5 - RGB Color Mixing

# Getting Started

Bleh…white. So boring. Let’s add some color to this Sandbox. Let's look at making some cool colors with a special device on your digital sandbox called the RGB LED. It's a special device that is basically three LEDs (Red, Green, and Blue) all integrated into a single package! It's pretty cool.



In art class you probably learned about primary colors, and how you can mix them to produce any other color there is. While the artsy primary colors you might be familiar with are red, yellow, and blue, in electronics (and programming in general) our primary colors are red, green, and blue. If we can control the three LEDs individually, we can start making all kinds of cool colors! Let's get started!

Example code on codebender: [https://codebender.cc/sketch:342882](https://codebender.cc/sketch%3A342882)

# Code Example

Let’s start with this simple piece of code. Type this in and upload it to your digital sandbox. You’ll notice that this code looks a lot like one of the previous examples!

|  |
| --- |
| void setup() { **pinMode(9, OUTPUT);** **pinMode(10, OUTPUT);** **pinMode(11, OUTPUT);**}void loop() { **analogWrite(9, 255);** **analogWrite(10, 150);** **delay(1000);** **analogWrite(9, 0);** **analogWrite(10, 0);** **delay(1000);**} |

# Writing an Analog Output

What is this code example doing? Is it a lot like the blink example we started off with? What color is the LED?

Here, we introduce a new command called analogWrite(). It looks a lot like the digitalWrite() function, except that we can specify the intensity of the brightness with a value instead of just ON and OFF!

|  |
| --- |
| **analogWrite([pin], [value]);** |

**analogWrite**() uses two arguments, a pin and a value that can be specified as a number from 0 to 255. This is pretty cool, but it only works on a few of the pins on the Arduino. These pins are 3, 5, 6, 9, 10, 11. Luckily the three pins that the RGB LED are connected to are pins 9, 10, and 11!

# Do This

The code example we provided is really just a standard blink, but we're getting an orange-ish color by mixing 255 of red with 150 of green. How would you add a little blue into this?

Play with the analog values to make your own colors. How do you make purple, orange, salmon, or crimson? Create two other colors - give them your own names and find the RGB values for them as well. If you’re not as creative - visit [www.colorpicker.com](http://www.colorpicker.com) or [www.colourlovers.com](http://www.colourlovers.com) for other ideas.

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|

|  |  |  |  |
| --- | --- | --- | --- |
| Color | Red | Green | Blue |
| purple |  |  |  |
| orange |  |  |  |
| salmon |  |  |  |

 |

|  |  |  |  |
| --- | --- | --- | --- |
| Color | Red | Green | Blue |
| crimson |  |  |  |
|  |  |  |  |
|  |  |  |  |

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# Spring Cleaning (Writing Custom Functions)

Do you find yourself copying a lot of the same code blocks? Clean up your code by writing your own function. A function is a block of code that can be re-used and called by name. Let's call this function purple(). Add this code to the very end of your program:

|  |
| --- |
| void purple(){ analogWrite(9, 255); analogWrite(10, 0); analogWrite(11, 255);} |

Does this look familiar? Now, let's change your code:

This is what your code should look like:

|  |
| --- |
| void setup() { // put your setup code here, to run once: **pinMode(9, OUTPUT);** **pinMode(10, OUTPUT);** **pinMode(11, OUTPUT);**}void loop() { // put your main code here, to run repeatedly: **purple();** **delay(1000);** **analogWrite(9, 0);** **analogWrite(10, 0);** **analogWrite(11, 0);** **delay(1000);**}void purple(){ analogWrite(9, 255); analogWrite(10, 0); analogWrite(11, 255);} |

Now, let's make a disco light show. Write separate functions for each of the disco colors you want to cycle through and add these to your code. Modify the delays so that you get a blinking or fading pattern to blend between the various colors. Describe what your pattern does:

# Challenge

Combine the repeat loops, fading example, and the RGB LED to create a lightscape that alternates from Red → Blue → Green → Red.