

An Autonomous Institution

Coimbatore-35

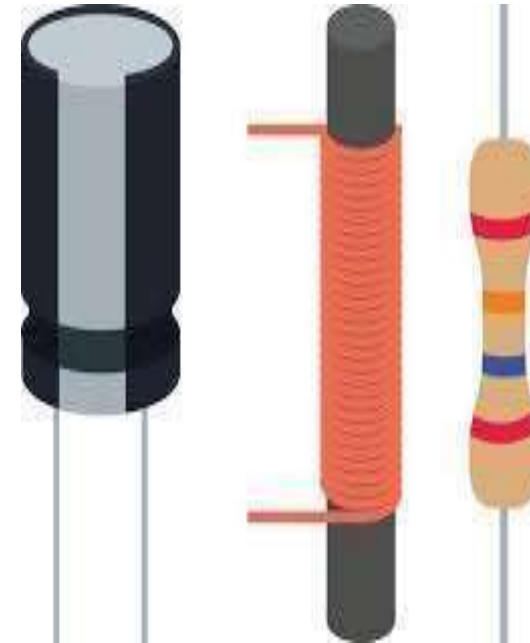
Department of Artificial Intelligence and Data Science

**23EET103-Electric Circuits and
Electron Devices**

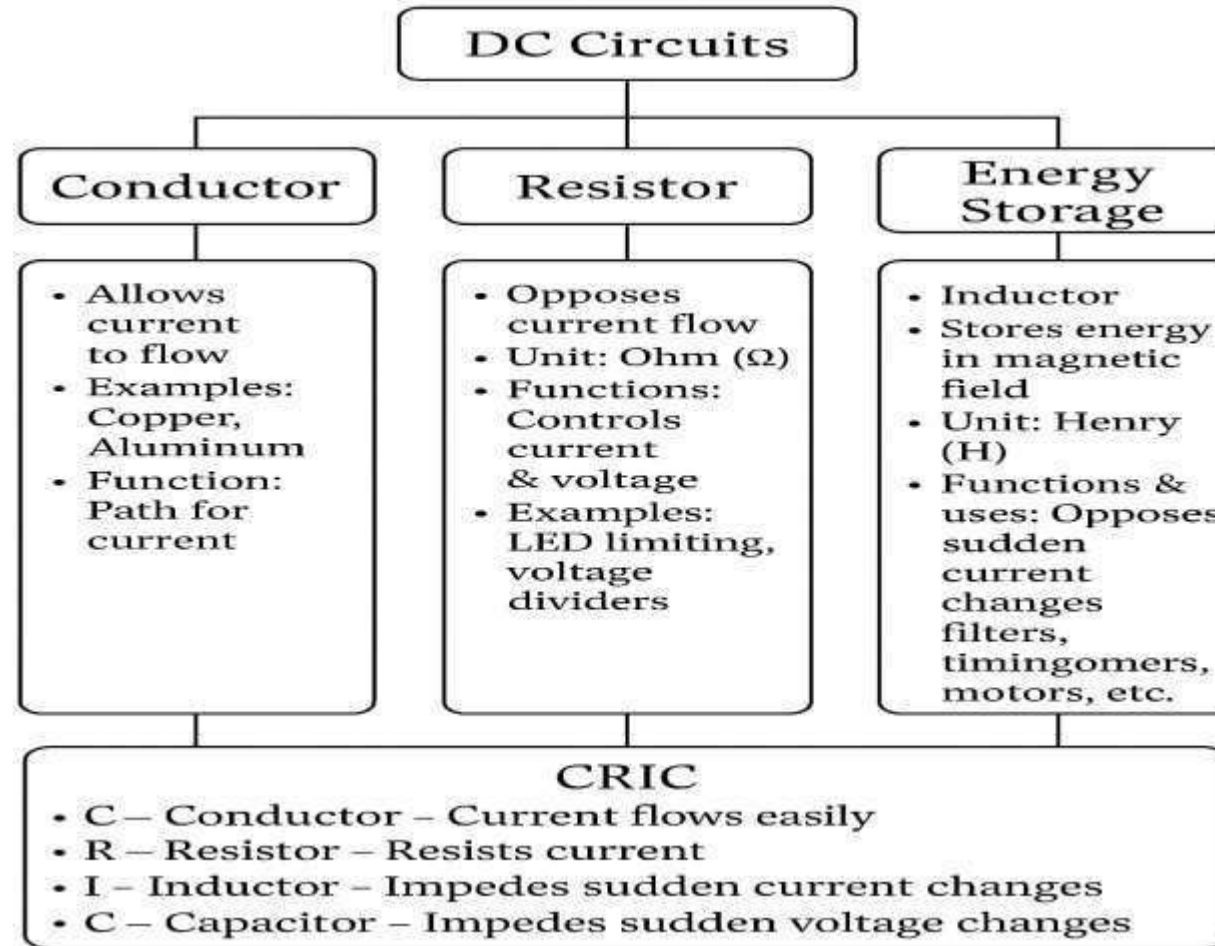
I B.Tech. IT / II SEMESTER

UNIT I : DC CIRCUITS

Topic 2 : Resistive Elements



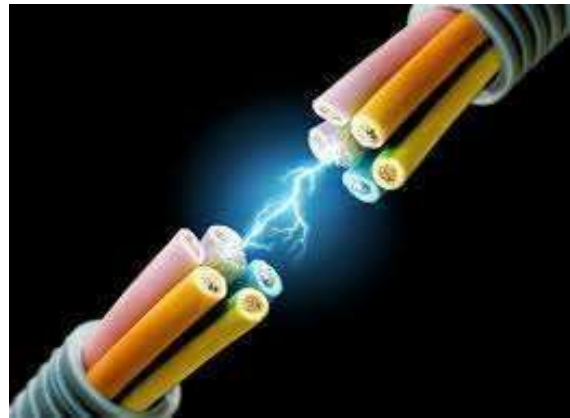
Let's Recall !!



Topics for discussion

- Why DC Circuits: Conductor, Resistor, Inductor, Capacitor ?
- DC Circuits: Conductor, Resistor, Inductor, Capacitor Fundamentals
- DC Circuits: Conductor, Resistor, Inductor, Capacitor Terminologies
- Why DC Circuits: Conductor, Resistor, Inductor, Capacitor
traversals in real world?

Let's explore !!



- Electricity?
- Voltage, Current, Resistance
- Nature of Current
- Ohms Law

Conductor



Definition: A material that allows free flow of electric current due to the presence of free electrons.

- **Examples:** Copper, Aluminum, Silver.
- **Key Characteristics:**
 - **Low resistance** → allows current to flow easily.
 - Conductivity depends on **material, cross-sectional area, and temperature.**
 - **Role in DC Circuit:** Provides a path for current; ideally, it doesn't drop voltage significantly.

Resistor



Resistance to the flow of the current.
Measured in Ohms

It **opposes an Electric Current**

Definition: A component that **resists** the flow of current, converting electrical energy into heat.

Symbol: Ω (ohms)

Key Characteristics:

