REVIEW ELECTRICAL COMPONENTS

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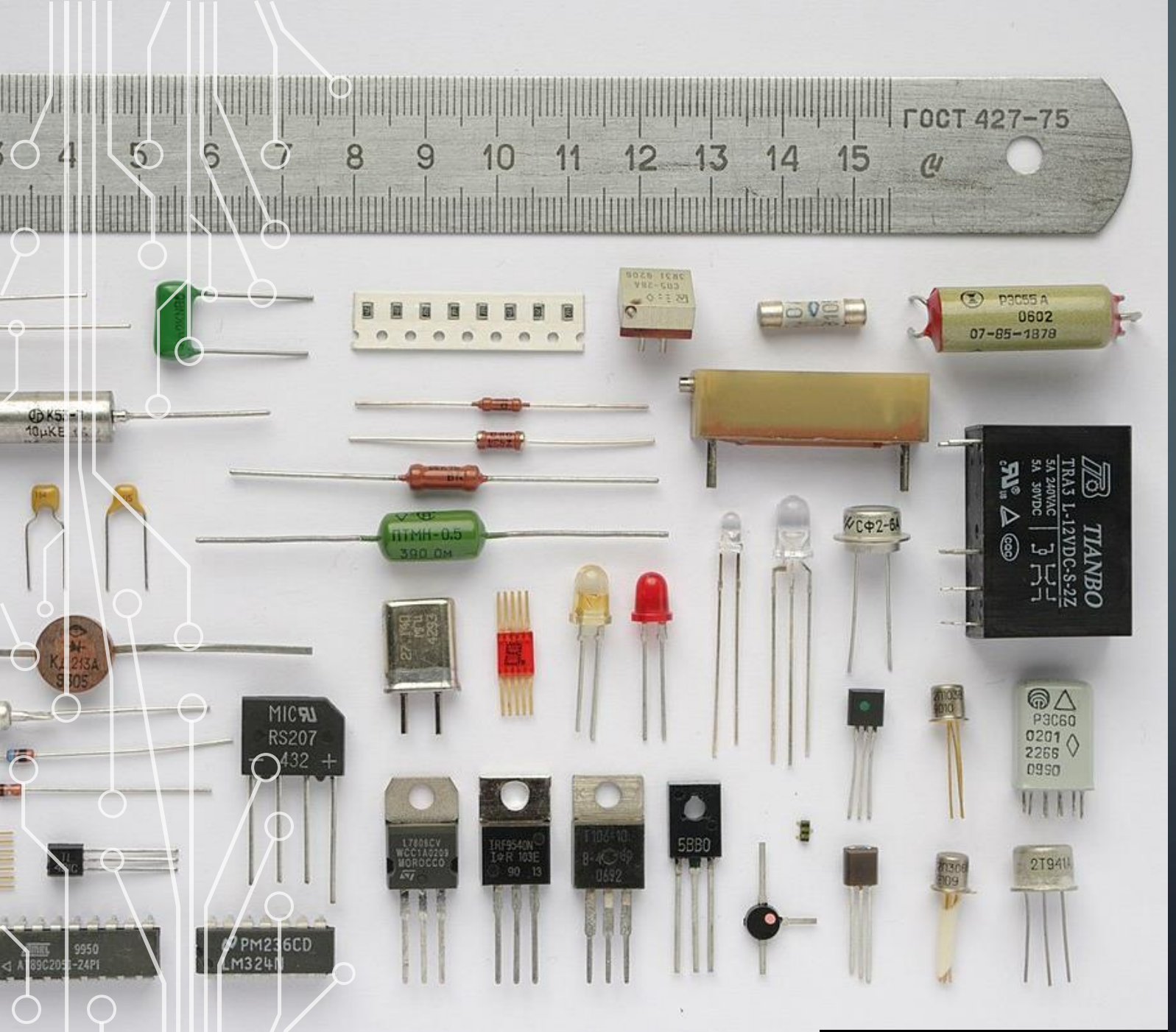


AGENDA

- Ohms Law
- Circuits
- Types of circuits
- Its components

OHM'S LAW

- Proposed by the German mathematician and physicist Georg Simon Ohm.
- One of the fundamental laws of electrodynamics.
- It is used to determine the relationship between the potential difference, the current intensity and resistance

