Data Interpretation

Data interpretation, as the name suggests, is all about the analysis of data. Data interpretation is the process of making sense out of the collection of data. Data may be collected in the form of bar graphs, line charts and tabular forms and hence some kind of interpretation that we need.

Introduction to data

Data is the number that comes from the occurrence of any event - physical, social, economic, graphical and other kinds of events.
A number value by itself represents nothing. Thus if we imagine a number, say 40, it means nothing by itself. The number starts to gain some significance when any unit attaches to it, say 40 crores. However, just by saying that the number represents crores does not complete the description of the number. It has to be further qualified by specific descriptions, that is the sales revenue of Coding ninjas for the year 2019-20.

Thus, three facts attached to the number:

a. The number which represents the sales revenue.
b. It refers to a company Coding ninjas.
c. In the year 2019-20.

Introduction to data interpretation

The interpretation of data is the process through which some information is drawn about the data available for analysis.
Let say Coding ninjas in 2019-20 has sales revenue of Rs 40 crores and in 2020-21 has sales revenue of Rs 50 crore.

From these two sales revenue, you get certain information:

a. Company sales have grown by 10 crores.
b. Company % growth has been 25%.
c. The ratio of sales revenue for 2019-20 to 2020-21 is 5:4.

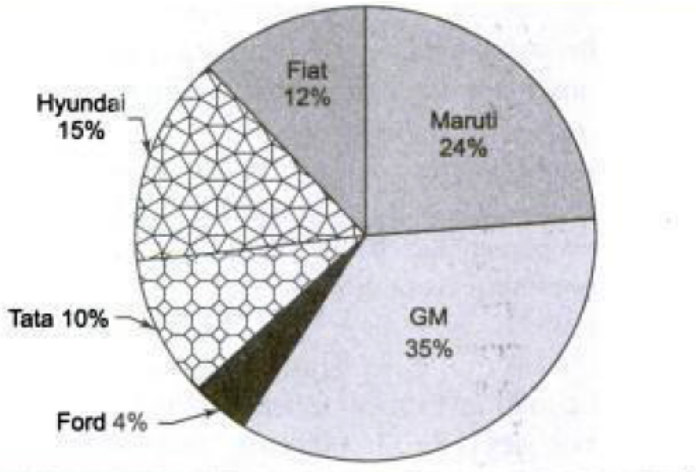
You make out these types of deduction by interpreting the data.

Data does not make any sense when it is in random form or it is difficult to draw out information from random data. So, you have to represent the data in some standard forms like a line graph, pie chart, bar chart, tables and caselet.

How To Read Pie Charts

Pie chart is a specific type of data presentation where data is presented in the form of a circle and pie charts essentially divide 100% of value within a circle. The circle is divided into various subparts. Each subpart represents a certain percentage of total. In the pie chart, the value of the individual pie chart will be an additive construct.

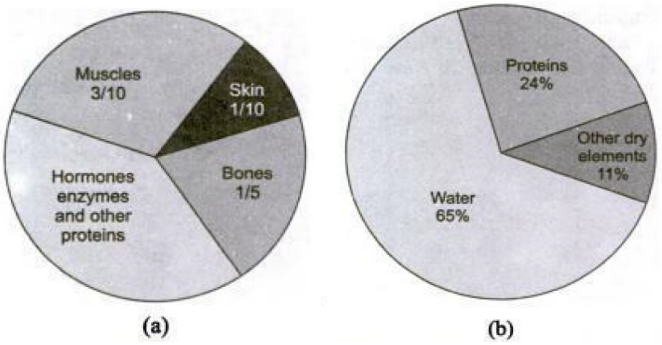
For example: A pie chart showing the distribution of car sales between six companies.



In this pie chart, Maruti has 24% of market share, while GM has 35% of market share, ford has 4% of market share, tata has 10% of market share, Hyundai has 15% of market share and fiat has 12% of market share.

The basic component here is car sales and divided into six companies. The pie chart is a circle, so it is also equal to 360^o or 100%. Thus, 1% is 3.6^o on a pie chart.

For example, The following pie chart figures (a) and (b) gives the information about the distribution of weight in the human body w.r.t. different kinds of components.



In this case, the kind of information that we can extract by interpreting what is given: Here muscles are 3/10 means 30%, the skin is 1/10 means 10%, bones 1/5 means 20% and hormones and enzymes and other proteins is 40%.

Let's say a person whose weight is 40kg. So, we can extract information about the components. Thus, weight of the muscles = 30% of 40 = 12 kg,
Weight of skin = 10% of 40 = 4 kg
Weight of bones = 20% of 40 = 8 kg
Weight of hormones and enzymes and other proteins = 40% of 40 = 16 kg
Weight of protein = 24% of 40 = 9.6 kg
Weight of other dry elements = 11% of 40 = 4.4 kg
Weight of water = 65% of 40 = 26 kg.

The question may be asked, what is the difference between water weight of a 40 and 60 kg person?
Water weight of 40 kg = 65% of 40 = 26 kg.
Water weight of 60 kg = 65% of 60 = 39 kg.
Difference between water weight = 39 - 26 = 13 kg.

In DI once you start understanding the variable, you start understanding the extraction or deduction you make. So, understanding the variable is the most important construct in DI.

How To Read Bar Charts

Data is always about variables, variables are either continuous or discrete.

For example, Sales revenue of company coding ninjas is 40 crores in the year 2019-20. Inside this statement there are few variables, which are running. The running variables are as follow:

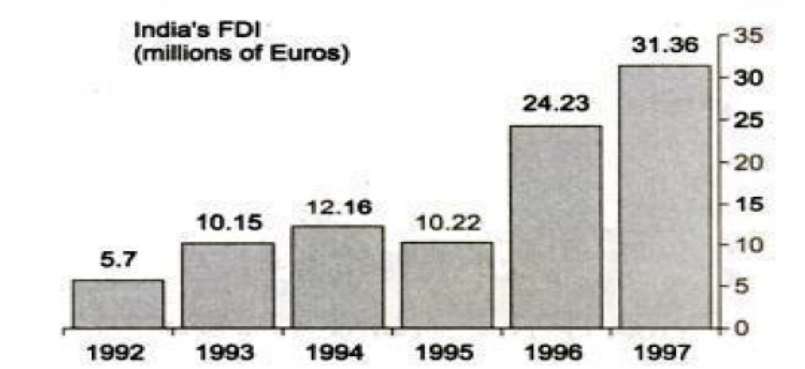
1. Number 40 crore is a sales revenue, which is a variable.
2. The year 2019-20 is also a variable because it could be 2020-21.
3. Company Coding Ninjas is also a variable.

Sales revenue is a continuous variable because it could be 40.01,40.12 etc. whereas the year 2019-20 and company coding ninjas are discrete variables.

Simple Bar Chart:

The simple bar chart is the simplest bar chart which has one continuous variable charted along with one discrete variable.

For example:

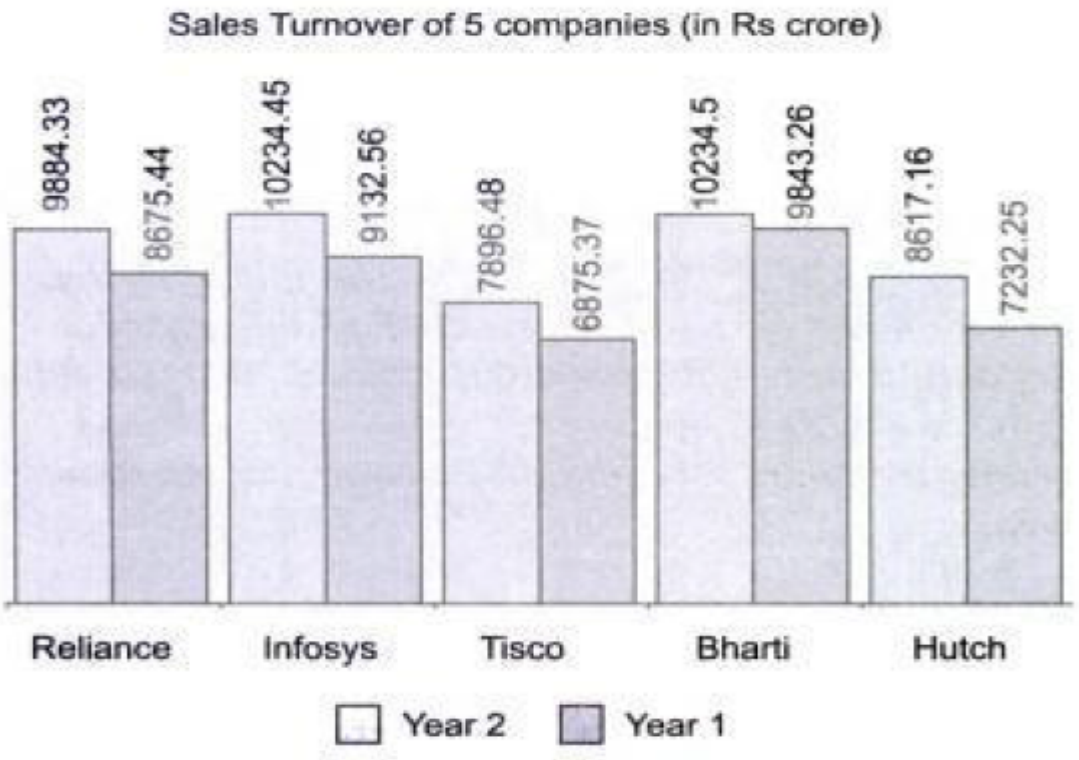


To read this Bar chart, we have to focus on the variables involved.
The year is a discrete variable.
Country India is also a discrete variable.
India's FDI is a continuous variable.
In 1992, number 5.7 meant 5.7 million euros. In this bar chart, we can see the trends of what is happening to India's FDI.

