stacked bar diagram: A stacked bar diagram, variously known as component bar diagram or sub-devided bar diagram, is a side by side diagram that uses bars to show comparisons between categories of data, but with ability to break down and compare parts of a whole. Each bar in the diagram represents a whole and segments in the bar represent different parts or categories of that whole. A stacked bar diagram is a good device to display categorical data. The component parts are variously colored or shaded to make them distinct and attractive.

As with the simple bar diagram, the stacked bar diagram uses rectangular boxes to represent categories of a variable. The variable located on the x-axis is known as the stacked variable. The stacked bar diagram differs from the simple bar diagram in that each rectangular box on the x-axis is made up of smaller individual boxes that we call segments. The segments are stacked on top of one another and could also be called the y-axis variable. The height of each segment represents the number of cases in a category of the stacked and a category of the segment variable. The stacked bar diagram depicts the relationship between the categories of the stacked and segment variable.

There are two types of stacked bar diagram: simple stacked bar and 100 percent stacked bar

In the construction of 100% stacked bar diagram, we follow the following steps:

(a) convert each component in the data set into percentage value of the corresponding total.

(b) Draw one rectangular for each total, taking equal length's of 100 units and bread th's proportional to the totals.

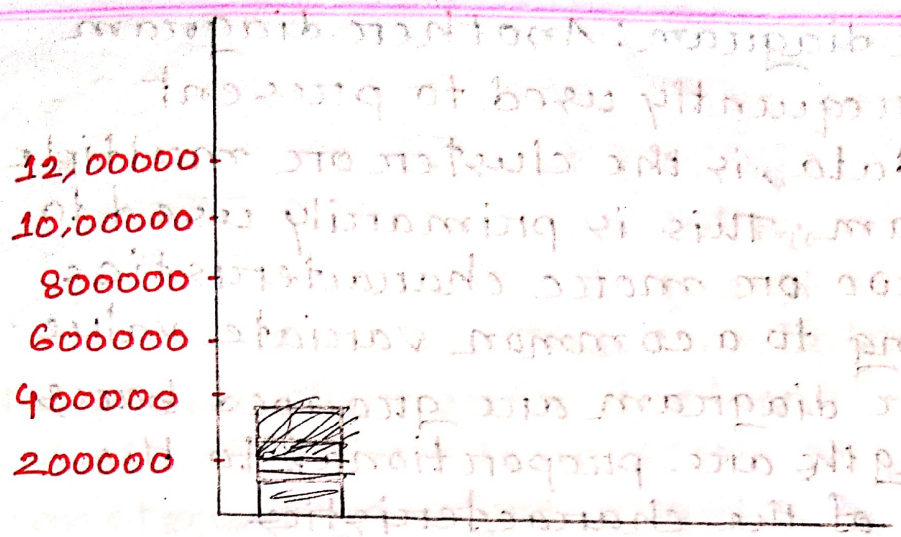
(c) Devide each rectangle so drawen into parts equal

(d) use shading or color to distinguish one component from the others.

Ex-2.18: The gross revenue expenditures of the government of Bangladesh in million BDT for the financial years 2011-12 and 2012-13 were as follows:

Sol: We first draw a ~~percentage~~ simple stacked bar ~~and~~ diagram followed by a percentange stacked bar.

Heads of revenue expenditure (gross)	% Expenditure in Taka	
	2011-12	2012-13
wages and salaries	21.9	20.3
commodities & services	4.9	4.5
Transfer	33.7	34.1
other services	32.5	34.1
total	100.0	100.0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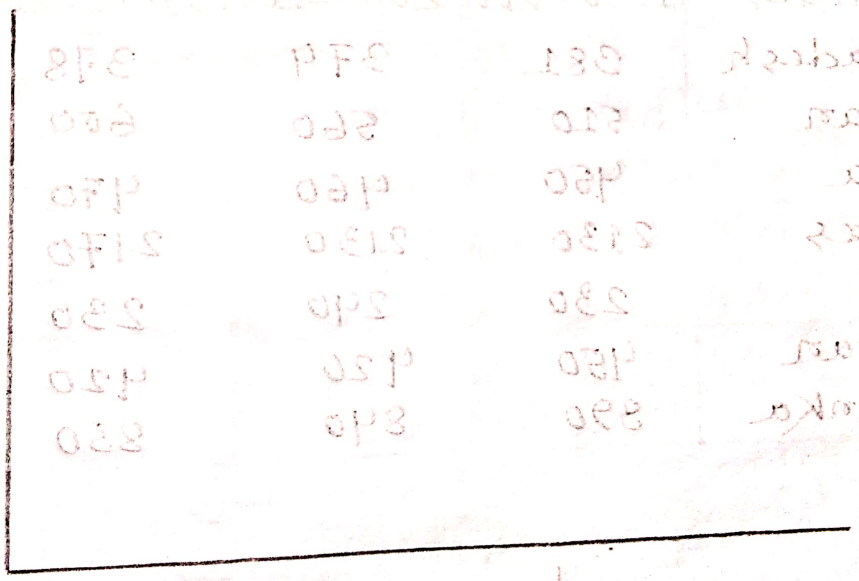


