# SWAMY DAYANANDA COLLEGE OF ARTS AND SCIENCE, MANJAKKUDI 612 610, TIRUVARUR DT

# MATHEMATICS AND STATISTICS FOR MANAGERS

**SUB. CODE: 16CCBB4**

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# UNIT 3

- Meaning and Definition of statistics
- Nature of statistics
- Functions of statistics
- Scope & Objectives of statistics
- Importance of statistics
- Limitations of statistics
- Collection of data
- Classification and tabulation of data
- Diagrammatic representation
- Graphical Representation

# MEANING AND DEFINITION OF STATISTICS

Meaning:

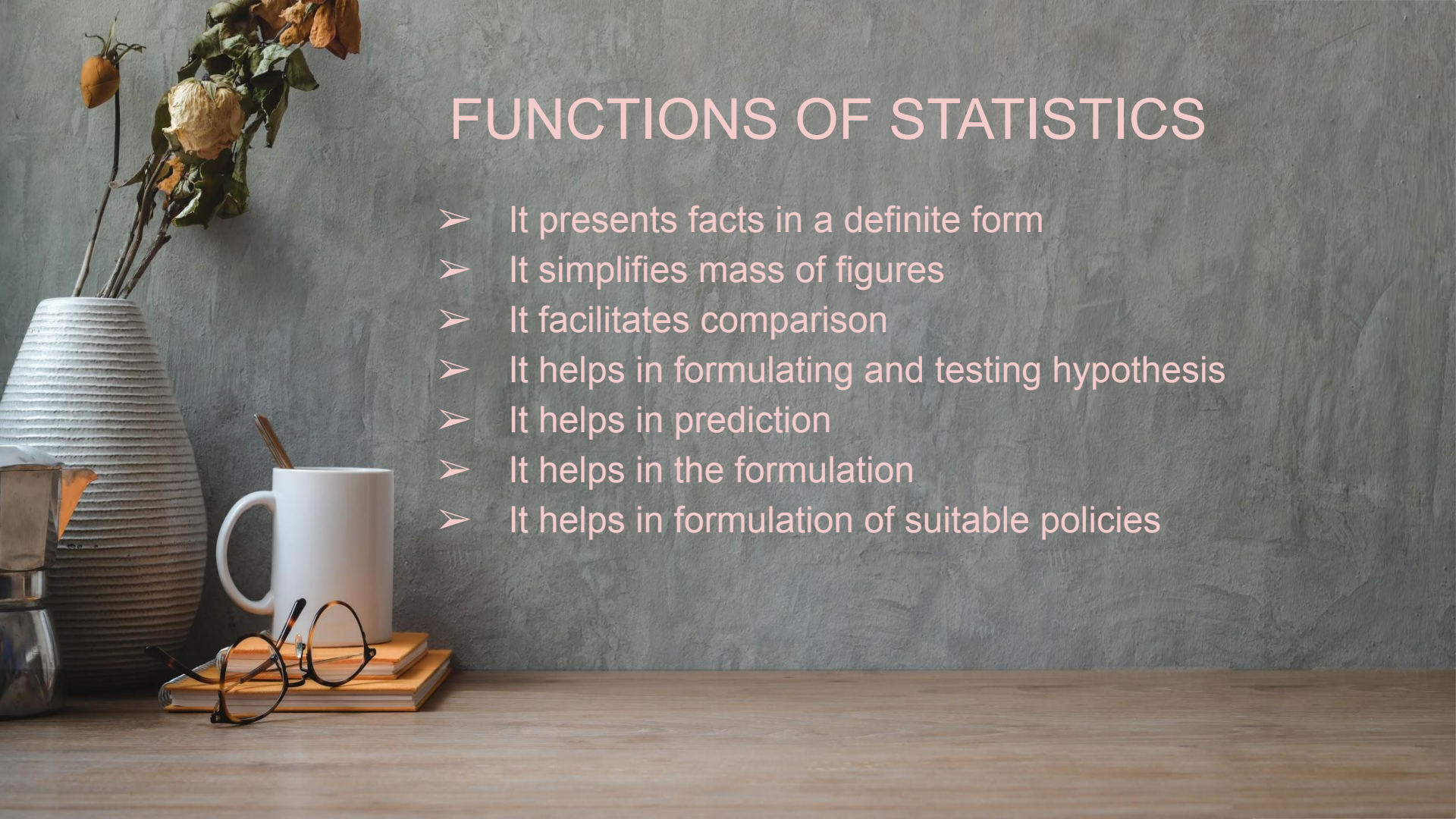
Word derived from the Latin word “status” or Italian word “Statistik” or the French word “Statistique” which means political State. Facts and figures which are provided by the State in its day to day life.