Ohm's Law: $V = I \cdot R$

Resistance is measured in **ohms (Ω)**

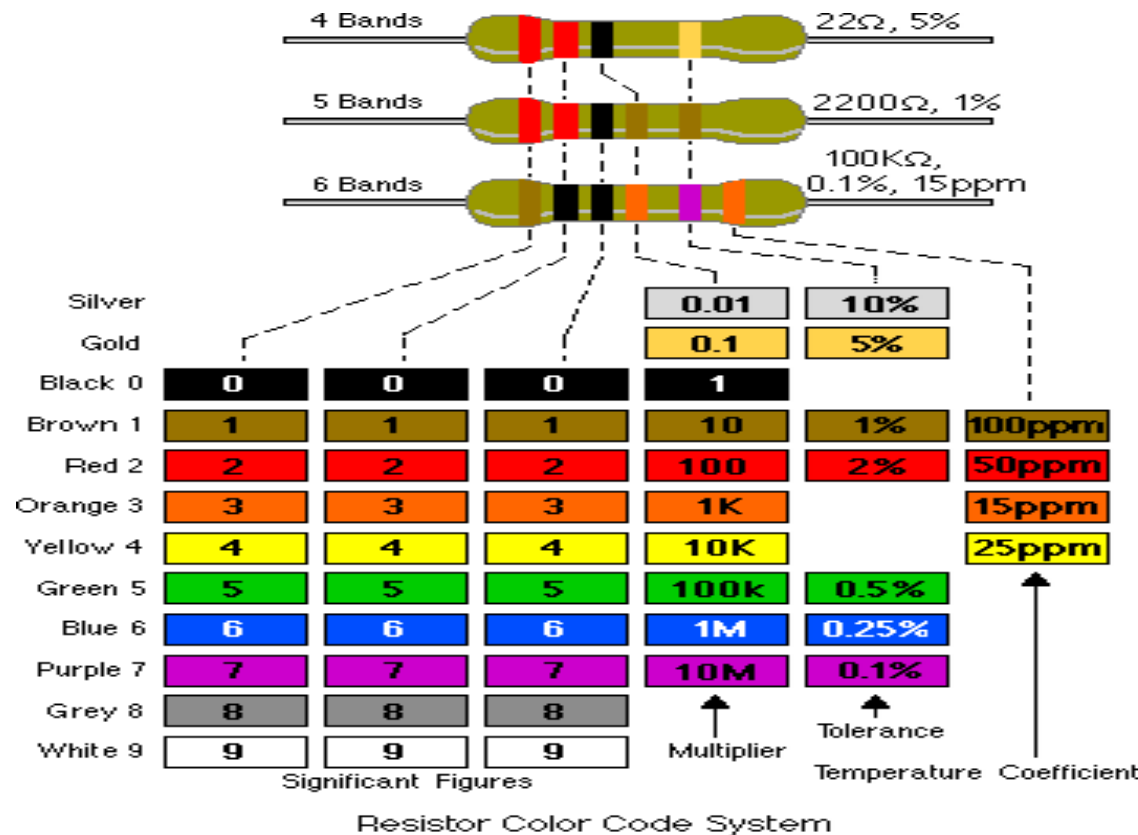
Can be **fixed or variable**.

Role in DC Circuit:

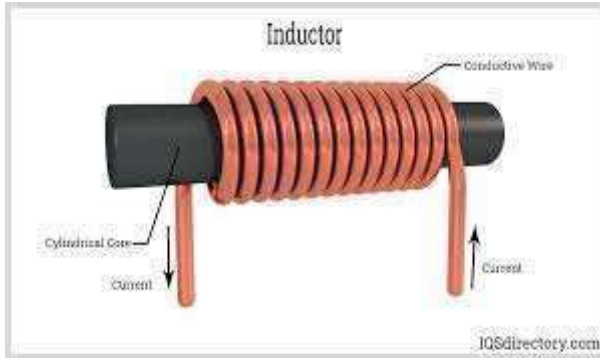
Limits current.

Divides voltage (voltage divider circuits).

Protects sensitive components.



Inductor



Definition: A component that **opposes changes in current** due to its magnetic field.

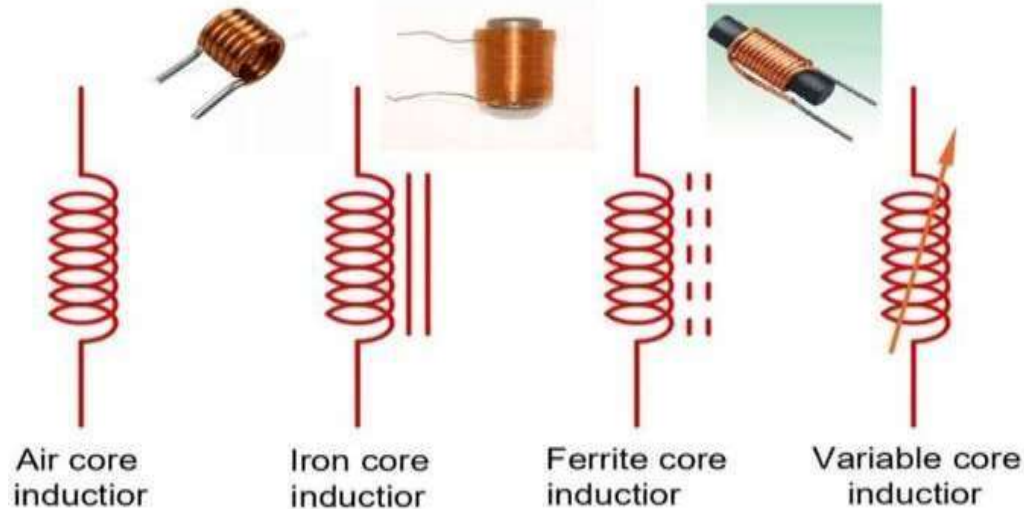
Symbol: H

Key Characteristics:

- Inductance measured in Henrys (H)
- Stores energy in magnetic field
- In DC steady state, acts as a short circuit (ideal inductor).