Composite Bar Charts:

In the composite Bar chart, we have two or more continuous variables that are represented.

For example: The following figure shows a Composite Bar Chart.



To read this Composite Bar chart, we have to focus on variables involved.

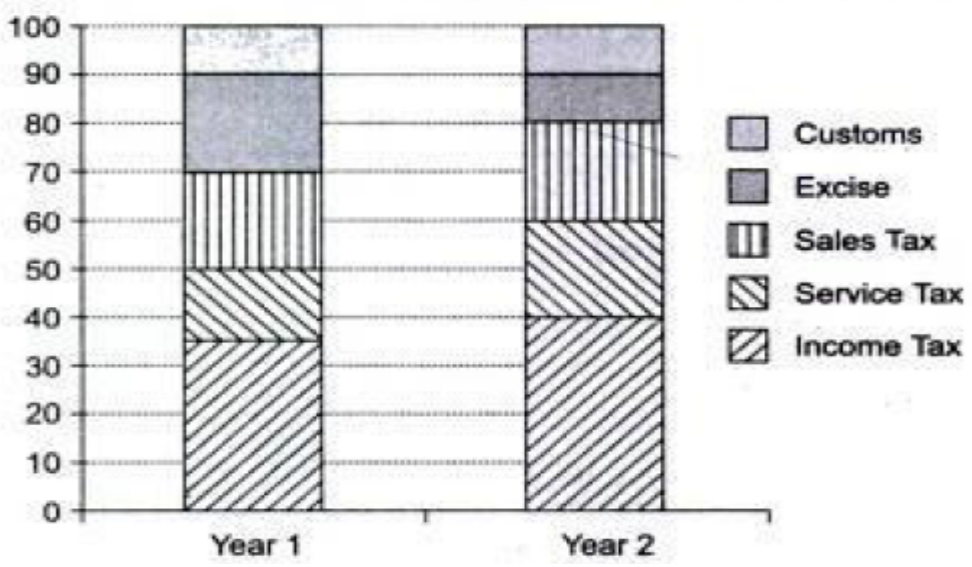
1. Year is a discrete variable.
2. Company names are also a discrete variable.
3. Sales turnover is a continuous variable.

This bar chart gives two or more information about the same discrete variable, for Reliance in Year 1 the sales turnover was 8675.44 crores and in the Year 2 was 9884.33 crores.

Stacked Bar Charts:

Stacked Bar charts represent multiple continuous variables. Sometimes stacked Bar chart can also be used to represent the break-up of some continuous variables.

For example:



Representing Percentage on Stacked Bar Chart

To read this Composite Bar chart, we have to focus on variables involved.

1. Year is a discrete variable.
4. Percentage is also a discrete variable.
5. Taxes i.e. customs, excise, sales tax, service tax and income tax are five continuous variables.

In the Stacked Bar Chart defining different types of taxes into their percentage component breakdown for Year 1 and Year 2.

How To Read Tables and X-Y charts

Tables:

Tables refer to the representation of data in form horizontal and vertical columns. Tables are one of the more versatile methods of representation of data. In tables, we can have any number of continuous variables over any number of discrete variables. The data that can be represented on any type of chart can also be represented on a table.

For example:: Representation of state-wise Literacy and Population growth on a table.

State	Percentage increase in		
	Total Literacy (From 1981 to 1991)	Female Literacy (From 1981 to 1991)	Change in % Population Growth Rate (From 1981 to 1991)
Andhra Pradesh	25.17	23.32	+ 0.09
Bihar	22.34	19.48	– 0.04
Gujarat	27.21	26.20	– 0.53
Haryana	29.19	28.67	– 0.11
Himachal Pradesh	31.06	31.00	– 0.24
Karnataka	27.52	26.63	– 0.47
Kerala	30.17	31.20	– 0.43
Madhya Pradesh	25.58	22.86	+ 0.13
Maharashtra	25.87	25.92	+ 0.10
Manipur	29.61	29.68	– 0.25

To read this Composite Bar chart, we have to focus on the variables involved.

