## **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** [ $\Omega$ ]. 1 $\Omega$ =1V/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

a) Find the equivalent resistance and current in the circut.b) Determine voltage on the 50 Ohm resistor, and the current running through it:



c) You need to replace one of the resistors in the circuit above with a light bulb, so that the current through the bulb were the smallest possible. Which one will you replace?