Role in DC Circuit:

- Smoothens current (in filters)
- Protects circuits from sudden current changes
- Used in energy storage and transient analysis.



Capacitor

TYPES OF CAPACITORS



Definition: A component that **stores electrical energy** in an electric field between its plates.

Symbol: f

Key Characteristics:

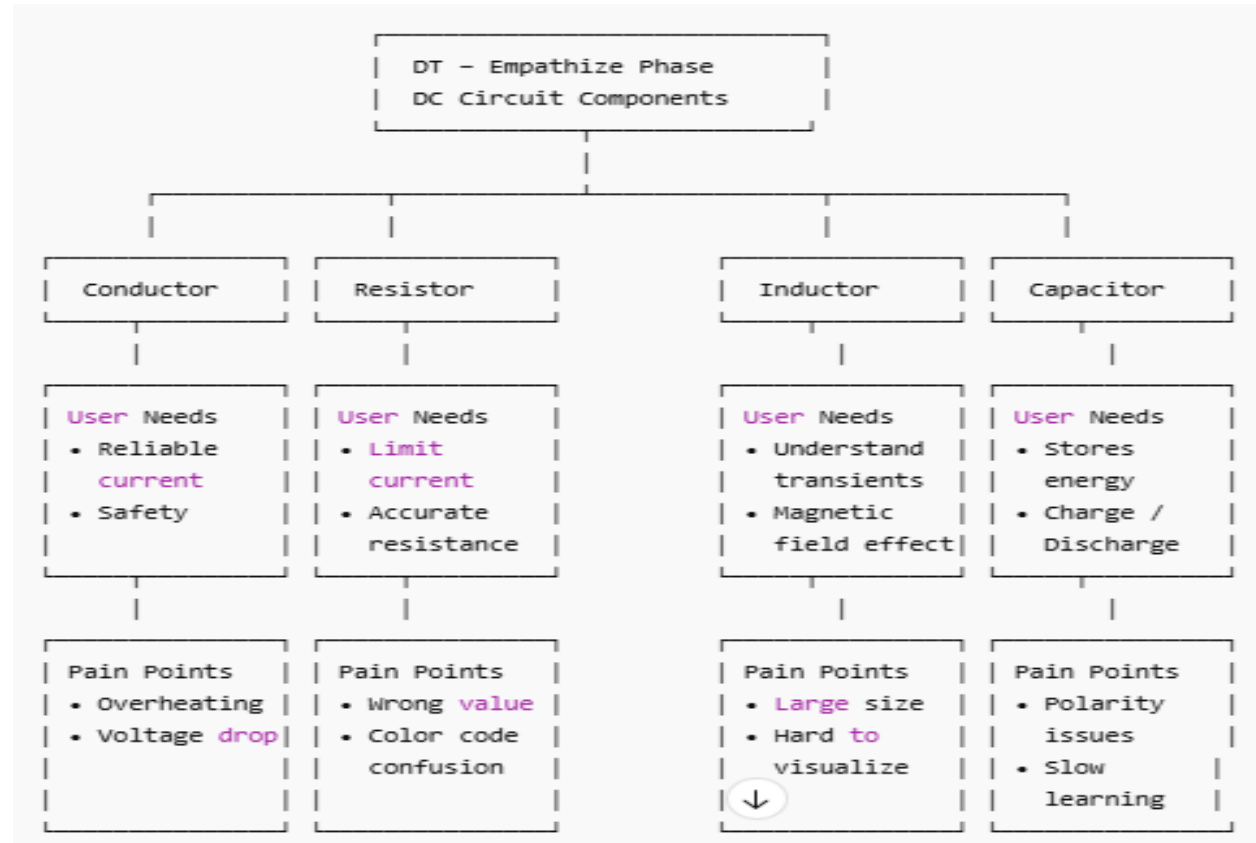
- Capacitance measured in **Farads (F)**
- In DC steady state, acts as an **open circuit** (blocks DC).
- Can be **polarized** (electrolytic) or **non-polarized**.

Role in DC Circuit:

- Stores energy for later use
- Filters voltage fluctuations
- Couples AC signals while blocking DC in circuits

Resistor, Inductor, Capacitor

DT-Empathize



Organization Hierarchy

DC circuit components

DC circuit components are the basic elements used in direct current (DC) electrical circuits that control, store, or oppose the flow of electric current. They form the building blocks of circuits and determine how voltage and current behave.