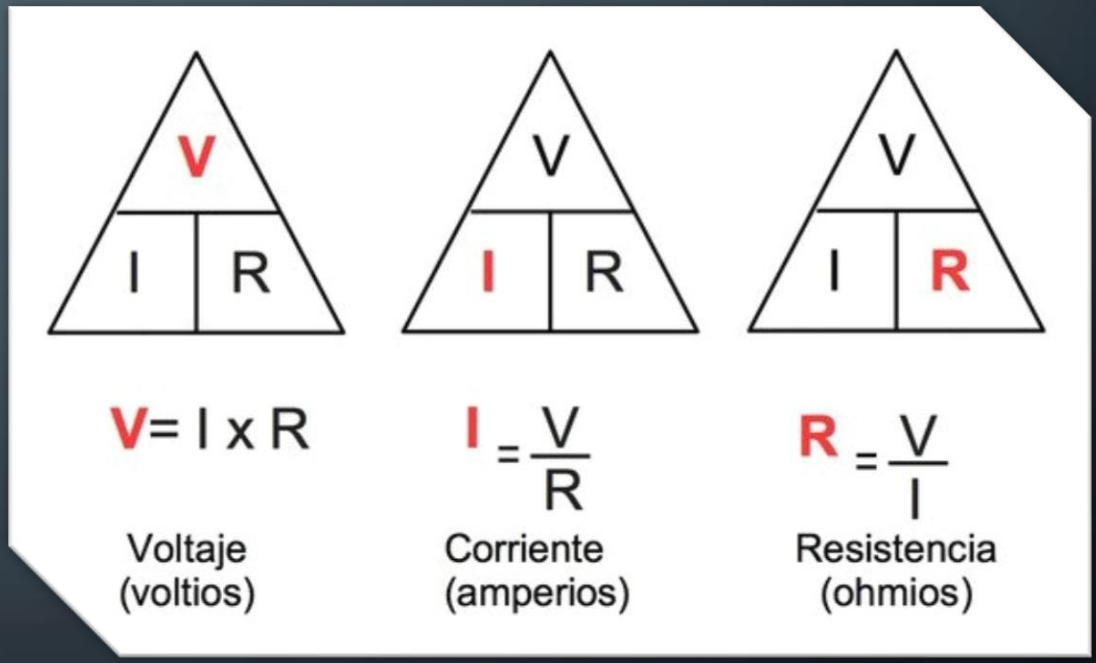
OHM'S LAW

- This law says,

"In an electronic circuit, the intensity of the current that runs through it is directly proportional to the applied voltage and inversely proportional to the resistance it presents"

