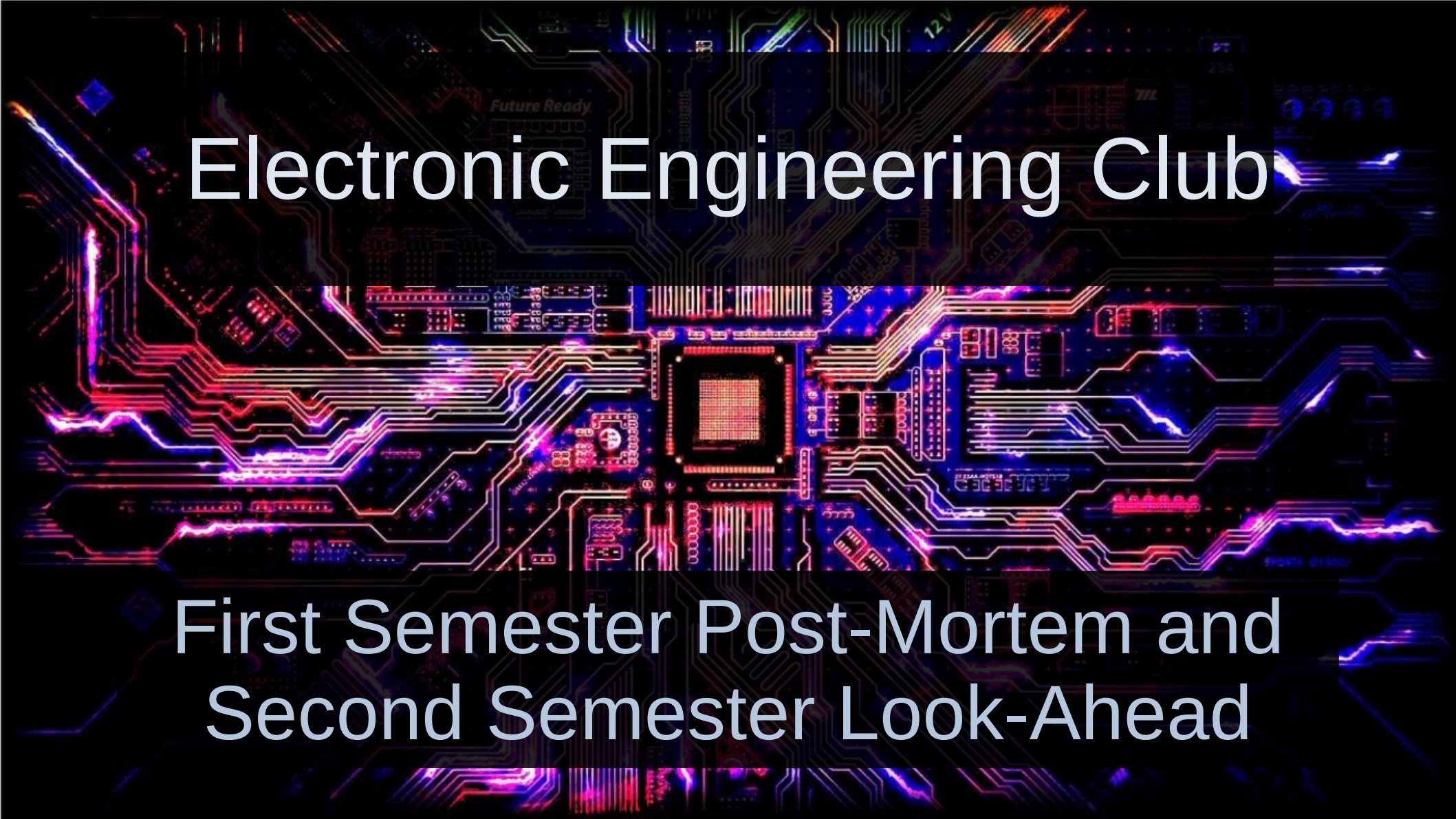
Electronic Engineering Club

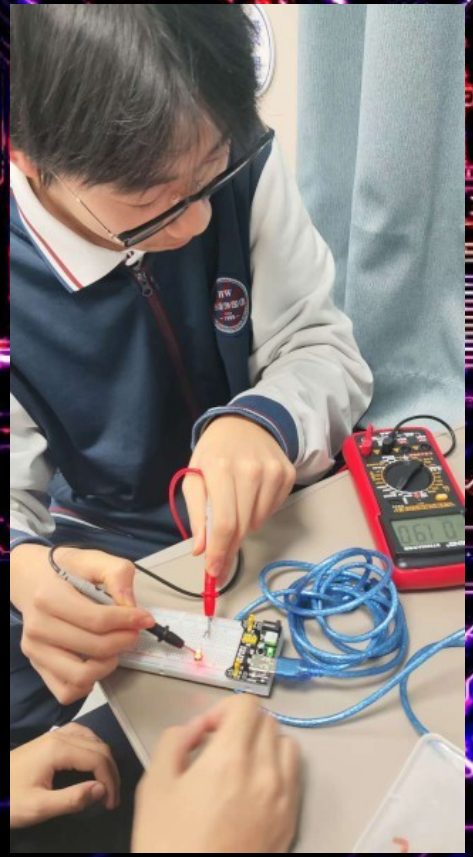


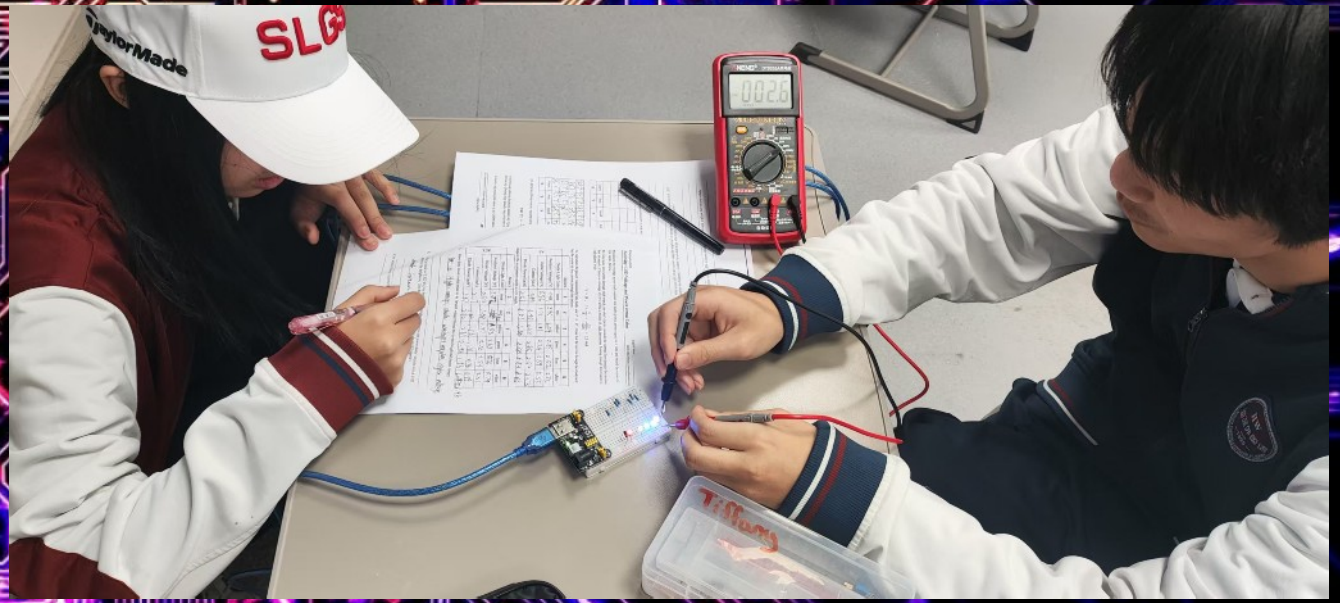
First Semester Post-Mortem and Second Semester Look-Ahead

Outline

- **First Semester**:
  Foundations of Analog Electronics
- **Second Semester**:
  Entering the Digital World

