



# QUANTITATIVE METHODS

MODULE CODE: BIT 125



# WELCOME



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# COURSE CONTENTS



## CHAPTER 04

### DIAGRAMMATIC AND GRAPHIC PRESENTATION OF DATA

- ☐ Importance and limitations
- ☐ Types of diagrammatic representations: bar diagram, pie diagram; pictogram
- ☐ Types of graphical representations: histogram, frequency polygon, frequency curve, cumulative frequency curve (Ogive)

5 Lecture Hours

# DIAGRAMMATIC PRESENTATION



## Diagrammatic Presentation of Data

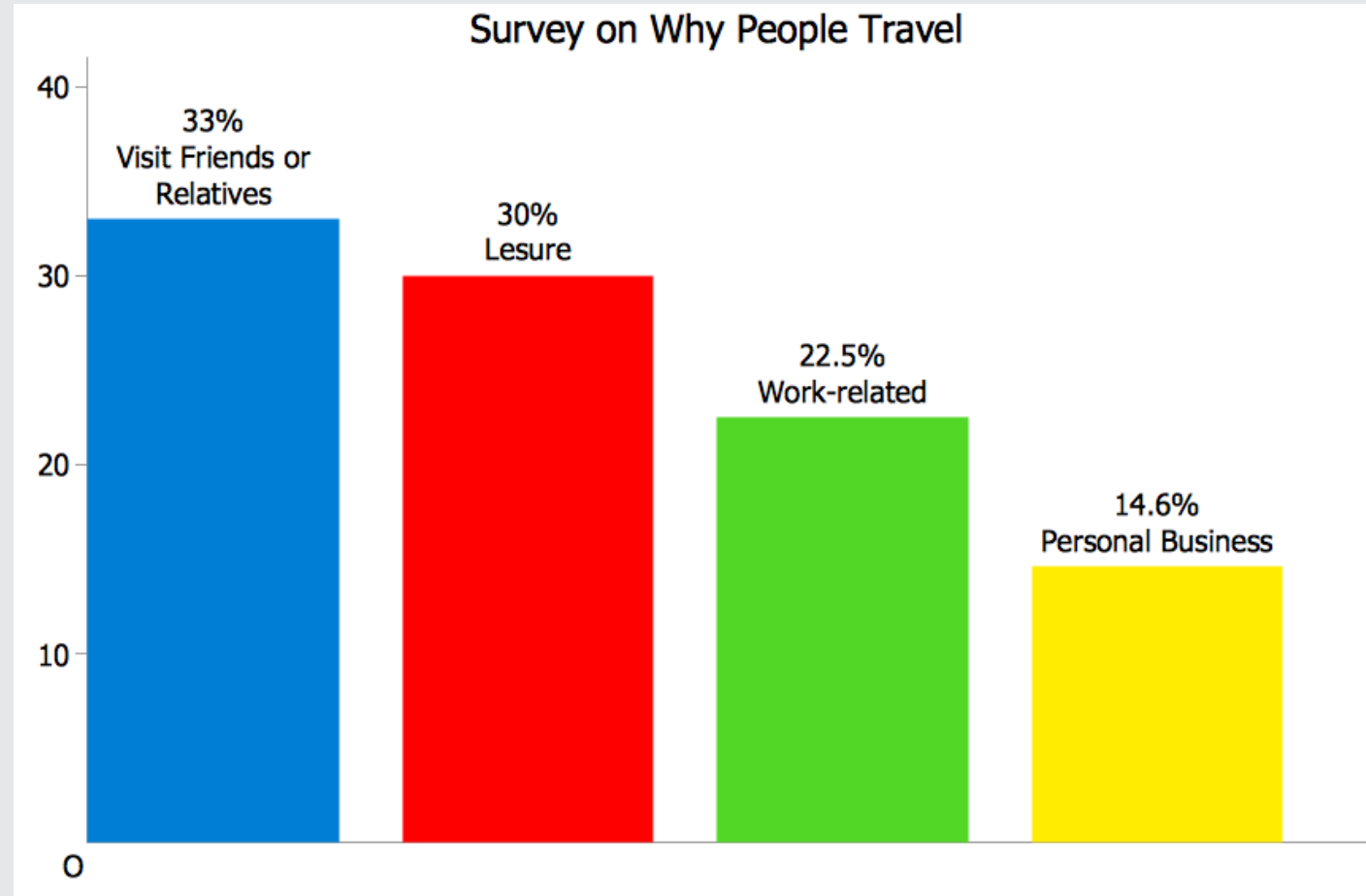
Diagrammatic Presentation of Data gives an immediate understanding of the real situation to be defined by data in comparison to the tabular presentation of data or textual representations. Diagrammatic presentation of data translates pretty effectively the highly complex ideas included in numbers into more concrete and quickly understandable form. Diagrams may be less certain but are much more efficient than tables in displaying the data. Most common diagrammatic presentation of data are bar diagram, pia diagram, pictogram.

# BAR DIAGRAM

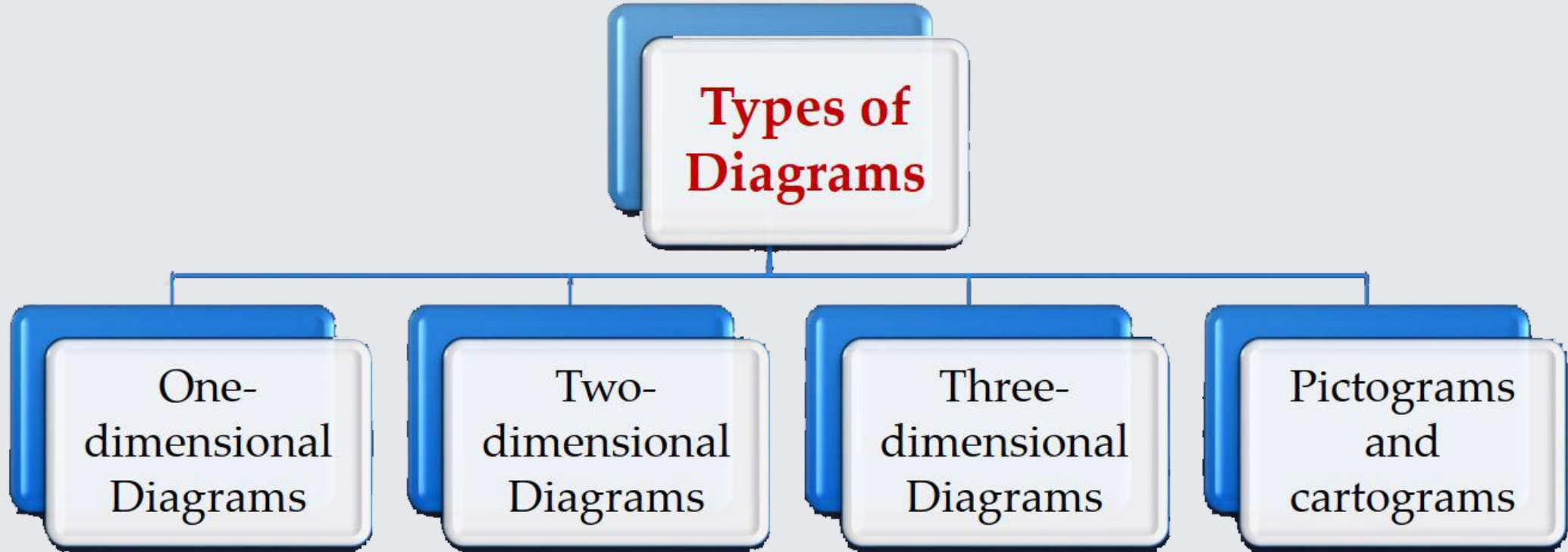


## Bar Diagram

A bar diagram is a chart that uses either horizontal or vertical bars to show comparisons among categories. Bar diagram is the easiest and most commonly used method. It consists of bars of equal width (all horizontal or vertical) standing on a common base line at equal intervals.



