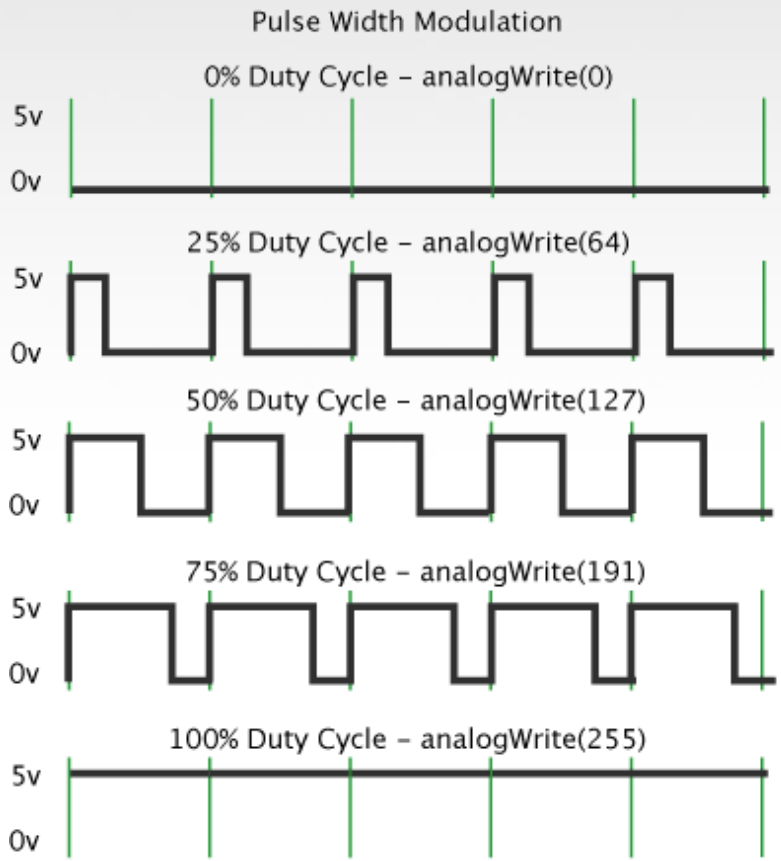
Project #2 – Fading
Introducing a new command…

```
analogWrite(pin, val);
```

pin – refers to the OUTPUT pin (limited to pins 3, 5, 6, 9, 10, 11.) – denoted by a ~ symbol

val – 8 bit value (0 – 255).

