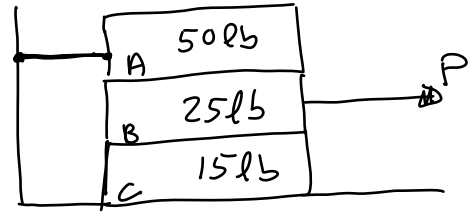


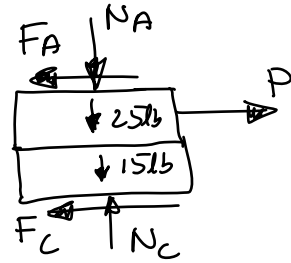
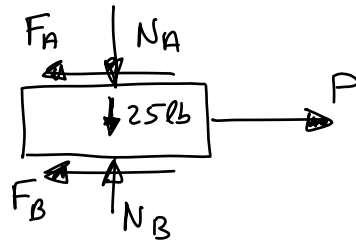
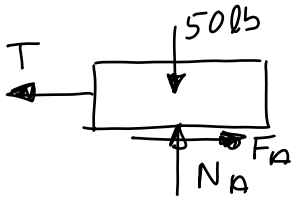
Friction

Problem Statement: Determine P for impending motion.

$$\begin{aligned} \mu_A &= 0.3 \\ \mu_B &= 0.4 \\ \mu_C &= 0.35 \end{aligned}$$



1.) Draw the FBD.



2.) Enforce equilibrium.

Unknowns: $T, N_A, F_A, N_B, F_B, F_C, N_C, P$ (8)

Equilibrium: $(\sum F_x = 0, \sum F_y = 0) \times 3$ (6)

Friction: $F_A = F_{Amax}, F_B = F_{Bmax}, F_C = F_{Cmax}$ (3)

\Rightarrow Impending Motion at some points

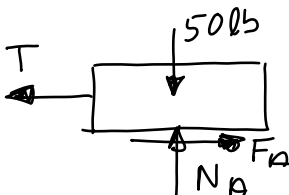
Block A \Rightarrow Stationary

Either Block B slips on Block C
or Blocks B + C slip together

2.) Enforce equilibrium.

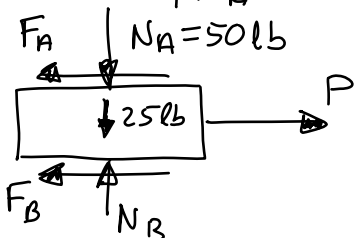
Assume Block B slips on Block C

Set $F_A = F_{Amax}$ + $F_B = F_{Bmax}$



$$+\uparrow \sum F_y = 0 \Rightarrow N_A - 50 \text{ lb} = 0$$

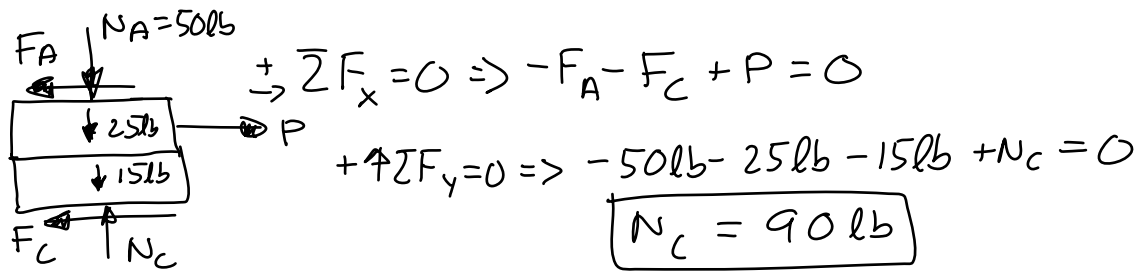
$$\boxed{N_A = 50 \text{ lb}}$$



$$+\rightarrow \sum F_x = 0 \Rightarrow -F_A - F_B + P = 0$$

$$+\uparrow \sum F_y = 0 \Rightarrow -50 \text{ lb} - 25 \text{ lb} + N_B = 0$$

$$\boxed{N_B = 75 \text{ lb}}$$



$$F_A = F_{A_{\max}} = \mu_A N_A = (0.3)(50\text{lb}) = 15\text{lb}$$

$$F_B = F_{B_{\max}} = \mu_B N_B = (0.4)(75\text{lb}) = 30\text{lb}$$

$$P = 45\text{lb}, F_C = 30\text{lb}$$

3.) Verify the answers.

Check $F_C \stackrel{?}{<} \mu_C N_C$

$$30\text{lb} \stackrel{?}{<} (0.35)(90\text{lb})$$

$$30\text{lb} < 31.5\text{lb} \checkmark$$

$$P = 45\text{lb}$$