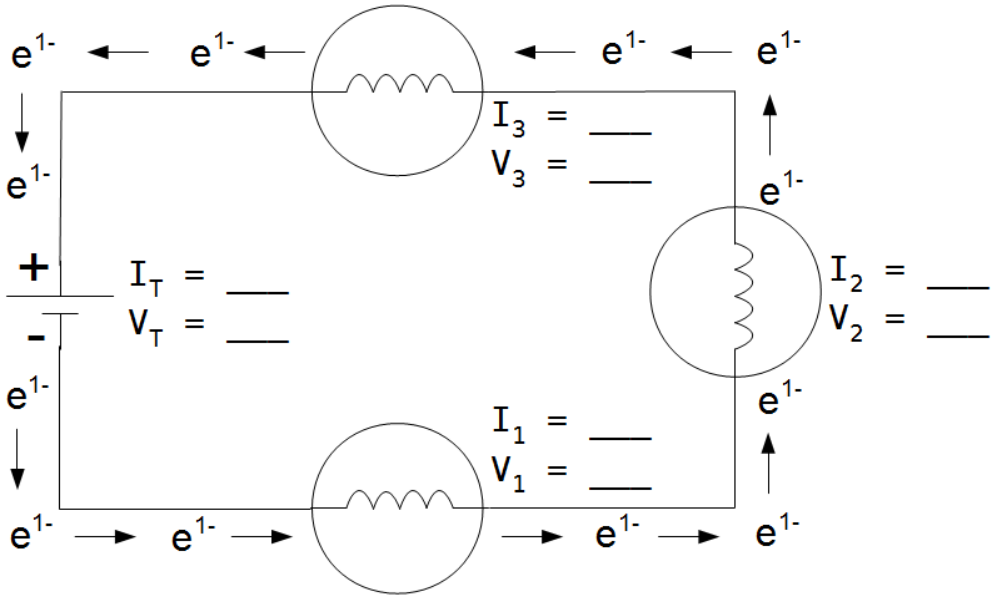
Series and Parallel Circuits – Details!

Current is the number of electrons that flow through a given location in a circuit – measured in amperes (A).

Voltage is the energy per electron. Measured in volts (V). At any point in a circuit all electrons are "at" the same voltage. A difference in voltage does not occur unless there are loads between the two location where voltage is measured. Voltage must be consummed in a circuit. Returning electrons must have used all of their energy.

Series circuit: All loads are in series (one after the other). All electrons must pass through all loads in series.



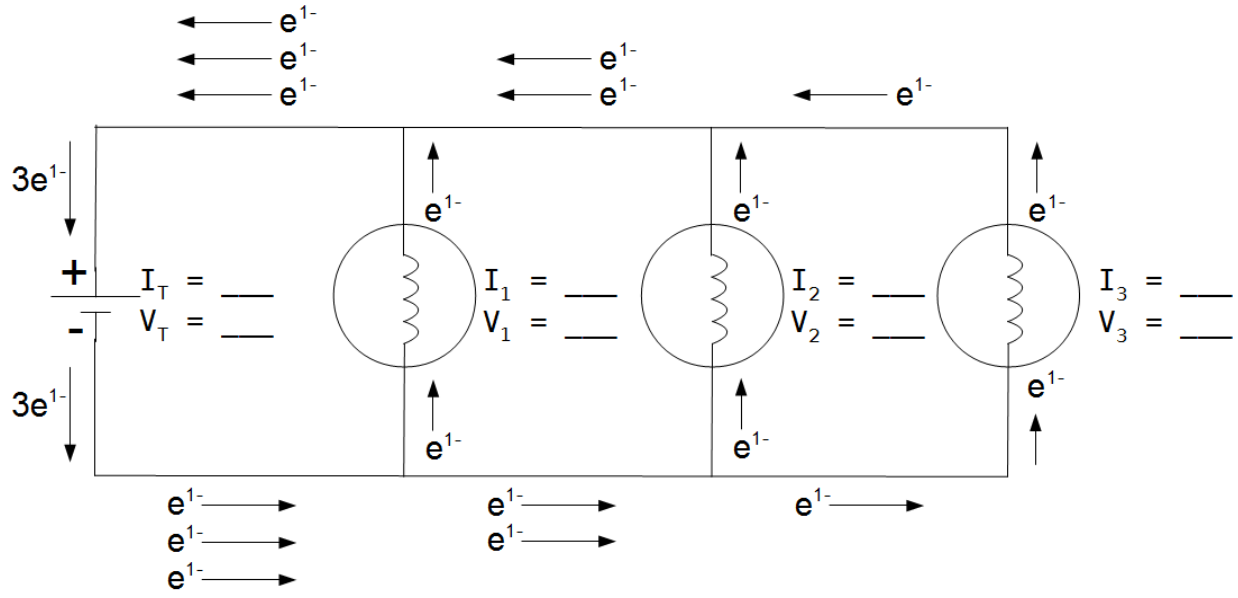
Current: in a series circuit all parts of the circuit have identical current. The electrons have not choice but to flow through the entire sequence in the circuit.

$$I_T = I_1 = I_2 = I_3 = \text{etc.}$$

Voltage: in a series circuit the voltage (potential energy of the electron) is used and distributed amongst the various loads. Some loads may consume more voltage than others, it will depend on the "resistance". The voltage must be entirely consumed the circuit. The electrons return to the power supply at "0 V".

$$V_T = V_1 + V_2 + V_3 + \text{etc.}$$

Parallel Circuit: will have branches that give the electrons a choice as to how to get around the circuit. Electrons, leave the power supply, choose a branch, go through the branch, branches join up and return to the power supply



Current: in a parallel circuit the current will divide up amongst the branches in the circuit. How much current in each branch depends on the resistance.

$$I_T = I_1 + I_2 + I_3 + \text{etc.}$$

The total current will be the sum of the branch currents.

Voltage: in a parallel circuit the entire voltage is consumed at the particular load that the electrons go through.

$$V_T = V_1 = V_2 = V_3 = \text{etc.}$$

Combination circuits are more complex.