Component	Function / Role	Unit
Conductor	Provides path for current	–
Resistor	Limits current, divides voltage	Ohm (Ω)
Inductor	Stores energy in magnetic field, opposes changes in current	Henry (H)
Capacitor	Stores energy in electric field, filters voltage	Farad (F)

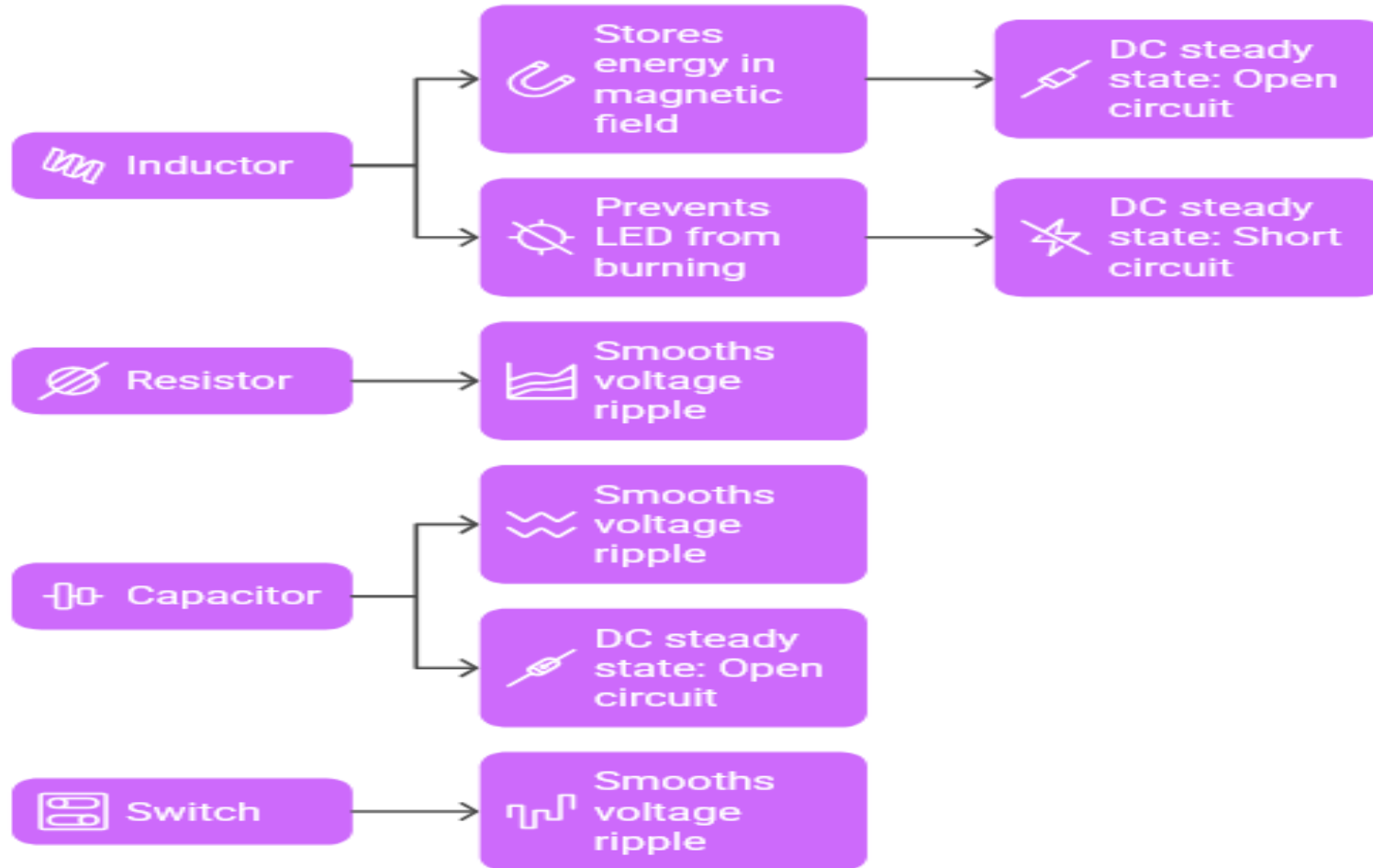
Application of DC Components in Real world



Lets Summarize.....

