tangible

ANALOG OUTPUT

Tangible Matrix

Context	DIGITAL	ANALOG
INPUTS	BUTTON	POTENTIOMETER photoCell
OUTPUTS	LED BLINK	LED FADE

Analog **OUTPUT**

Context	**DIGITAL**	**ANALOG**
INPUTS	BUTTON	POTENTIOMETER
OUTPUTS	LED BLINK	**LED FADE**

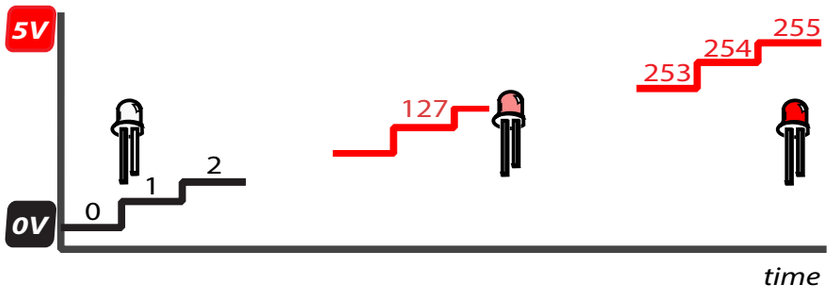
REFERENCE

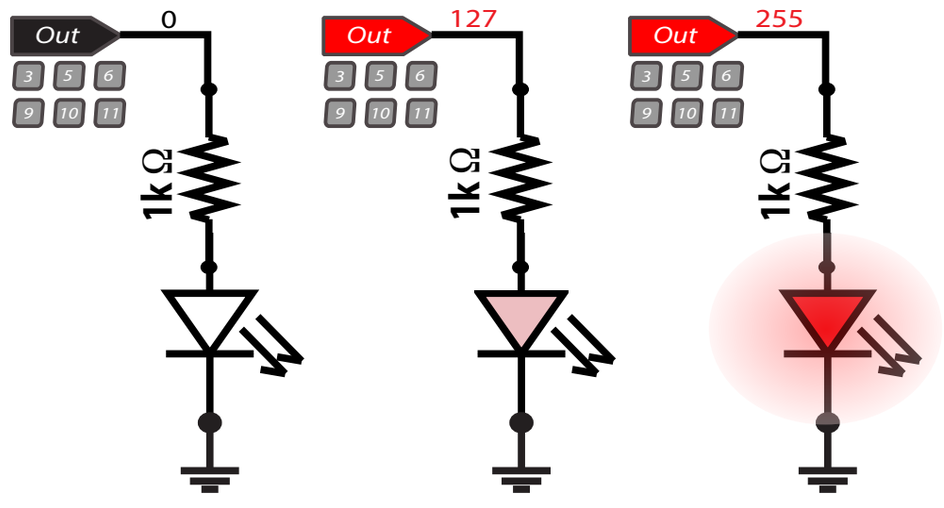
Analog Output

CONTEXT

	Digital	Analog
Input		
Output		

CIRCUIT





COMMAND

analogWrite (*pin*, *state*);