Definition:

“ Statistics are numerical statement of facts in any department of enquiry placed in relation to each other” - Bowley

# NATURE OF STATISTICS

1. Statistics are aggregate of facts
2. Statistics are affected to a marked extent by a multiplicity of causes
3. Statistics are numerically expressed
4. Statistics should be enumerated or estimated
5. Statistics should be collected with reasonable standard of accuracy
6. Statistics should be collected in systematic manner
7. Statistics should be placed in relation to each other



# FUNCTIONS OF STATISTICS

- It presents facts in a definite form
- It simplifies mass of figures
- It facilitates comparison
- It helps in formulating and testing hypothesis
- It helps in prediction
- It helps in the formulation
- It helps in formulation of suitable policies

# SCOPE OF STATISTICS

- Planning
- State
- Mathematics
- Economics
- Business & Management
- Accountancy & Auditing
- Industry
- Astronomy
- Physical sciences
- Medical & Biological sciences
- Social sciences
- Psychology & Education
- War

## Importance of Statistics:

- It simplifies mass of data (condensation);
- Helps to get concrete information about any problem;
- Helps for reliable and objective decision making;
- It presents facts in a precise & definite form;
- It facilitates comparison(Measures of central tendency and measures of dispersion);
- It facilitates Predictions (Time series and regression analysis are the most commonly used methods towards prediction.);
- It helps in formulation of suitable policies;

# LIMITATIONS OF STATISTICS

- ★ Statistics does not deal with individual items
- ★ Statistics deals with quantitative data only
- ★ Statistics may mislead to wrong conclusion in the absence of details
- ★ Statistical laws are true only on averages
- ★ Statistics does not reveal the entire story
- ★ Statistics data should be uniform and homogeneous
- ★ Statistics is liable to be measured

# COLLECTION OF DATA

MEANING:

Collection of data is the process of enumeration together with the proper recording of results.

CLASSIFICATION:

- Primary data - first time data / original data
- Secondary data - already collected data / analysed by someone earlier

# PRIMARY DATA - METHODS

1. Direct personal observation
2. Indirect oral interview
3. Information through agencies
4. Mailed questionnaires
5. Schedules sent through enumerator

# SECONDARY DATA - METHODS

1. Published sources
2. Unpublished sources

# CLASSIFICATION OF DATA

DEFINITION:

“The process of grouping a large number of individual facts or observations on the basis of similarity among the items, is called classification”

- *Stockton and Clark*

# NATURE OF CLASSIFICATION

- ★ Facts are classified into homogeneous groups by the process of classification
- ★ The basis of classification is unity in diversity
- ★ It may be either real or imaginary
- ★ It may be according to either similarities or dissimilarities
- ★ It should be flexible to accommodate adjustment

# OBJECTS OF CLASSIFICATION

- To condense the mass of data
- To present the facts in the simple form
- To facilitate comparison
- To bring out relationship
- To prepare data for tabulation
- To bring out clear point of similarity and dissimilarity
- To facilitate easy interpretation
- To eliminate unnecessary details

# RULES OF CLASSIFICATION

- ➔ Exactness
- ➔ Mutually Exclusive
- ➔ Stability
- ➔ Flexibility
- ➔ Homogeneity
- ➔ Mathematical accuracy

# TYPES OF CLASSIFICATION

## Classification of Data

**On the basis of nature of Variable-**

- Quantitative data
- Qualitative data
- Discrete data
- Continuous data
- Chronological or temporal data
- Geographical or spatial data

**On the basis of Source of Collection**

- Primary data
- Secondary data

**On the basis of Presentation**

- Grouped data
- Ungrouped data

**On the basis on content**

- Simple Classification
- Manifold Classification

# TABULATION OF DATA

DEFINITION:

“A statistical table is a systematic organisation of data in columns and rows.”

Tabulation is the process of presenting data in tables.

- *Prof. Neiswanger*

# OBJECTS OF TABULATION

- ★ To clarify the object of tabulation
- ★ To simplify complex data
- ★ To clarify the characteristics of data
- ★ To present facts in the minimum space
- ★ To facilitate comparison
- ★ To detect errors and omission in the data
- ★ To depict trend and tendencies of the problem of data
- ★ To facilitate statistical processing
- ★ To help reference

# IMPORTANCE OF TABULATION

- To Simplify the Complexity of the Data.
- To Facilitate Comparative Analysis of the Data.
- To Ensure Economy of Space and Time.
- To Indicate the Trend and Pattern of the Data.
- To Facilitate References.
- To Facilitate Computation of Various Factors.
- To Detect Errors.

# IMPORTANT PARTS OF TABULATION

- Table number
- Title
- Head note
- Caption
- Stubs
- Body of the table
- Foot-note
- Source note

# TYPES OF TABLE

- On the basis of coverage:

1. Simple table
2. Complex table - two fold, three fold or manifold table

- On the basis of objective or purpose

1. General purpose or reference table
2. Special purpose or summary table

- On the basis of nature of enquiry or originality

1. Original or primary table
2. Derived or derivative table

# DIAGRAMMATIC PRESENTATION

MEANING:

- It is a visual form for presentation of statistical data.
- It refers to the various types of devices such as bars, circles, maps, pictorials, cartograms, etc.
- It exhibits more clearly about statistical facts

# IMPORTANCE OF DIAGRAMS

- They are attractive and impressive
- They save time and labour
- They have universal applicability
- They make data simple
- They make comparison easy
- They provide more information