1. Three continuous variables: (a) total literacy (b) female literacy (c) change in % population growth rate.
2. States are discrete variables.
3. Year is also a discrete variable.

Total literacy of Andhra Pradesh 25.17% (from 1981 to 1991) means literacy rate 10 years later increased by 25.17%.
Change percentage growth rate 0.09 means percentage growth rate 10 years later increased by 0.09.

Some following type of questions may arise after reading this table:

1. Which state has the highest % growth in literacy?
   Ans: % growth literacy highest for Himachal Pradesh (31.06%)
2. Which state shows the lowest % growth in female literacy?
   Ans: Bihar (19.48%)
3. How many states may have negative growth in population growth rate while having more than 20% growth in both total literacy and female literacy?
   Ans: Gujrat, Himachal Pradesh, Haryana, Karnataka, Kerala and Manipur i.e. 6 states.

Example 2: Shows courier charges (in Rs) for sending a parcel of 1 kg from one city to another city.

Courier Charges For Sending Parcel:

Cities	Allahabad	Mumbai	Kolkata	Delhi	Lucknow
Allahabad	–	10	5	15	10
Mumbai	10	–	7	25	20
Kolkata	5	7	–	20	15
Delhi	15	25	20	–	10
Lucknow	10	20	15	10	–

In this table, sending parcels from Allahabad to Mumbai costs 10 Rs. and sending parcels from Lucknow to Mumbai costs 25 Rs. Similarly, we can see the costs for other cities.

In this table what kind of question can be asked, Minimum cost, maximum cost, % difference in cost or cost of the parcel from Mumbai to Kolkata and then from Kolkata to Delhi.

In this table from Mumbai to Delhi and Delhi to Mumbai has the same courier cost and this is true for every pair.

Example 3: Employees working in various departments of Hoola Moola Boola, Inc.

Years	Departments (Number of Employees)				
	Production	Marketing	Corporate	Accounts	Research
1999	150	25	50	45	75
2000	225	40	45	62	70
2001	450	65	30	90	73
2002	470	73	32	105	70
2003	500	80	35	132	74
2004	505	75	36	130	75

Variables are; Year, Departments and Number of employees. Let's say if we want to extract in 2004 the number of employees in Research, then it is 75 employees.

X-Y Charts:

As the name itself suggests the X-Y Charts will be, in which discrete variables against the continuous variables.

X-Y charts are also useful in determining the trends, rate of change and for illustrating comparison w.r.t some time series.

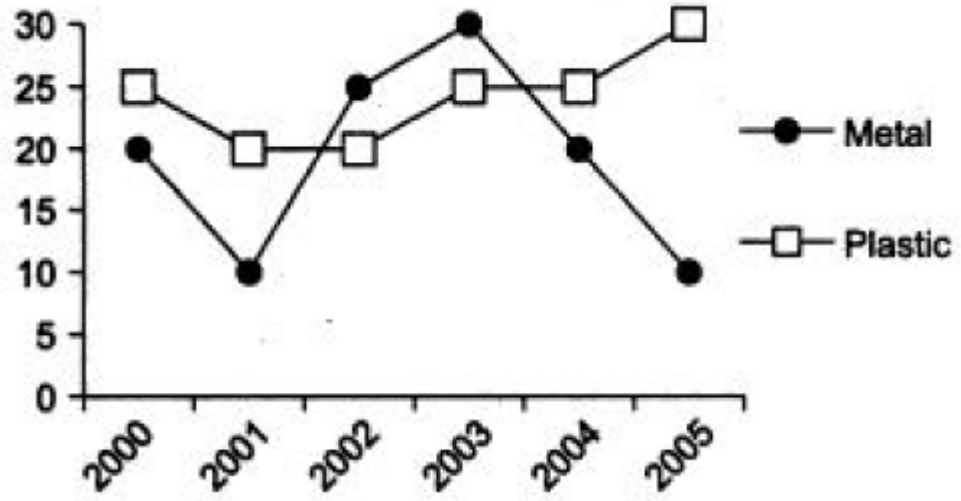
Feo example: The X-Y Chart of Consumer Price Index In 1993-94.

The continuous variable in this set is the consumer price index for the year 1993-94 and the discrete variable is the name of months.

Consumer price index in 1993-94, Jan was 335.

In X-Y charts we also have multiple continuous variables:

For example, The following graph shows the trends of consumption of metals and plastic in the production of cars between 2000-2005.



Consumption of metals versus plastic in given years for car manufacturing (in thousand tons)

In 2000 the metal used in cars was 10 k tons and plastic used in cars was 20k tons.

There is a small difference between Line cheats and X-Y charts, in Line charts we draw the lines and in X-Y charts the line will not be there, only points will be marked.