# Tutorial 6: LED Strips (WS2812)

## Goals

You can install and use external libraries. You know how to use WS2812 LED strips.

## Exercises

Build following circuits on a breadboard.

### 1 Safely connecting WS2812 LED strips

LED strips are very sensitive to short burts of current as they can happen when plugging in the strip or connecting the Arduino via USB (see https://learn.adafruit.com/adafruit-neopixel-uberguide/best-practices)

- Connect the LED strip and open the *"strand test"* sample. Place a rather big capacitor (at least 47 µF) between the power supply pins of the strip and a dropping resistor between pin 6 of the Arduino and the data pin of the strip. Adjust the constant for the strip's length in sample code.

### 2 Programming the WS2812 LED strip

Connect the Arduino and upload the sample program. The strip should glow now.

- Change the *wait* parameter for all calls of *colorWipe* from 50 to 200. What do you expect? Test the program.
- Change the *wait* parameter for all calls of *colorWipe* from 200 to 300. What do you expect? Test the program.

### 3 Animations

- Write a program that makes one colored pixel move back and forth over the strip.
- Adjust the program so there are always two less bright pixels next to the pixel in the last exercise.
- Add a button to your circuit. Write a program that creates a pixel that moves across the LED strip, when the button is pressed. You should be able to create multiple pixels simultaniously. Which data structure is suitable?