- Its formula is,

$$V = R \cdot I$$



CURRENT

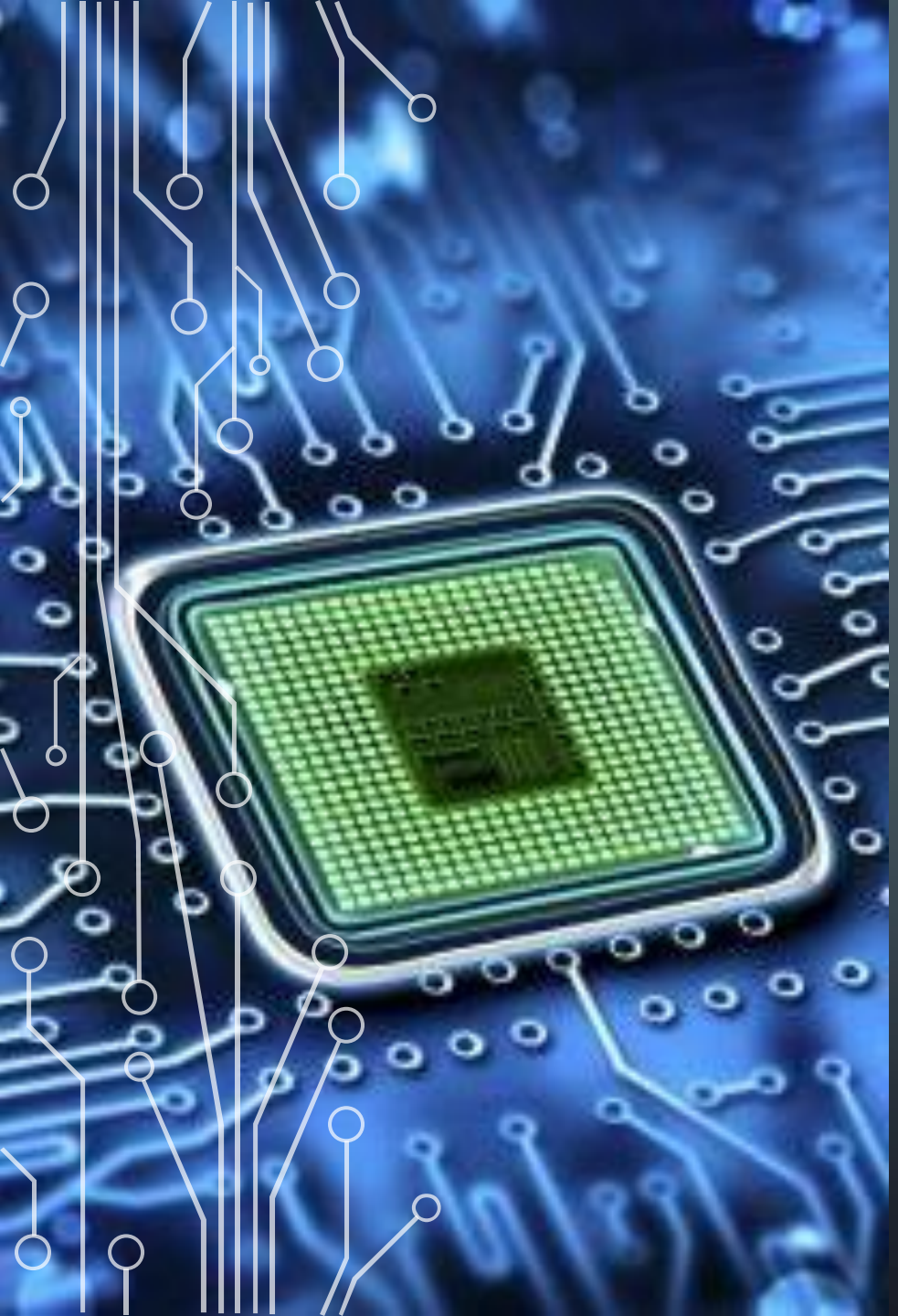
- Electric current is the flow of charge through a conductor per unit of time. Electric current is measured in amps (A). One ampere equals the flow of 1 coulomb per second, that is, $1A = 1C / s$.

VOLTAGE

- The electrical current that flows through a conductor depends on the electrical potential or voltage and the resistance of the conductor to the flow of charge. Voltage is measured in volts (V).
- Electric current is comparable to the flow of water. The difference in water pressure in a hose allows water to flow from high pressure to low pressure. The difference in electrical potential measured in volts allows the flow of electrical charges through a wire from a zone of high potential to a low one.

RESISTENCE

- Electrical resistance is the difficulty with which electrical charges flow through a conductor. Resistance is measured in ohms, and is represented by the Greek letter omega Ω.
- Using the analogy of water, electrical resistance can be compared to the friction of the flow of water through a tube. A smooth, polished tube offers little resistance to the passage of water, while a rough, debris-filled tube will make the water move more slowly.



WHAT IS A CIRCUIT?

- An electrical circuit is the set of electrical elements connected to each other.
- This allows to generate, transport and use electrical energy in order to transform it into another type of energy.

A CIRCUIT MAIN COMPONENTS ARE

- Generator = where electricity is produced.
- Conductor = wire through which the electrons driven by the generator circulate
- Electrical resistance = element that opposes the passage of electric current
- Switch = element that allows the passage of electric current to be opened or closed.

COMPONENTS OF A CIRCUIT

Resistors

- As the name suggest these help in resisting excessive current.

Capacitors

- This is used to store energy in from of electric charge and produce static voltage (potential energy). These are like small rechargeable batteries.

