Lab1: Setting up

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Why young digital makers

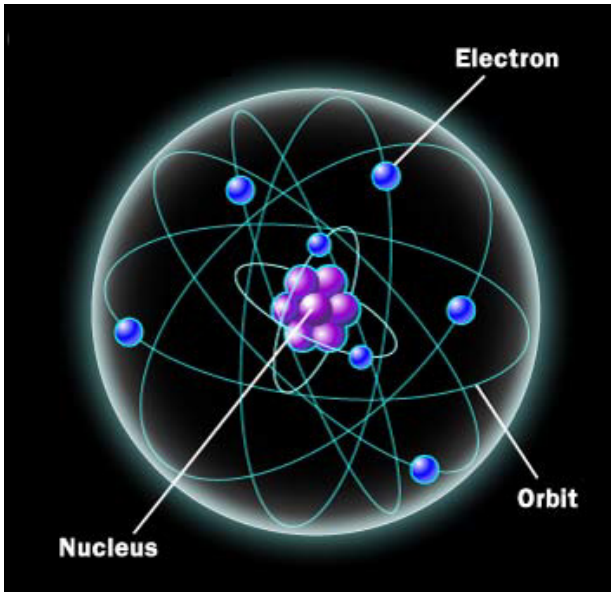
https://www.facebook.com/greatbigstory/videos/1812650069037418/?t=117

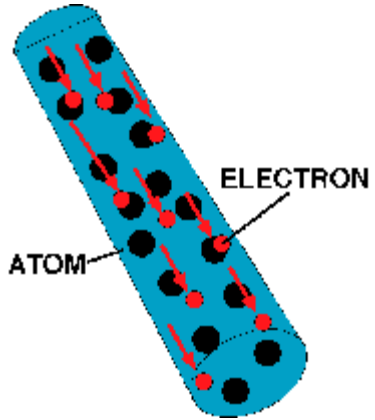
https://www.youtube.com/watch?v=wcSGd2i1BFg

https://www.youtube.com/watch?v=3Ml9j1UkeI4

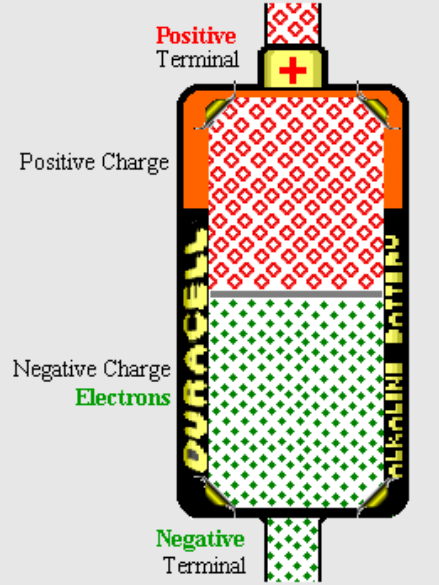
1.1 พื้นฐานอิเลคทรอนิก

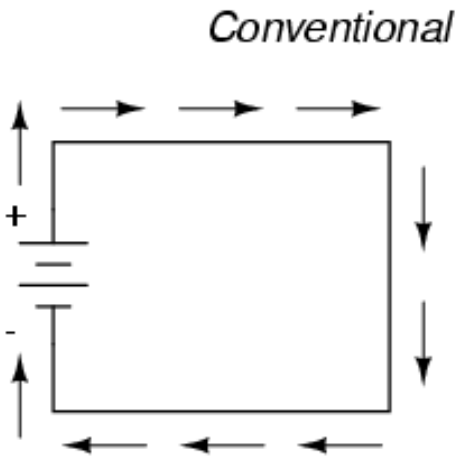
1.1 Current





1.1 Current

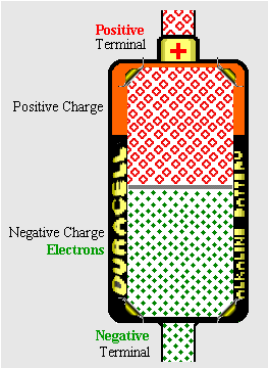




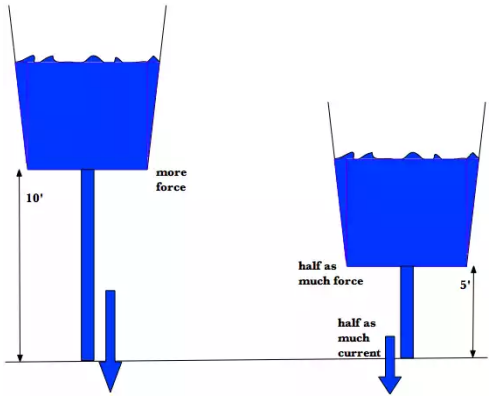
Conventional flow notation

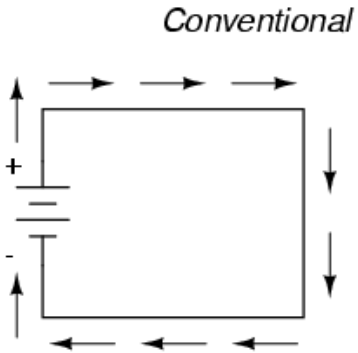
Electric charge moves from the positive (surplus) side of the battery to the negative (deficiency) side.