Cluster Bar diagram: Another diagram which is frequently used to present statistical data, is the cluster or multiple bar diagram. This is primarily used to compare two or more characteristics corresponding to a common variate value. cluster bar diagram are grouped bars whoose lengths are proportional to the magnitude of the characteristics.

Ex-2.24:

Per capita Income in US $			
countries	1990-2000	2000-2001	2001-2002
Bangladesh	381	374	378
Bhutan	510	560	600
India	450	460	470
Maldives	2130	2130	2170
Nepal	230	240	230
Pakistan	450	420	420
Sri-Lanka	890	840	850

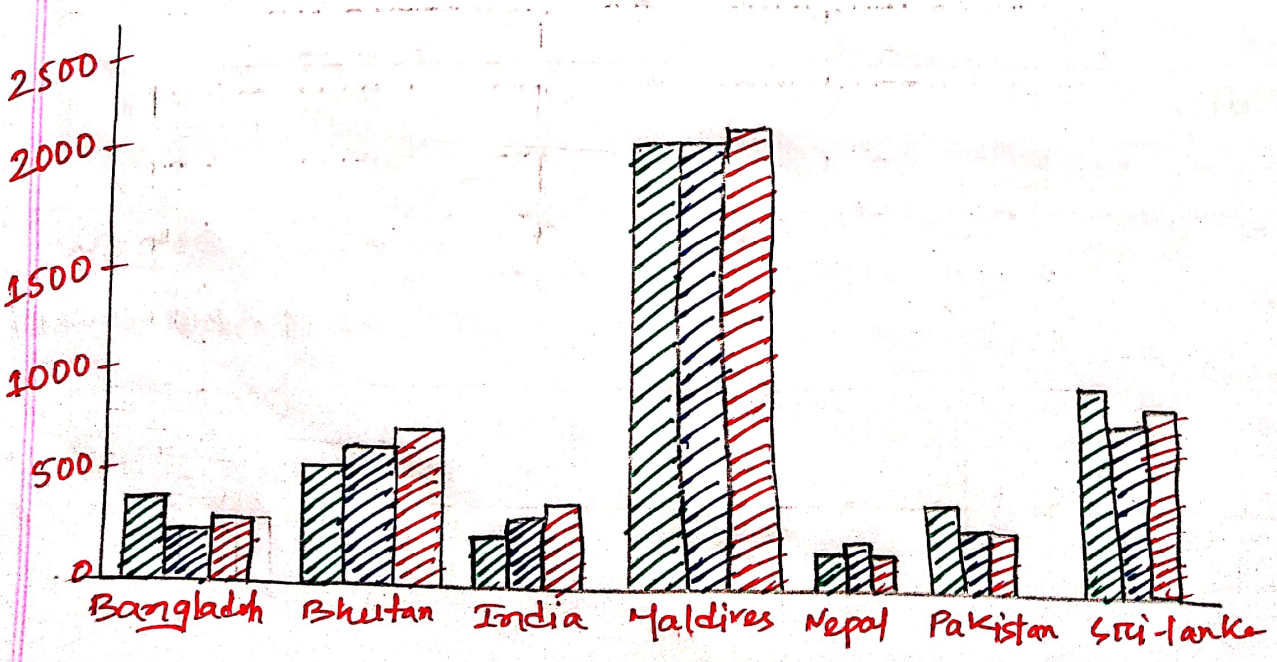


Figure: cluster bar diagram representing the data

Pie chart: Pie diagram also known as pie chart, is a useful device for presenting categorical data. The pie chart consists of a circle sub devided into sectors whose areas are proportional to the various parts into which the whole quantity is devided. The sectors may be shaded or colored differently to show their individual contributions to the whole. The following steps are involved in constructing a pie chart:

(a) convert the absolute frequencies into relative ~~percentage~~ frequencies for each category of the variable.

(b) Multiply the percentage value by 360° for each category. The resulting values are the angles expressed into degrees.

