NeoPixel Strip with Arduino

Objective:
Control a **NeoPixel LED strip** (individually addressable RGB LEDs) using Arduino to create colorful lighting effects.

Components Required:

- Arduino Uno or compatible board

- NeoPixel strip (WS2812 or WS2812B)

- Power supply (5V regulated, sufficient current)

- 470Ω resistor (on data line, for protection)

- 1000μF capacitor (across power lines, to prevent voltage spikes)

- Common ground connection

- Library: **Adafruit NeoPixel** (for coding)

Circuit Overview:

- NeoPixels have 3 wires:

    o **5V** (power)

    o **GND**

    o **DIN** (data input, connected to Arduino digital pin)

- Power can be supplied directly from Arduino for a few LEDs; use external power for longer strips.

Working Principle:

- Each NeoPixel LED contains an RGB LED and a tiny controller.

- Arduino sends serial data to control the **color and brightness** of each LED individually.

- Stunning animations like rainbow, chase, wave, and fade can be created.

Use Cases:

- Decorative lighting

- Wearable tech

- Smart home ambience

- Notification bars, audio-reactive lights, art installations

Tips:

- Match voltage exactly (usually 5V)

- Don't forget to **connect grounds together**

- Use a **logic level shifter** if Arduino runs on 3.3V