Electronic Engineering Club





Foundations of Analog Electronics

- Resistors
- Current and Voltage
- Capacitors
- Diodes
- Transistors

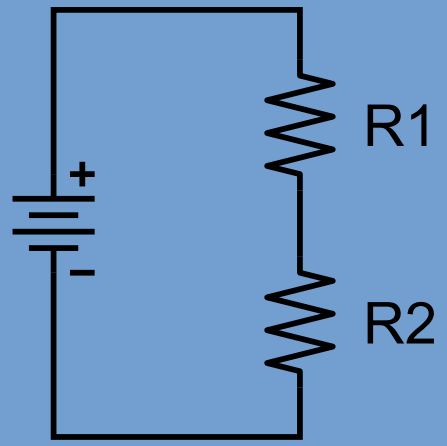
Understanding Capacitance

- A **resistor** is an electronic component that inhibits the flow of electricity
  - it acts like a valve controlling the amount of current flow

resistor

Understanding Resistance

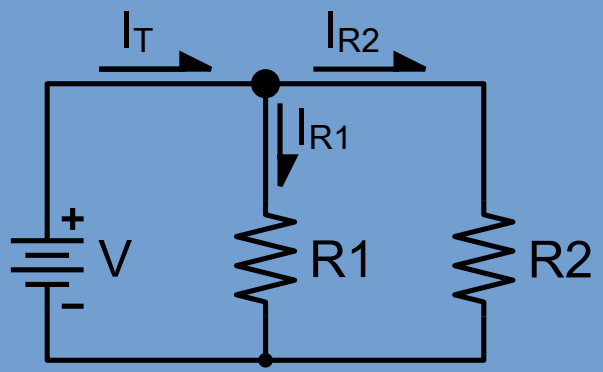
- Learning objective completed:
  - Understand and calculate the **total resistance** of resistors in a **series circuit**.



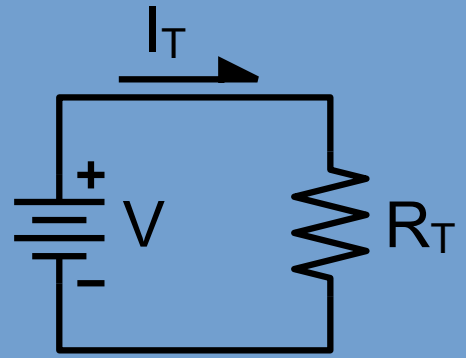
$$R_T = \sum_n R_n$$

Understanding Resistance

- Learning objective completed:
  - Understand and calculate the **total resistance** of resistors in a **parallel circuit**.

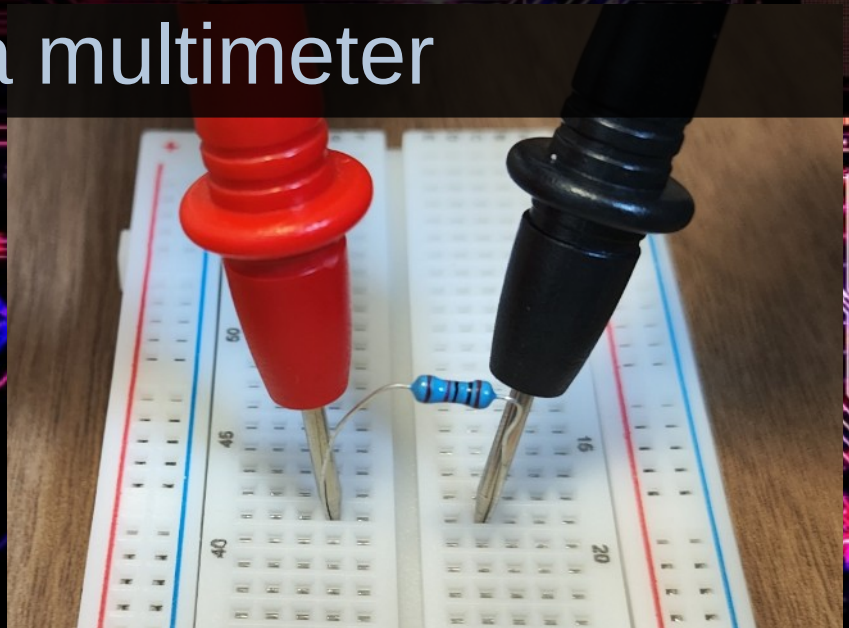


$$\frac{1}{R_T} = \sum_n \frac{1}{R_n}$$



Understanding Resistance

- Learning objective completed:
  - Safely and accurately **measure resistance** using a multimeter



Understanding Voltage and Current

- **Current** is the number of electrons flowing through a circuit per unit time.

$$I = \frac{Q}{t}$$

-
- **Voltage** is the pressure that pushes these electrons

Analogy:

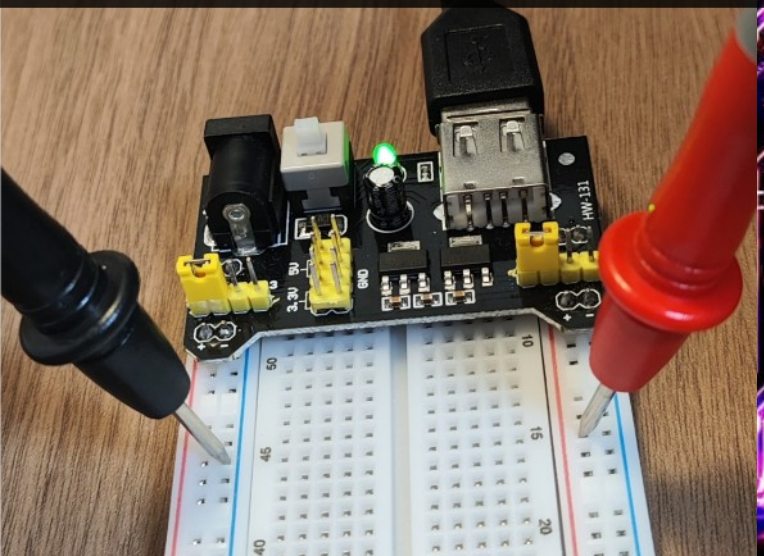
- Water flowing through the hose represents the **current**.
- The pressure pushing the water represents the **voltage**.

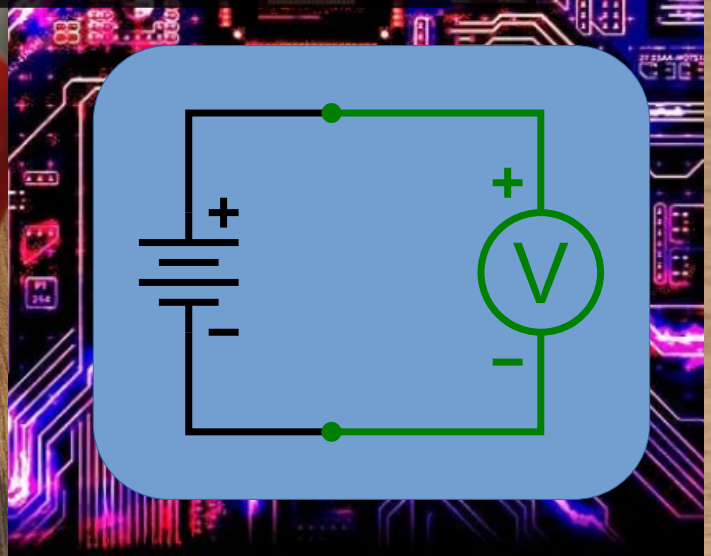
Ohm’s Law

- Learning objective completed:
  - Understand **Ohm’s Law**, **V = I·R**, the relationship between voltage, resistance and electrical current
  - Use ohms law to **calculate voltage, current, and resistance** values in electronic circuits

Understanding Voltage

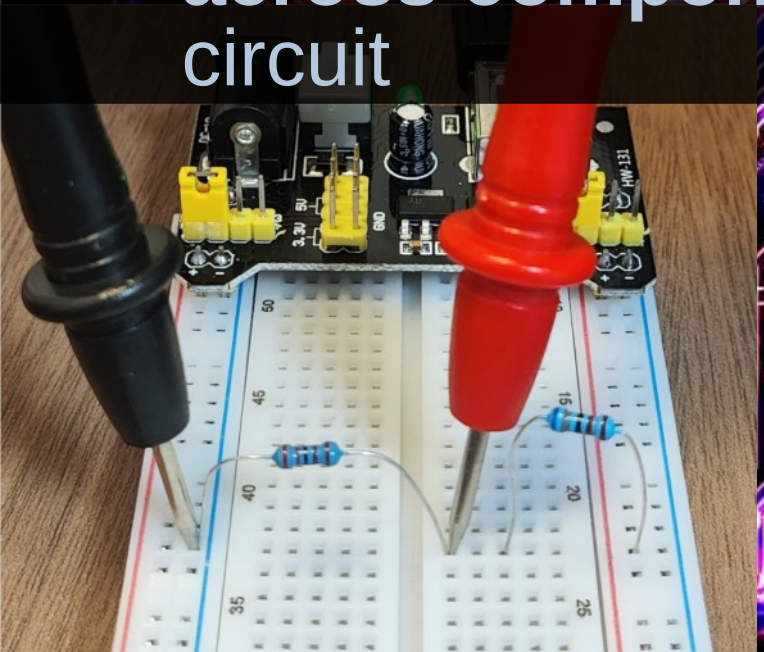
- Learning objective completed:
  - Safely **measure voltage** using a multimeter

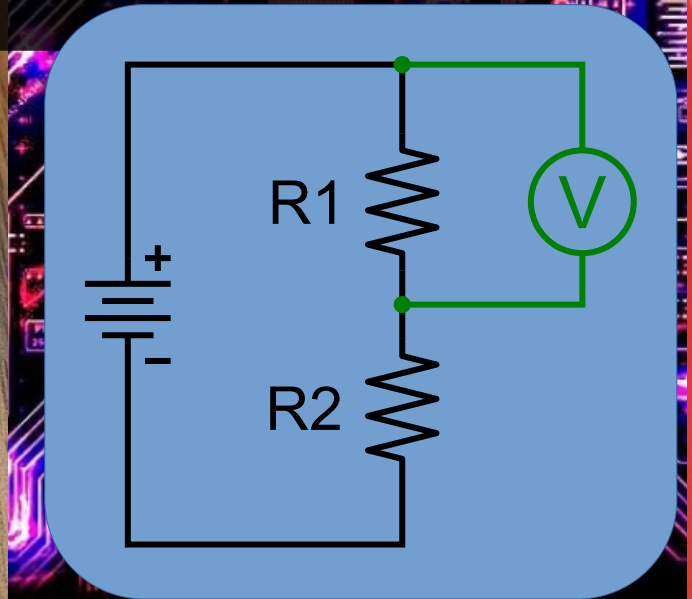




Understanding Voltage

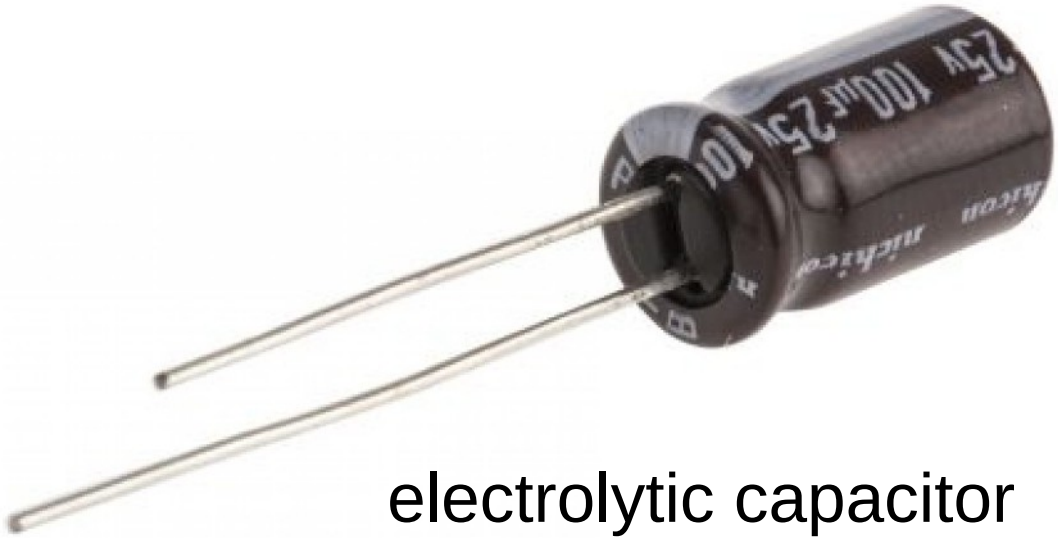
- Learning objective completed:
  - Safely measure **voltage across components** of a circuit





Understanding Capacitance

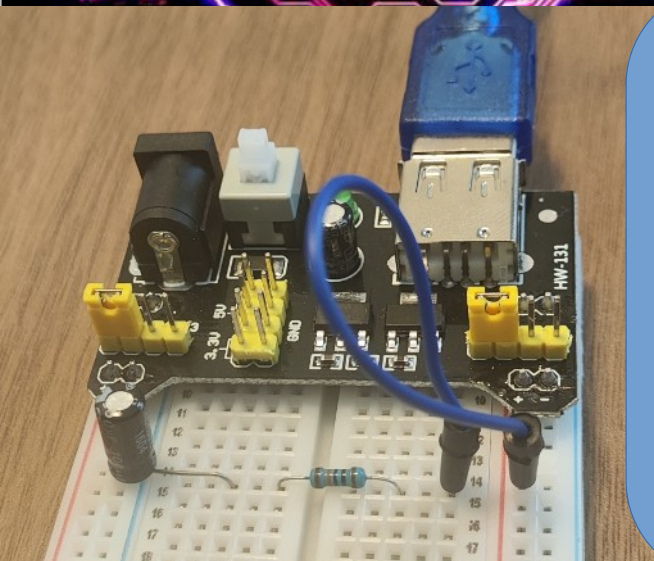
- A **capacitor** is an electronic component that stores electrical charge
  - It acts like a small, fast battery