# TYPES OF DIAGRAMS



# TYPES OF DIAGRAMS



## One Dimensional Diagram

One dimensional diagram represent only one-dimensional measurement i.e. height is used and width is not considered.

*One-dimensional diagram can be classified as*

1. *Line diagram*
2. *Simple diagram*
3. *Multiple bar diagram*
4. *Sub-divided bar diagram*
5. *Percentage bar diagram*

# TYPES OF DIAGRAMS



## Line diagram

A line graph is a type of chart or graph which shows information when a series of data is joined by a line. It shows the changes in the data over a period of time. In a simple line graph, we plot each pair of values of  $(x, y)$ . Here, the x-axis denotes the various time point  $(t)$ , and the y-axis denotes the observation based on the time.

### Properties of a Line Graph

- It consists of Vertical and Horizontal scales. These scales may or may not be uniform.
- Data point corresponds to the change over a period of time.
- The line joining these data points shows the trend of change.



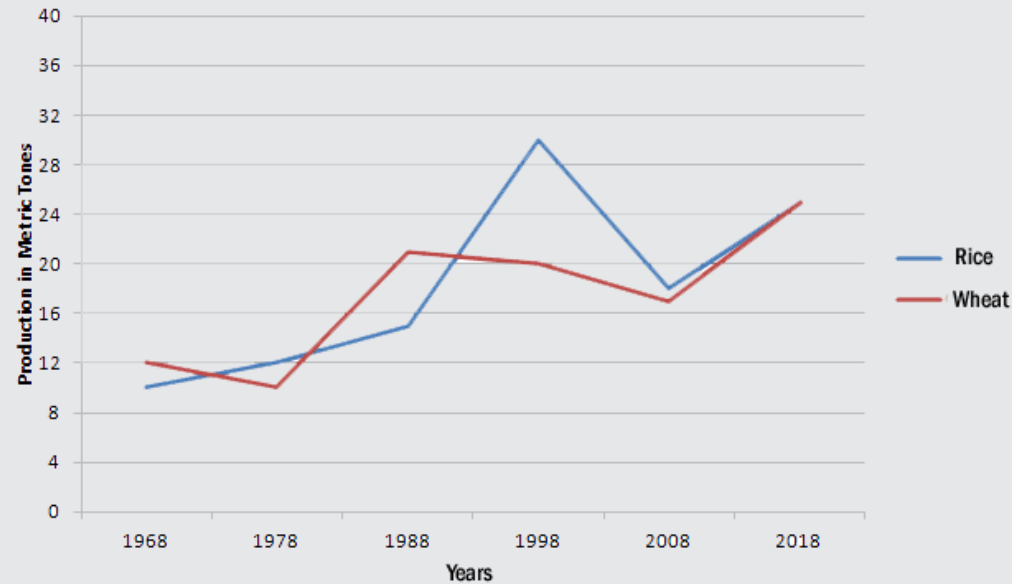
# TYPES OF DIAGRAMS



*For Example:*

Draw a line graph for the production of Rice and Wheat for the given years.

Year	1968	1978	1988	1998	2008	2018
Rice	10	12	15	30	18	25
Wheat	12	10	21	20	17	25



# TYPES OF DIAGRAMS



## Simple Bar Diagram

Simple bar diagram can be drawn either on horizontal or vertical base. Bars must be uniform width and intervening space between bars must be equal. While constructing a simple bar diagram, the scale is determined on the basis of the highest value in the series. However, an important limitation of simple diagrams is that it can present only one classification or one category of data.

i.e. while presenting the population for the last five decades, one can only depict the total population in the simple bar diagrams, and not its sex-wise distribution.

