Electronics

Electronic Devices Examples

- Cell Phones
- TVs
- Many various tools and appliances

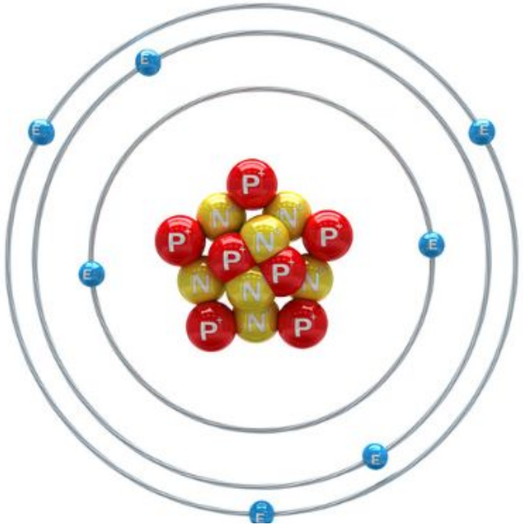
Electronics Definition

- The study of the
  - control of electricity and
  - physical components and circuits that help direct electrical energy

The Word “Electronics”

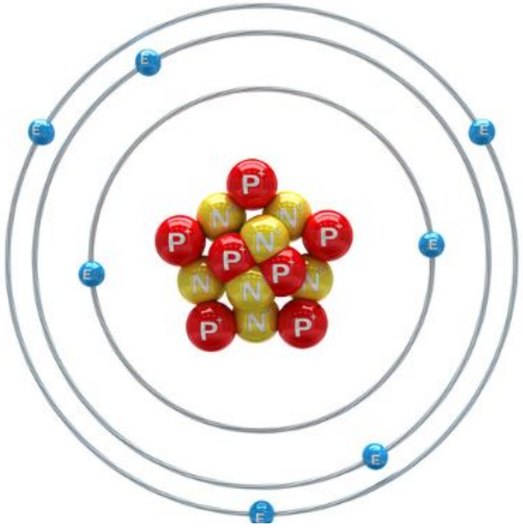
- The word **“Electronics”** is derived from the word **electron**

Electric current



- is created from the movement of **electrons**
- **Current** flows in a closed loop and is constant everywhere in that loop

Electrons



- along with **protons** and **neutrons** are what make up atoms
- carry negative charges
- source of electric charge
- attracted to the positively charged protons within the nucleus of the atom

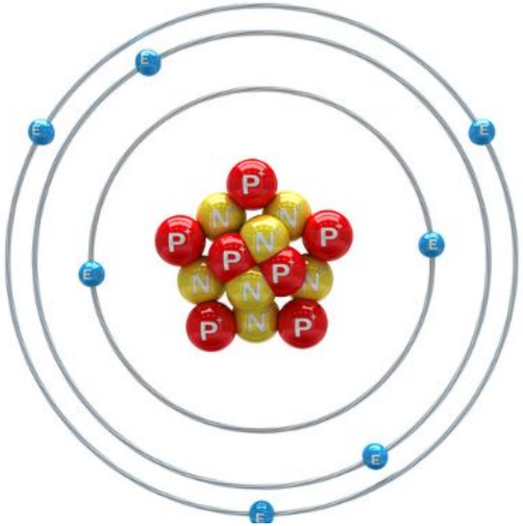
- The basic charge on an electron is measured in terms of **coulombs**
- 1 **coulomb** of charge = the amount of charge carried by 1 ampere in 1 second

Voltage & Ampere

- **`Voltage`**
  - is the force that drives current
  - can also be referred to as electric pressure
  - is measured as the difference in electric potential energy between two points

- **`Amperes (Amps)`**
  - measure the strength of electric current
  - are a measure of the number of electrons in an electric current
  - **1 ampere** = **1 coulomb** traveling through a circuit in **1 second**
  - This is roughly equivalent to the flow of 6.241509×10^18 electrons per second

Atoms and Elements



- **Atoms**
  - are the building blocks of all elements and matter

- **Chemical Elements**
  - on the periodic table
  - are made up of atoms

Conductors vs Insulators

- **Electrical Conductors**
  - materials with elements that weakly attract their electrons
  - In conductors, electrons tend to move from atom to atom
  - **Examples**: metals like copper & gold & silver

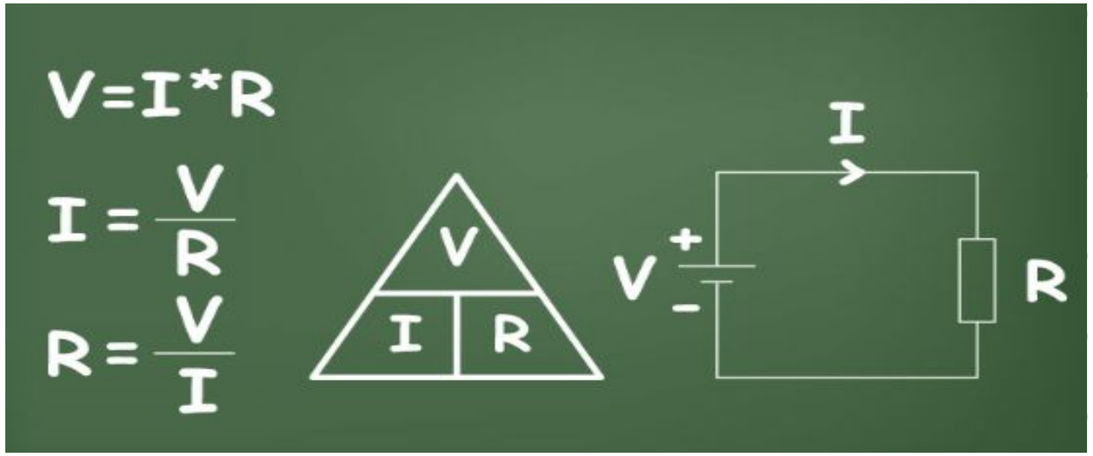
- **Electrical Insulators**
  - materials with elements that strongly attract their electrons
  - In insulators, electrons never leave the atom
  - **Examples:** dried wood & glass & various rubber materials

Power & Electrical Circuit

- **`Power`**
  - is the amount of energy consumed over time
  - is measured in Watts
  - **Basic Formulation**: power = voltage x current

- **`Electrical Circuit`**
  - is closed conductive path that allows electrons to flow and create electric current
  - is a physical network (or model of a physical network) of interconnected electrical components including batteries, resistors, capacitors, inductors, and switches

Ohm’s Law



- **In the 1800s**
  - Ohm published his theory (known as Ohm’s Law)

- **Ohm’s Law**
  - Voltage is directly proportional to the strength of current multiplied by resistance within a circuit
  - is a fundamental concept in electronics

Questions

Links

https://github.com/FCAI-B/iot