Day 10

Tuesday, January 2, 2024 8:00 AM

5 - step

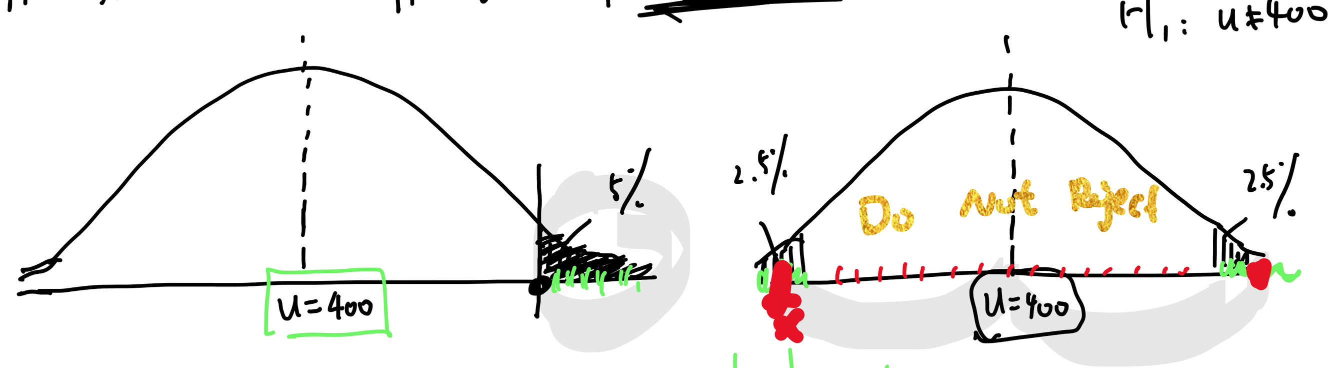
Step 1: H_0 : (Null)

H_1 :

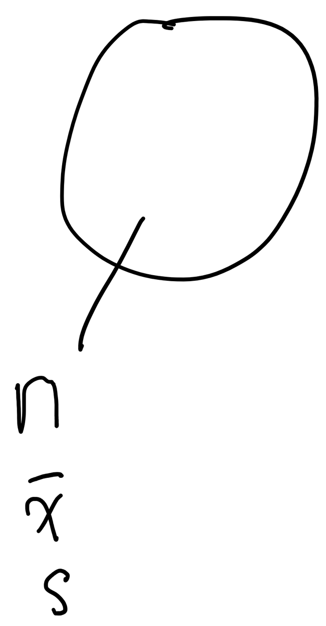
step 2: $\alpha = P_r(\text{Type I error}) = P_r(\text{Reject } H_0 \mid H_0 \text{ is true})$ — Reject a True H_0

$H_0: \boxed{u = 400}$ ✓

$H_1: u \neq 400$



$P_r(Z_{\bar{x}} > 1.65 \mid u = 400) = 5\%$ $\quad$ $P_r(|Z_{\bar{x}}| \geq 1.96 \mid u = 400) = 5\%$



$\beta = P_r(\text{Type II error}) = P_r(\text{Accept a False } H_0)$

$1 - \beta$ = the Power of the test $= P(\text{Reject } H_0 \mid H_0 \text{ is False})$

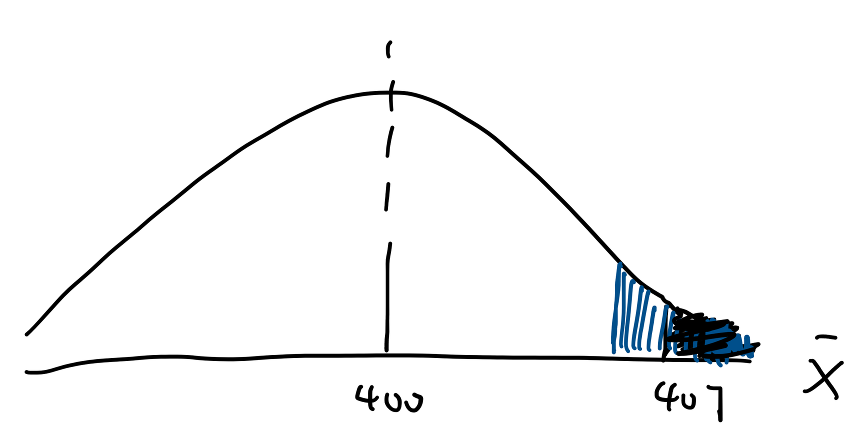
Step 3. 1-or- 2-tail $\quad$ z / t test

step 4. $|P\text{-value}| \leq (\alpha)$: Reject H_0 : P↓ :)

