upper Bound

$\bar{x} + Z_{\alpha} \frac{\sigma}{\sqrt{n}}$

$= 1990 + Z_{\frac{0.05}{2}} \left(\frac{2500}{\sqrt{140}}\right)$

$= 1990 + (1.96)(211.29)$

$= 1990 + 414.12$

$= 2404$

The avg balance, they are going to maintain after full fledge launch is [1576 2404).

Q. On a quant test CAT exam of sample of 25 test taker m as sample mean 520 with sample SD of 80. construct 95% CI about the mean

$n = 25, \ \bar{x} = 520, \ S = 80, \ CI = 95\%, \ \alpha = 0.05$

~~$t = \bar{x} \pm ...$~~

$t = \bar{x} \pm t_{\alpha} \frac{S}{\sqrt{n}}$

$t = 520 + t_{0.05} \left(\frac{80}{\sqrt{25}}\right)$

$= 520 + t_{0.05} \times 16$

$= 520 + 2.05 \times 16$

$= 552$

upper bound

$t = 520 - t_{0.05} \left(\frac{80}{\sqrt{25}}\right)$

$= 487$

Statistical Tests

- 1 sample
  - t-test
    - Paired t-test
  - Proportion
- 2 sample
  - t-test
  - Proportion
- ANNOVA
- chi square

H_0: the avg Salary of IT Employee in BNG is 27k.

H_A: " " is not 27k

Sample 1

1) 28 k
2) 35 k
3) 18 k
4) 50 k
...
34k

Avg => 32 k

Two tail

H_0 sal = 27k

H_A sal $\neq$ 27k

<27>

1 same t test

The avg sal of IT emp in Bnglr is 32k.

Q. H_0 : More than 70% of people are married to India

H_a : No more than 70% of people are not married in I.

$H_0 > 70\%$ } one tail test
$H_a < 70\%$

1 Sample

1 Sample propotion test
Dependent on population

1) Yes
2) Yes
. NO
NO
Yes
NO
NO
100> Yes

60% married
40% unmarried

Q- H_0 : Covishield is better than covaxine

H_a : No covishield is better than co-vaxine

Sample 1 Covidshield	Sample 2 Co-vaccine
1) 2 hr	3 hr
2) 4 hr	6.5 hr
3) 1.5 hr	4 hr
50) 5 hr	7 hr
3.5 hr	7.2 hr

2 sample t test
Independent on population

So we have to accept H_0
Because we got 3.5 hr reaction time for covidshield
7.2 hr for covaccine

Q- H_0 : New beauty treatment is better than older one

H_a : No the new beauty treatment is better than old one.

	New Sample 1	Old Sample 2
1>	Yes	Yes
2>	NO	Yes
3>	Yes	Yes
:	NO	NO
.	Yes	NO
50>	NO	Yes
	50% Yes	60% Yes
	50% NO	20% NO

2 sample propotion test
It is also Independent on Population.

we can reject the H_0.
Bcz 80% people like old beauty treatment

Q) H_0 : by joining new weightloss pgm u can do significant difference in you weight

H_a: NO ——, there is no ——

Sample 1

	Before	After
1)	78	65 ✓
2)	93	81 ✓
3)	110	90 ✓
4)	90	68 ✓
50)	85	87 ✗

~~we can do~~ 1 Sample Paired t test.

we can accept the H_0

bcz majority got weight loss

7. H_0 : your batch students can't able to score >90 M

H_A : No my batch students are able to score >90 M

B_1	B_2	B_3	B_4	B_5
63	75	92	47	81
62	88	98	58	75
58	83	88	63	78
73	65	89	70	85
80	73	95	68	70
65	78	92	59	80

Annova : Analysis of varience

If one sample proved means,

we can reject the H_0

Q. In the 2000 Indian census the age of the individual in a small town where found to be the following

In the year 2000

less than 18	18 - 35	>35
20%	30%	50%

In 2010 age of n=500 individuals were sampled

below are the results

In year 2010

less than 18	18 - 35	>35
121	288	91

using $\alpha = 0.05$ would you calculate the population distribution of ages has changed in the last ten years?

	<18	18-35	>35	
2000 y	20%	30%	50%	
2010 y	121	288	~~250~~ 91	observed value
Sample =500	100	150	250	Excepted

H_0 : 2010 sense ratio is same as 2000

H_A : No 2010 sense ratio is not same as 2000

CI = 95%

$\alpha = 0.05$

Chi-square calculation

χ^2 > chi-square table value with DoF (3-1=2)

means you can might reject else accept

$\chi^2 > 5.991$ then reject H_0

$$\chi^2 = \sum_{i=1}^{n} \frac{(f_o - f_e)^2}{f_e} = \frac{(\text{Observed} - \text{Excepted})^2}{\text{Excepted}}$$

$$= \frac{(121-100)^2}{100} + \frac{(288-150)^2}{150} + \frac{(91-250)^2}{250}$$

$\chi^2 = 232 > 5.991$ so we reject

<u>Correlation</u>

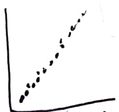
To check the relationship b/w the two numerical features/columns we use correlation.

There are 3 types of corr

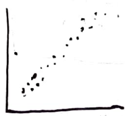
1> +ve corr $x\uparrow y\uparrow$ Exp $\uparrow$ sal $\uparrow$

2> -ve corr $x\uparrow y\downarrow$ weight $\uparrow$ Mpg $\downarrow$

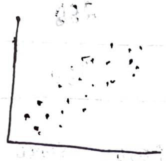
3> No corr $x\uparrow y\uparrow\downarrow$ weight sal



100% +ve corr

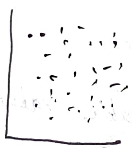


Strong +ve corr



weak +ve corr

100% -ve corr



no corr

<u>Two types of corr formulas</u>

1> Pearson's correaltion

2> ~~Sphere one~~ Spearman correaltion

→ The corr value ranges from -1 to 1.

→ If corr value near to +1 is a positive correaltion

→ If corr value near to -1 is called as -ve corr

→ If value near to 0 is called as zero corr