# LIMITATIONS OF DIAGRAM

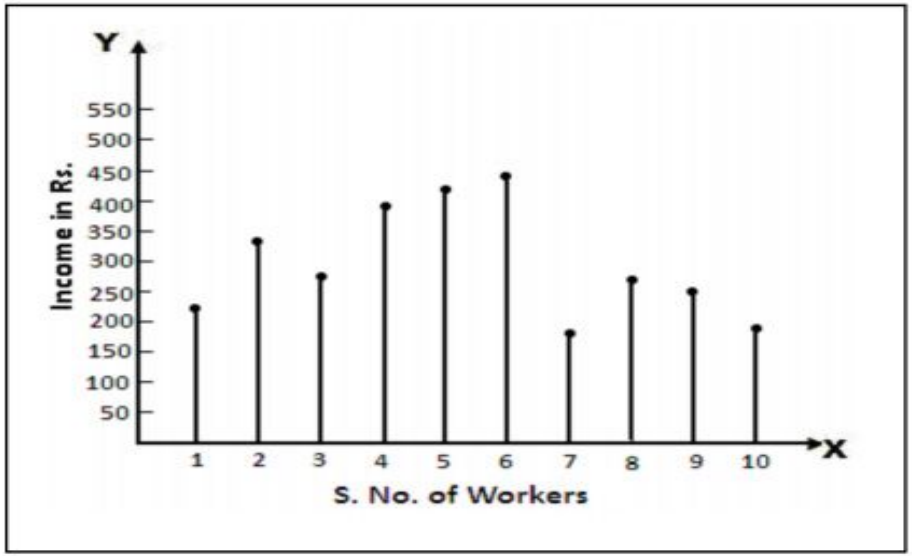
- It cannot be analysed further
- It shows only approximate values
- It expose only limited facts
- It is supplementary to table but not an alternative to it
- It is drawn when comparison needed, otherwise they are of little use

# TYPES OF DIAGRAM

- One dimensional diagram (line and bar)
- Two dimensional diagram (rectangle, square, circle, etc)
- Three dimensional diagram ( cube, sphere, cylinder, etc)
- Pictogram (pictures)
- Cartogram (mapping)

# LINE DIAGRAM

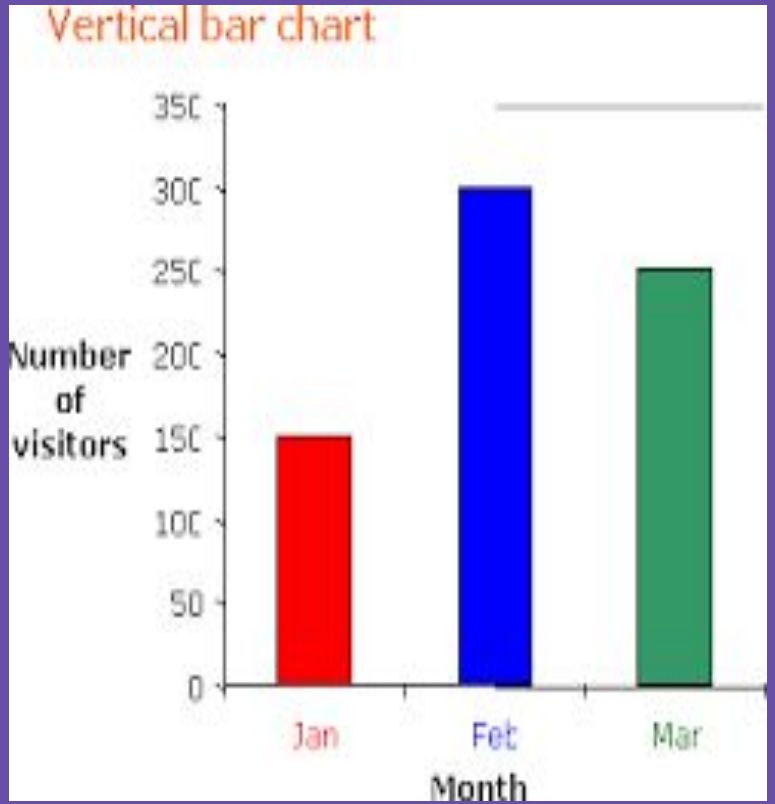
- On the basis of size of the figures, heights of lines are drawn