1.2 Voltage



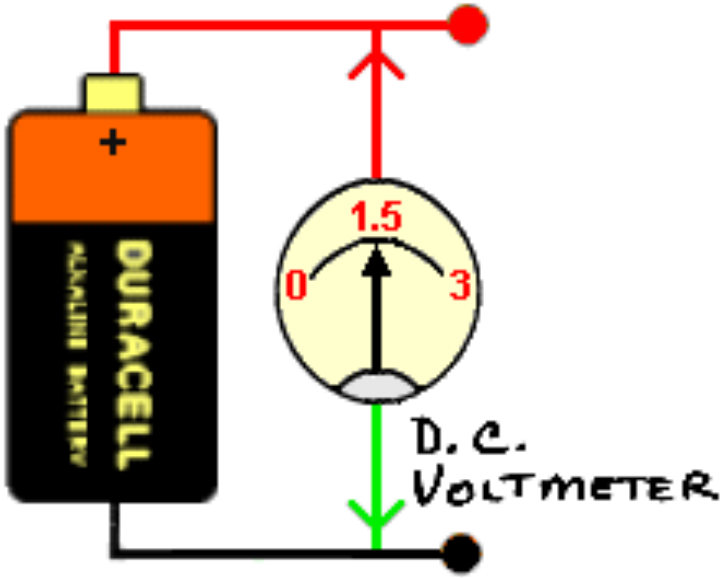
- A battery positive terminal (+) and a negative terminal (-). The difference in charge between each terminal is the potential energy the battery can provide. This is labeled in units of volts.





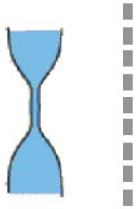
Electric charge moves from the positive (surplus) side of the battery to the negative (deficiency) side.

