteristics

- 1) Subset: Represent a portion of the population.
- 2) Statistic: A numerical value summarizing the sample data  
[sample mean, sample variance]
- 3) Random sampling: Samples should be randomly selected to avoid bias

### Examples

#### 1) Sample in a school study.

- i) A group of 50 students from school
- ii) Used case: estimate the average height of students in a school

#### 2) Sample in market research

- i) 500 consumers from the city

↓  
behaviour -----> Population

#### 3) Sample in a medical study

- i) 200 patients
- ii) Test the effectiveness of the drug.