DT-Empathize

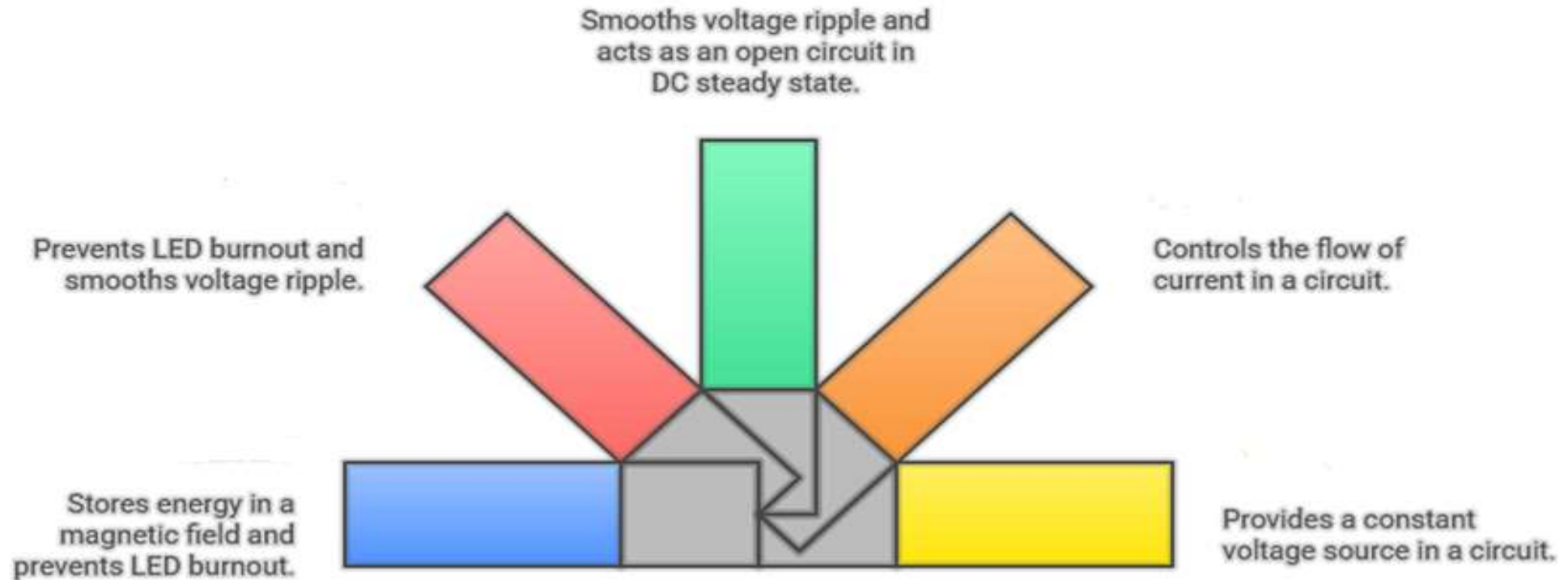
Electronic Components and Their Functions



