MEDIAN

Definition — Median is that value of the variable which divides the group into two equal parts, one part comprising all values greater than the median value and the other part comprising all the values smaller than the median value.

— Connor

MERITS

(i) **Simple** — It is a very simple measure of the central tendency. In case of simple statistical series, just a glance at the data is enough to locate the mid median value.

(ii) **Certainty** — It is always a certain specific value in the series.

(iii) **Real Value** — It is a better representative value of the series compared to arithmetic mean.

(iv) **Possible even when data is incomplete** — It is enough if one knows the number of items and the middle item(s) of the series.

(v) **Graphic Presentation** — Besides algebraic approach, the median value can be estimated also through the graphic presentation of data.

Calculation of median in a continuous series involves the following steps —

(a) Arrange the data in ascending or descending order of their class-intervals.

(b) The frequencies are then converted into cumulative frequencies

(c) Median class of the series is identified. It corresponds to that C.f. which includes the $(N/2)$ th item.

(d) The following formula is applied to determine the actual median value.

$$M = l_1 + \frac{N/2 - c.f.}{f} \times i$$

where
l_1 - lower limit of the median class
$c.f.$ - cumulative frequency of the class preceding the median class.
f - frequency of the median class
i - size of the median class interval.

[Demerits in last Page]

Q.1. Find out the median value of the following distribution — (EQUAL CLASS-INTERVA(III)

Wage rate (₹)	Number of workers (f)	c.f.
0-10	22	22
10-20	38	60
20-30	46	106
30-40	35	141
40-50	20	161
	$\Sigma f = 161$	

M = Size of $N/2$ th item

$= \quad$ " " $161/2$ " "

$= \quad$ " " 80.5 " "

Median class is 20-30 because 80.5th item lies in 106th cumulative frequency. The c.I. corresponding to this c.f. is 20-30.

$$M = l_1 + \frac{N/2 - cf}{f} \times i$$

$$M = 20 + \frac{80.5 - 60}{46} \times 10$$

$$= 20 + \frac{20.5}{46} \times 10$$

$$= 20 + \frac{205}{46}$$

$$= \frac{920 + 205}{46} = \frac{1125}{46} = 24.4 \quad \text{Ans.}$$

Q.2 Calculate median of the following distribution (UNEQUAL CLASS- INTERVAL)

C.I	f	Cf
0-5	12	12
5-10	15	27
10-20	25	52
20-30	40	92
30-50	42	134
50-70	14	148
70-100	8	156
	$\Sigma f = 156$	

M = size of $N/2$ th item

$$= \text{"} \quad \text{"} \quad 156/2 \quad \text{"} \quad \text{"}$$

$$= \text{"} \quad \text{"} \quad 78 \quad \text{"} \quad \text{"}$$

Median class is 20-30 as 78th item lies in 92th C.f. & corresponding to this c.f. the C.I is 20-30.

$$M = l_1 + \frac{N/2 - Cf}{f} \times i$$

$$= 20 + \frac{78 - 52}{40} \times 10$$

$$= 20 + \frac{260}{40} = 20 + 6.5 = 26.5 \quad \text{Ans.}$$

DEMERITS —

(i) Lack of representative character — It fails to be a representative. measure in case of such series the different values of which are wide apart from each other.

(ii) Unrealistic — When the median is located some-where between the two middle values, it remains only an approximate ~~medive~~ measure, not a precise value.

(iii) Lack of algebraic treatment — Arithmetic mean is capable of further algebraic treatment, but median is not.