Inductors

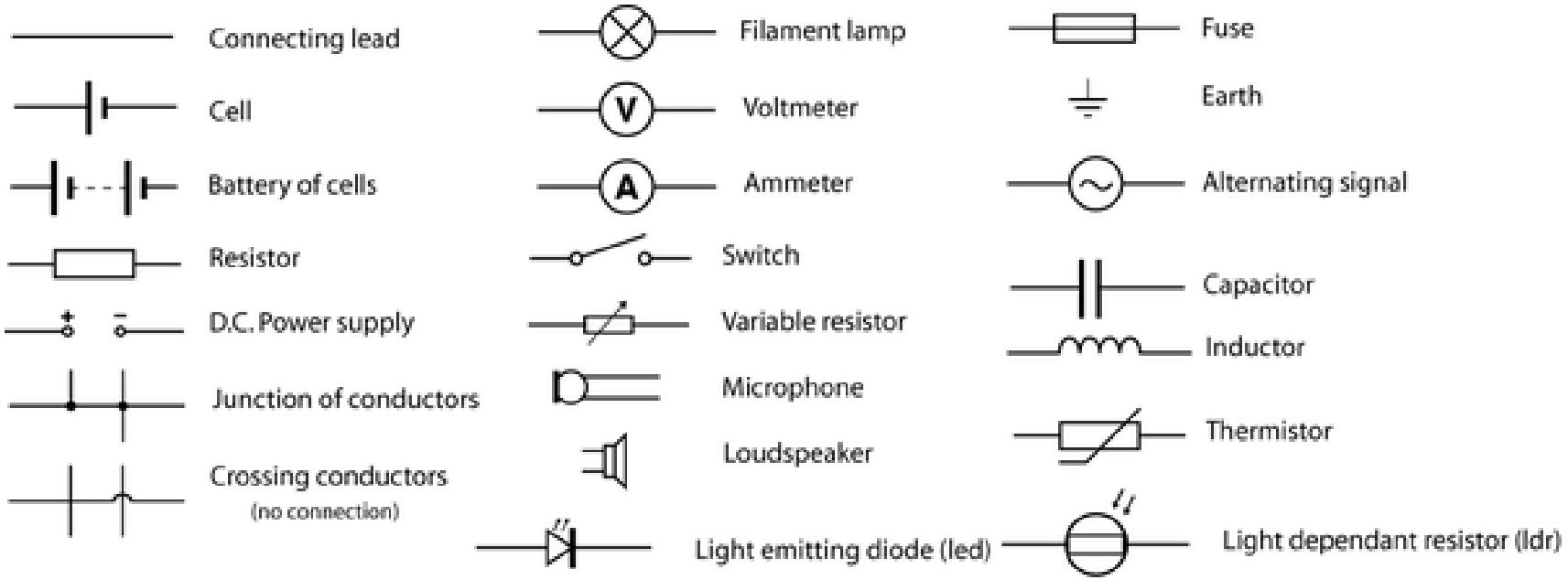
- They are used in Circuits due to their magnetic charge

Transistors

- This acts as a regulator for electric current or voltage and acts as an amplifier or switch for electric signals.
- Used in an Electronic Circuit

Diodes:

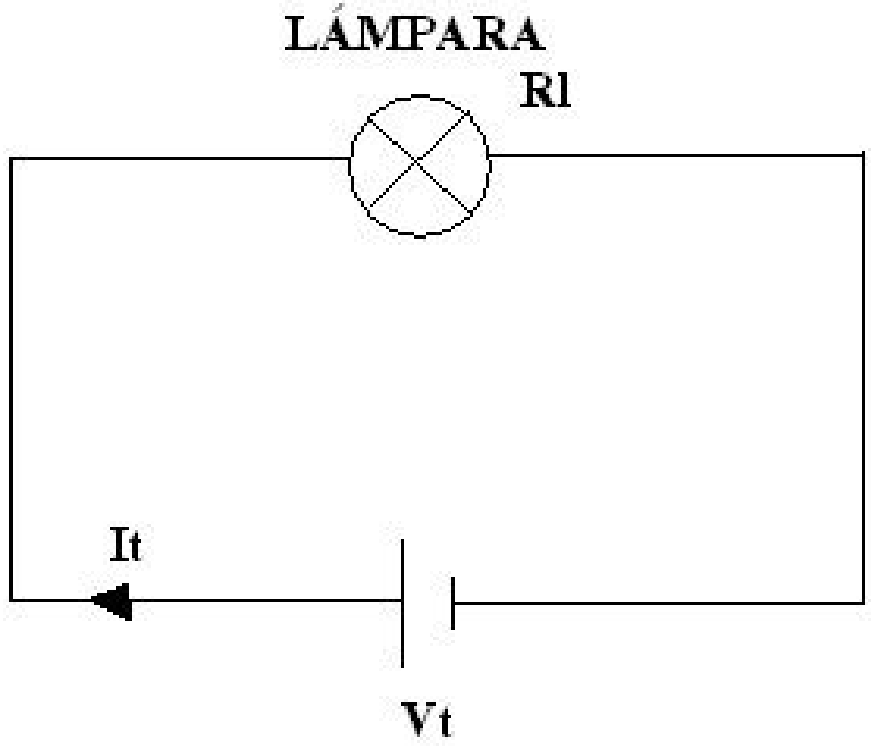
- This is a semi conductor which has the ability to conduct electric current
- Used in an Electronic Circuit



