
LED Pattern Project (Using 6 LEDs, 6 Resistors, and 1 Potentiometer)

Objective:
Create dynamic LED patterns (like moving or breathing effects) and control the speed or brightness using a potentiometer.

Components Required:

- Arduino Uno
- 6 LEDs
- 6 Resistors (220Ω–330Ω, one per LED)
- 1 Potentiometer (10kΩ is common)
- Breadboard & jumper wires

Circuit Overview:

- Connect each LED in series with a resistor, and then to separate digital pins (e.g., D2–D7) of the Arduino Uno.
- The other end of each LED (cathode) goes to GND.
- Connect the **middle pin of the potentiometer** to an analog pin (e.g., A0), and the two side pins to **5V** and **GND**.

Working Principle:

- The Arduino lights up the LEDs in patterns (like left-to-right, ping-pong, alternate blinking, etc.).
- The **potentiometer** acts as a variable input, allowing real-time control of pattern speed or LED brightness.
- Turning the potentiometer changes the voltage read by the Arduino, which is then used to adjust delay or PWM output.

Use Cases:

- Demonstrating analog input and digital output interaction
- Making DIY LED chasers or visual effects for toys or displays