(c) Draw a circle of appropriate radius.

(d) The resulting figure is the desired pie diagram of the data.

Ex-2.7:

Sectors	Percent of Jobs	Angles
Govt.	4	14.4
Non-govt.	14	50.4
Private	61	219.6
Others	21	75.6
Total	100	360.0

Sol: To draw a pie diagram,

$$\text{Angle} = \frac{14}{100} \times 360^\circ = 50.4^\circ$$

4) The various parts of the Pie chart drawn may be either by angles in degrees or in percentage value.

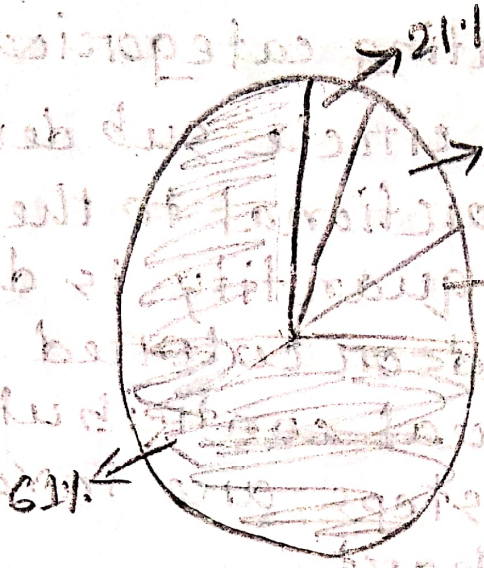


Figure: Pie diagram of this data

Presentation of Continuous Data:

→ Histogram
→ Frequency polygon
→ Ogive

Histogram: The most common form of graphical presentation of a frequency distribution is the frequency histogram. A frequency histogram is constructed by placing the class boundaries on the horizontal axis of a graph and the frequencies on the vertical axis. Each class is shown on the graph by drawing a rectangle whose base is the class boundary and whose height is the corresponding frequency for the class.

Ex-2.39:

House rent (% of income in taka)	Frequency (no. of families)
4.5-9.5	8
9.5 - 14.5	29
14.5 - 19.5	27
19.5 - 24.5	12
24.5 - 29.5	4
Total	80

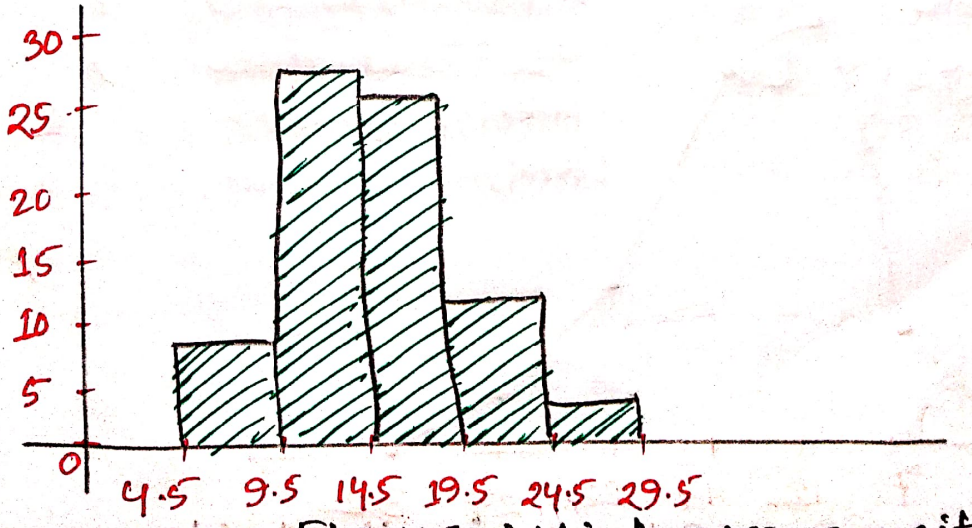


Figure: Histogram with equal class width

Frequency Polygon: A frequency polygon provides an alternative to a histogram as a way of graphically presenting a distribution of a continuous variable. The presentation involves placing the mid-values on the horizontal axis and the frequencies on the vertical axis. Instead of using rectangles, as with the histogram, we find the class mid-points on the horizontal axis and then plot points directly above the class mid-points at a height corresponding to the frequency of the class.

