

**tangible**

**ANALOG OUTPUT**

# Tangible Matrix

<b>Context</b>	<b>DIGITAL</b>	<b>ANALOG</b>
<b>INPUTS</b>	BUTTON	POTENTIOMETER photoCell
<b>OUTPUTS</b>	LED BLINK	LED FADE

# Analog **OUTPUT**

<b>Context</b>	<b>DIGITAL</b>	<b>ANALOG</b>
<b>INPUTS</b>	BUTTON	POTENTIOMETER
<b>OUTPUTS</b>	LED BLINK	<b>LED FADE</b>

# INPUT / OUTPUT

When we discuss **INPUT** and **OUTPUT**  
we mean relative to **ARDUINO**.

## INPUT

Electric **SIGNAL** that moves **IN to** the **Arduino**

## OUTPUT

Electric **SIGNAL** that moves **OUT of** the **Arduino**

# ANALOG

Refers to **SIGNALS**, **CIRCUITS** or **LOGICAL** systems that

are

**VARIABLE OR GRADUATED**

# ANALOG OUTPUT

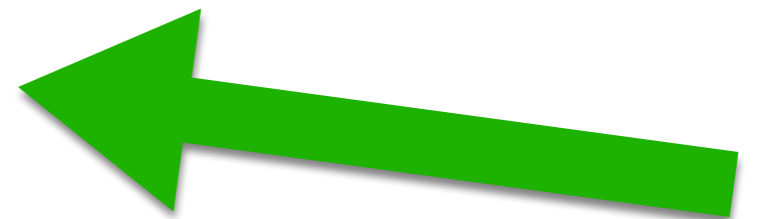
An **STAIRCASE-like** SIGNAL that moves **OUT OF** the  
Arduino.

# The CODE

Analog **Output** (**Fade** an LED)

```
analogWrite( pin, state );
```

**state = 0-255**





# The CODE

Analog **Output** (**Fade** an LED)

```
analogWrite( pin, state );
```

**state = 0-255**

Digital **Output** (**Blink** an LED)

```
digitalWrite( pin, state );
```

**state = 0, 1**

# REFERENCE - Card is in your kit.

## Analog Output

### CONTEXT

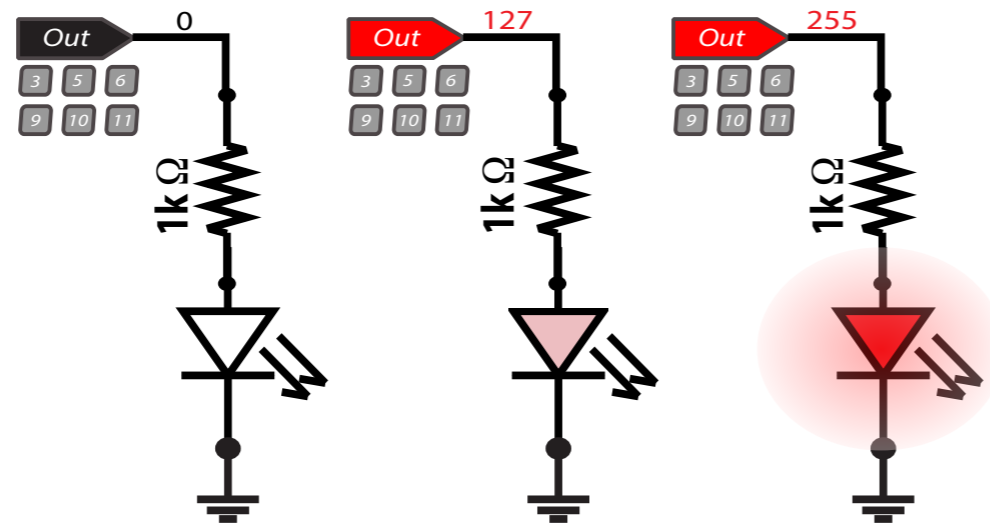
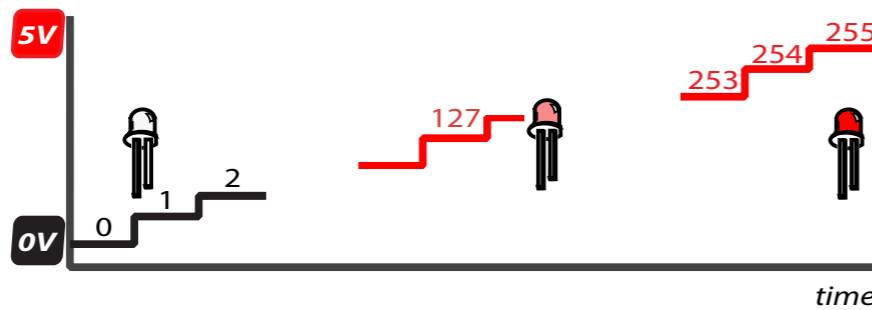
	Digital	Analog
Input		
Output		

