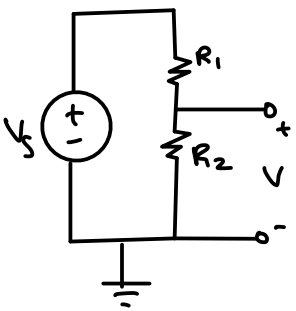
Week 6 Cribsheet

NOTES: 12, 13, 14

VOLTAGE DIVIDER

when useful: converting a larger voltage into a smaller one



$$V = \frac{R_2}{R_1+R_2} V_s$$

also, $V_{R_1} = \frac{R_1}{R_1+R_2} V_s$

voltage is "divided" into two weighted v's.

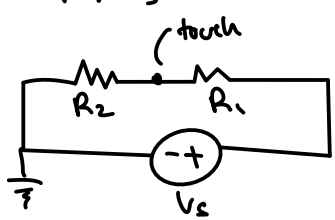
★ same behavior w/ two inverting amps

1D RESISTIVE TOUCHSCREEN

Resistivity ρ (greek letter "rho") is a physical property of a resistor

$$R = \rho \frac{L}{A} = \rho \frac{\text{length}}{\text{x sectional area}}$$

no touch ⇒ touch



at touch point: $V_{touch} = \frac{R_2}{R_1+R_2} V_s$ (voltage divider formula)

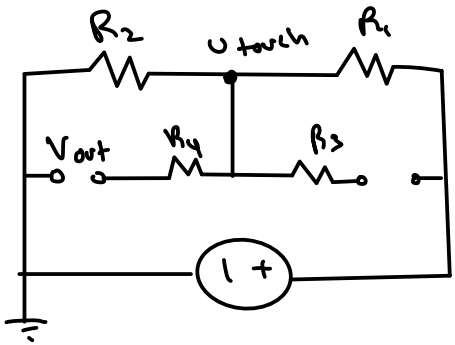
$$= \frac{\rho L_t / A}{\rho L_t/A + \rho L_R/A} V_s$$

$$= \frac{L_t}{L_t + L_r} V_s$$

$$= \frac{L_t}{L} V_s$$

★ takeaway: knowing V ⇒ find location L_t!

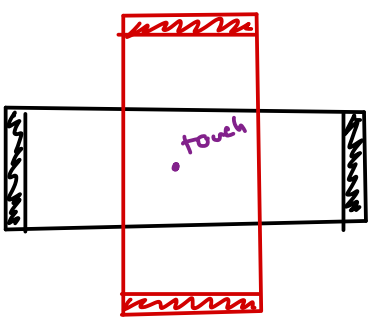
now, for bottom plate (to measure V_{touch} safely):



we can measure across V_{out}, because I thru R_y is 0.

2D RESISTIVE TOUCHSCREEN

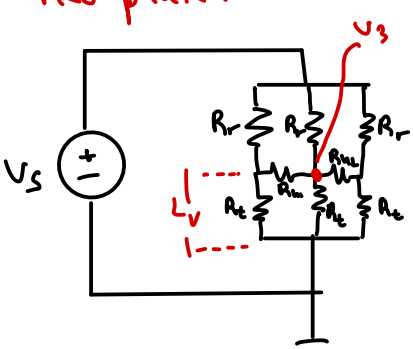
an extension of the 1D touchscreen to measure (L_1, L_2) [pixel]



vertical — voltage source ⇒ red
voltmeter ⇒ black

horizontal — voltage source ⇒ black
voltmeter ⇒ red

Red plate:



Red :

$$v_3 = \frac{L_v}{L} V_s$$

Black :

$$v_3 = \frac{L_h}{L} V_s$$

Black plate: