🔌 **Circuit Connections:**

1. **LED Connections:**

   o Connect the **anode (longer leg)** of the LED to **digital pin 9** via a **220-ohm resistor**.

   o Connect the **cathode (shorter leg)** to **GND**.

2. **Potentiometer Connections:**

   o One outer pin to **5V**.

   o Other outer pin to **GND**.

   o Middle pin (wiper) to **analog pin A0**.

3. **Power Source (optional for battery mode):**

   o Connect a 9V battery to the VIN and GND pins for mobile operation.

💡 **Working Principle:**

- The potentiometer controls the analog input.

- The Arduino reads the analog value from **A0** (ranges from 0 to 1023).

- It maps this value to **PWM output** (0–255) to control **LED brightness**.

- More resistance = lower voltage = dimmer LED.

- Less resistance = higher voltage = brighter LED.