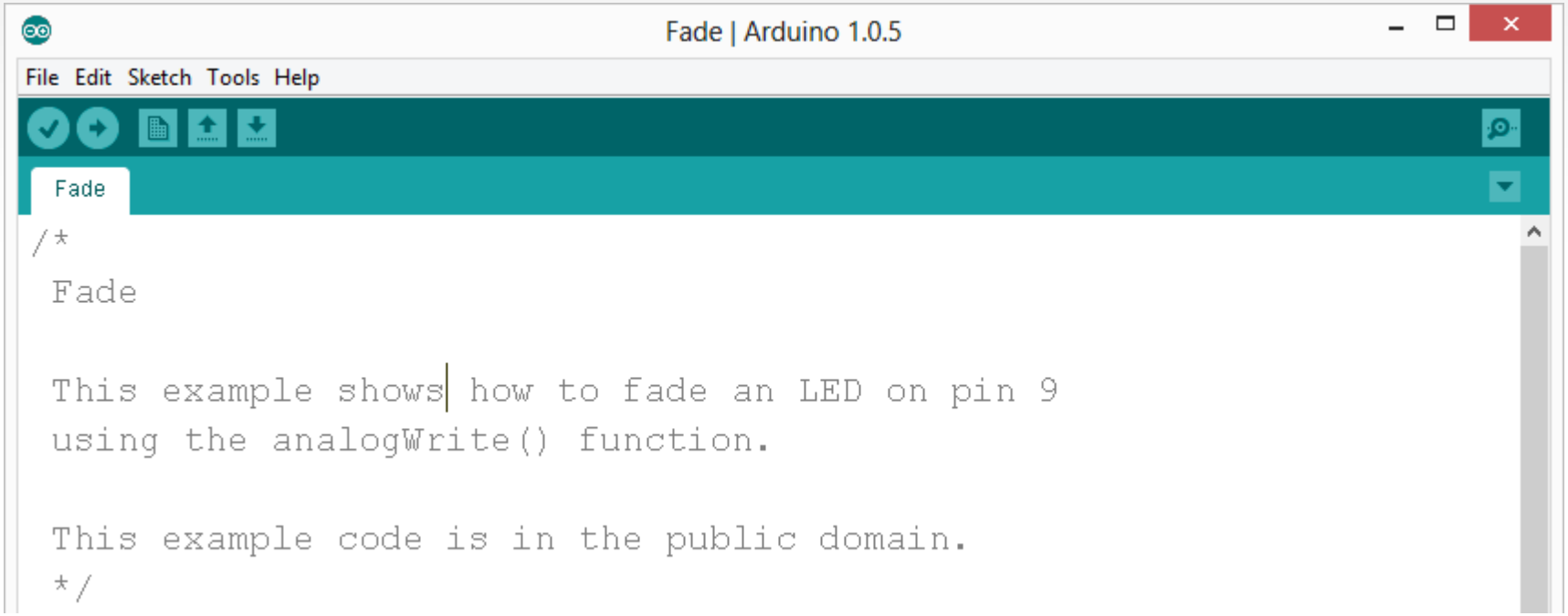
0 => 0V | 255 => 5V



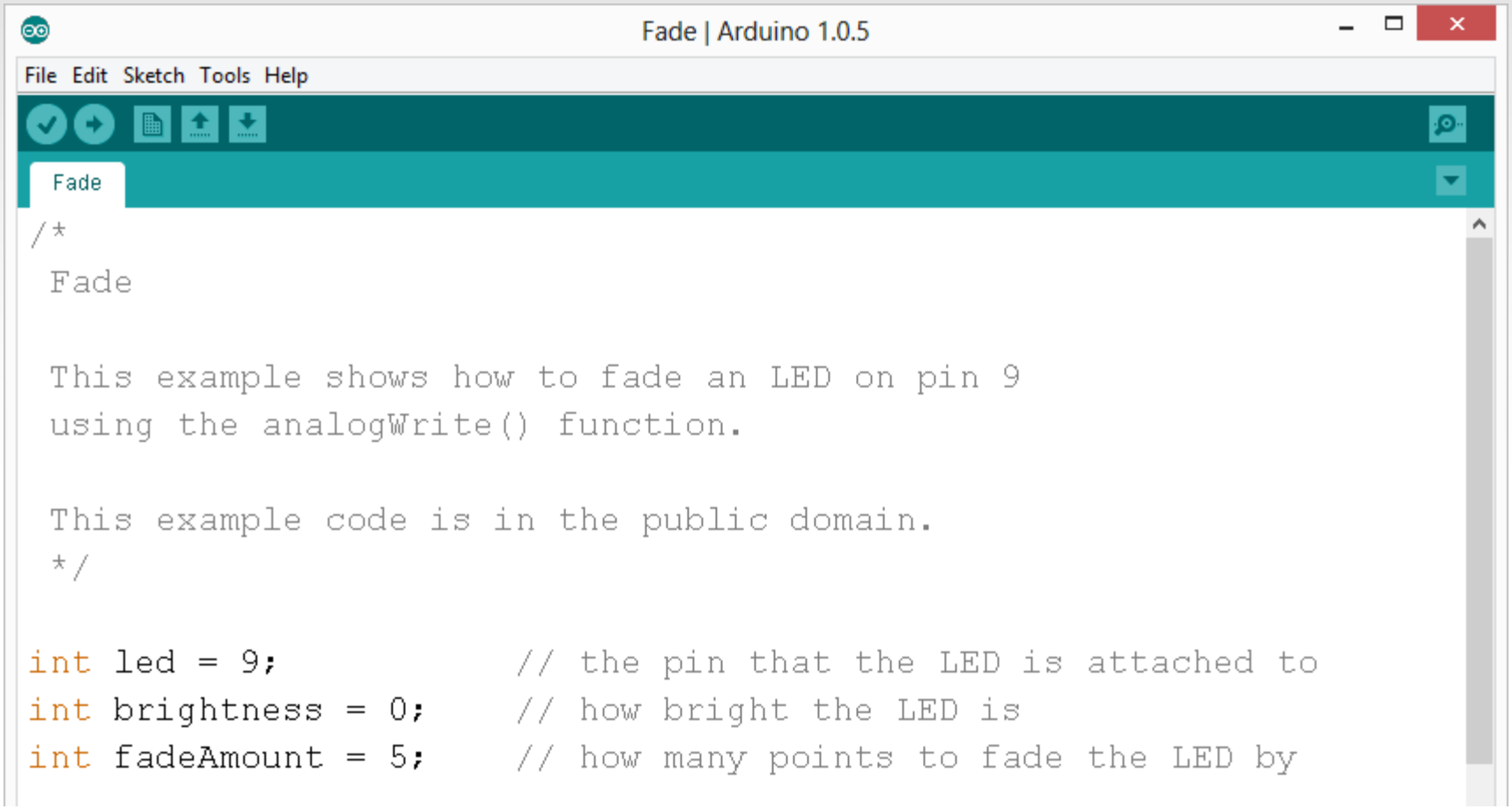
Move one of your LED pins over to Pin 9

In Arduino, open up:

File → Examples → 01.Basics → Fade



Fade - Code Review



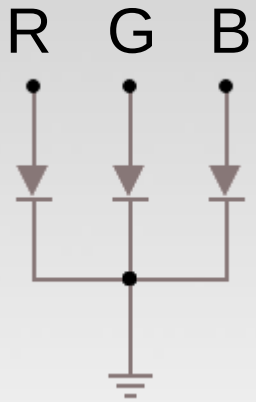
Fade - Code Review

```
void setup()  {
  // declare pin 9 to be an output:
  pinMode(led, OUTPUT);
}

// the loop routine runs over and over again forever:
void loop()  {
  // set the brightness of pin 9:
  analogWrite(led, brightness);

  // change the brightness for next time through the loop:
