> for ungrouped = the most repeated value
unimodal = one mode
bimodal = more than one mode

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The Mode:

The French word 'mode' means fashion (it has been adopted to x) has been adopted to convey the (data) idea of most frequent. The mode is defined as;
"a value which occours most frequently in a set of data that is it indicates the most common results.

A set of data may have more than one mode or no mode at all. When each observation occours the same number of time. In an ungroup frequency distribution, m with classes consisting of single values, the mode can be immediately located by examining the distribution.

In other words, we can say that;
-the mode is actually the most repeated value in the whole data set. When the data are organized into a grouped frequency distribution, the mode would lie in the class that carries the highest frequency. This class is called 'the modal class'. For most practical purposes it is sufficient to take the midpoint of the modal class as the mode but generally it is a poor approximation.

We can define the mode as:

$$\text{mode} = l + \frac{(f_m - f_1)}{(f_m - f_1) + (f_m - f_2)} \times h$$

(for grouped frequency distribution)

where ;

- l = lower class boundary of modal class
- f_m = frequency of the modal class
- f_1 = frequency associated with the class preceding the modal class
- f_2 = frequency associated with the class following the modal class
- h - width of the class interval

The mode can also be calculated by the following formula ;

$$\text{mode} = l + \frac{f_2}{f_1 + f_2} \times h$$

But it should be noted that the first formula is more accurate and should be generally used for calculating the mode.

Question

Suppose that the distribution of examination of marks are listed below

Marks	No. of students	class boundary	mid point	CF
30-39	8	29.5 - 39.5	34.5	8
40-49	87	39.5 - 49.5	44.5	95
50-59	190	49.5 - 59.5	54.5	285
60-69	304	59.5 - 69.5	64.5	589
70-79	211	69.5 - 79.5	74.5	800
80-89	85	79.5 - 89.5	84.5	885
90-99	20	89.5 - 99.5	94.5	905

$$\text{mode} = l + \frac{(f_m - f_1)}{(f_m - f_1) + (f_m - f_2)} \times h$$

$$\text{mode} = 59.5 + \frac{(304 - 190)}{(304 - 190) + (304 - 211)} \times 10$$

$$\text{mode} = 59.5 + \frac{114}{114 + 93} \times 10$$

$$= \frac{\cancel{173.5} \times \cancel{10}}{\cancel{207}}$$

$$\text{mode} = 59.5 + \frac{1140}{207}$$

$$\text{mode} = 59.5 + 5.5$$

$\text{mode} = 65.0$ Ans.

Advantages:

4. It is simply defined as easily calculated.
1. In many cases it is extremely easy to locate the mode.
2. It is not affected by abnormally large or small observation.
3. It can be determined for both the quantitative and qualitative data.

Disadvantages:

1. It is not based on all the observations made.
2. when the distribution consist of small number of values then the mode may not exist.

Question

The weight of 40 male students at a university are given in the following frequency table.

weight	f	class boundary	midpoint	C.F
118 - 126	3	117.5 - 126.5	122	3
127 - 135	5	126.5 - 135.5	131	8
136 - 144	9	135.5 - 144.5	140	17
145 - 153	12	144.5 - 153.5	149	29
154 - 162	5	153.5 - 162.5	158	34
163 - 171	4	162.5 - 171.5	167	38
172 - 180	2	171.5 - 180.5	176	40

$$\text{mode} = l + \frac{(f_m - f_1)}{(f_m - f_1) + (f_m - f_2)} \times h$$

$$\text{mode} = 144.5 + \frac{(12-9)}{(12-9)+(12-5)} \times 9$$

$$\text{mode} = 144.5 + \frac{3}{3+7} \times 9$$

$$\text{mode} = 144.5 + \frac{27}{10}$$

$$\text{mode} = 144.5 + 2.7$$

$$\text{mode} = 147.82 \quad \text{Ans}$$

* Relative measure of Dispersion :

→ Relative measure of dispersion is the measure of variance of the range of the values regardless of its unit of measure

→ Spread of two ranges of values with different measures can be compared directly via relative measure of dispersion