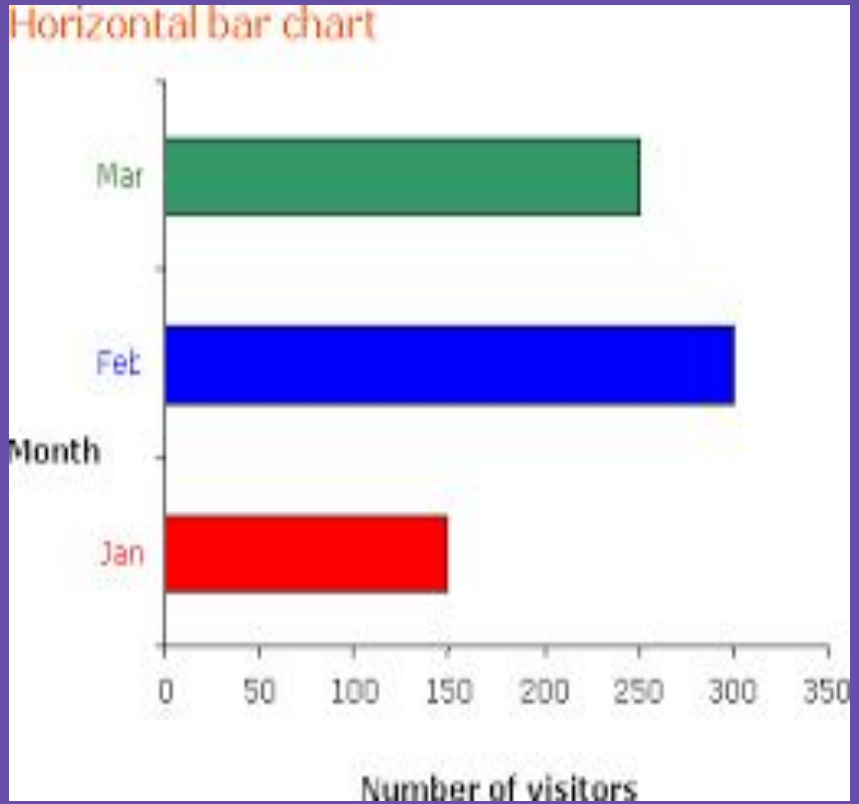


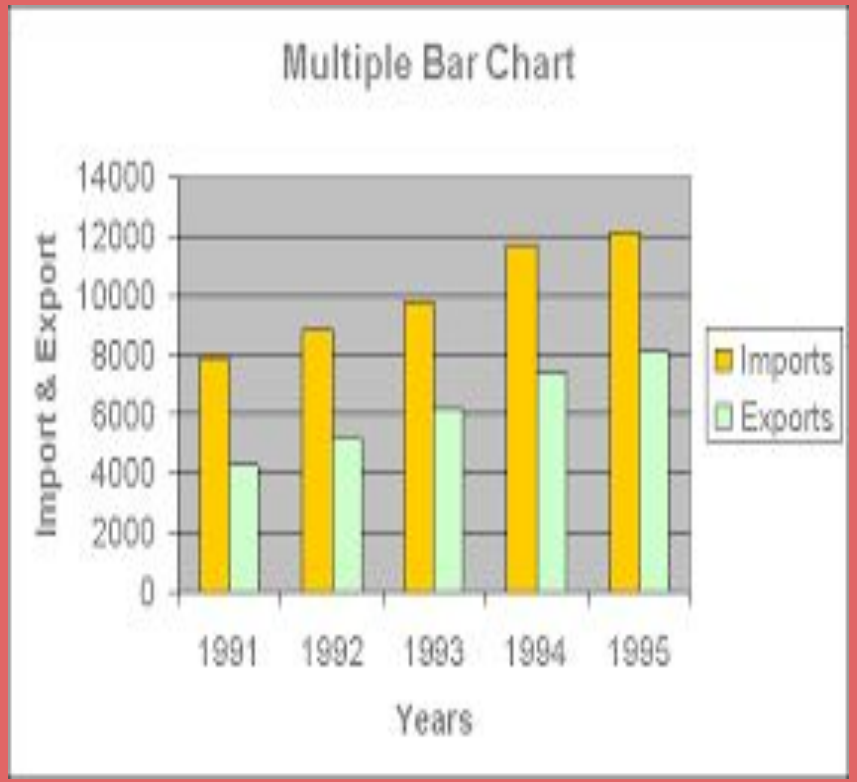

Line Diagram of Income of 10 workers

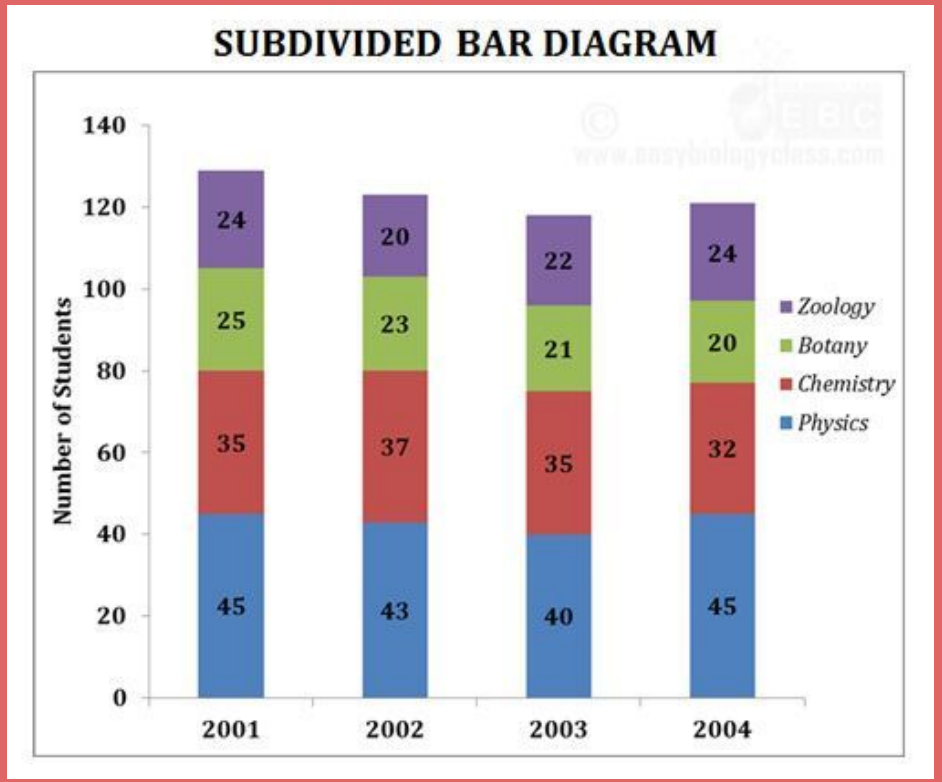
# SIMPLE BAR DIAGRAM

- Vertical bar diagram
- Horizontal bar diagram
- Multiple bar diagram
- Sub divided bar diagram
- Percentage subdivided bar diagram

