Problem: Following are the marks obtained by the students X and Y in 6 tests of 100 marks each. If the consistency of the performance is the criteria for awarding a prize, who should get the prize?

Test	*1*	*2*	*3*	*4*	*5*	*6*
X	56	72	48	69	64	81
Y	63	74	45	57	82	63

1 Objective :

To find variance in the given distribution.

2 Procedure/ Explanation :

Tabulating the data for X:

X	$X - \bar{X}_x$	$(X - \bar{X}_x)^2$
48	-17	289
56	-9	81
64	-1	1
69	4	16
72	7	49
81	16	256
$\sum X = 390$		$\sum (X - \bar{X}_x)^2 = 692$

N=6

$$\bar{X}_x = \frac{\sum X}{N} = \frac{390}{6} = 65$$

$$\sigma_x = \sqrt{\frac{\sum (X - \bar{X}_x)^2}{N}} = \sqrt{\frac{692}{6}} = 10.74$$

Coefficient of variation $(C.V_x) = \frac{\sigma_x}{\bar{X}_x} * 100 = \frac{10.74}{65} * 100 = 16.52$

Tabluating the data for Y:

X	f	fX	$f(X-\bar{X}_y)^2$
45	1	45	361
57	1	57	49
63	2	126	2
74	1	74	100
82	1	82	324
		$\sum fX = 384$	$\sum f(X-\bar{X}_y)^2 = 836$

N=6

$\bar{X}_y = \frac{\sum fX}{N} = \frac{384}{6} = 64$

$\sigma_y = \sqrt{\frac{\sum(X-\bar{X}_y)^2}{N}} = \sqrt{\frac{835}{6}} = 11.80$

Coefficient of variation $(C.V_y) = \frac{\sigma_y}{\bar{X}_y} * 100 = \frac{11.80}{64} * 100 = 18.44$

$\therefore C.V_x < C.V_y$. Hence, data in set Y has more variation.

3 Observation:

The coefficient of variation of the marks of student X in less than that of student Y. Thus, student X has less variant (i.e, more consistent) marks.

4 Conclusion:

Uniformity of data in a given distribution can be determined with the help of co-efficient of variation of the data. The higher the co-efficient of variation, the greater the level of dispersion around the mean (or any arbitiary number taken).