Assignment-1

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1   2017-ICSE-10th Board Question Paper : 8(a)

Question 8

(a) Calculate the mean of the following distribution using step deviation method.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Number of Students	10	9	25	30	16	10

Table 1: Given Table

Solution :

Here, In the Assignment-1-Solution-Table :

$$Assumed mean : A = 25$$

$$Mid - value : x$$

$$class - size : i$$

$$t = \frac{(x - A)}{i}$$

From the Solution Table :

$$\sum f = 100$$

$$\sum ft = 63$$

Class-Interval (Marks)	Mid-value (x)	No of Students (f)	t	ft
0-10	5	10	-2	-20
10-20	15	9	-1	-9
20-30	25	25	0	0
30-40	35	30	1	30
40-50	45	16	2	32
50-60	55	10	3	30
		$\sum f = 100$		$\sum ft = 63$

Table 2: Solution Table

$$Mean = A + \frac{\sum ft}{\sum f} * i$$

$$= 25 + \frac{63}{100} * 10$$

$$= 25 + 6.3$$

$$= 31.3$$

Hence , Mean of given data is 31.3

Solution(Vector Operations)
By given Data :

$$\vec{F} : frequency vector$$
$$\vec{X} : mid-value vector$$
$$i = 10$$
$$\vec{T} : (\vec{X} - \vec{A})/i$$
$$\textbf{FT} : Dot-product$$

$$\vec{F} = \begin{bmatrix} 10 & 9 & 25 & 30 & 16 & 10 \end{bmatrix}$$

$$\vec{X} = \begin{bmatrix} 5 \\ 15 \\ 25 \\ 35 \\ 45 \\ 55 \end{bmatrix} \vec{A} = \begin{bmatrix} 25 \\ 25 \\ 25 \\ 25 \\ 25 \\ 25 \end{bmatrix}$$

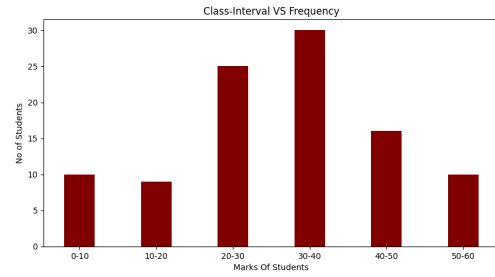$$\vec{T} = \begin{bmatrix} -2 \\ -1 \\ 0 \\ 1 \\ 2 \\ 3 \end{bmatrix}$$

$$\textbf{FT} = \begin{bmatrix} 10 & 9 & 25 & 30 & 16 & 10 \end{bmatrix} * \begin{bmatrix} -2 \\ -1 \\ 0 \\ 1 \\ 2 \\ 3 \end{bmatrix}$$

$$= 63$$

$$Mean = A + \frac{\textbf{FT}}{\sum f} * i$$
$$= 25 + \frac{63}{100} * 10$$
$$= 25 + 6.3$$
$$= 31.3$$

In the graph we see distribution of Number

Mean Deviation Method By Graph :

Figure 1: Mean Deviation Method

of students against the marks of students.
In the Mean-Deviation-Method we assume a mean in this case the Assumed-Mean (**A**) is 25 , then we define the term 't' which is measure of deviation of any class interval wrt to the Assumed-Mean
Then we calculate the summation of this deviation multiplied by the frequency of that class to obtain overall deviation of the data As we get the overall deviation to get the actual mean we add the mean of the deviation of each class-Interval to the Assumed-Mean.to calculate the mean of deviation we divide the summation of deviation by summation of frequency and multiply by classlength(**i**) (As in t is divided) . In this way we get the Mean of the Data.