  brightness = brightness + fadeAmount;

  // reverse the direction of the fading at the ends of the fade:
  if (brightness == 0 || brightness == 255) {
    fadeAmount = -fadeAmount ;
  }
  // wait for 30 milliseconds to see the dimming effect
  delay(30);
}
```

Project# 2 -- Fading

Challenge 2a – Change the rate of the fading in and out. There are at least two different ways to do this – can you figure them out?

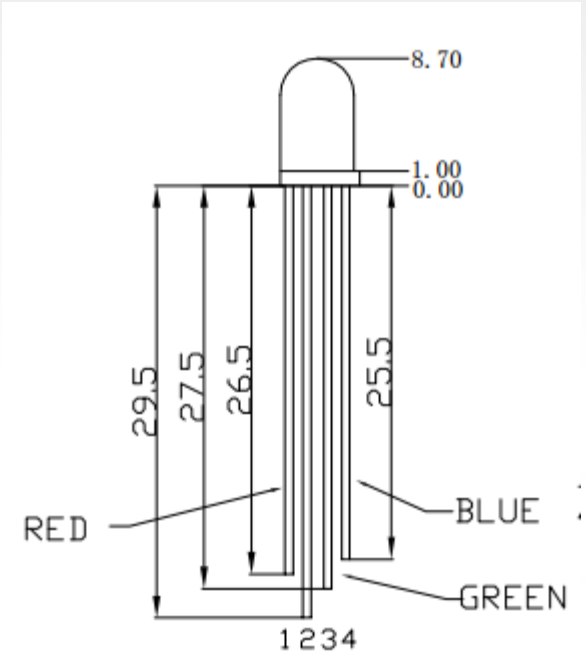
Challenge 2b – Use 2 (or more) LEDs – so that one fades in as the other one fades out.