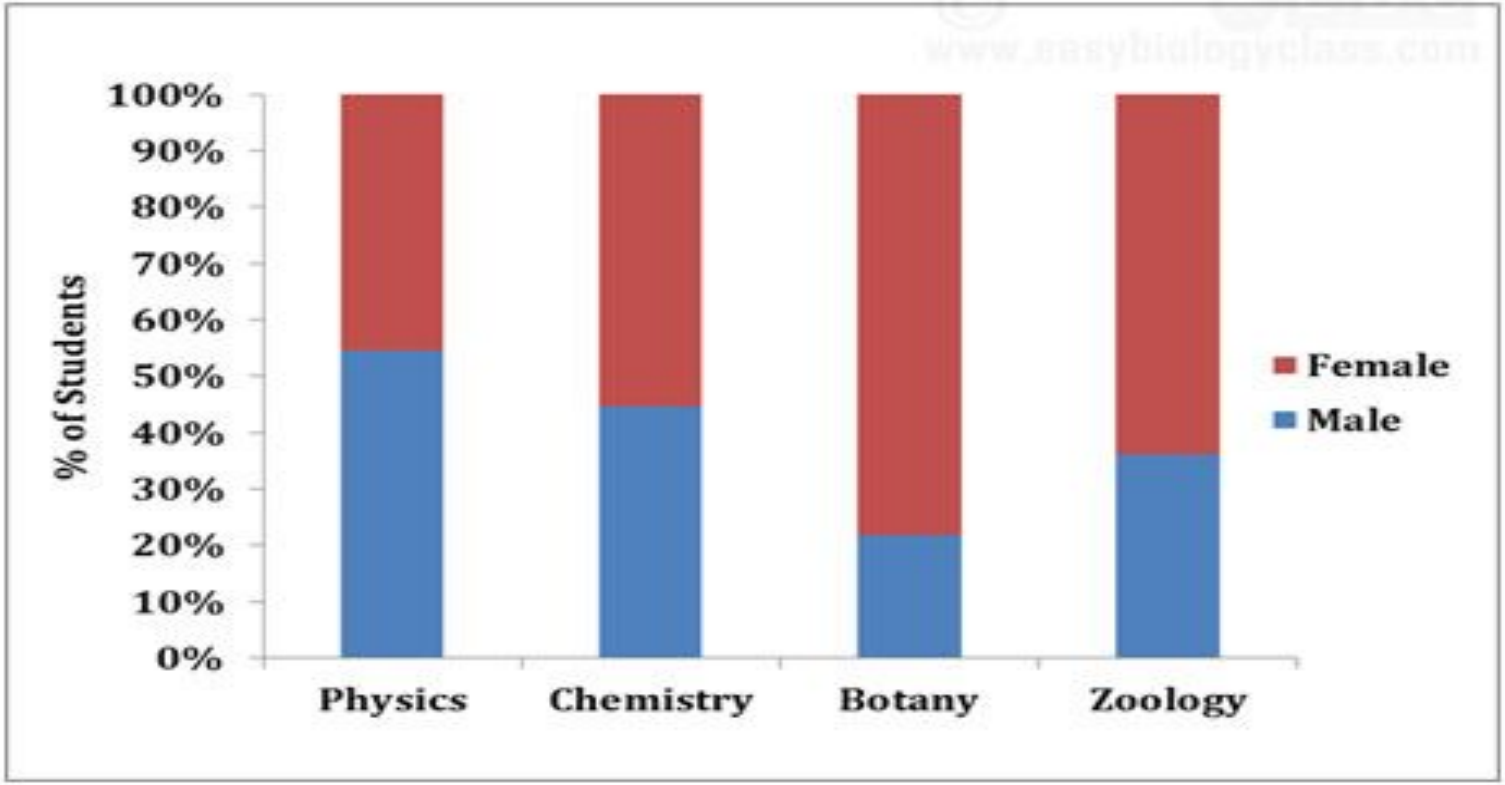

Vertical bar chart
350
300
250
200
150
100
50
0
Number of visitors
Jan
Feb
Mar
Month

