5. Turn on this Wonderful RGB

1. Key Points

This is a LED, with several colors (RGB). You can make very beautiful and attractive light. The main difference with other RGB LED is that it is using just 1 PIN, thus allowing for more hardware interfacing on your projects.

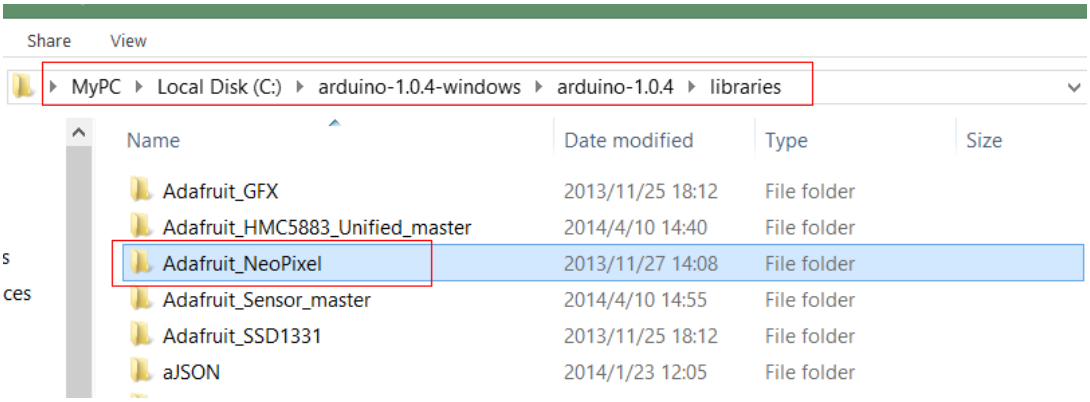
City doesn't hate nights, because she always lights them.

What can you do?

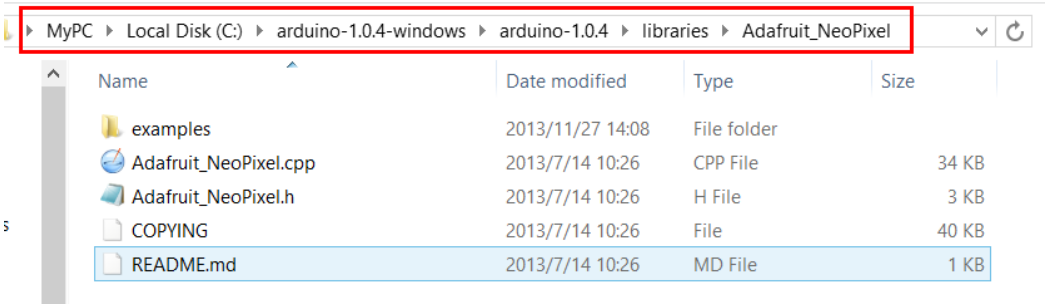
1. Learn something about the principle of WS2812, a kind of RGB LED
2. Learn how to use a library, and control the color of your LED
3. Display the state of your robot through LED

Download your Code

➢ Put the folder into the path the picture below shows。

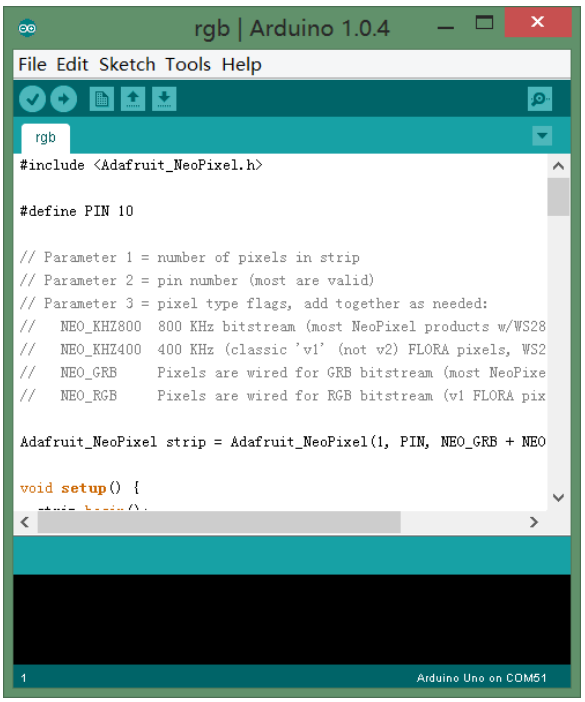


1) Where to put the library



2) Check the library path

➢ Open “rgb.ino”，download the code:



3) Program download

Now check your LED, what will you see?。

Code Analysis

✧ Import the library
- #include <Adafruit_NeoPixel.h>

✧ Define a class
- Adafruit_NeoPixel strip = Adafruit_NeoPixel(1, PIN, NEO_GRB + NEO_KHZ800);

