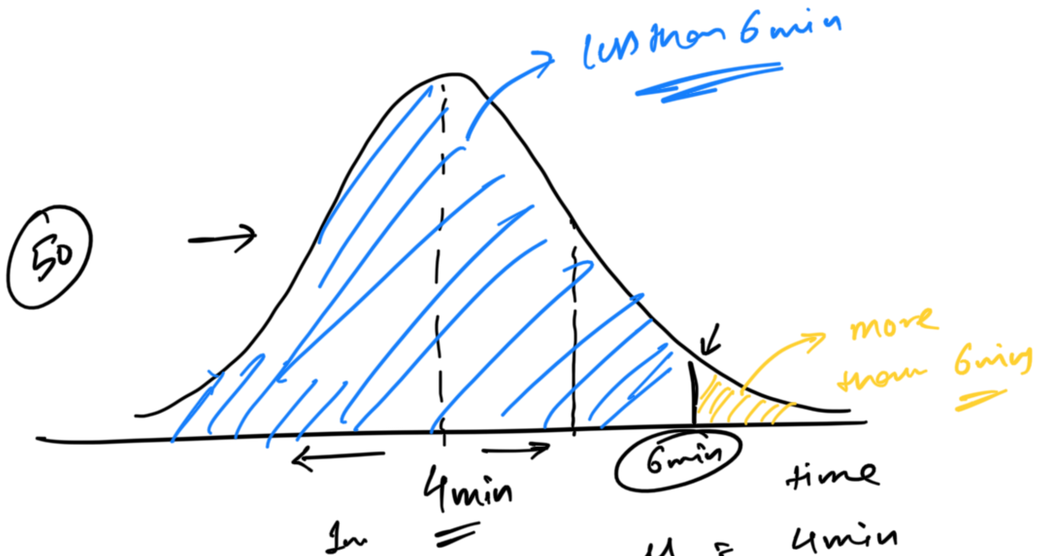
Confidence Intervals

$$S.E. = \frac{SD}{\sqrt{n}}$$

Standard Error

S.E.



$\mu = 4min$

$\sigma = 1\ min$

$$Z_{6min} = \frac{6-4}{1} \quad \left(\frac{x-\mu}{\sigma}\right)$$

$$\boxed{Z = 2}$$

norm.cdf (2) $\Rightarrow$ 97.7 %

$$1 - \text{norm.cdf}(2) \Rightarrow \underline{\underline{2.3\%}}$$

Q2.

$$\Rightarrow \begin{Bmatrix} \mu = 4 \\ \sigma = 1 \end{Bmatrix}$$

sample size
$\underline{\underline{N = 5}}$

$\downarrow$

$\underline{\underline{\text{sample mean}}}$

$$z = \frac{x - \mu}{\frac{1}{\sqrt{n}}}$$

$$\text{s.d}_{\text{sample distribution}} = \frac{\sigma}{\sqrt{n}} = \frac{1}{\sqrt{n}}$$

$$= \frac{6 - 4}{\frac{1}{\sqrt{5}}} \Rightarrow$$

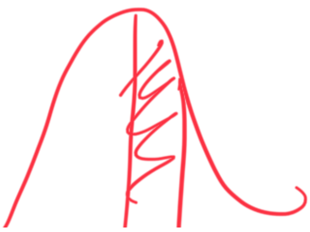
Confidence Interval

→ Idea : "From samples, you want to conclude about the popⁿ"

popⁿ mean = x

X

Not a single value] X



It is going to be

x_1 x_2

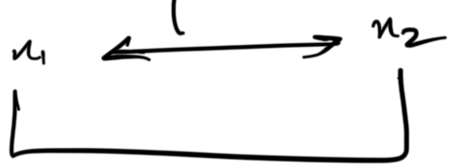
a range.

pop^n mean $\rightarrow$ confidence interval

$\downarrow$

$\boxed{99\%}$

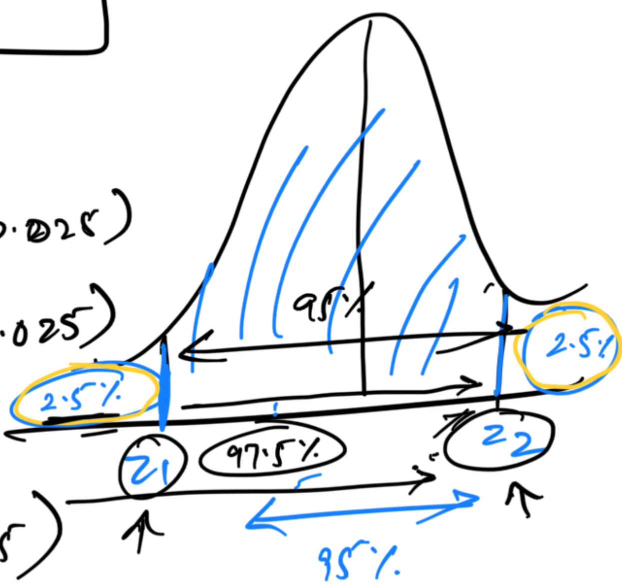
95% confident $\rightarrow$ find the range where 95% of samples lie within that range.