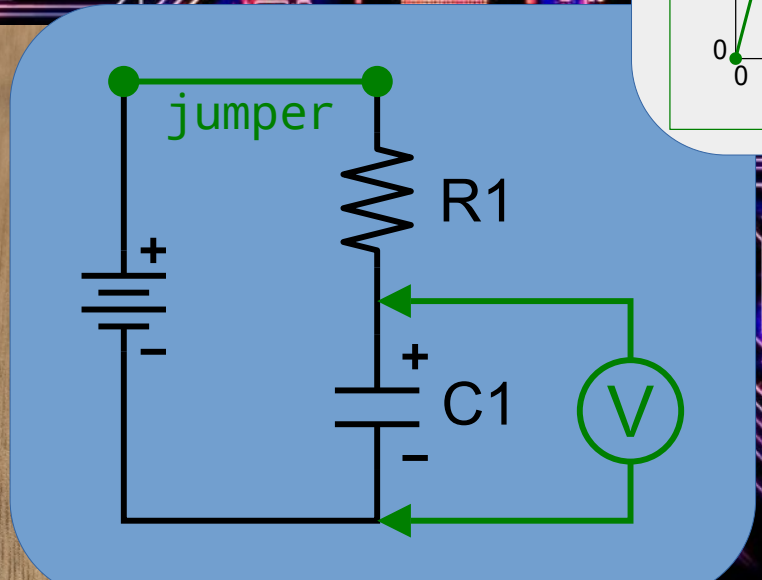


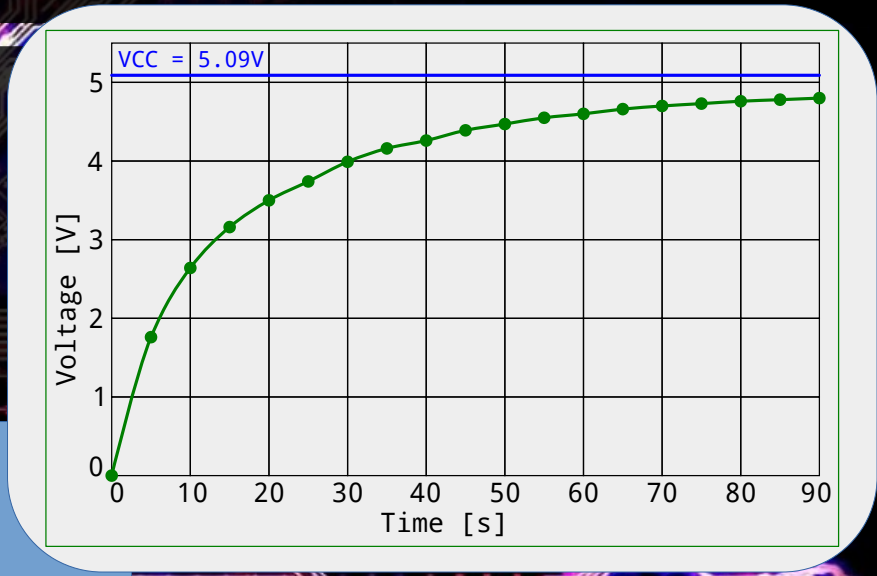
electrolytic capacitor

Understanding Capacitance

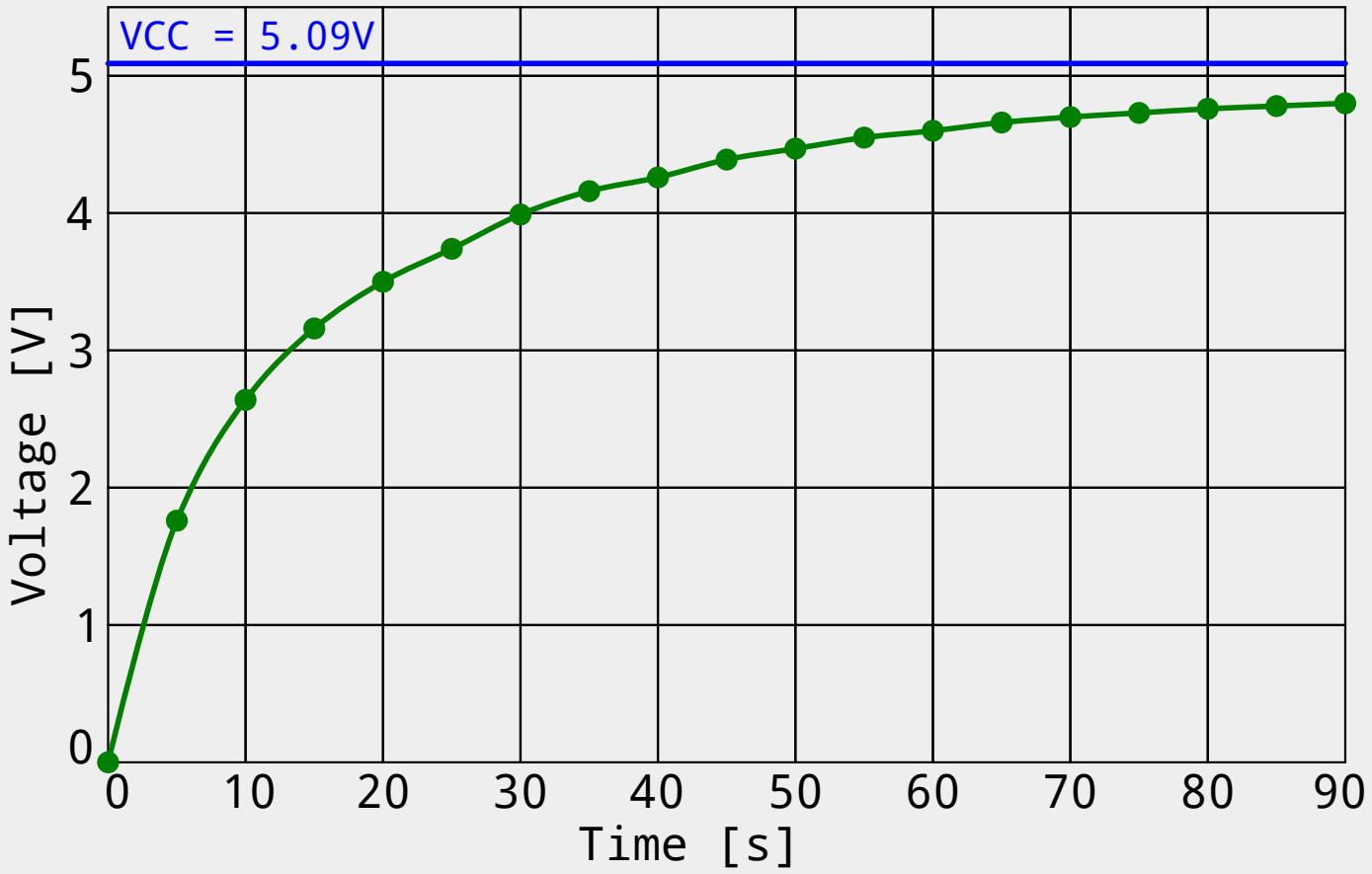
- Learning objective completed:
  - Safely measure **change in voltage** across a **charging capacitor** in an RC circuit





