Mode

Mode is the value which occurs most frequently in a set of observations and around which the other items of the set cluster densely.

According to A.M. Tuttle, 'Mode is the value which has the greatest frequency density in its immediate neighbourhood.'

In case of frequency distributions, mode is the value of the variable corresponding to the maximum frequency.

Example

Give ↑ Mode value.

X :	1	2	3	4	5	6	7	8	9
f :	3	1	18	25	40	30	22	10	6

↓ Maximum frequency

In case of continuous frequency distributions, the class corresponding to the maximum frequency is called the modal class and the value of mode is obtained by following formula

$$\text{Mode} = l + \frac{h(f_1 - f_0)}{2f_1 - f_0 - f_2}$$

where,

l -> lower limit of the modal class

f_1 -> frequency of the modal class

f_2 -> frequency of the class succeeding the modal class

f_0 -> frequency of the class preceding the modal class

h -> Magnitude of the modal class.

Example

x	f
10-20	4
20-30	6
30-40	5
40-50	10
50-60	20 → (f_0)
60-70	22 → Modal class (f_1)
70-80	24 → (f_2)
80-90	6
90-100	2
100-110	1

* The maximum frequency occurs either in the very beginning or at the end.
* If there are irregularities occurs then modal class is located by the method of grouping method.

∴ Here, modal class identified by using grouping method.

* If the method of grouping gives the modal class which does not correspond to the maximum frequency then we may get the situation of $2f_1 - f_0 - f_2 = 0$.

∴ $2f_1 - f_0 - f_2$
$= 2 \times 22 - 20 - 24$
$= 44 - 44$
$= 0$.

The formula will be:

$$\text{Mode} = l + \frac{h|f_1 - f_0|}{|f_1 - f_0| + |f_1 - f_2|}$$

(Using this formula)

$$M_0 = 60 + \frac{10|22-20|}{|22-20| + |22-24|}$$

$$= 60 + \frac{10 \times 2}{2+2}$$

$$= 60 + 5$$

$$= 65$$ Ans

Grouping Method:

x	f (1)	(2)	(3)	(4)	(5)	(6)
1	3	22	31	34	35	20
2	19	16	8	11	14	16
3	12	7	10	16	13	12
4	4	13	9	11		
5	4	7	9			
6	3	7				
7	7					
8	6					
9	3					
10	4					
11	5					
12	2					

Colours No.	Maximum frequency in each colours	corresponding X values to the maximum frequency
(1)	19	(2)
(2)	22	(1) (2)
(3)	31	(2) (3)
(4)	34	(1) (2) (3)
(5)	35	(2) (3) (4)
(6)	20	(3) (4) (5)

(2) (5) (4) (2) (1)

Value 2 is repeated maximum (5) times. Hence mode is (2) Ans.

Merits

(1) Easy to calculate and understand.
(2) Not affected by extreme values.
(3) Also can be used in open ended class.

Demerits

(1) Not based on the all the observations of the series.
(2) Not suitable for further mathematical treatment.
(3) Affected by the fluctuations of sampling.

Reference: Fundamentals of Statistics by S.C. Gupta.

— x —