Ex-2.41:

Data for constructing Frequency polygon

Class boundary	Mid-values	Frequency
-0.5-4.5	2	0
4.5-9.5	7	8
9.5-14.5	12	29
14.5-19.5	17	27
19.5-24.5	22	12
24.5-29.5	27	4
29.5-34.5	32	0
Total		80

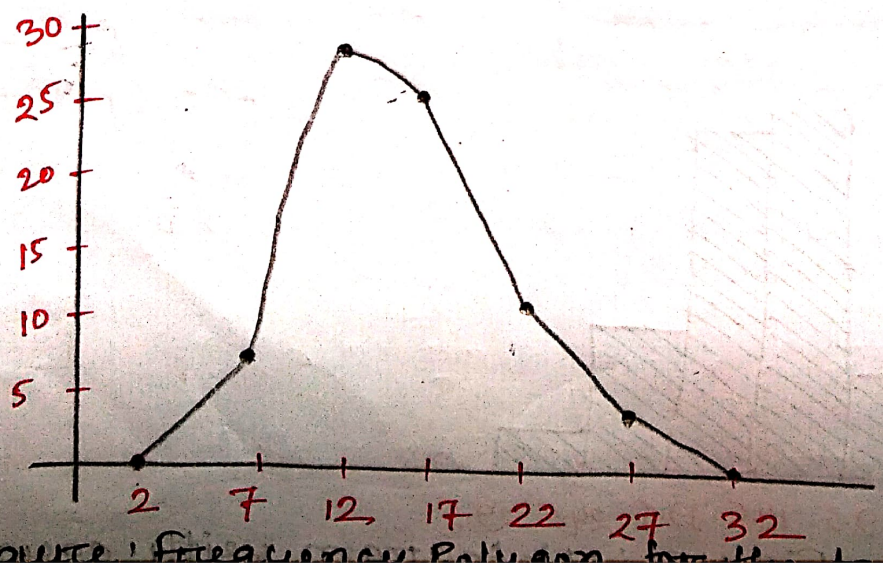


Figure: Frequency Polygon

Cumulative frequency polygon: A graph of the cumulative frequency distribution or cumulative relative frequency distribution is called an ogive. Two types of ogive can be constructed:

(a) more than type ogive
(b) less than type ogive

To construct a less than type ogive, follow the steps below:

(a) Put the upper class limits (precisely the upper boundaries) on the horizontal axis and cumulative frequency on the vertical ~~bar~~ axis.

(b) Plot a point directly above each upper class limit at a high height corresponding to the cumulative frequency at that upper class limit.

(c) Plot one additional point above the lower class limit for the first class at a height ~~corresponding~~ of zero.

(d) connect these points by straight lines.

To construct a more than type ogive, the steps are as follows:

(a) Put the lower class limits on the horizontal axis.

(b) Plot a point against each lower class limit at a height corresponding to the cumulative frequency at that lower class limit.

(c) Plot an additional point above the upper class limit for the terminal class at a height of zero frequency.

Ex-2.43:

longevity (in month)	Number of bulbs
1.45 - 1.95	4
1.95 - 2.45	2
2.45 - 2.95	8
2.95 - 3.45	30
3.45 - 3.95	20
3.95 - 4.45	10
4.45 - 4.95	6
Total	80

Sol:

less than type		more than type	
Inflation rate (%)	cumulative Frequency	Inflation rate (%)	cumulative frequency
less than 1.45	0	more than 1.45	80
less than 1.95	4	more than 1.95	76
less than 2.45	6	more than 2.45	74
less than 2.95 / 3.45	14	more than 2.95	66
less than 3.95 / 3.45	44	more than 3.45	36
less than 4.45 / 3.95	64	more than 3.95	16
less than 4.45	74	more than 4.45	6
less than 4.95	80	more than 4.95	0