# TYPES OF DIAGRAMS



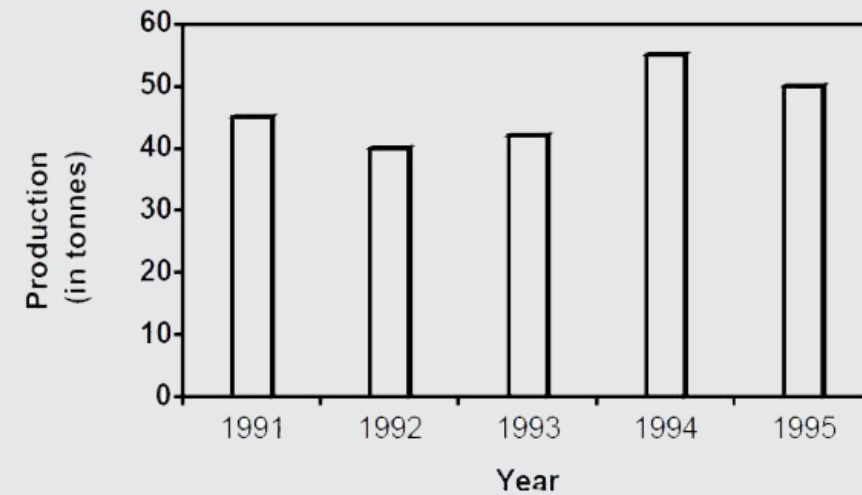
*For Example:*

Represent the following data by a bar diagram.

Year	Production (in tonnes)
1991	45
1992	40
1993	42
1994	55
1995	50

**Solution:**

**Simple Bar Diagram**



# TYPES OF DIAGRAMS



## Multiple Bar Diagram

Simple bar diagram is used for comparing two or more sets of statistical data. In this diagram bars are constructed side by side to represent the set of values for comparison.

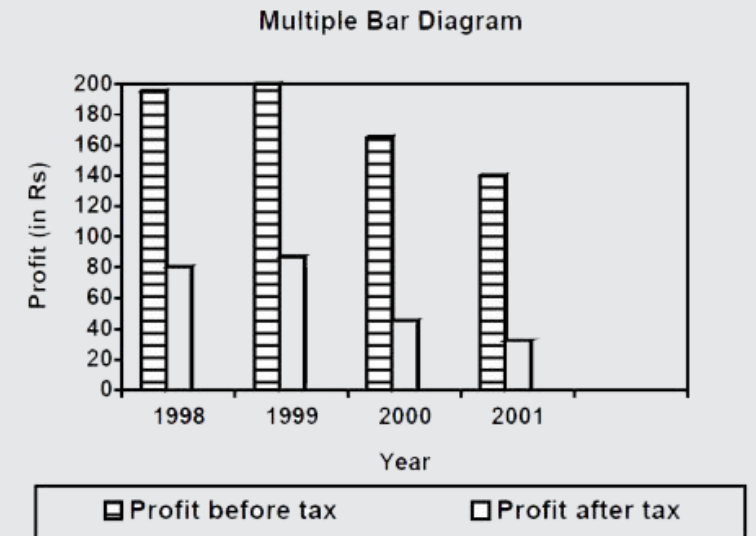
*For Example*

### Example 3:

Draw a multiple bar diagram for the following data.

Year	Profit before tax ( in lakhs of rupees )	Profit after tax ( in lakhs of rupees )
1998	195	80
1999	200	87
2000	165	45
2001	140	32