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

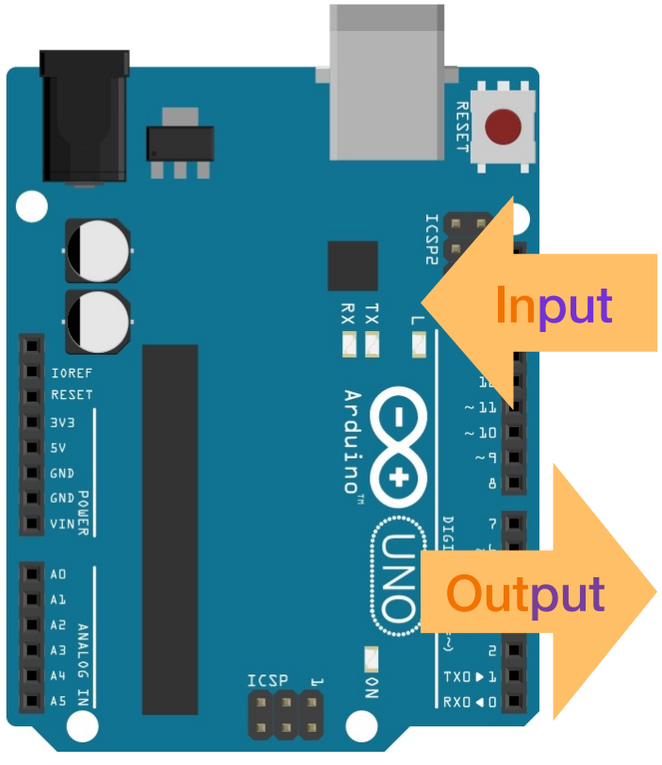
CODE

```
int ledPIN = 6;
int state = 0;


void setup() {

  pinMode( ledPIN, OUTPUT );

}

void loop() {

  analogWrite( ledPIN, state );
  state++;
  delay(50);


}
```