ADDITIONAL COMPONENTS AND THEIR SYMBOL

TYPES OF ELECTRICAL CIRCUITS

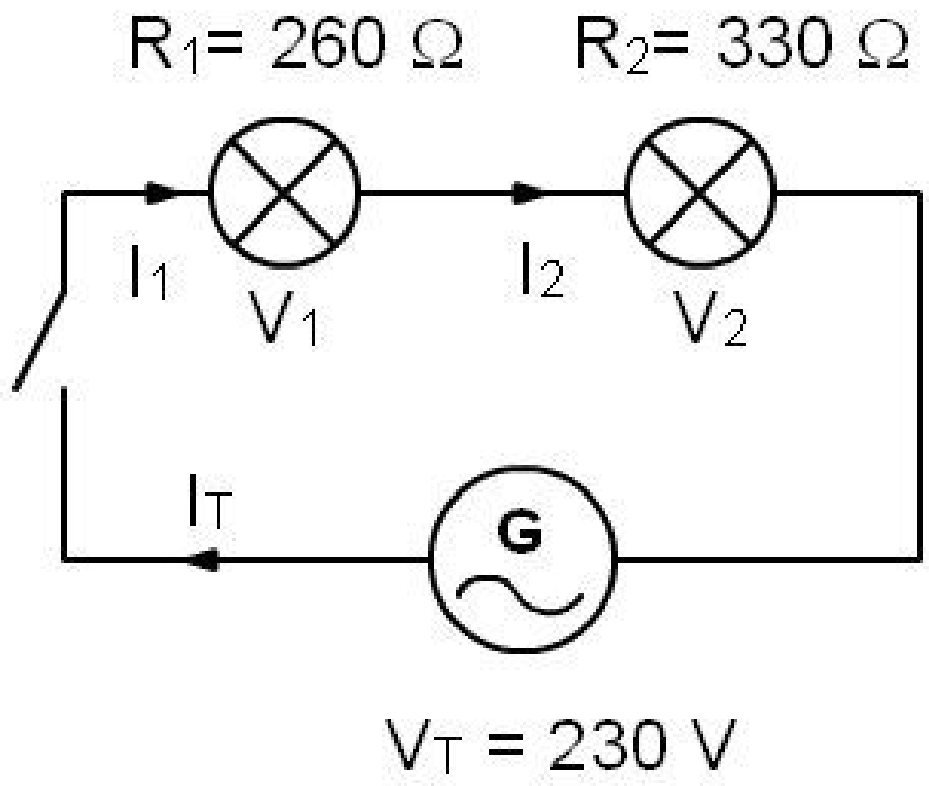
- Electrical circuits are closed circuits, although we can open the circuit at some point to interrupt the flow of current through a switch or other element of the circuit.
- Depending on how the resistors are connected we have several different types of electrical circuits. It also depends on whether the type of current used in the circuit is direct current or alternating current.