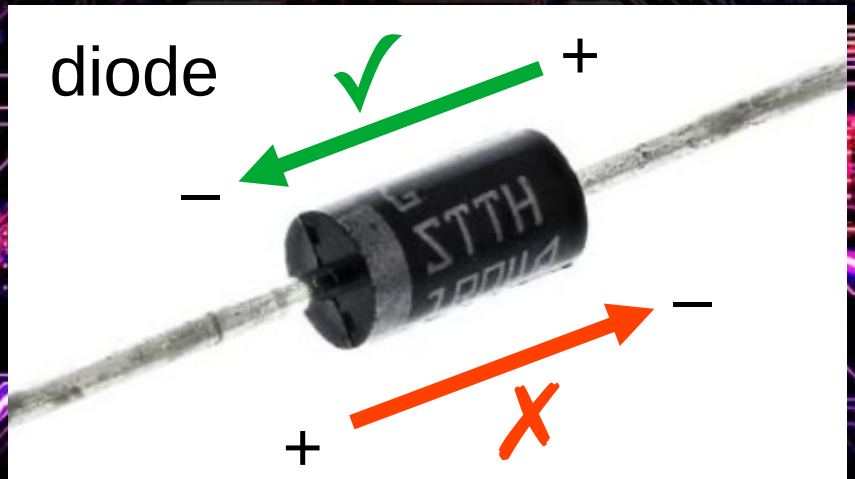


Understanding Capacitance



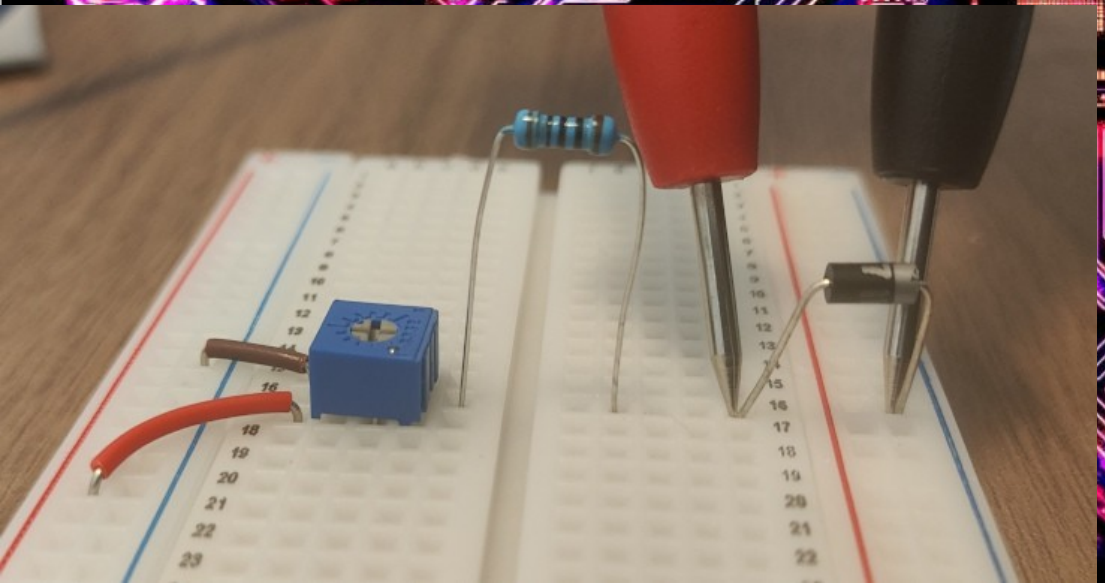
Understanding Diodes

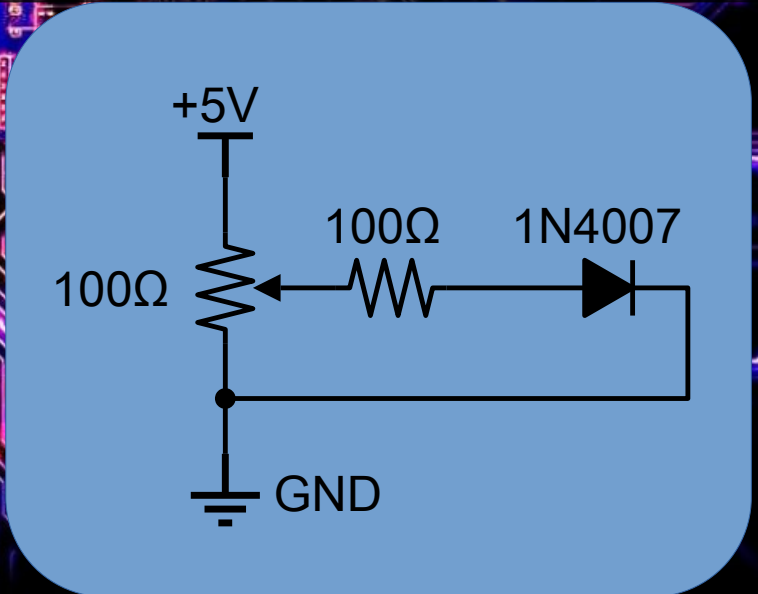
- A **diode** is a semiconductor that allows current to flow in only one direction
  - Diodes are used in circuits that convert AC to DC (such as USB chargers).



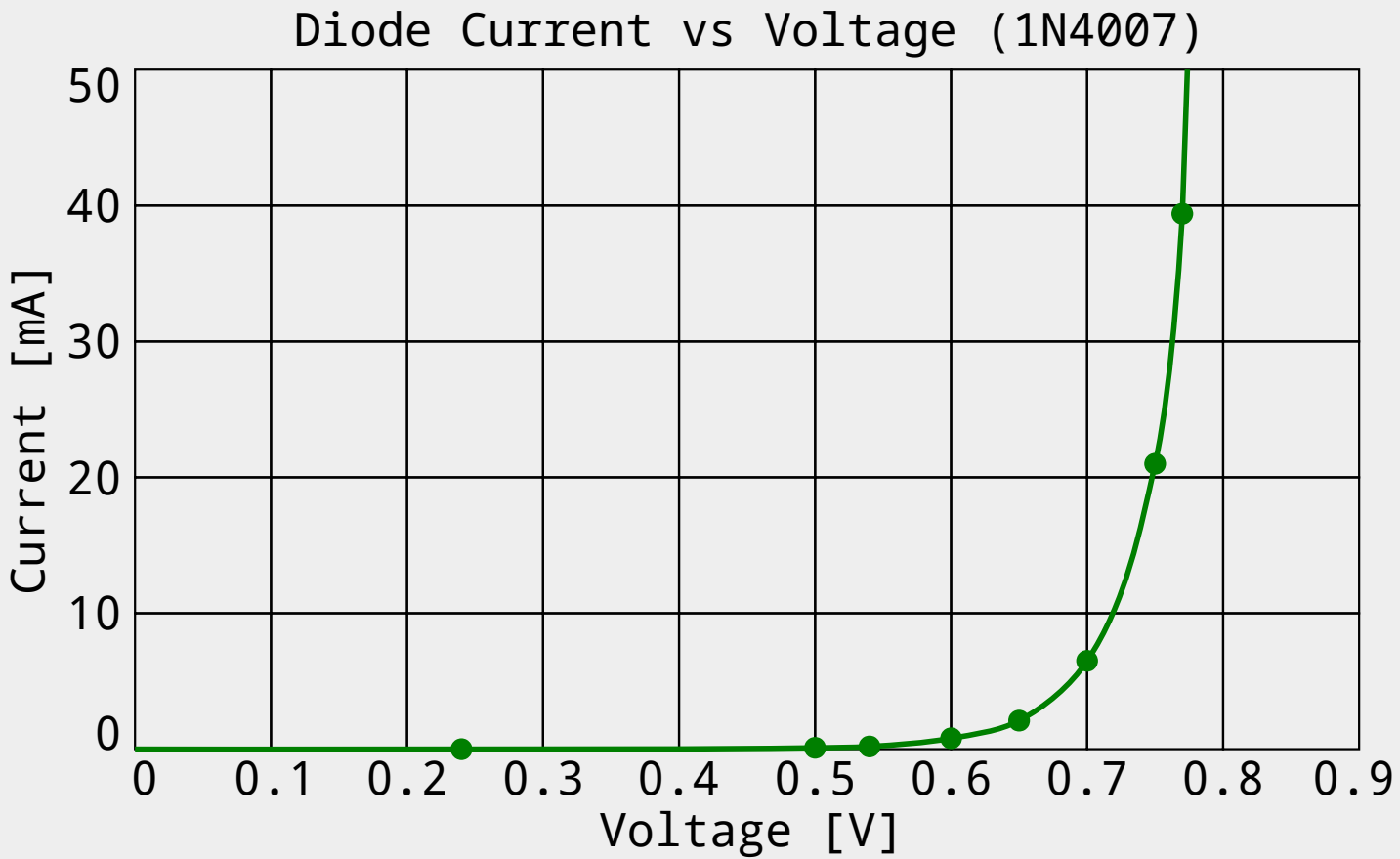
Understanding Diodes

- Learning objective completed:
  - Safely measure the **forward current** through a diode with changing **voltage across** the diode





Understanding Diodes



Unlike resistors, **diodes** do <u>not</u> follow Ohm's Law

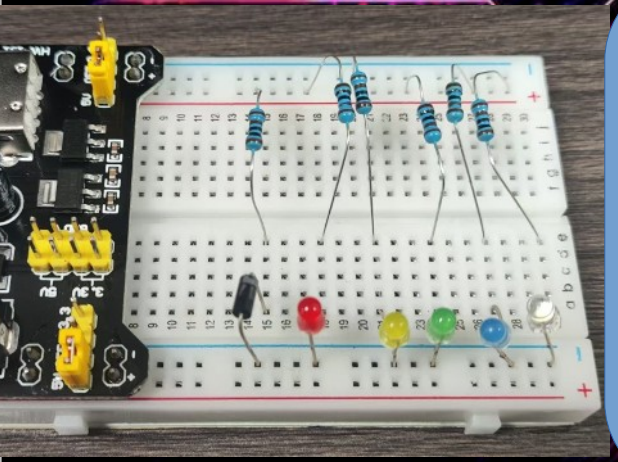
Understanding Diodes

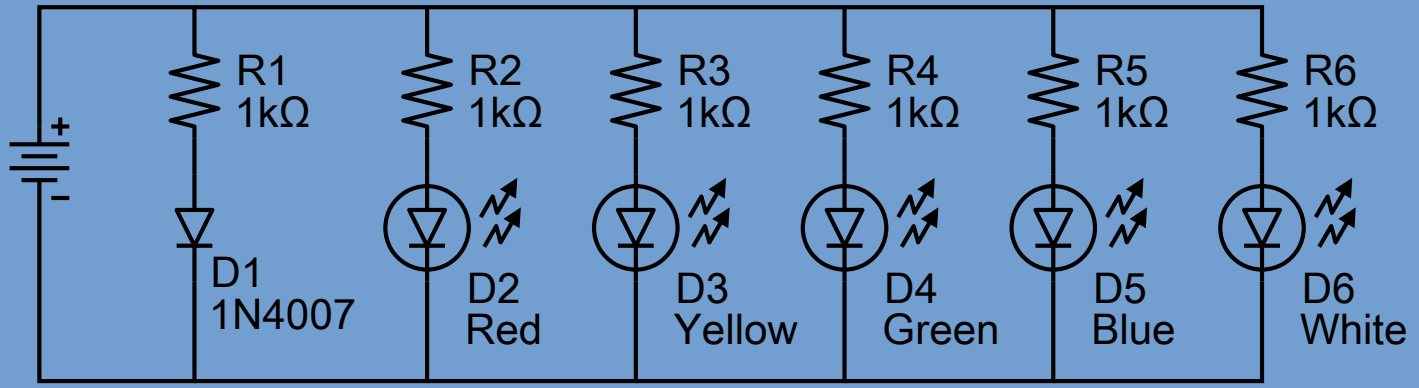
- A **light emitting diode**, or LED, is a diode that also emits light