### COMMAND

```
analogWrite ( pin, state );
```

- *pin* = 3, 5, 6, 9, 10, 11
- *state* = 0 - 255 (int)

### CIRCUIT



### CODE

```
int ledPIN = 6;  
int state = 0;  
  
void setup() {  
    pinMode( ledPIN, OUTPUT );  
}  
  
void loop() {  
    analogWrite( ledPIN, state );  
    state++;  
    delay(50);  
}
```

You should be able to see similarities with DIGITAL SYSTEM already looked at in this class.

# Analog OUTPUT

uses **SAME** circuit as digital **OUTPUT**

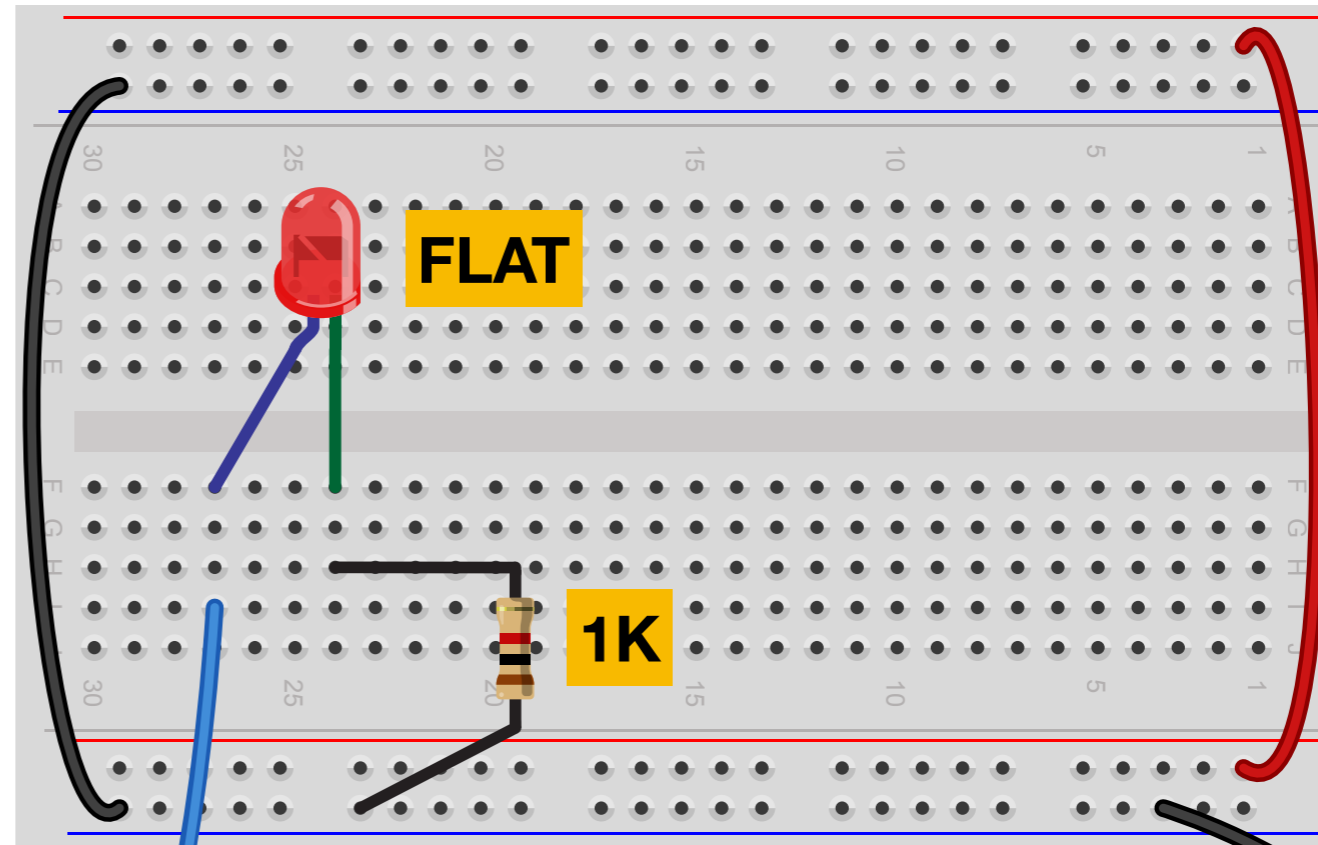
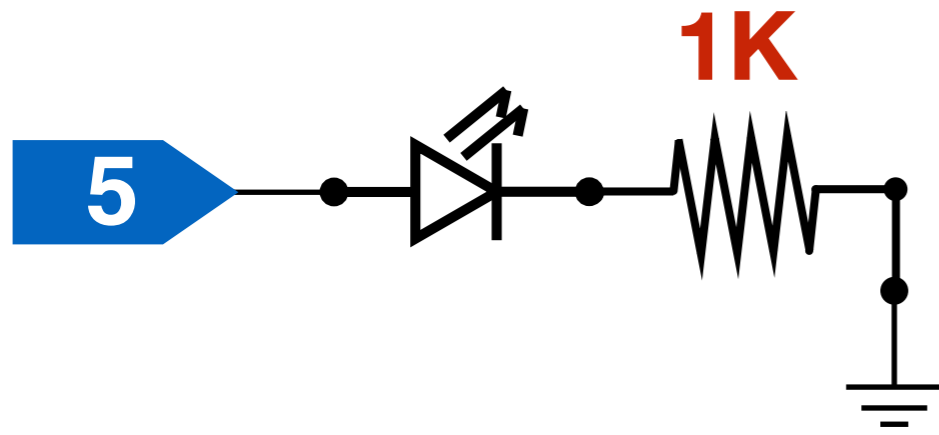
but