**Solution:**



# TYPES OF DIAGRAMS



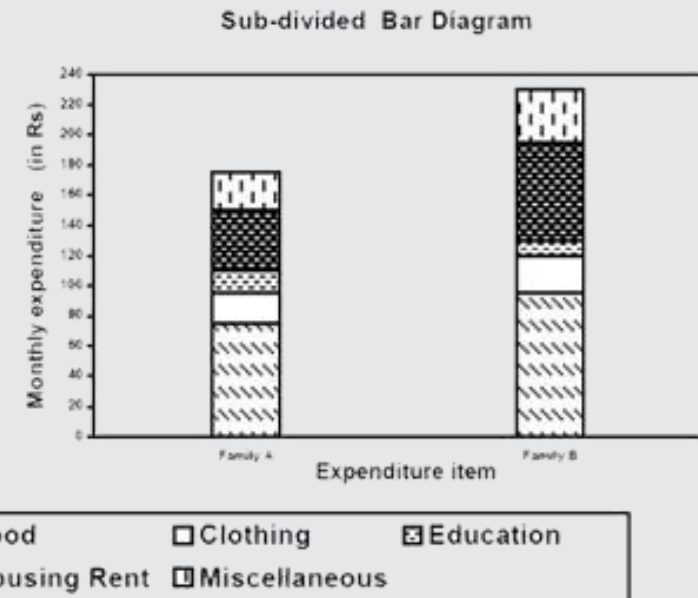
## Sub-divided diagram

In a sub-divided bar diagram, the bar is sub-divided into various parts in proportion to the values given in the data and the whole bar represent the total. Such diagram also called component bar diagram.

*For Example:*

Expenditure items	Monthly expenditure (in Rs.)	
	Family A	Family B
Food	75	95
Clothing	20	25
Education	15	10
Housing Rent	40	65
Miscellaneous	25	35

**Solution:**



# TYPES OF DIAGRAMS



## Percentage Bar Diagram

In percentage bar diagram components are not the actual values but percentages of the whole. The main difference between the sub-divided bar diagram and percentage bar diagram is that in the former the bars are of different heights since their totals may be different whereas in the latter the bars are of equal height since each bar represents 100 percent.

*For Example:*

Represent the following data by a percentage bar diagram.

Particular	Factory A	Factory B
Selling Price	400	650
Quantity Sold	240	365
Wages	3500	5000
Materials	2100	3500
Miscellaneous	1400	2100

# TYPES OF DIAGRAMS



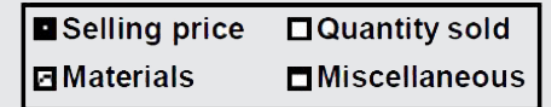
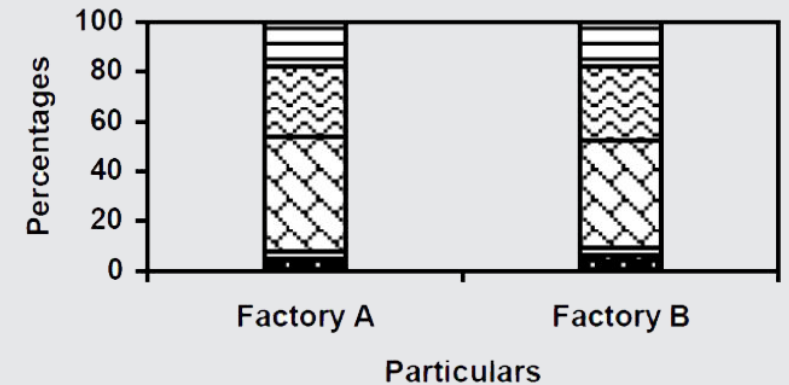
## Solution:

Convert the given values into percentages as follows:

Particulars	Factory A		Factory B	
	Rs.	%	Rs.	%
Selling Price	400	5	650	6
Quantity Sold	240	3	365	3
Wages	3500	46	5000	43
Materials	2100	28	3500	30
Miscellaneous	1400	18	2100	18
Total	7640	100	11615	100

## Solution:

Sub-divided PercentageBar Diagram



# TYPES OF DIAGRAMS



## Two Dimensional Diagram

In two-dimensional diagrams the area represent the data and so the length and breadth have both to be taken into account. Such diagrams are also called area diagrams or surface diagrams.

*Two-dimensional diagram can be classified as*

1. *Rectangles*
2. *Squares*
3. *Pie-diagrams*



# TYPES OF DIAGRAMS



## Pie Diagram or Circular Diagram

In pie diagram, both the total and the component parts or sectors can be shown. The area of a circle is proportional to the square of its radius. While making comparisons, pie diagrams should be used on a percentage basis and not on an absolute basis.