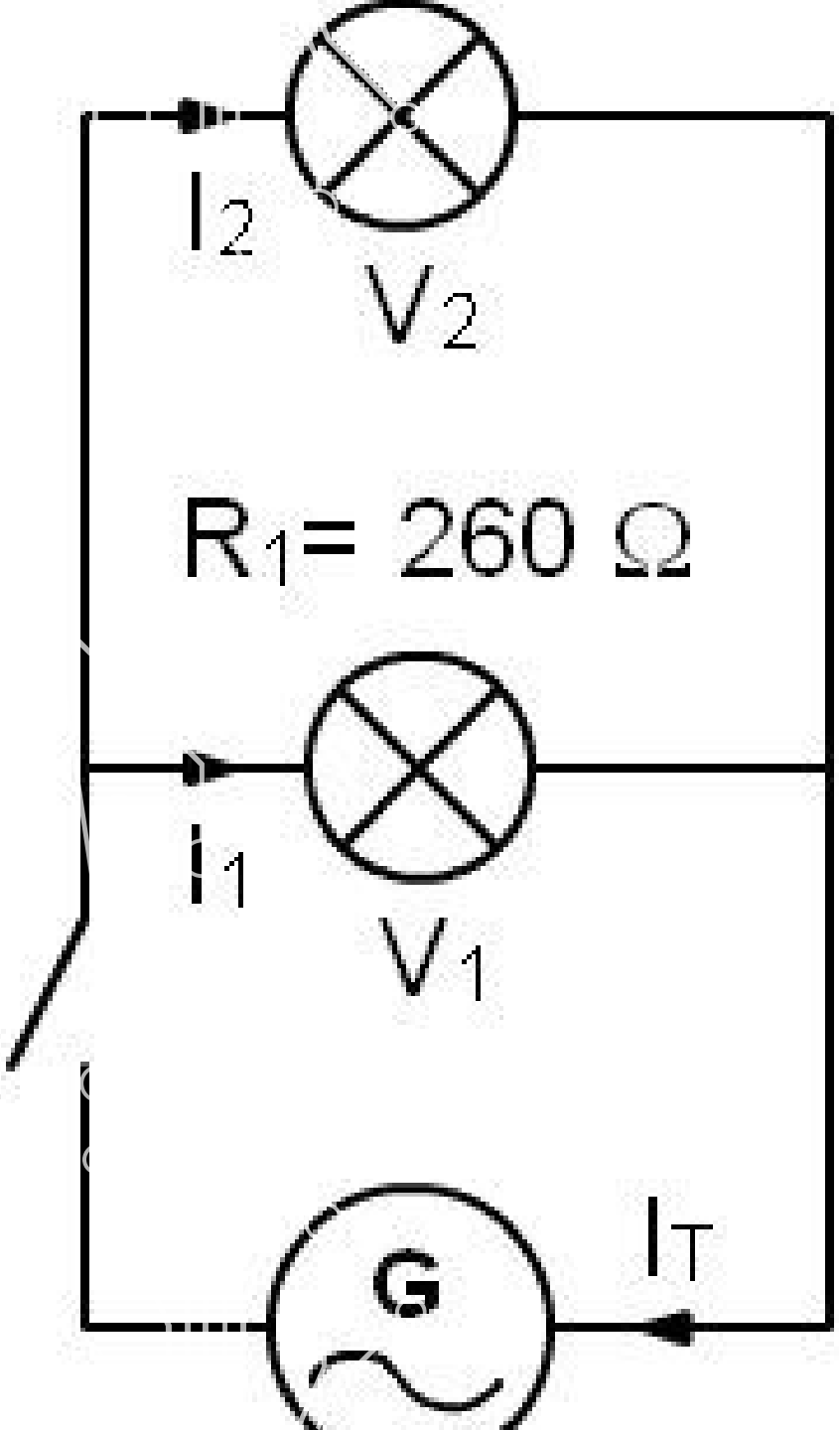
SIMPLE CIRCUIT

- The resistance will be connected to the same voltage as the generator, a current intensity equal to that of the total circuit will circulate through the receiver and the only resistance of the circuit will be that of the receiver.
- The formulas for this type of circuits:
  - It = I1; Vt = V1; Rt = R1

SERIES CIRCUIT



- In series circuits the resistance are connected one after the other, the end of the first with the beginning of the second and so on.
- This type of circuit has the characteristic that the intensity that passes through all the resistances is the same and is equal to the total of the circuit.
  - It = I1 = I2.
- The total resistance of the circuit is the sum of all the resistances of the receivers connected in series.
  - Rt = R1 + R2.
- The total voltage is equal to the sum of the voltages in each of the series connected receivers.
  - Vt = V1 + V2.