LEDs (light emitting diodes)

Understanding Diodes

- Learning objective completed:
  - Safely measure and understand how the **color** of an LED affects the **voltage drop** across the LED





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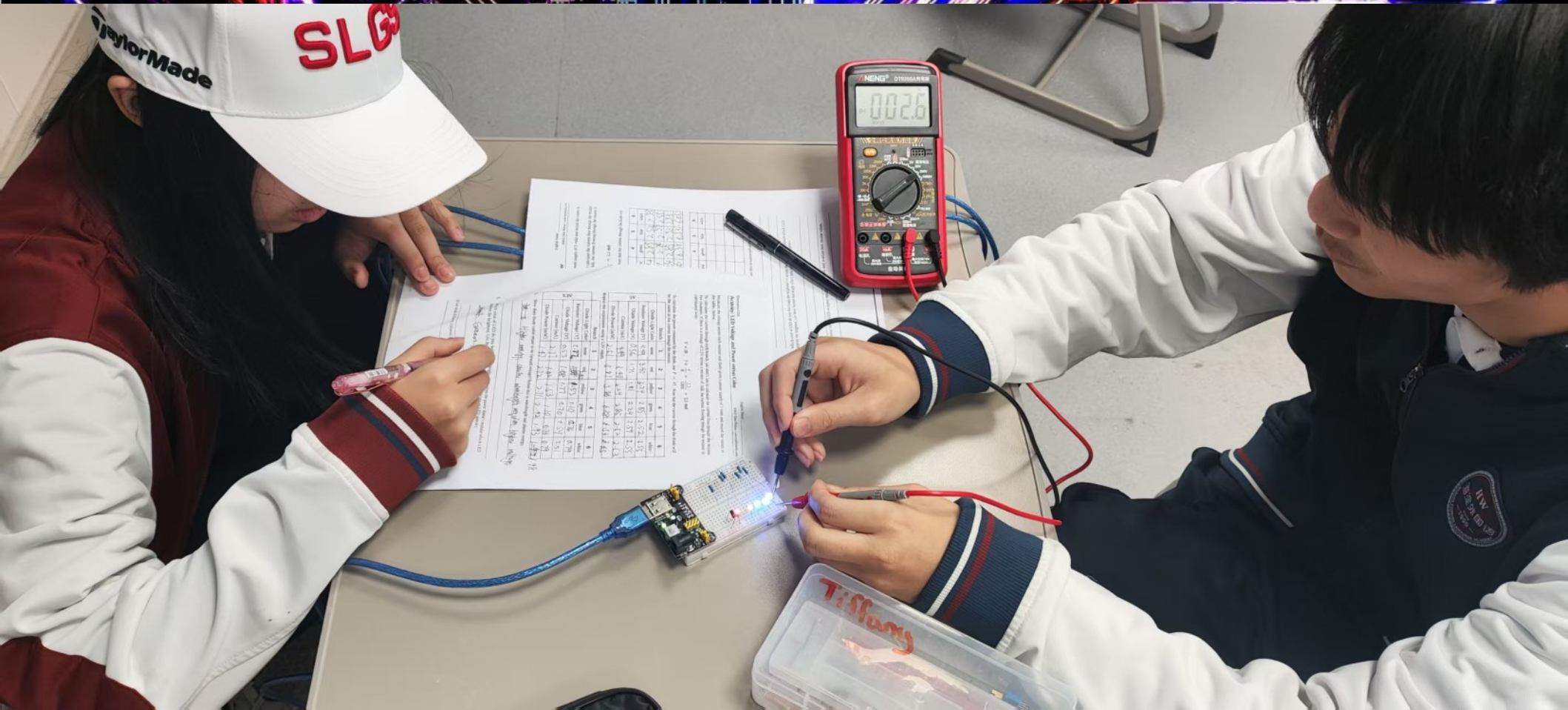
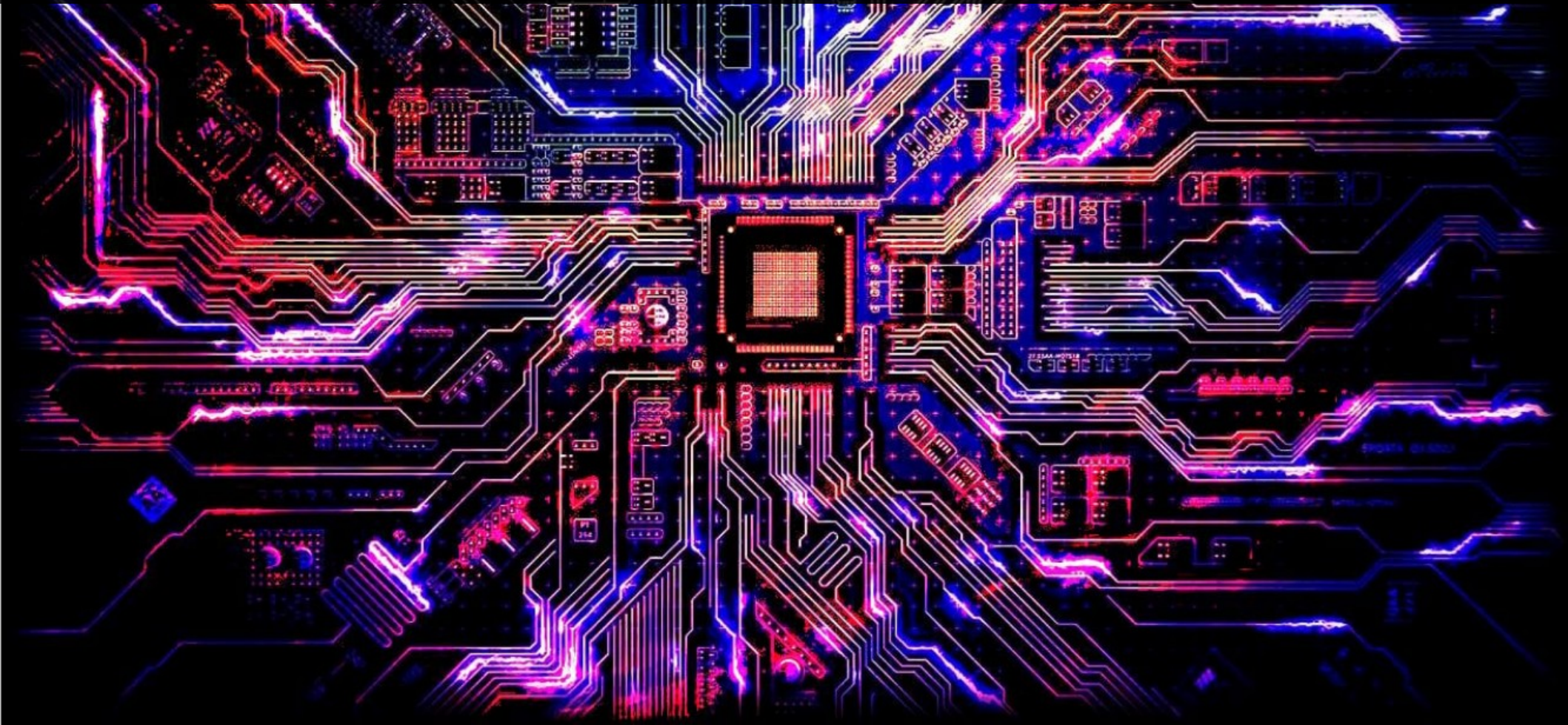
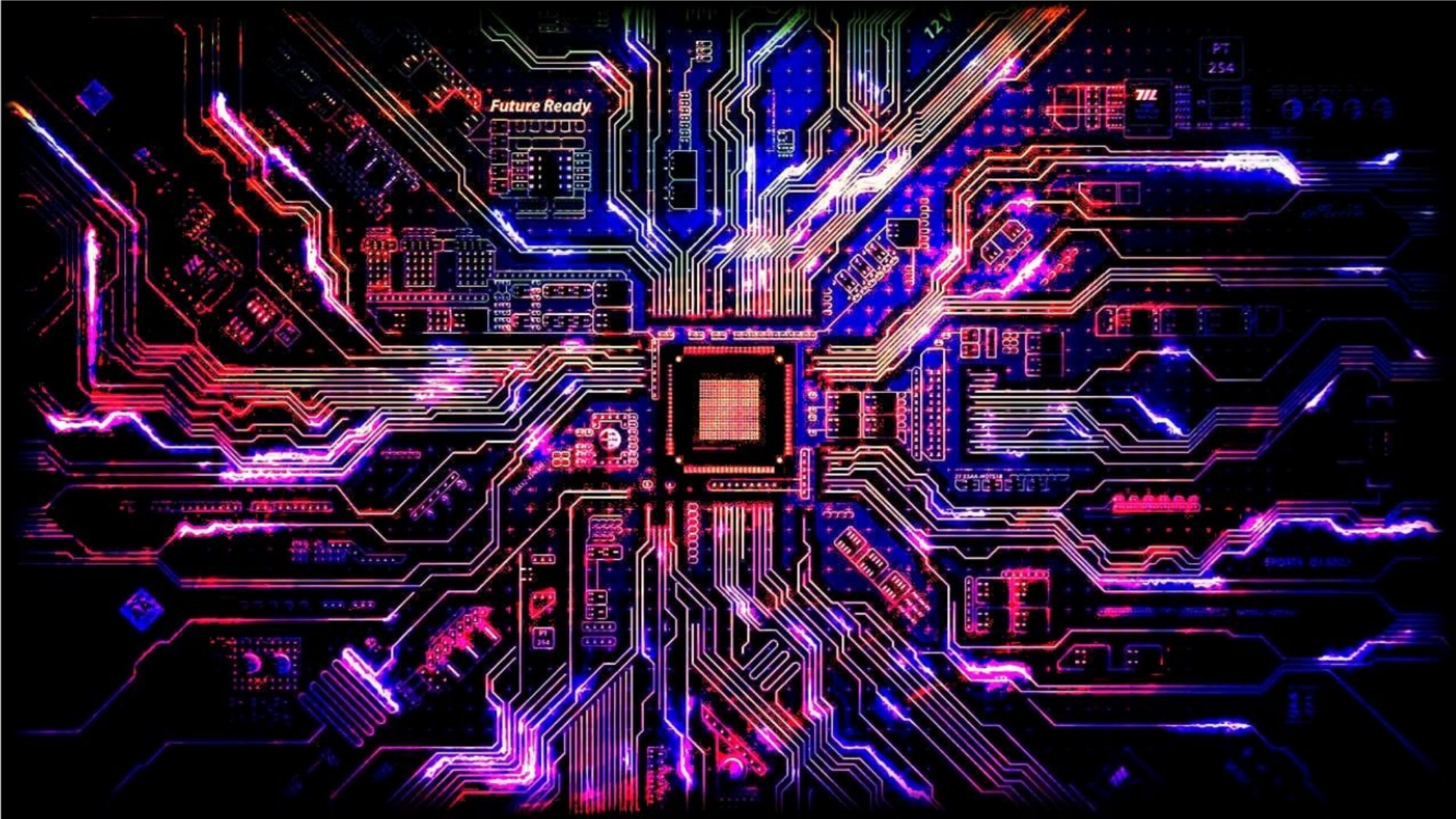
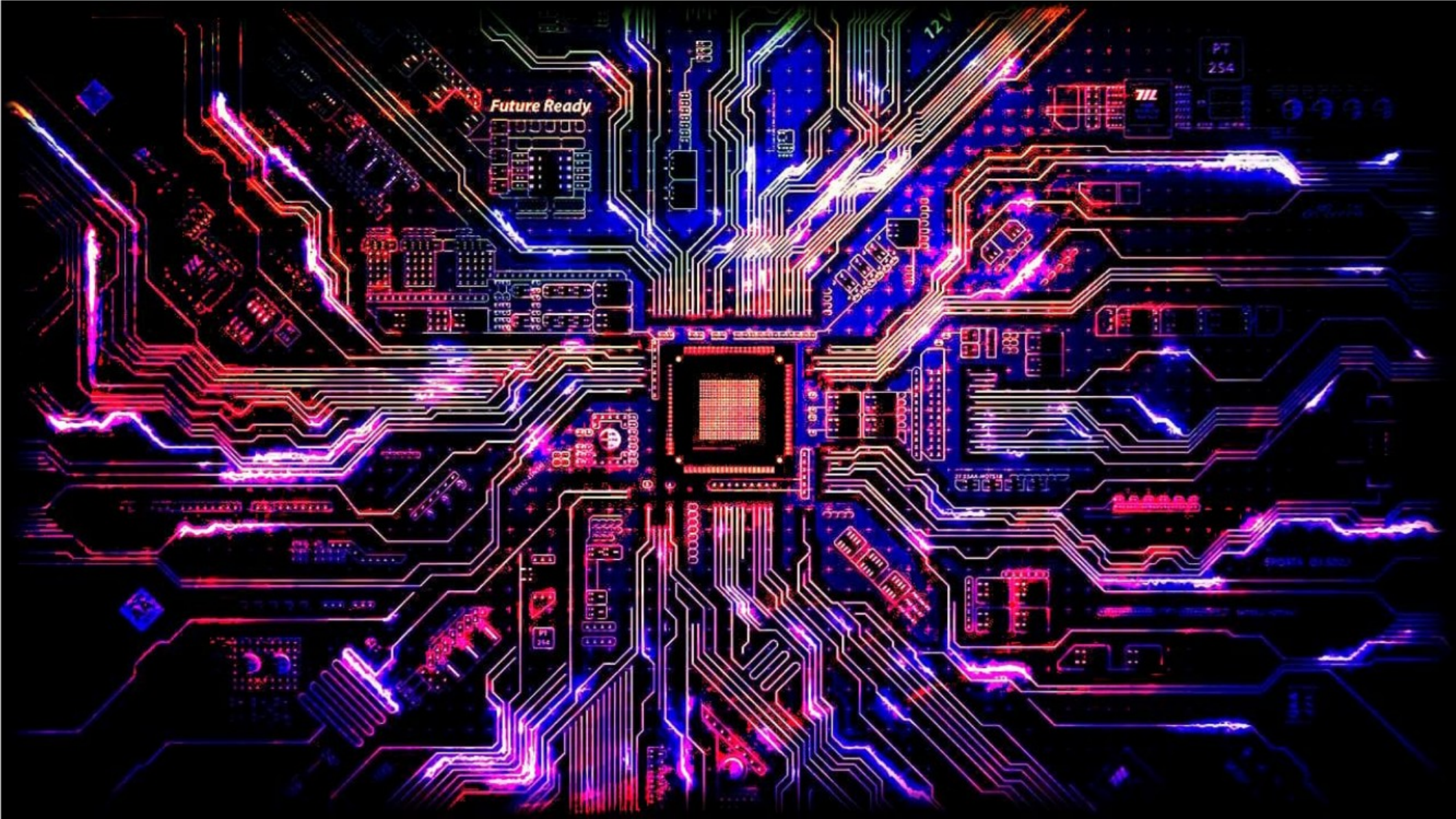