QUIZ

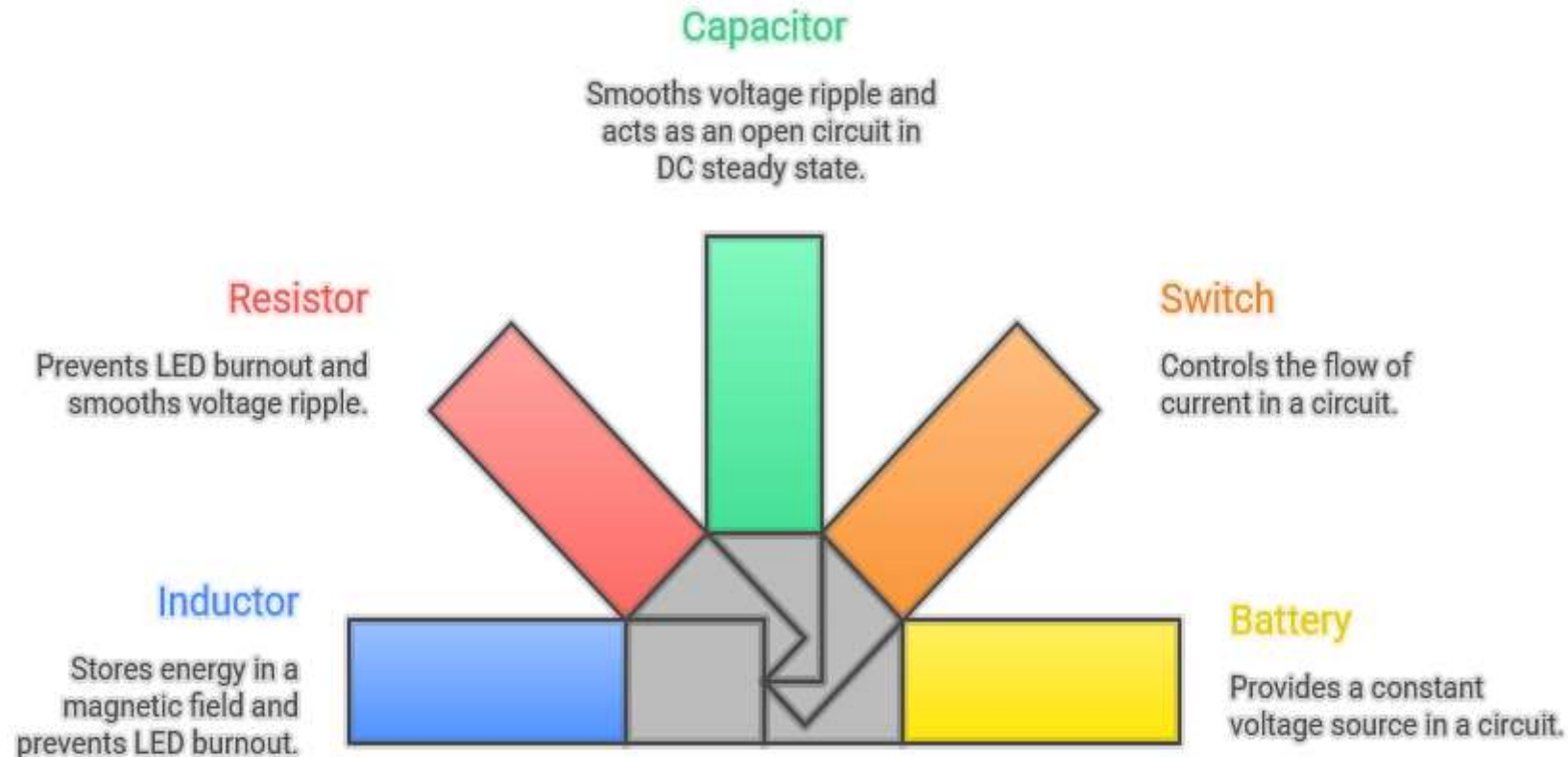
DT-Empathize

Which electronic component serves a specific function in a circuit?



ANSWER

Which electronic component serves a specific function in a circuit?



Quiz

Q: Identify the component symbol:

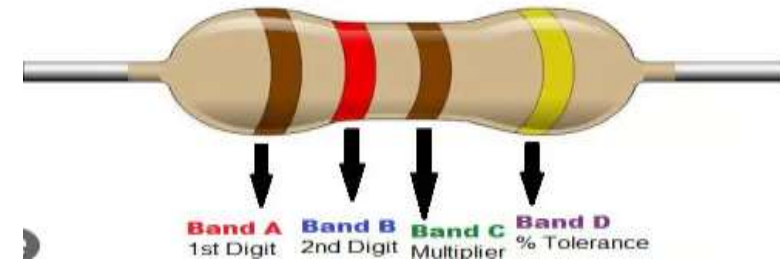


A) Capacitor

B) Resistor

C) Inductor

DT-Emphatize




B) Resistor



Quiz

DT-Empathize

1 What is the primary function of a **resistor**?

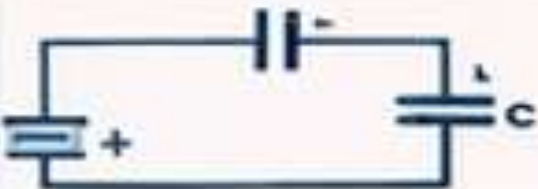


Question 1:

- a) Stores electric charge
- b) Opposes current flow
- c) Allows current to flow easily

1. **Answer: b) Opposes current flow**

2 What will the capacitor do if we suddenly **remove** the battery?



Question 2:

- a) Consume energy
- b) Store magnetic energy
- c) Discharge stored energy

1. **Answer: c) Discharge stored energy**



*Thank
you!*