$z1$ = norm.ppf(0.025)

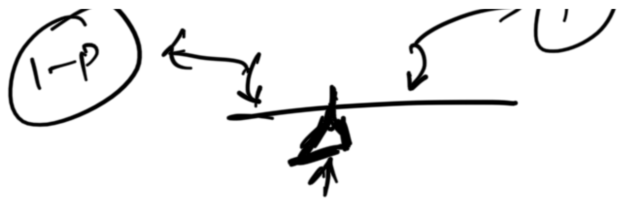
$z2$ = norm.ppf(1-0.025)

= norm.ppf(0.975)



CDF

P



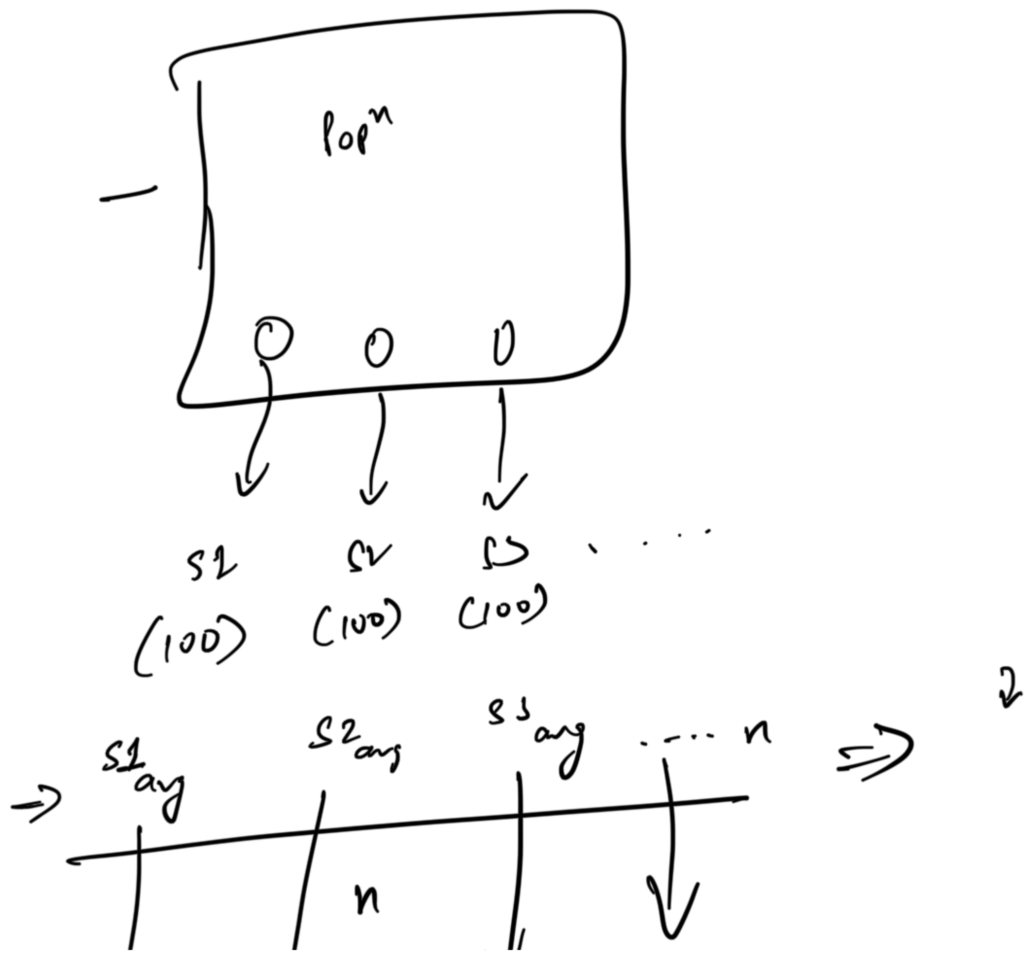
PPF →

$$z = \frac{x - \mu}{\sigma}$$

$x_1 = 65 + z1 *$ std_error $\qquad x = z \times \sigma + \mu$

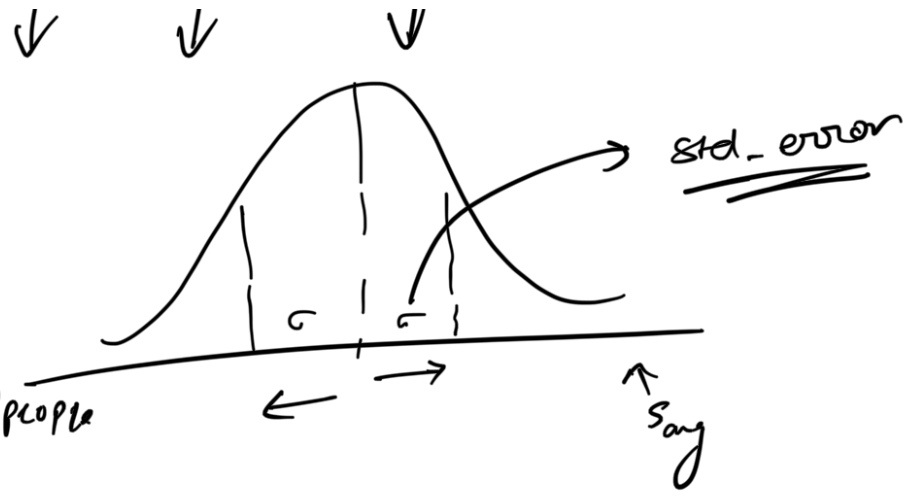