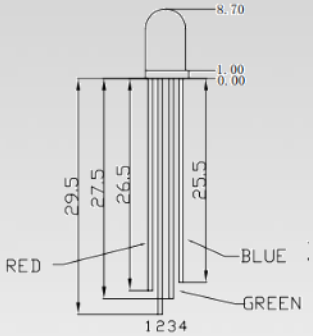
Color Mixing
Tri-color LED

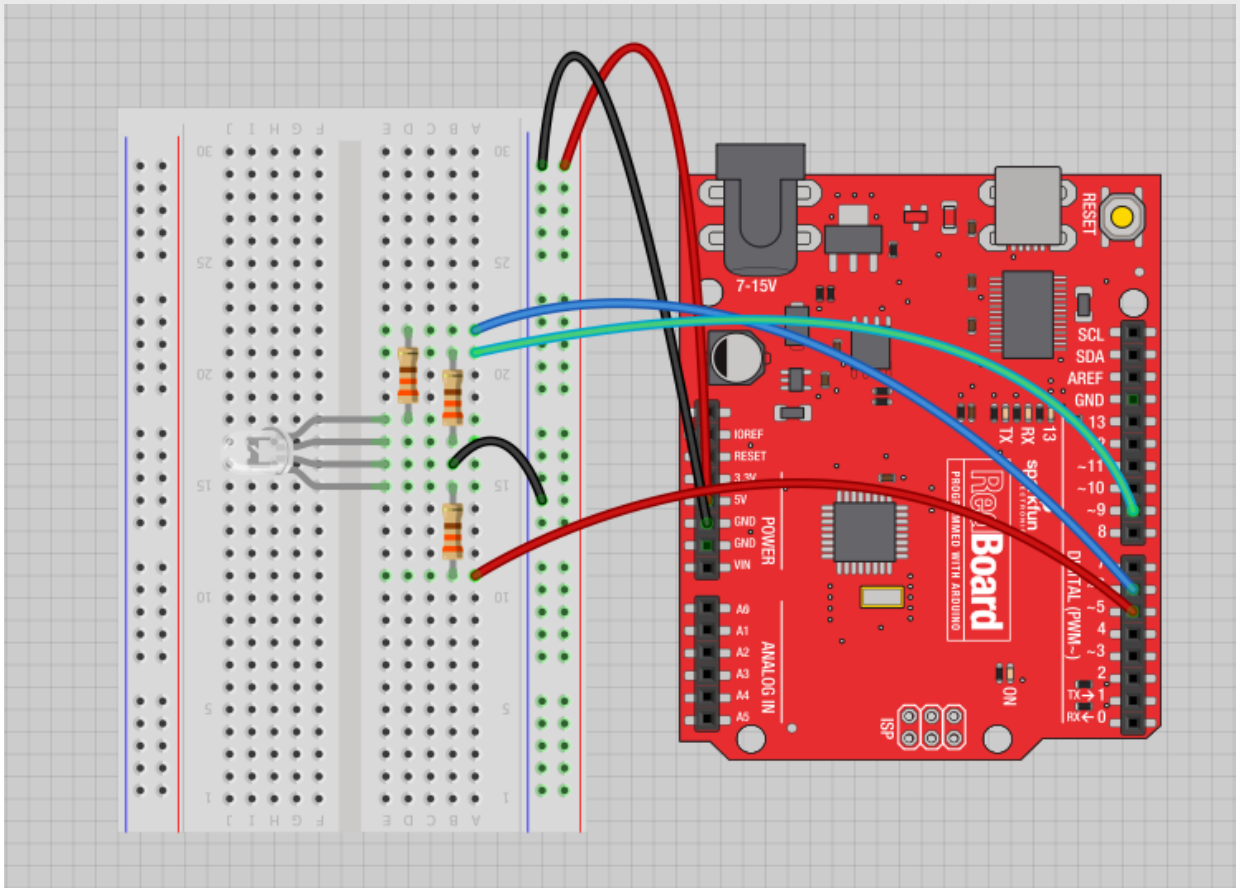
In the SIK, this is a standard –
Common Cathode LED

