15 May 2022 15:58

D1	D2	
9	0	X_1
9	2	X_2
9	4	X_3
9	8	
9	8	
9	12	
9	25	
9	40	
9	50	
9	80	
9	85	X_n
100		"μ"

Variance =

$$\frac{(X_1-\mu)^2 + (X_2-\mu)^2 + (X_3-\mu)^2 + (X_n-\mu)^2}{n}$$

$$\boxed{\sigma^2 = \frac{\sum_{i=1}^{n}(X_i-\mu)^2}{n}}$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(X_i-\mu)^2}{n}}$$

("Standard deviation")

Goa	UP
1.)	1.)
2.)	2.)
10,00,000.)	20,00,000)

$1 - \frac{1}{k^2} = 0.9 \Rightarrow k^2 = \frac{1}{0.1} \Rightarrow k = \sqrt{10}$

→ Proportion of observations lying between $[\mu - k\sigma, \mu + k\sigma]$ is atleast "$1 - \frac{1}{k^2}$".

→ "Chebyschev Inequality"

$\mu = 1,000$

$\sigma = 200$

"$k = 2$"

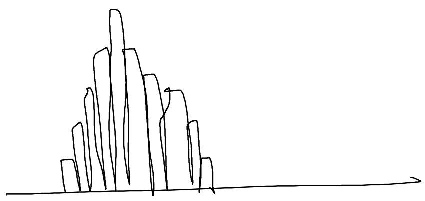
$X_1, X_2, X_3, \dots X_{10,00,000}$

$[400, 1600]$

$\approx 89\%$

- $(\mu-\sigma, \mu+\sigma)$ — 68%
- $(\mu-2\sigma, \mu+2\sigma)$ — 95%
- $(\mu-3\sigma, \mu+3\sigma)$ — 99.7%

— Symmetric



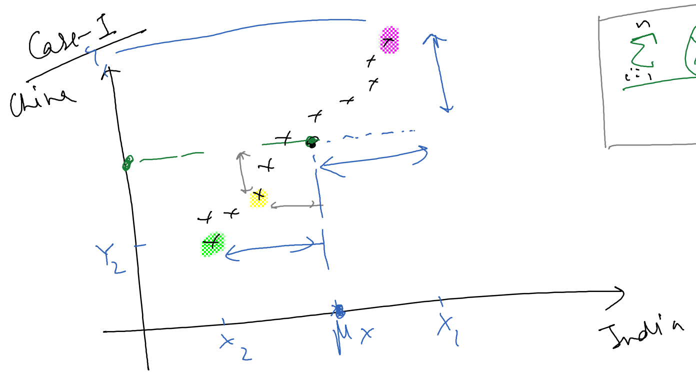
Summary - Multiple Data Sets.

(GDP)	"India" X	"China" Y
2001		
2002		
2003		
|		
2020		
2021		

Covariance

$$= \left(\frac{\sum_{i=1}^{n} (X_i - \mu_X)(Y_i - \mu_Y)}{n} \right)$$

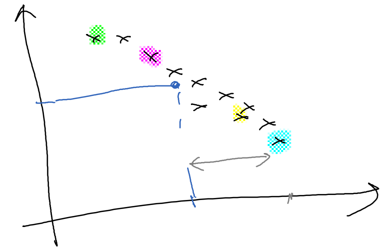
Case-I



$$\boxed{\frac{\sum_{i=1}^{n} (X_i - \mu_X)(Y_i - \mu_Y)}{n}}$$ "+ve"

$$\boxed{\text{"}X_1 + X_2 + X_3 + \dots + X_{100}\text{"} = \sum_{i=1}^{100} X_i}$$

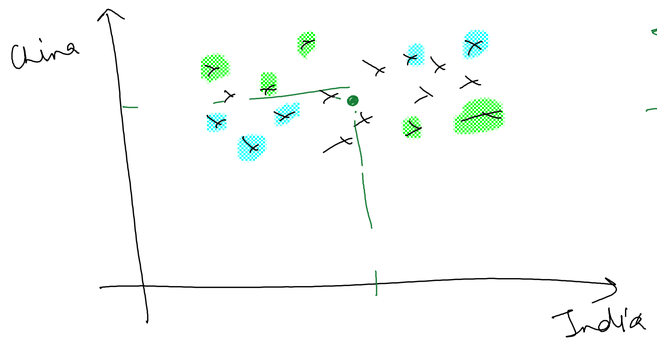
Case 2



$$\frac{\sum_{i=1}^{n} \underbrace{(X_i - \mu_X)}\underbrace{(Y_i - \mu_Y)}}{n}$$

$$= \frac{(X_1 - \mu_X)(Y_1 - \mu_Y) + (X_2 - \mu_X)(Y_2 - \mu_Y) + \dots + (X_n - \mu_X)(Y_n - \mu_Y)}{n}$$