The CONTEXT

INPUT / OUTPUT

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



INPUT

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

OUTPUT

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

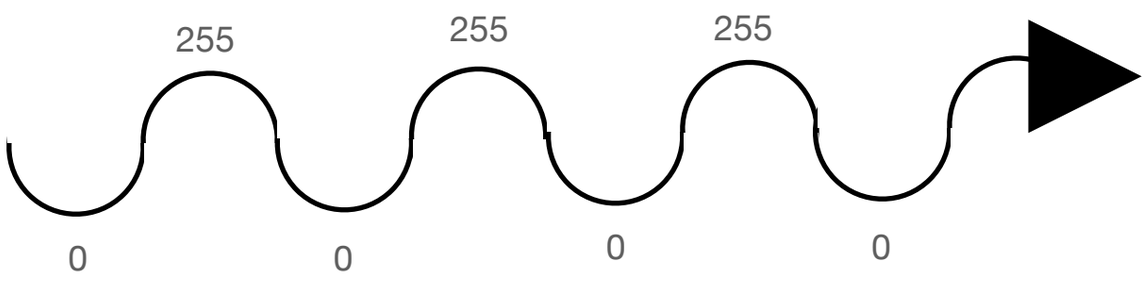
ANALOG

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

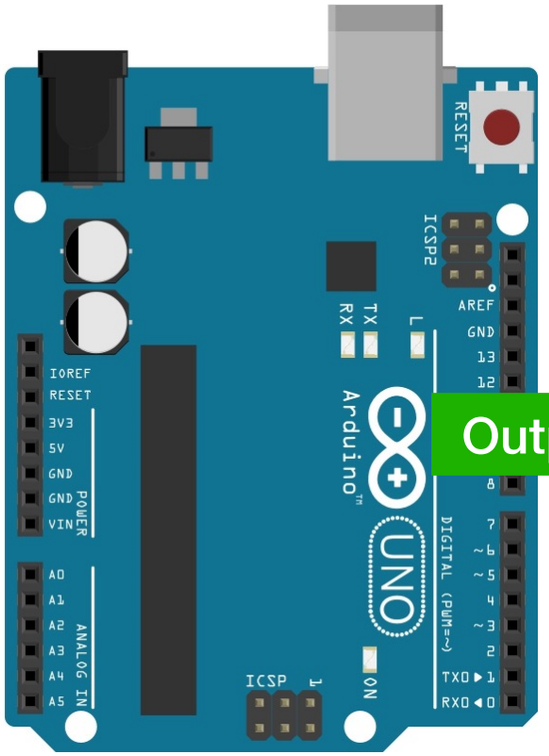
are

VARIABLE OR GRADUATED

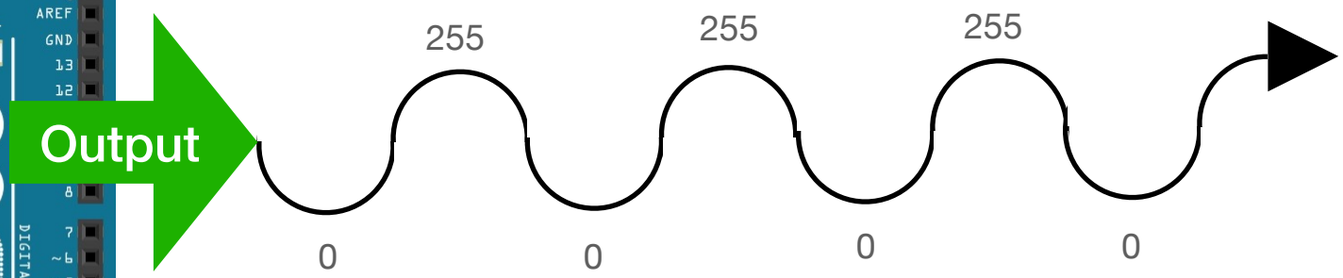
An **VARIABLE** SIGNAL:



Analog OUTPUT



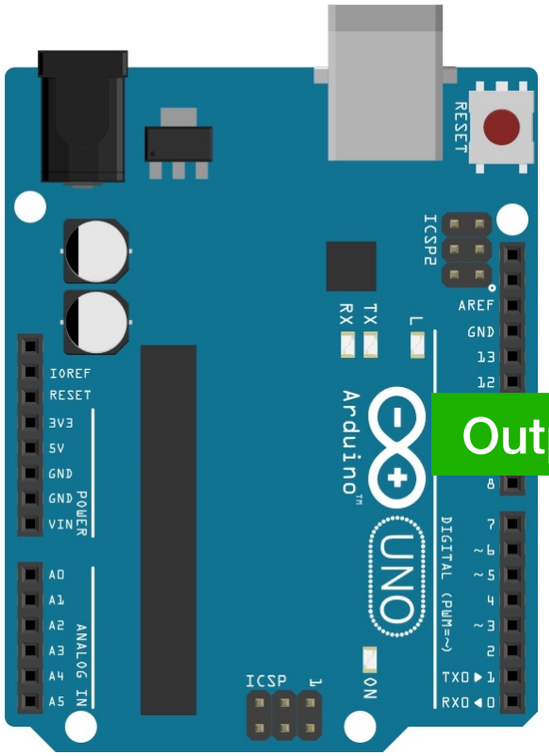
An **VARIABLE** SIGNAL that moves **OUT** of the Arduino



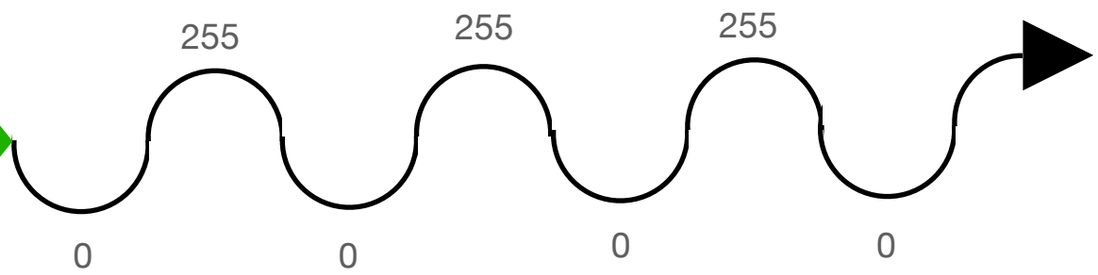
Analog OUTPUT

The variable signal is generated with

Pulse Width Modulation (PWM).