This means the negative side of the LED is all tied to Ground.



Project 3 – RGB LED



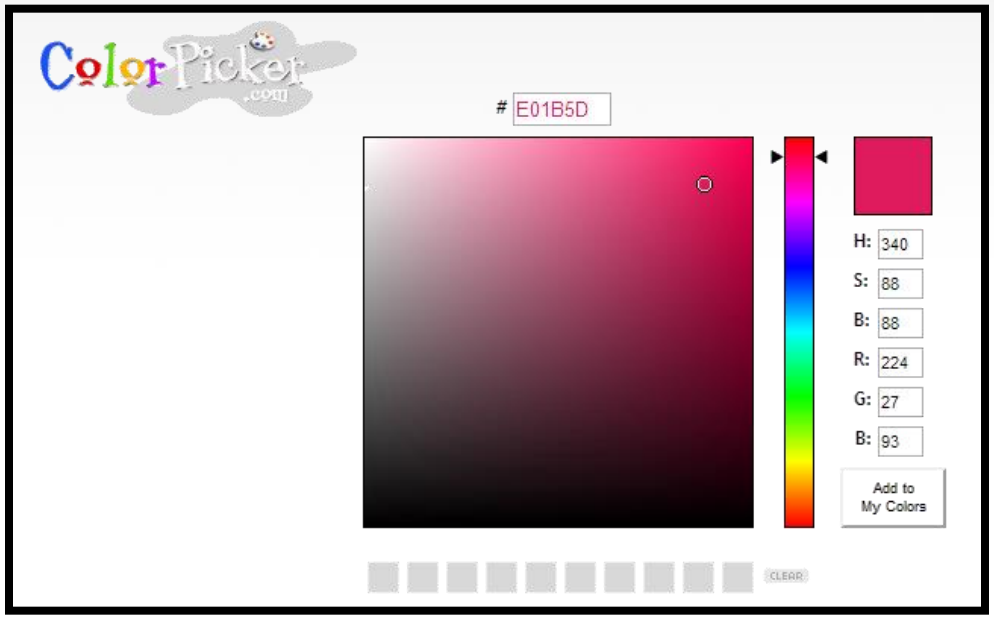


Note: The longest leg of the RGB LED is the Common Cathode. This goes to GND.

Use pins 5, 6, & 9

How many unique colors can you create?

$$\#\ of\ unique\ colors = 256 \cdot 256 \cdot 256$$
$$= 16{,}777{,}216\ colors!$$



- Use Colorpicker.com or experiment on your own.
- Pick out a few colors that you want to try re-creating for a lamp or lighting display...
- Play around with this with the `analogWrite()` command.

RGB LED Color Mixing

```
int redPin = 5;
int greenPin = 6;
int bluePin = 9;

void setup()
{
   pinMode(redPin, OUTPUT);
   pinMode(greenPin, OUTPUT);
   pinMode(bluePin, OUTPUT);
}
```

RGB LED Color Mixing

```
void loop()
{
   analogWrite(redPin, 255);
   analogWrite (greenPin, 255);
   analogWrite (bluePin, 255);
}
```