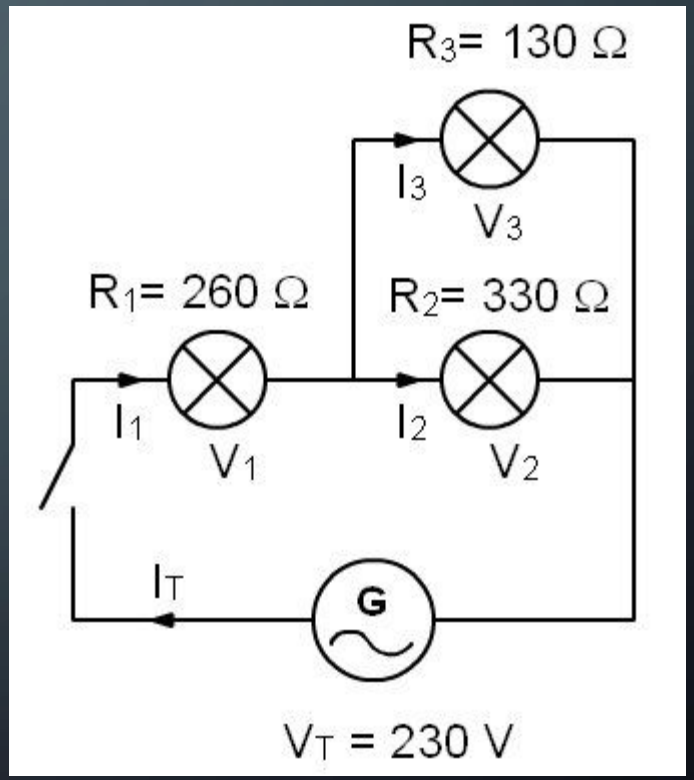
PARALLEL CIRCUIT

- They are the circuits in which the receivers are connected together all the inputs of the receivers on the one hand and on the other all the outputs.
- The voltages of all receivers are equal to the total voltage of the circuit. Vt = V1 = V2.
- The sum of each intensity that passes through each receiver is the total intensity of the circuit. It = I1 + I2.
- The total resistance of the circuit is calculated by applying the following formula: 1 / Rt = 1 / R1 + 1 / R2; if we clear the Rt it would be:
  - Rt = 1 / (1 / R1 + 1 / R2)

All receivers connected in parallel will remain working at the same voltage as the generator.

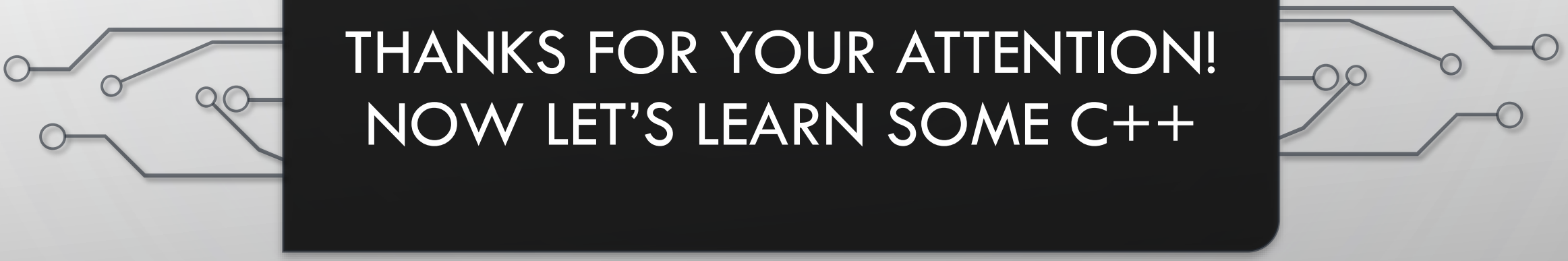
MIXED CIRCUIT

- They are those electrical circuits that combine series and parallel
- In this type of circuit, the receivers must be combined in series and in parallel to calculate them.



Interpretation of the color code of a resistor

Color	1 ª Cifra	2 ª Cifra	3 ª Cifra	4 ª Cifra
Ninguno	-	-	-	±20%
Plata	-	-	10^{-2}	±10%
Oro	-	-	10^{-1}	±5%
Negro	-	0	10^{0}	-
Marrón	1	1	10^{1}	-
Rojo	2	2	10^{2}	-
Naranja	3	3	10^{3}	-
Amarillo	4	4	10^{4}	-
Verde	5	5	10^{5}	-
Azul	6	6	10^{6}	-
Lila	7	7	10^{7}	-
Gris	8	8	10^{8}	-
Blanco	9	9	10^{9}	-


THANKS FOR YOUR ATTENTION!
NOW LET'S LEARN SOME C++