Understanding Diodes




Future Ready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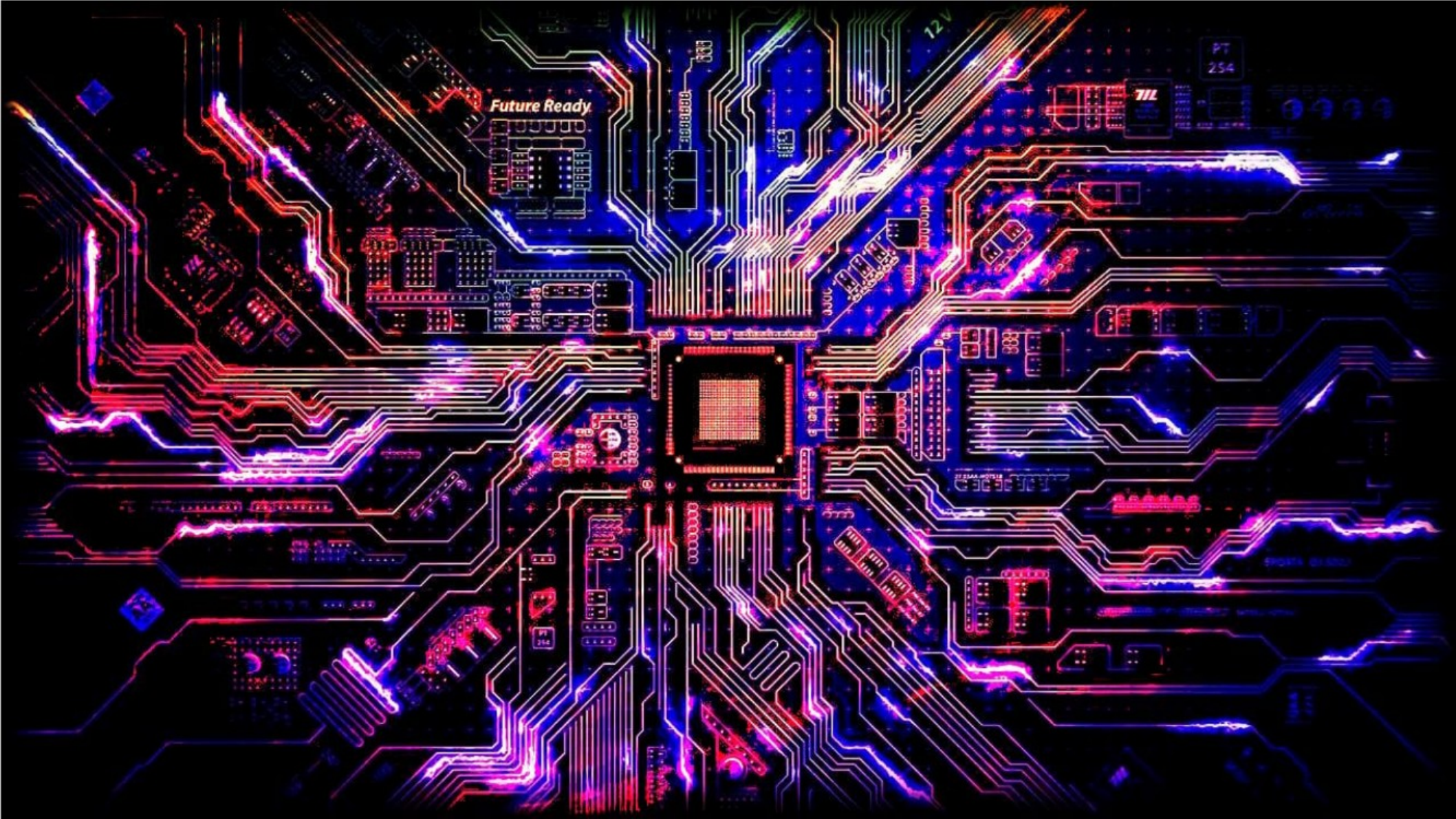
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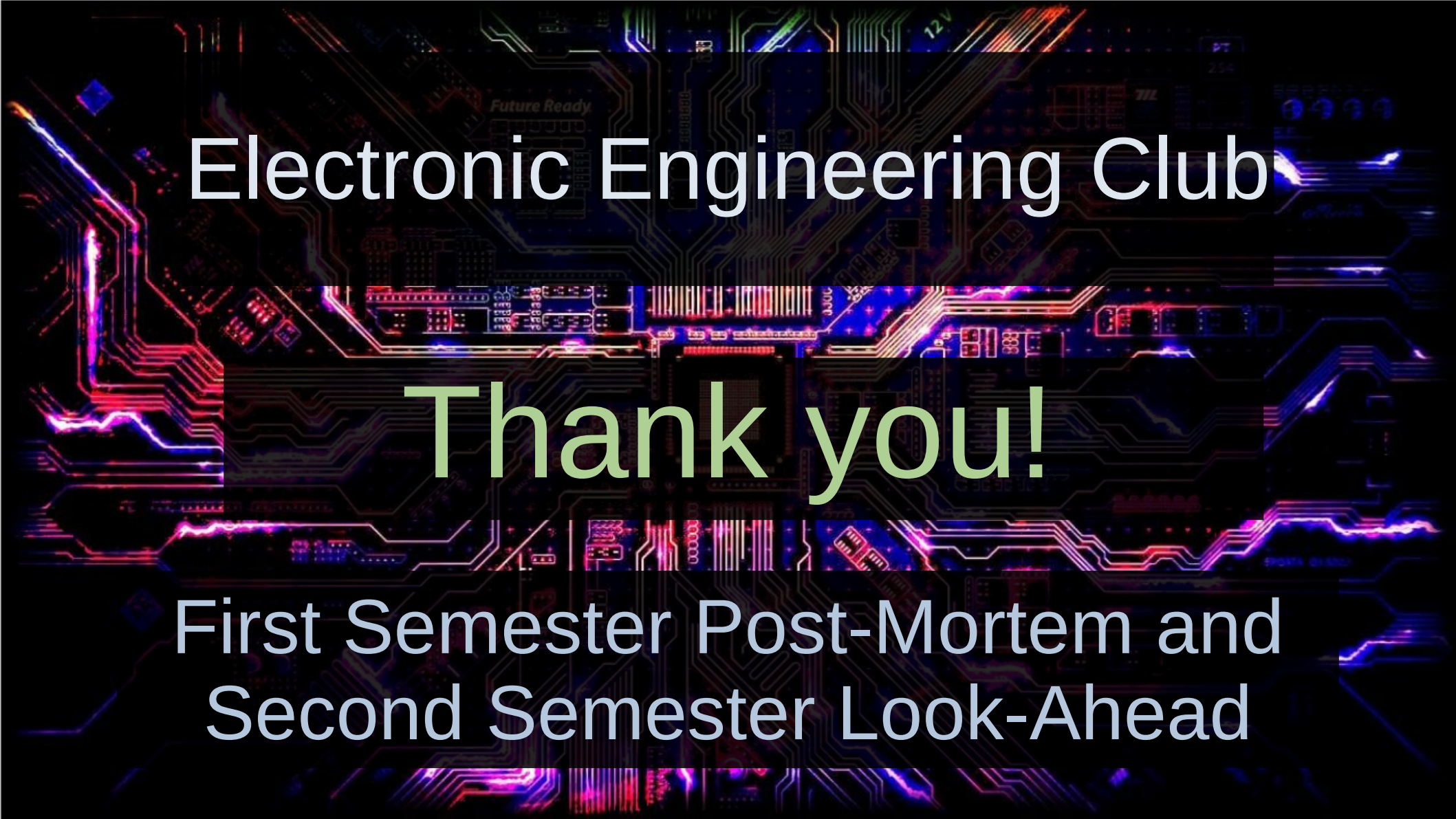
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Thank you!
First Semester Post-Mortem and
Second Semester Look-Ahead