

# Score Normalization

## About Normalization

Normalization means adjusting values measured on different scales to a notionally common scale

## Need for Normalization in Exam

Exam pertaining for a particular post/course could be spread across multiple shifts which will have different question paper for each shift. The normalization is to be done by considering the difficulty level of each set, since the questions may be different in different sets and difficulty level of a particular set may be different from other sets.

Hence the normalization of scores need to be carried out for all the candidates who had written the exam, across shifts for the same post/course.

## Normalization Method

The following has to be calculated for every shift for all the candidates who have written the exam for the same post:

- a. Average score for each Shift

$X_{av}$  = total marks scored by candidates in a shift divided by no. of candidates in the shift.

- b. Standard Deviation of score for each Shift. Standard Deviation is a measure that is used to quantify the amount of variation of a set of data values:

N = Number of candidates

X = Raw score of candidates

L = Total Raw score for all candidates in a shift

$X_{av}$  = Average which is total marks divided by no. of candidates.

x = Raw Score of Candidate - Simple Average (X- $X_{av}$ )

Standard Deviation (S) =  $(\sum x^2)/N$

## Normalization Formula

**Normalized Score for each candidate ( $X_n$ ) =  $X_n = (S_2 / S_1) * (X - X_{av}) + Y_{av}$**

<b>S2</b>	Is the SD of the shift with the Highest Average Score taken as <b>Base</b> for normalization (Criteria for choosing the base for normalization is generally taken as the shift with 'Highest Average' of raw scores)
<b>S1</b>	Standard Deviation for the corresponding shift (to be scaled to S2)
<b>X</b>	Raw score of a candidate
<b><math>X_{av}</math></b>	Simple average of the Shift
<b><math>Y_{av}</math></b>	Average corresponding to shift with highest Average (taken as <b>Base</b> for normalization)