Country	Production of sugar (in quintals)
Cuba	62
Australia	47
India	35
Japan	16
Egypt	6

# TYPES OF DIAGRAMS



Solution:

The values are expressed in terms of degree as follows:

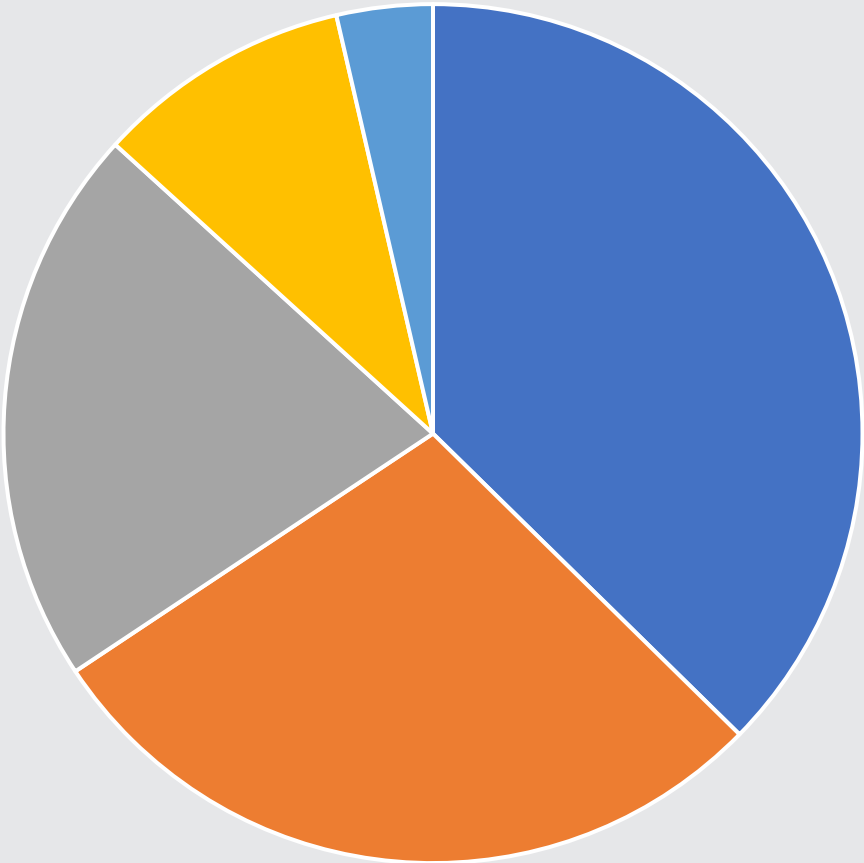
Country	Production of Sugar	
	In Quintals	In Degrees
Cuba	62	134
Australia	47	102
India	35	76
Japan	16	35
Egypt	6	13
<b>Total</b>	<b>166</b>	<b>360</b>

# TYPES OF DIAGRAMS



Solution:

Pie Diagram



■ Cuba ■ Australia ■ India ■ Japan ■ Egypt ■

# TYPES OF DIAGRAMS



## Three-Dimensional Diagram

- It consists of cubes, cylinders, spheres, etc.
- In such diagrams three things, namely length, width and height have to be taken into account.
- Side of a cube is drawn in proportion to the cube root of the magnitude of data.
- Cubes of figures can be ascertained with the help of logarithms.
- The logarithm of the figures can be divided by 3 and the antilog of that value will be the cube-root.

# PICTOGRAMS AND CARTOGRAMS



## Pictograms

A **pictogram** or **pictograph** represents the frequency of data as pictures or symbols. Each picture or symbol may represent one or more units of the data.

- Pictograms are not abstract presentation such as lines or bars but really depict the kind of data we are dealing with.
- Pictures are attractive and easy to comprehend and as such this method is particularly useful in presenting statistics to the layman.
- When Pictograms are used, data are represented through a pictorial symbol that is carefully selected.

# PICTOGRAMS AND CARTOGRAMS



For Example:

The following table shows the number of computers sold by a company for the months January to March. Construct a pictogram for the table.