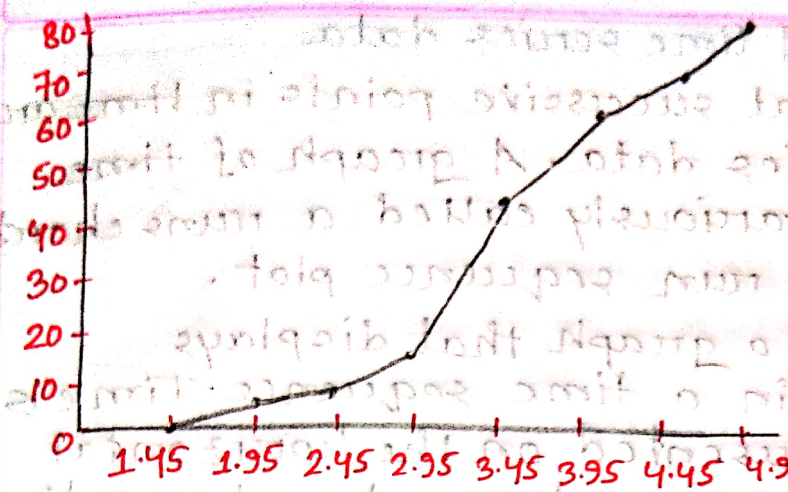


Figure: less than type ogive

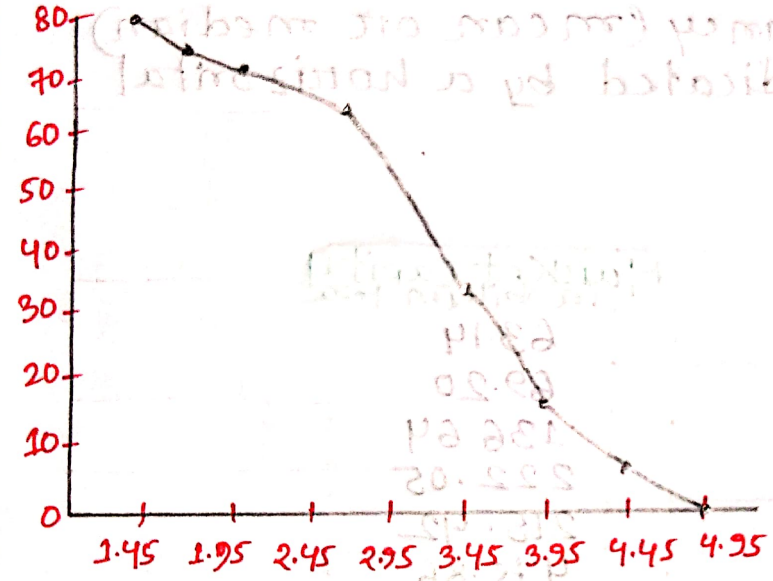
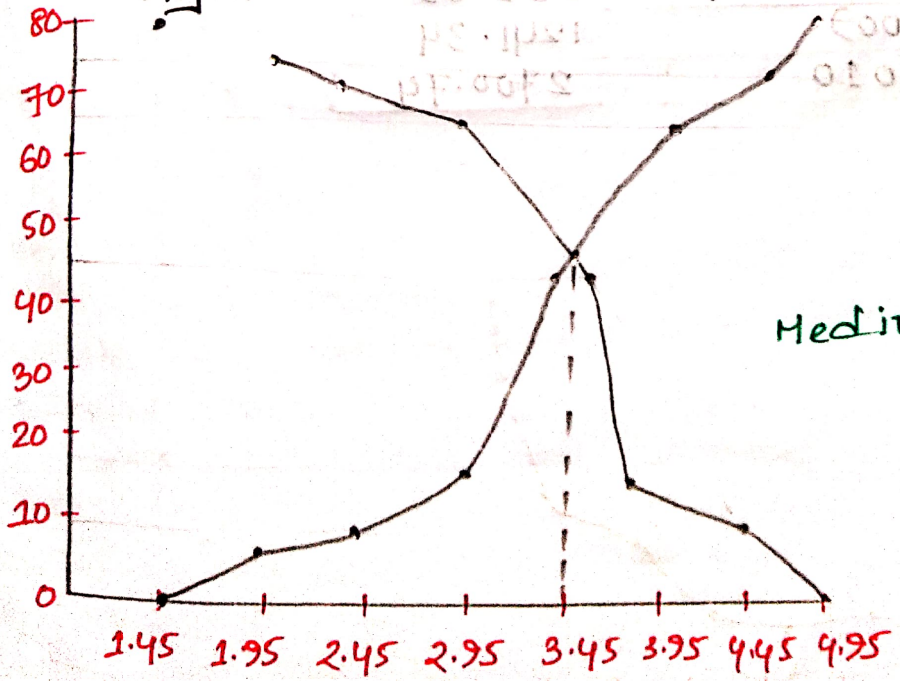


Figure: More than type ogive



Medium = 3.45

Presentation of time series data

Data measured at successive points in time are called time series data. A graph of time series data is variously called a runs chart, line chart or a run sequence plot.

A run chart is a graph that displays observed data in a time sequence. Time is generally represented on the horizontal (x) axis and the property under observation on the vertical (y) axis. Often, some measure of central tendancy (mean or median) of the data is indicated by a horizontal reference line.

Ex: 2.49

Year	Market capital in billion rupees
2002	63.14
2003	69.20
2004	136.64
2005	222.05
2006	215.42
2007	475.86
2008	931.03
2009	1241.34
2010	2700.74