

02/18

The Design Process and Touch Screens

The Design Process: How to Design?

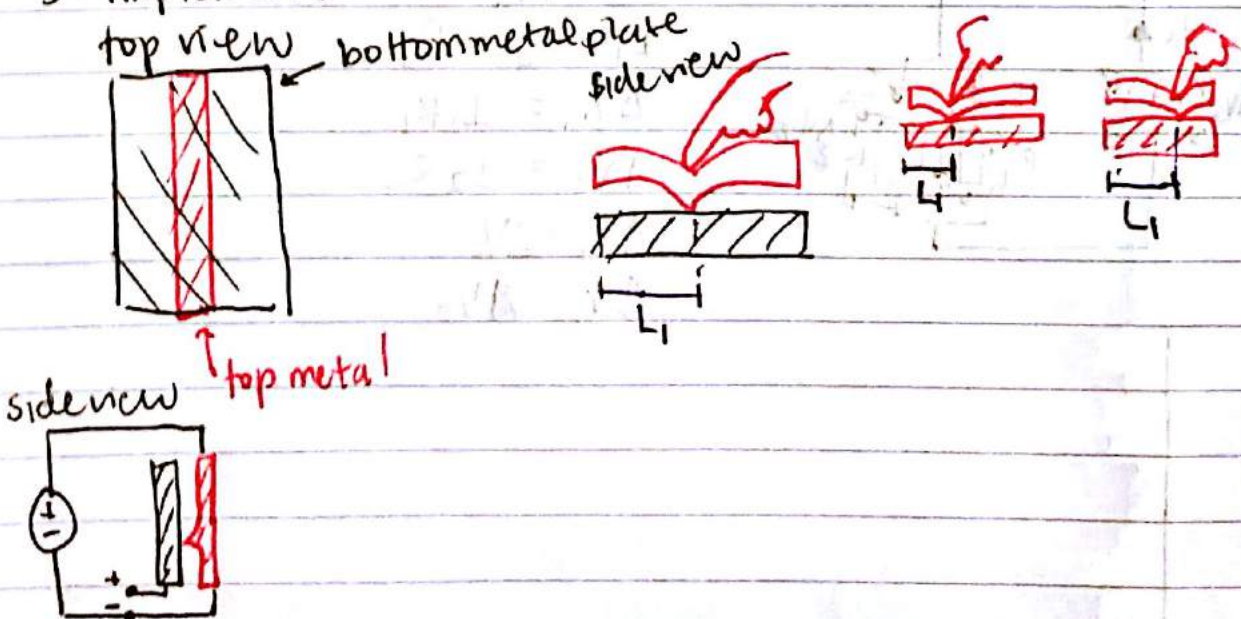
1. State your goal
2. Describe strategy for goal
 - what you measure vs what you want to measure and how they relate w/ each other
3. Implement components within strategy
4. Verify what you have meets original requirements
 - Iterate...

Touchscreen sensor

1. circuit to indicate what position on the screen finger is touching
2. - can't measure finger directly
 - but finger touch can affect electrical quantity in circuit.
 - measure that electrical quantity and figure out how it maps to the finger.

Touch position (x, y) — sensor — (V_x, V_y)

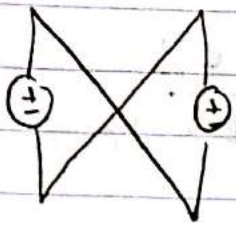
3. Implement



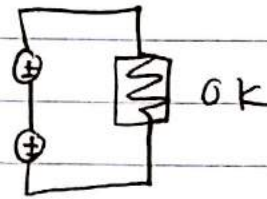
* Voltage: quantifying how much energy is spent per unit charge to move some charge from pt A to B.

$$V = \frac{\text{Energy}}{Q} = \frac{[\text{Joules}]}{[\text{Coulomb}]}$$

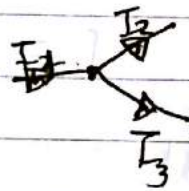
relative! define start + end



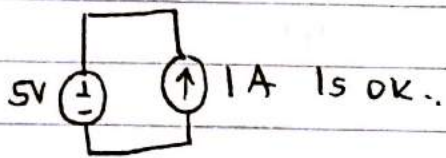
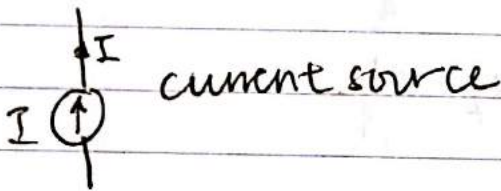
violates KVL.



current: $I = \frac{dq}{dt}$



$I_1 = I_2 + I_3$ by KCL

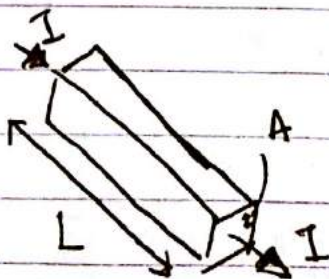


current can flow into a voltage source.

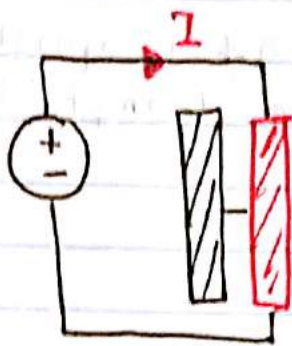
Resistance:



-take energy in form of current + convert it to heat



resistivity
 $R = \frac{\rho L}{\text{cross-sectional area (A)}}$



$$\rho: 1 \Omega \cdot m$$

$$L = 20 \text{ cm}$$

$$W = 30 \text{ cm}$$

$$d = 1 \text{ mm}$$

$\leftarrow R?$

$$R = 1 \Omega \cdot m \cdot \frac{20 \text{ e}^{-2}}{30 \text{ e}^{-2} \cdot 1 \text{ e}^{-3}}$$

$$= 666.7 \Omega$$

$$I = 5 \text{ V} / 666.7 \Omega$$