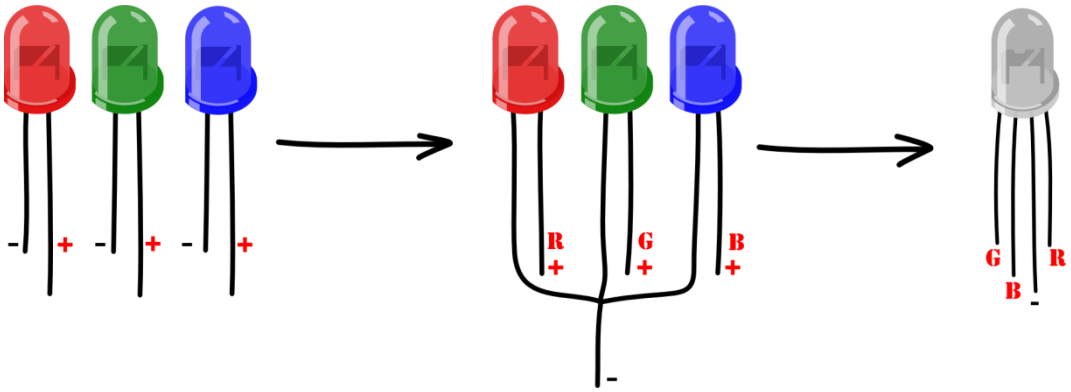
✧ Init the LED
- strip.begin();

✧ Color change function
- rainbow(20);

✧ Number i LED change color into Wheel（(i+i) &255))
- strip.setPixelColor(i, Wheel((i+j) & 255));

Principle Analysis

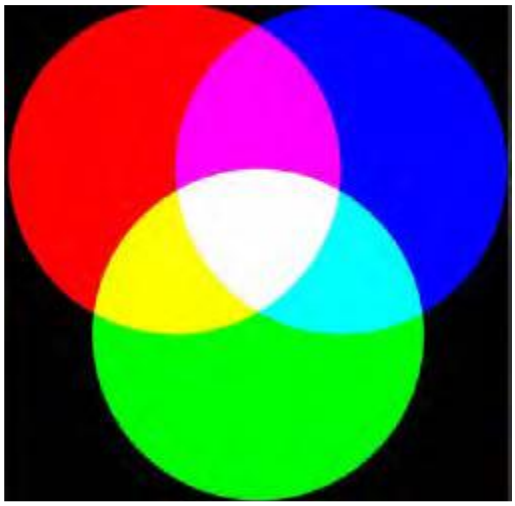
The mode of RGB is a kind of standard mode of color control, it gives different color through different rate of Red, Green and Blue. And these three kinds of color can nearly constitute all color we can see, so this system is the most popular system about color constitution. Common RGB LEDs usually have 4 pins, 3 pins control 3 kinds of color and another is the common pin for power supply. The picture below shows a kind of common cathode LED, you can see how a RGB LED be born.



4) How a RGB LED be born

So how to control the color?

Common RGB LED is just packaging three leds into one, so just consider that you are using 3 leds. And you control the color use the picture below:



5) Mixture of color

5-1 Color Mixture

Value			Color Mixture
Red	Green	Blue	
255	0	0	Red
0	255	0	Green
0	0	255	Blue

255	255	0	Yellow
0	255	255	Cyan
255	0	255	Pink
255	255	255	White

Chart 5-1 gives several samples of how to get yellow or pink and so on, and you can get much more color with different value of different color, the mount of the kind can be 255*255*255=16777216.

6) Common RGB LED

The LED in the car is also like this but you need a little more code. So why? Every LED we see upon needs three pins to control, if I need 2 LED shows different color, I must give 6 pins for control, but if I need 3 or 4, that seems insupportable.

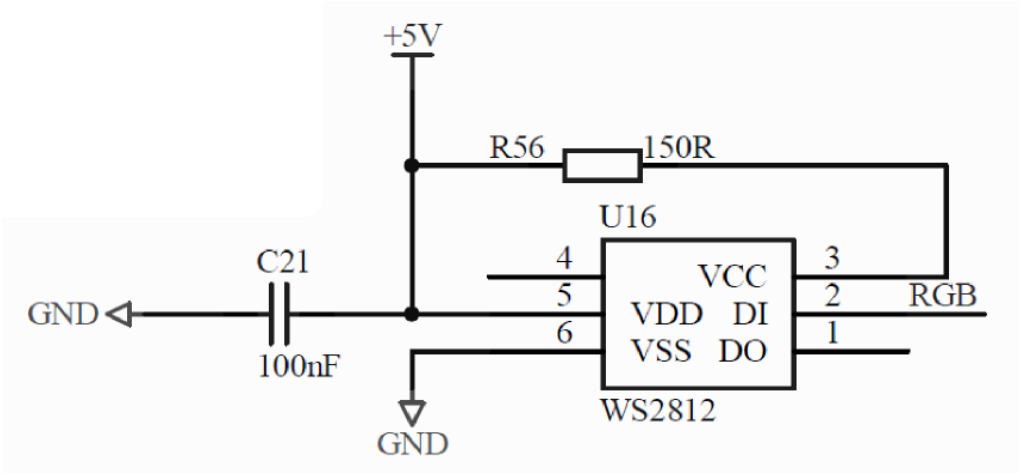
7) WS2812

But you don’t worry about that, in the car, there is only one LED but only occupy one pin. And if you want to control more in the future, just add the amount of LED you can also control

them use one pin! That sounds wonderful. Every LED contains a chip inside, which receives commands and transmits them to the next LED, so you just need to tell which one should be which color, all the things will be OK. The chip on the LED will do the work for you.

Circuit Analysis

This is the schematic of WS2812, it is so simple just need two devices outside：



8) Schematic of WS2812

The pin with “RGB” (DI) connects with Arduino, and DO is used to transmit the command to the next LED.

Continue

You may be confusing that how messages transmit in one wire. You can search “one-wire” in internet for more details. You can also learn how to use DS18B20 which is a temperature sensor, thus you can know it better.