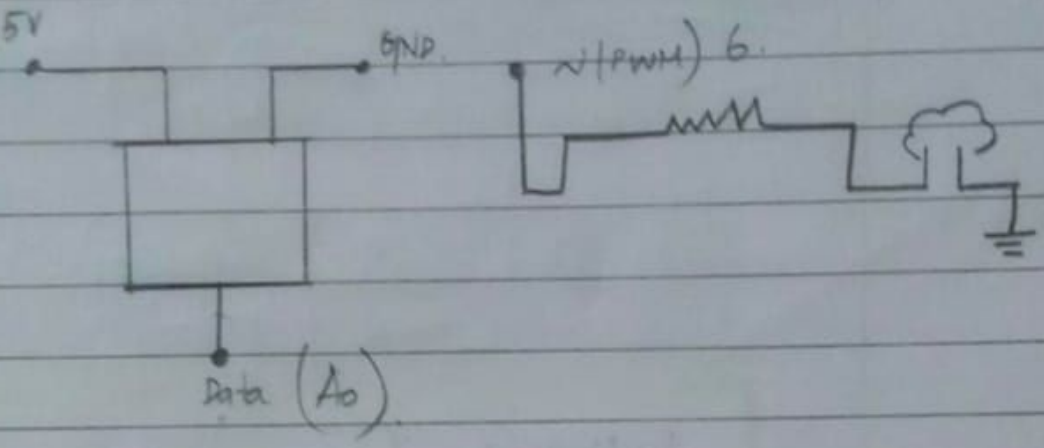
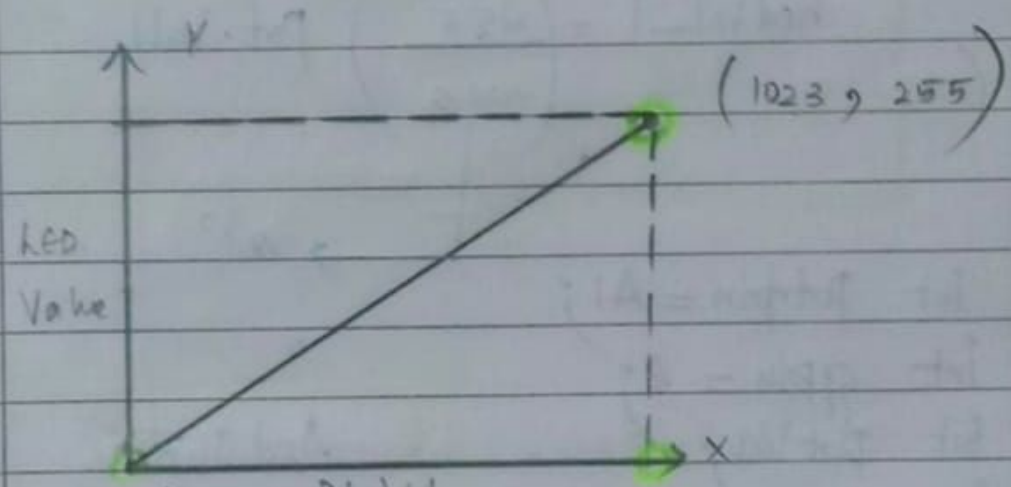
Module-4

Dimmable LED





(0, 0)

(1023, 255)

finding slope

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

$$m = \frac{led\,value\,2 - led\,value\,1}{Pot\,value\,2 - pot\,value\,1}$$

$$m = \frac{255 - 0}{1023 - 0}$$

$$m = \frac{255}{1023}$$ (Slope of line)

Equation of line
point slope formula.

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

$$hedVal_1 - hedVal_2 = Slope\ (potValue_1 - potVal_2)$$

$$hedVal_1 = Slope\ (potVal_1)$$

$$hedVal_1 = \left[\frac{255}{1023}\right] pot.Val_1$$

$$hedVal\_1 = \left(\frac{255}{1023}\right) Pot.Val_1$$

2^{10}

```
int potpin = A1;
int gpin = 6;
int potVal;
int HED.VAL;

Void setup()
{
  pinMode (potpin, INPUT);
  pin Mode (gpin, OUTPUT);
  Serial.begin (9600);
}
```

Arduino is 10-bit ADC. while ARM has 12-bit ADC.

```
Void loop() {
PotVal = analogRead(potpin);
LEDVal = (255.0/1023.0) * potVal;

analogWrite(gpin, LEDVal);
Serial.println(LEDVal);
}
```

255 → Indicates the brightness

5 → Voltage.

1023 → Analog value (10 bit ADC)

$$\frac{\text{Max\_Voltage (Ref Voltage)}}{1023} \times \text{Analog Read.}$$

(0V) ——→ 0

(1V) ——→ 1

2.7V ——→ could not represented as 0 or 1

thats where the role of Analog comes.

Whats is the ADC ?

Analog to digital converter

To be specific it converts Analog Voltage into a digital ne

$A_0 - A_5$ Can read ~~Analog~~ Voltages.

Arduino has 10-bit ADC.

Which mean $2^{10} = 1024$ (discreate levels). It has ability to detect 1024 discreate levels.

Working of ADC

The Internal Capacitor get charges from the analog Voltage. Once if it charges, it also needs to discharge. The Microcontroller monitors the no of clock cycles that pass befor the capacitor discharge.

The number of clock cycles are returned Once the process is completed.