n, $\bar{x}$, s $\quad$ pre-specified

P-Value = P($\bar{X}$ is more extreme than computed $\bar{x}$)

variable $\quad$ value



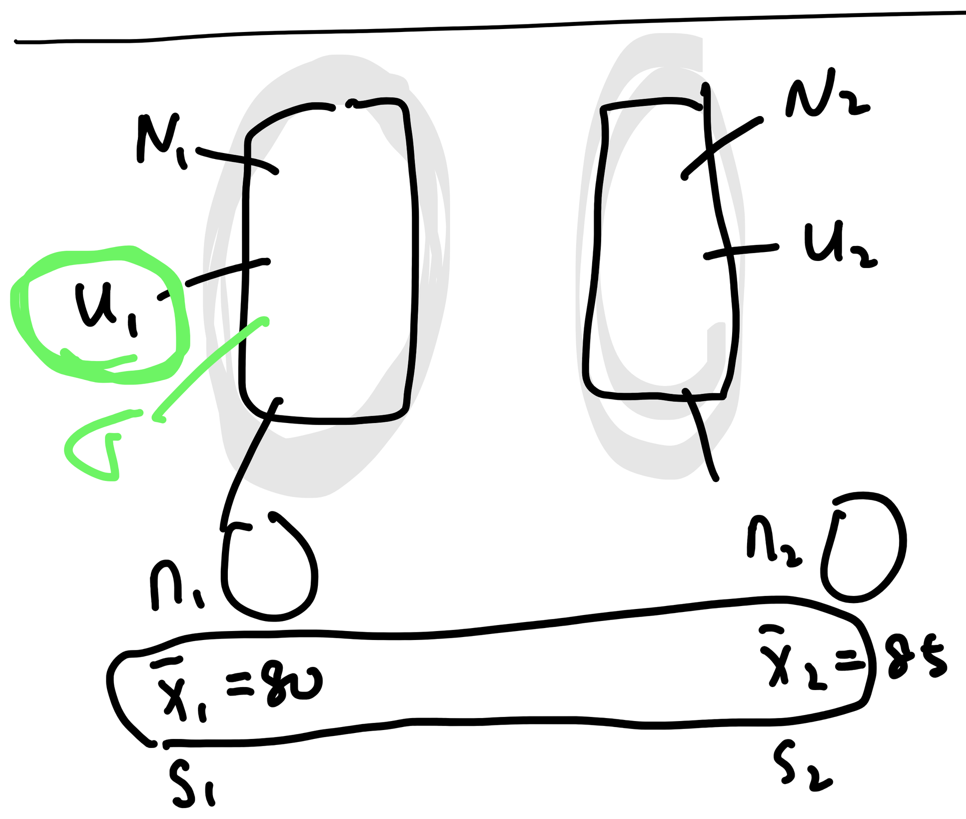
$P\text{-value} = P(\bar{X} \geq 407)$

CLT

$\bar{X} \sim N(u, \sigma/\sqrt{n})$, $\quad \sigma/\sqrt{n} = \sigma_{\bar{x}}$

$\bar{X}_1 \sim N(u_1, \sigma_1/\sqrt{n_1})$

$\bar{X}_2 \sim N(u_2, \sigma_2/\sqrt{n_2})$



$H_0: u_1 = u_2$

$H_1: u_1 \neq u_2$

1. $\bar{X}_1 - \bar{X}_2 \sim N(u_1 - u_2, \sigma_{\bar{x}_1 - \bar{x}_2})$

Case 1: 2 samples are independent

1. $n_1 \geq 30 \quad n_2 \geq 30$: $\sigma_{\bar{x}_1 - \bar{x}_2} = \sqrt{\left(\frac{\sigma_1}{\sqrt{n_1}}\right)^2 + \left(\frac{\sigma_2}{\sqrt{n_2}}\right)^2}$
2. at least one sample is small : $\sigma_{\bar{x}_1 - \bar{x}_2} =$

Case 2 : 2 samples are dependent