$x_2 = 65 + z2 *$ std_error

Range → [64.51, 65.49]



100 → 1.

std (↑)



10000 → 100 people

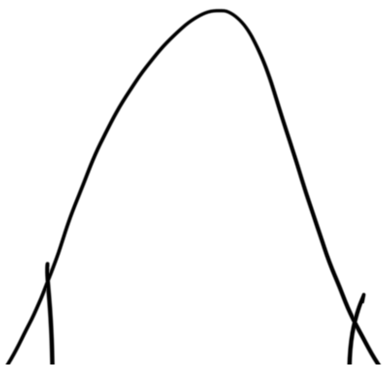
Mean height

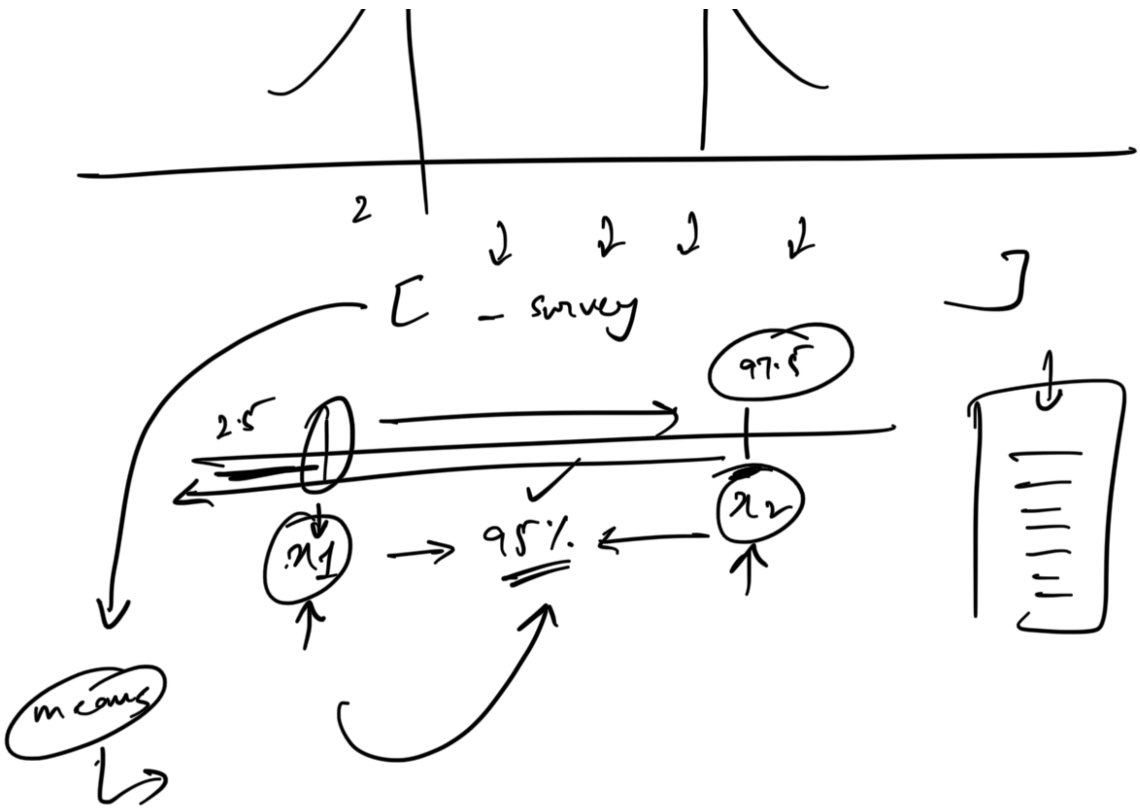
std error (↓)

10000 ← → 95% → 99%

say interval ↑ ↓ ?

Typical 95%, 99% 90%





$$f(x) = [x^2 + 2x = y]$$