USES special pins.

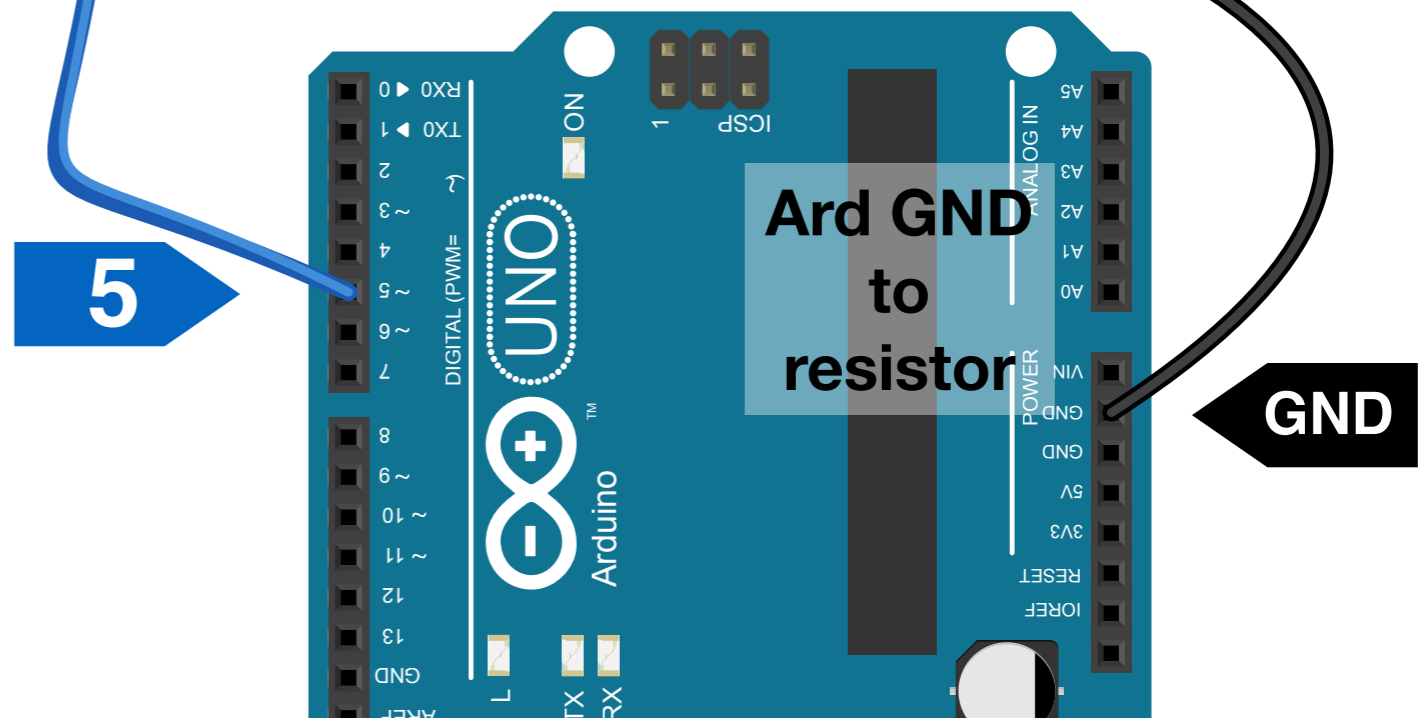
**DIGITAL pins with a TILDE (~) can PWM**

# We built this before, let's do it again.

(i turned it on its side)



Connect a wire from:  
ARD Pin 5 to  
LED



**To understand this idea, we need to count from 0 to 255.**

How can we do that?

```
analogWrite( pin, state );
```

**state = 0-255**



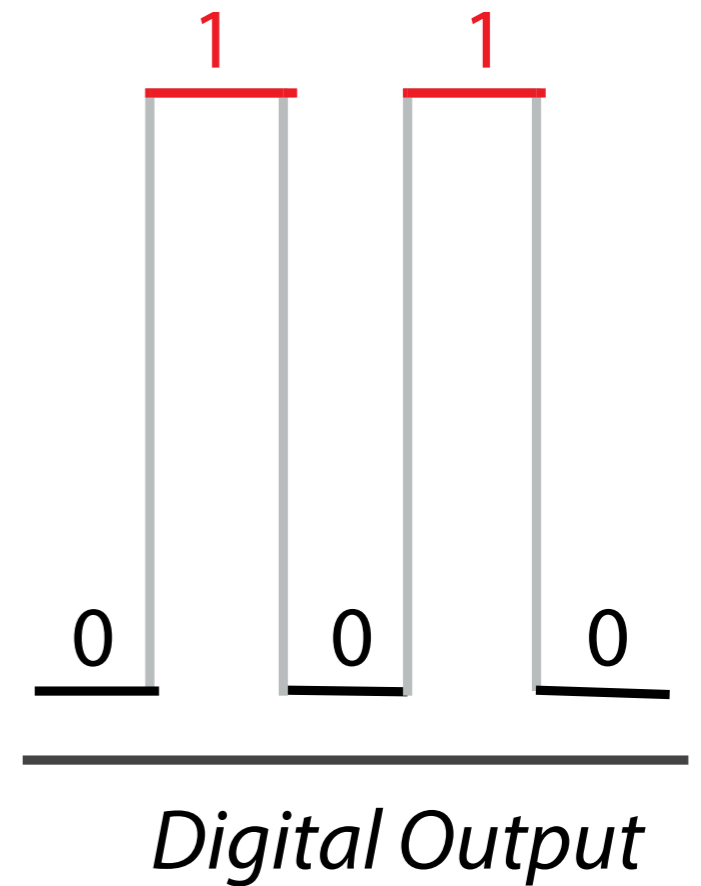
# FOR LOOP STRUCTURE:

```
for ( START;      END;      STEP SIZE ++ ) { }
```

```
for (int brightness = 0; brightness < 255; brightness++ ) {  
    analogWrite( led , brightness ); // pin, state  
  
    delay(10) ;  
  
}
```

**Add CODE**

# What's Going ON ?





# What's Going ON ?