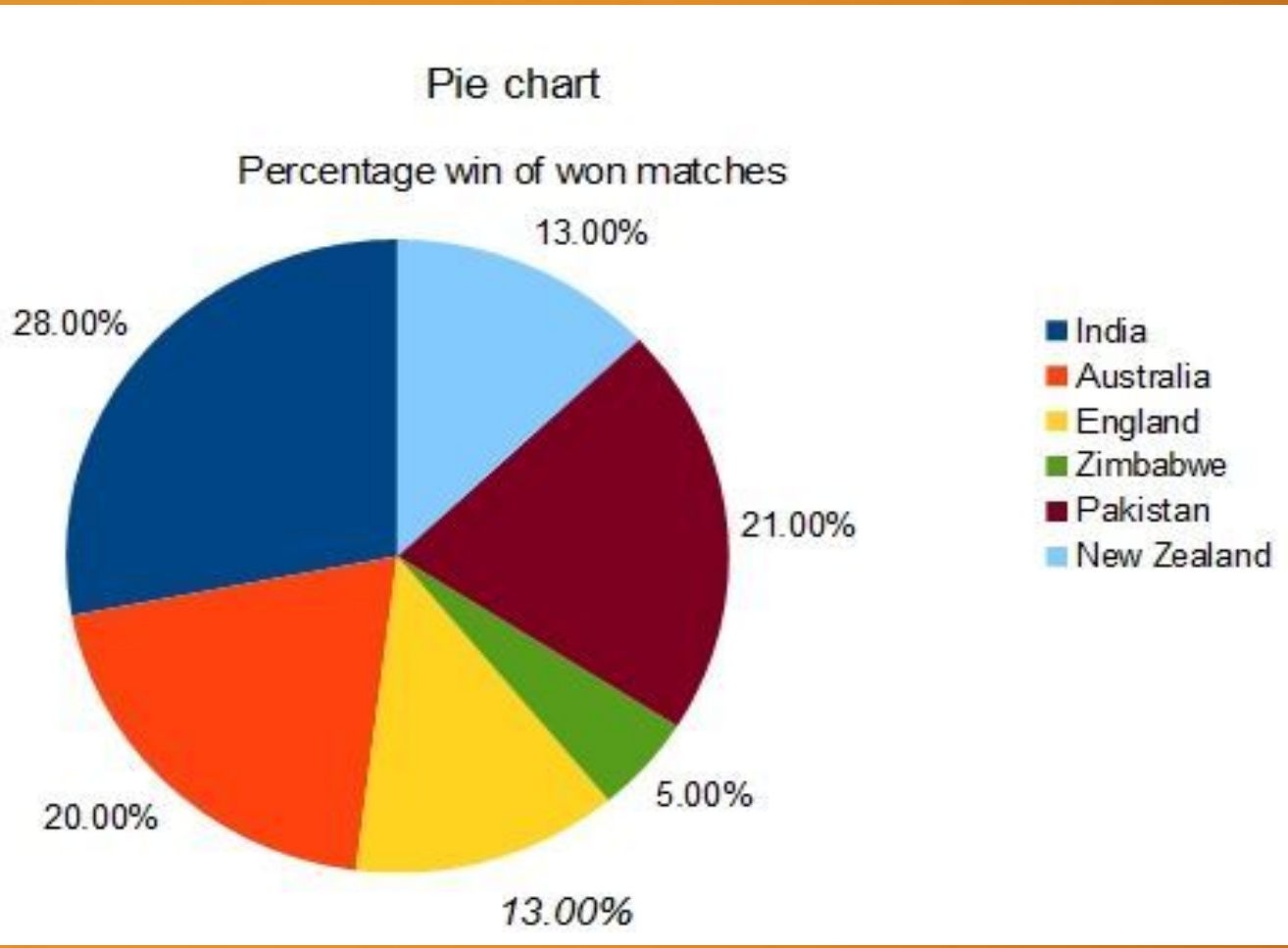

Horizontal bar chart
Mar
Feb
Jan
Month
0
50
100
150
200
250
300
350
Number of visitors


Multiple Bar Chart
Import & Export
14000
12000
10000
8000
6000
4000
2000
0
1991
1992
1993
1994
1995
Years
Imports
Exports


SUBDIVIDED BAR DIAGRAM
Number of Students
140
120
100
80
60
40
20
0
24
25
35
45
20
23
37
43
22
21
35
40
24
20
32
45
2001
2002
2003
2004
Zoology
Botany
Chemistry
Physics

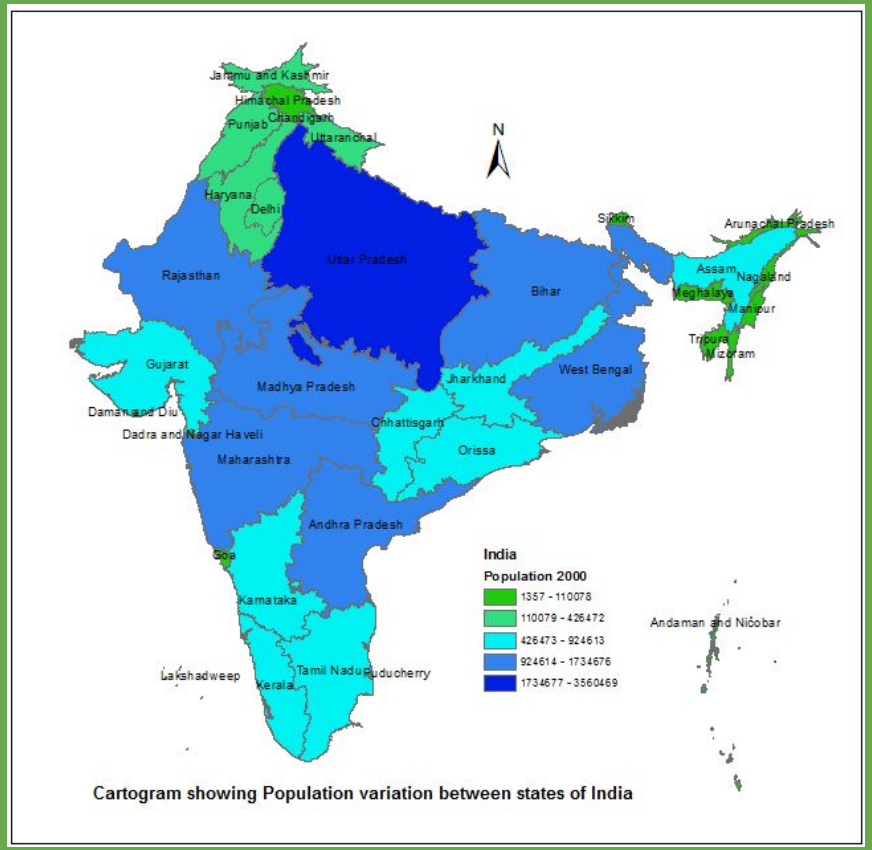
# PERCENTAGE BAR DIAGRAM




Pie chart
Percentage win of won matches
13.00%
28.00%
21.00%
20.00%
5.00%
13.00%
India
Australia
England
Zimbabwe
Pakistan
New Zealand

# PICTOGRAPHS

# CARTOGRAM


Jammu and Kashmir
Himachal Pradesh
Chandigarh
Punjab
Uttaranchal
N
Haryana
Delhi
Sikkim
Arunachal Pradesh
Uttar Pradesh
Rajasthan
Bihar
Assam
Nagaland
Meghalaya
Manipur
Tripura
Mizoram
Gujarat
West Bengal
Jharkhand
Madhya Pradesh
Daman and Diu
Chhattisgarh
Dadra and Nagar Haveli
Orissa
Maharashtra
Andhra Pradesh
Goa
India
Population 2000
1357 - 110078
110079 - 426472
426473 - 924613
924614 - 1734676
1734677 - 3560469
Andaman and Nicobar
Karnataka
Lakshadweep
Tamil Nadu
Puducherry
Kerala
Cartogram showing Population variation between states of India

# GRAPHIC PRESENTATION

- Graph is a visual form of presentation - graph paper
- It simplifies complexity of data
- It provides easy comparison of two or more data
- No need of special knowledge of Mathematics to understand the graph
- It saves time and energy

# TYPES OF GRAPHS

1. GRAPH OF FREQUENCY DISTRIBUTION
- ❖ Histogram
- ❖ Frequency polygon
- ❖ Frequency curve
- ❖ Ogives or cumulative frequency curve

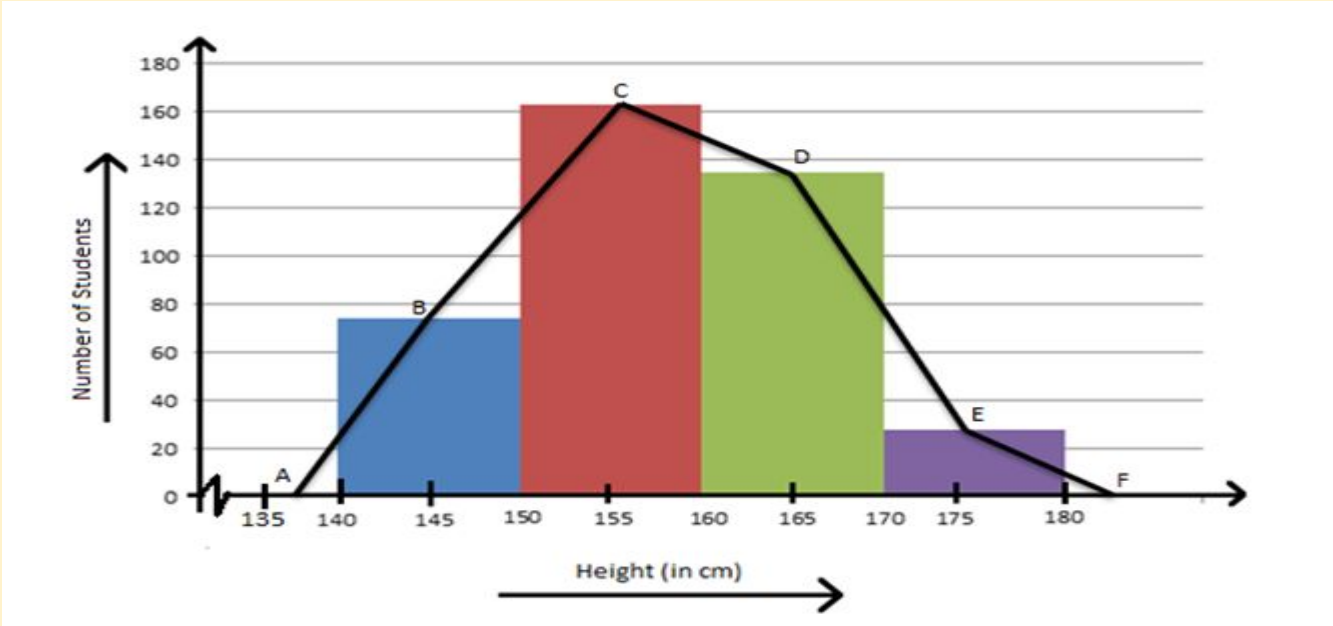
2. GRAPHS OF TIME SERIES
- ❖ Horizontal line graph
- ❖ Net balance graph
- ❖ Component graph
- ❖ Z curve

# HISTOGRAM

A **histogram** is a **chart** that groups numeric data into bins, displaying the bins as segmented columns. They're used to depict the distribution of a dataset: how often values fall into ranges.