Case-3



$$\frac{\sum_{i=1}^{n} (X_i - \mu_X)(Y_i - \mu_Y)}{n}$$

$$\boxed{\text{"Correlation}(r) = \text{"}\frac{Cov(X,Y)}{\sigma_X \sigma_Y}\text{"}}$$

$$\boxed{-1 \le r \le 1}$$ "

→ Measures the strength of linear relationship between X & Y

$Y = 2^{x}$

$F = m.a$

0.85

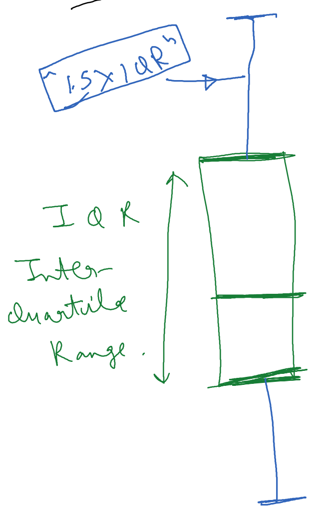
$Y = 2^{x}$

$\Rightarrow \underbrace{\log_2(Y)}_{Z} = x.$

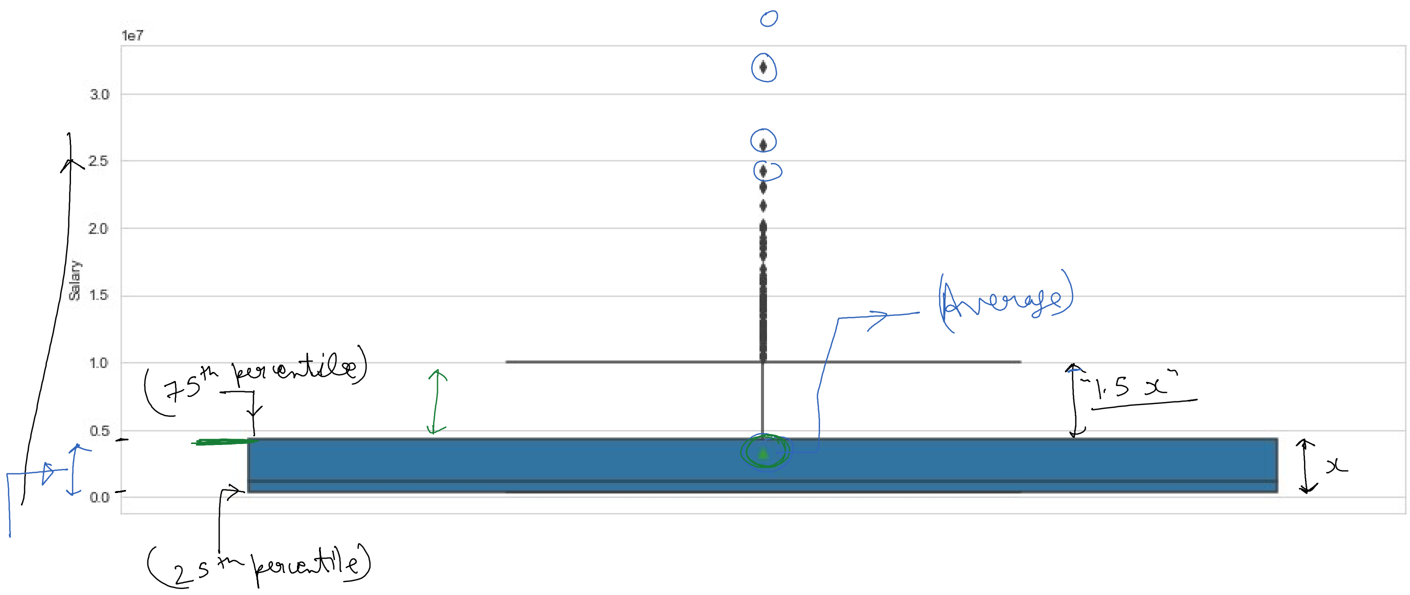
$\underline{Z = x}$

