

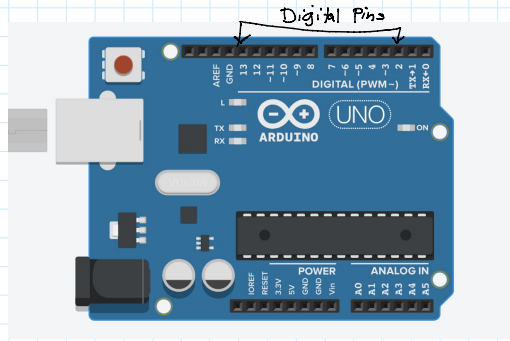
DigitalRead(), AnalogWrite(), AnalogRead()
 Thursday, 29 June 2023 1:44 pm

Digital Pins

DR
0
1

DW
Low
High

```
digitalWrite(13,HIGH);
digitalWrite(13,LOW);
```



PWM Pins

Pulse Width modulation

— way to control analog devices with a digital output

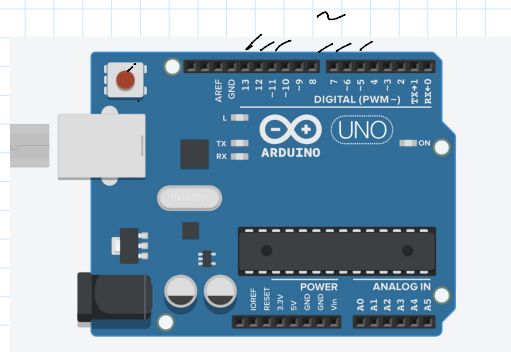
AW
0V - 5V Out V
0 - 255 AVal

8bits
2⁰ 2¹ 2² 2³ 2⁴ 2⁵ 2⁶ 2⁷ 2⁸
1
0 → 256 → 255

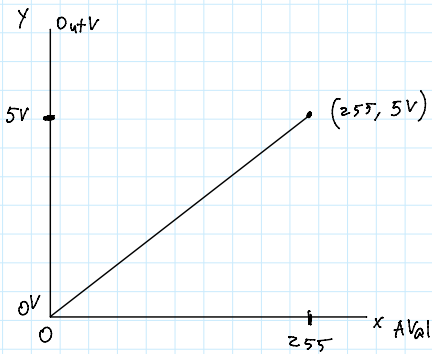
$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

```
analogWrite(13,0); No light
analogWrite(13,127.5); katamtaman na bright light
analogWrite(13,255); Full bright light
```



0V - 5V Out V
0 - 255 AVal



$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{OutV_2 - OutV_1}{AVal_2 - AVal_1} = \frac{5V - 0V}{255 - 0} = \frac{5V}{255}$$

$$OutV - OutV_1 = m(AVal - AVal_1)$$

$$OutV = \frac{5V}{255} * AVal$$

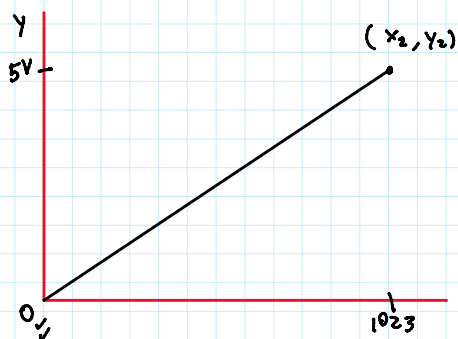
analogRead();

Analog Pins

AR
0V - 5V Y
0 - 1023 X

2⁰ 2¹ 2² 2³ 2⁴ 2⁵ 2⁶ 2⁷ 2⁸ 2⁹ 2¹⁰
1 0 1024 1023

Rv₀₁ Rv₀₁
y₁ = 0V, x₁ = 0
y₂ = 5V, x₂ = 1023

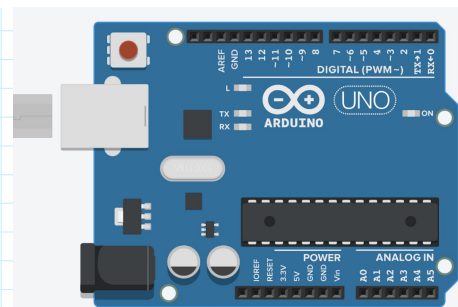


$$y - y_1 = m(x - x_1)$$

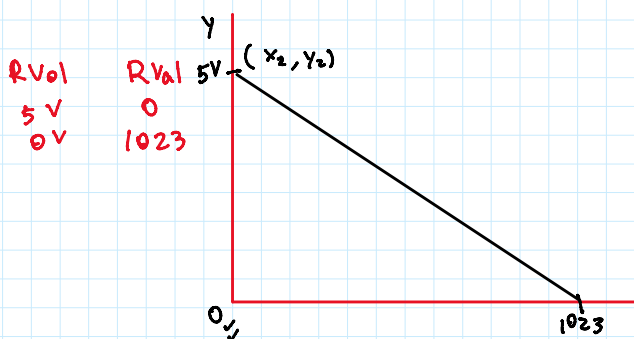
$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5V - 0V}{1023 - 0}$$

$$Rv_{01} - Rv_{01} = \frac{5V}{1023} (Rv_{01} - Rv_{01})$$

$$Rv_{01} = \left(\frac{5V}{1023} \right) * Rv_{01}$$



AP



ESP32 in Wokwi
Resolution 12-bits

2⁰ 2¹ 2² 2³ 2⁴ 2⁵ 2⁶ 2⁷ 2⁸ 2⁹ 2¹⁰ 2¹¹ 2¹²
0 4096
0 4095
0V 1023 * 4
5V

$$Rv_{01} = \left(\frac{5V}{4095} \right) * Rv_{01}$$