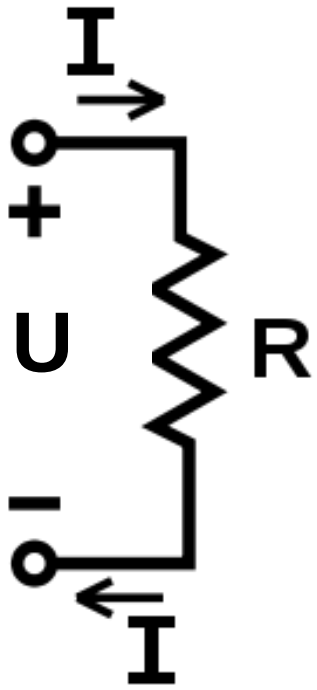
Ohm's Law

$$V = I \cdot R$$



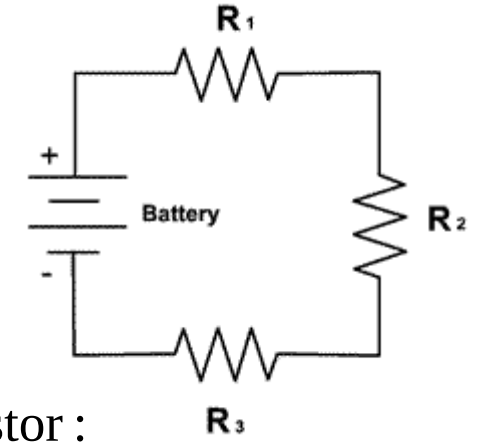
• **V** is **Voltage**, the **Potential Difference** between two ends of a wire (or resistor, light bulb etc). Measured in **Volts [V]**

• **I** is **Electric Current,** the total charge flowing through the wire in 1 sec. Measured in **Amperes [A]** (Coulomb per second) **:** **1A=1C/s**

• **R** is **Resistance** of the wire. Measured in **Ohms [Ω].** $1\Omega = 1\,V/A$

Serial connection:

Current the same. Voltage adds up.



$$I_{total} = I_1 = I_2 = I_3$$

$$U_{total} = U_1 + U_2 + U_3$$

the circuit can be replaced with an single resistor :

$$R = \frac{U_{total}}{I_{total}} = R_1 + R_2 + R_3$$

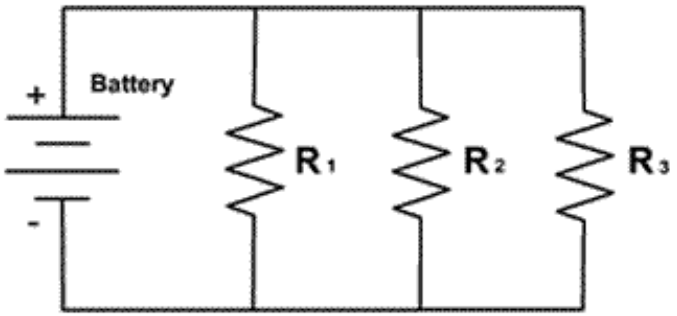
Parallel connection:

Voltage the same. Current adds up.

$$U_{total} = U_1 = U_2 = U_3$$

$$I_{total} = I_1 + I_2 + I_3$$

$$\frac{1}{R} = \frac{I_{total}}{U_{total}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$



Homework

Find the overall resistance ***R*** for the resistor circuits.

A series-parallel combination circuit