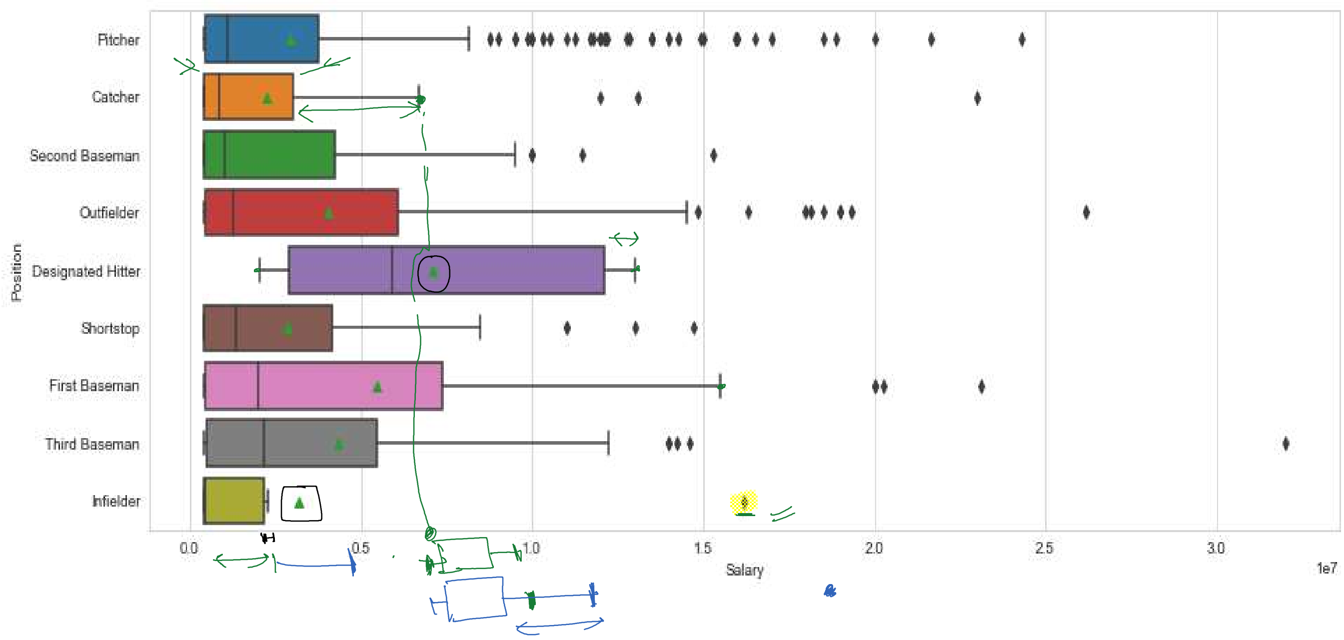
$F = \underline{m} . a$ 0.85

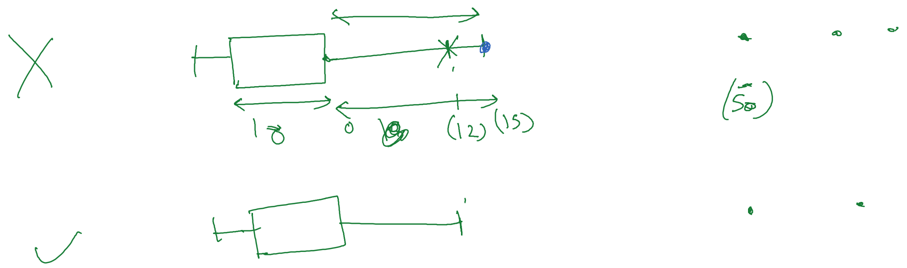
"Box & Whisker Plot"



1 — Min
2
3
.
→ 250th — 25th percentile
500 — 50th percentile, Median
.
750 — 75th percentile
.
1000 — Max.




Pitcher
Catcher
Second Baseman
Outfielder
Designated Hitter
Shortstop
First Baseman
Third Baseman
Infielder
Position
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Salary
1e7


(12) (15)
(50)