Output



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

The CIRCUIT

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

Analog OUTPUT

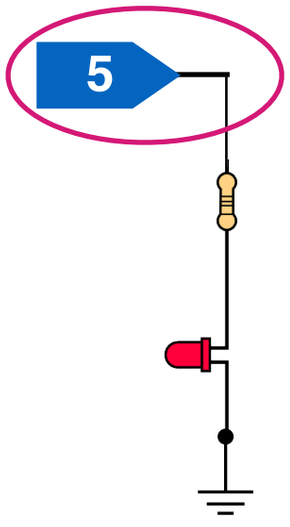
uses **SAME** circuit as digital **OUTPUT**

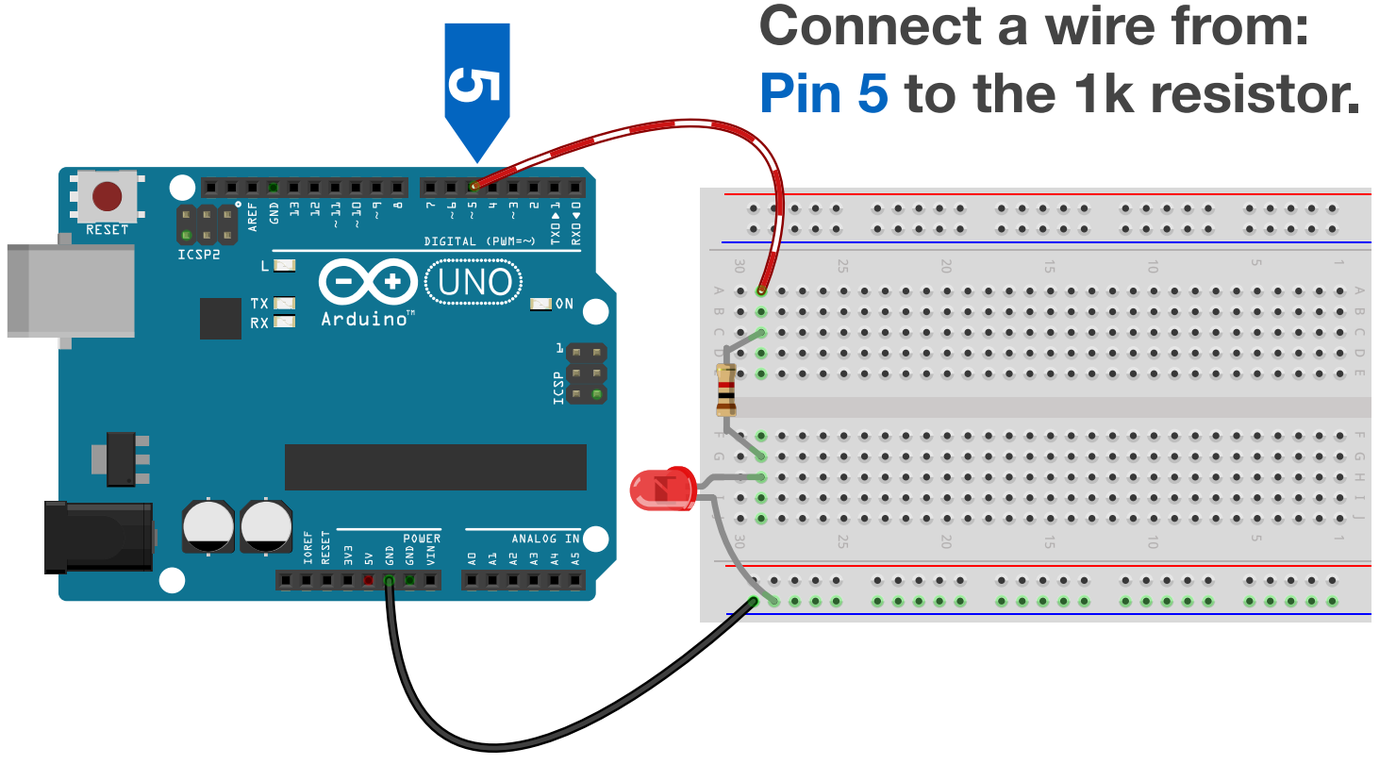
but

USES special pins.

DIGITAL pins with a TILDE (~) can PWM
(~3, ~5, ~6, ~9, ~10, ~11)

The simple analog output circuit is the same as the simple digital output circuit.
Only the code changes!





Remember :: use a ~ pin : ~3, ~5, ~6, ~9, ~10, ~11

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 ?