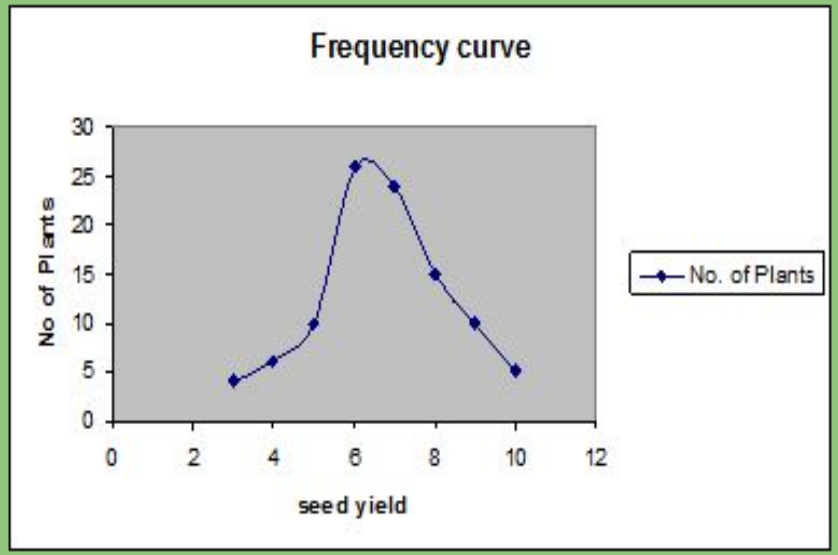
# FREQUENCY POLYGON

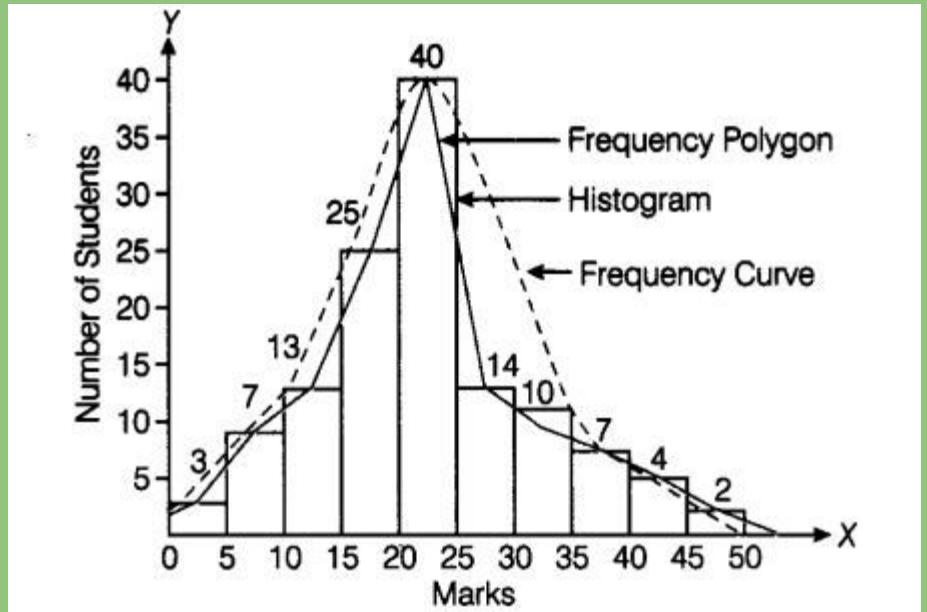
A **frequency polygon** is a graph constructed by using lines to join the midpoints of each interval, or bin. The heights of the points represent the **frequencies**. A **frequency polygon** can be created from the histogram or by calculating the midpoints of the bins from the **frequency** distribution table.



# FREQUENCY CURVE

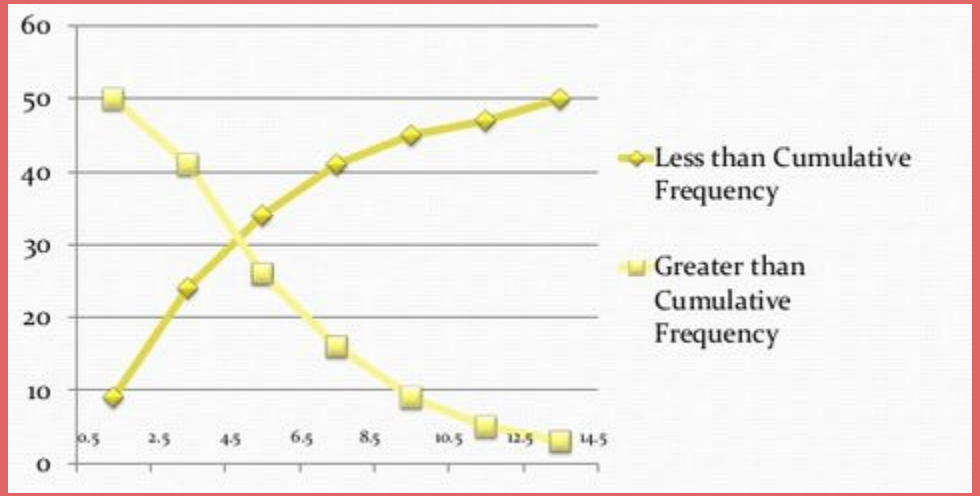
A **frequency-curve** is a smooth **curve** for which the total area is taken to be unity. It is a limiting form of a histogram or **frequency** polygon. The **frequency-curve** for a distribution can be obtained by drawing a smooth and free hand **curve** through the mid-points of the upper sides of the rectangles forming the histogram.



# OGIVE CURVE

An **ogive** (oh-jive), sometimes called a cumulative frequency polygon, is a type of frequency polygon that shows cumulative frequencies. In other words, the cumulative percents are added on the graph from left to right. An **ogive** graph plots cumulative frequency on the y-axis and class boundaries along the x-axis




Thank You