Month	January	February	March
Number of Computers	25	35	20

Solution:

January	    
February	      
March	   



represents 5 computers

# PICTOGRAMS AND CARTOGRAMS



## Cartograms

**Cartograms** or statistical maps are used to give quantitative information as a geographical basis. They are used to represent spatial distributions. The quantities on the map can be shown in many ways such as through shades or colors or dots or placing pictogram in each geographical unit.

# World Press Freedom Index

The Press Freedom Index is composed of a number of indicators, including:



## Pluralism

Measures the degree to which opinions are represented in the media.



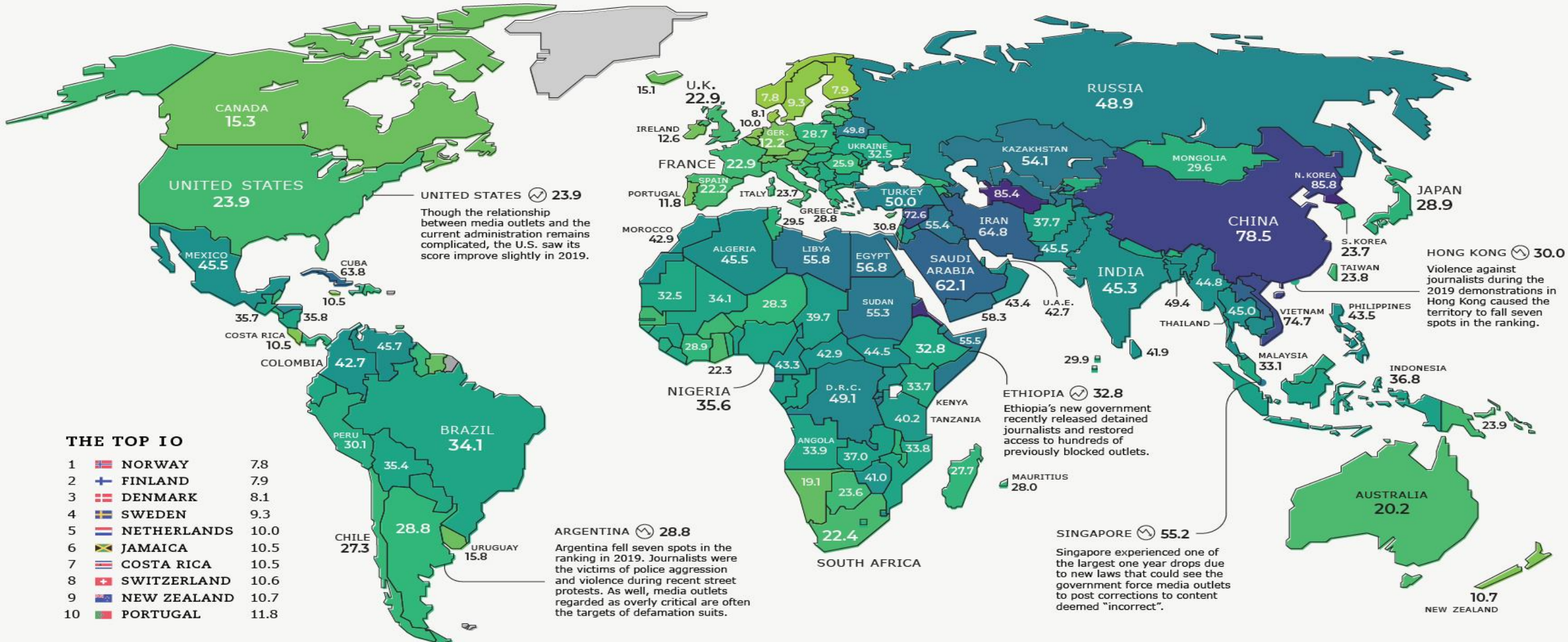
## Abuses

Measures the level of abuses and violence.



 Independence

The degree to which the media is able to function independently of sources of political, governmental, business and religious power and influence.



## WORLD PRESS FREEDOM INDEX SCORE

← Less restrictive

More restrictive  $\longrightarrow$



SOURCE: Global Press Freedom Index, 2020

visualcapitalist.com