1.2 Voltage



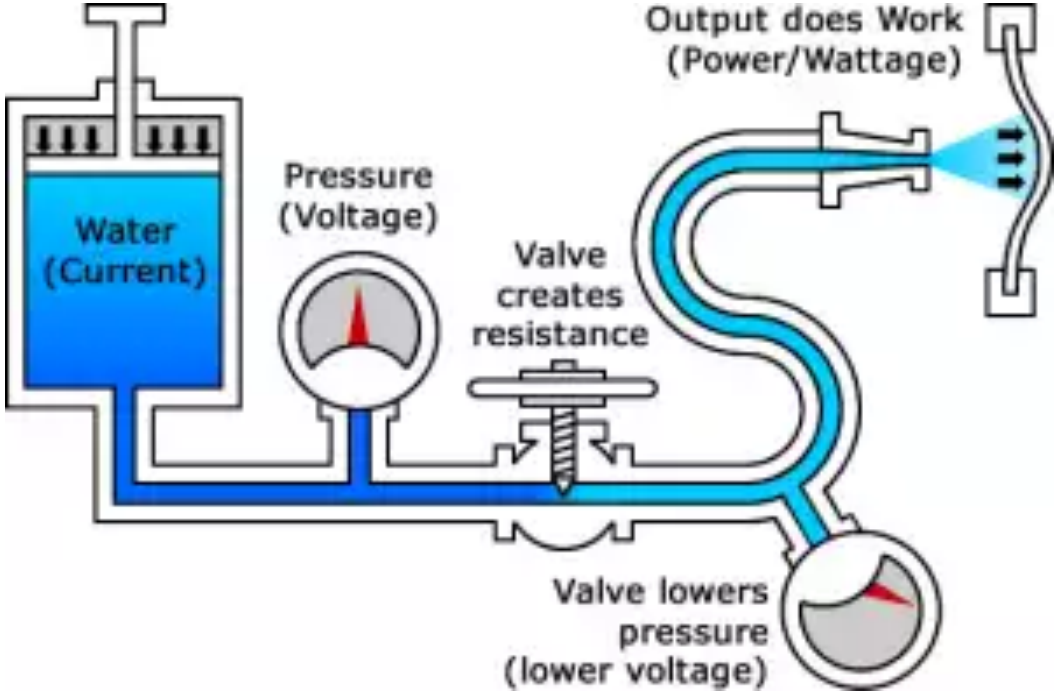
1.3 Resistance

Constriction
creates
Resistance to water flow

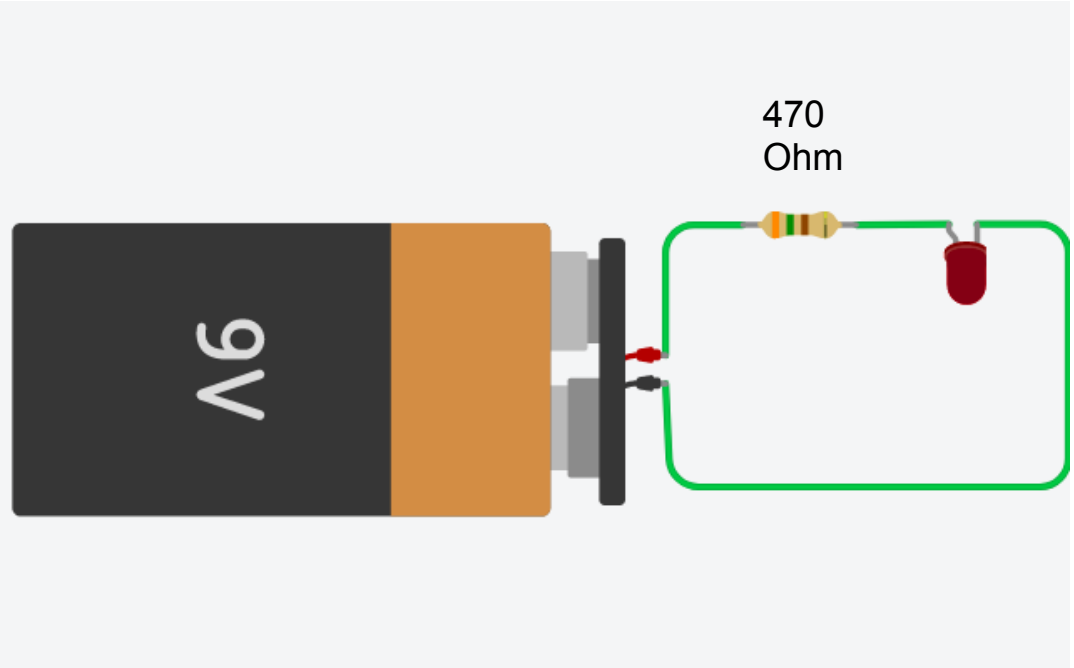


Resistor creates
Resistance to current
flow

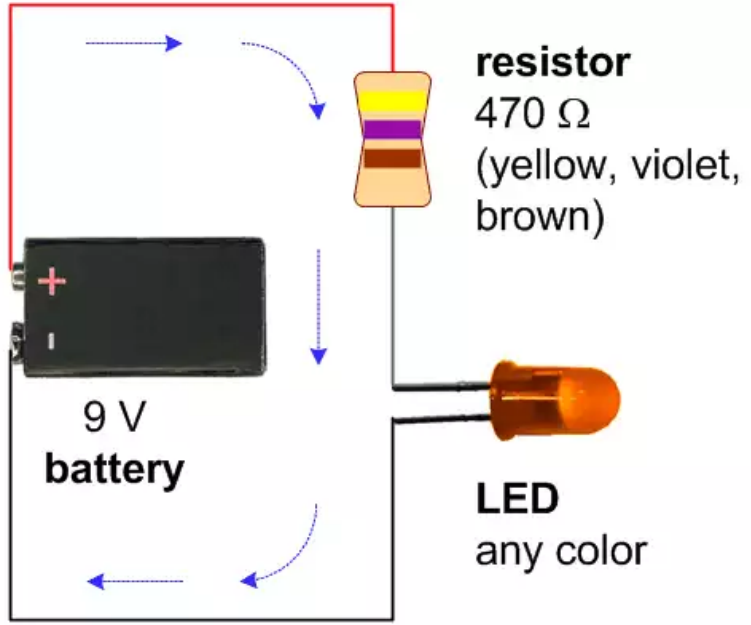
Summation


Output does Work
(Power/Wattage)
Water
(Current)
Pressure
(Voltage)
Valve
creates
resistance
Valve lowers
pressure
(lower voltage)

Experiment 1



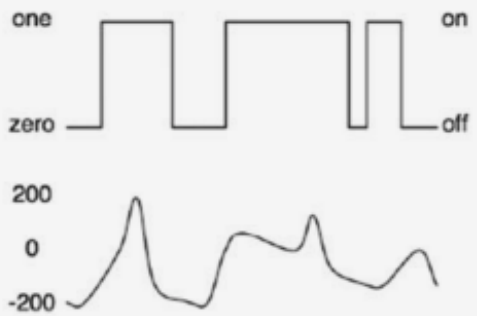
Experiment 1 (Explain)



1.2 Digital & Analog

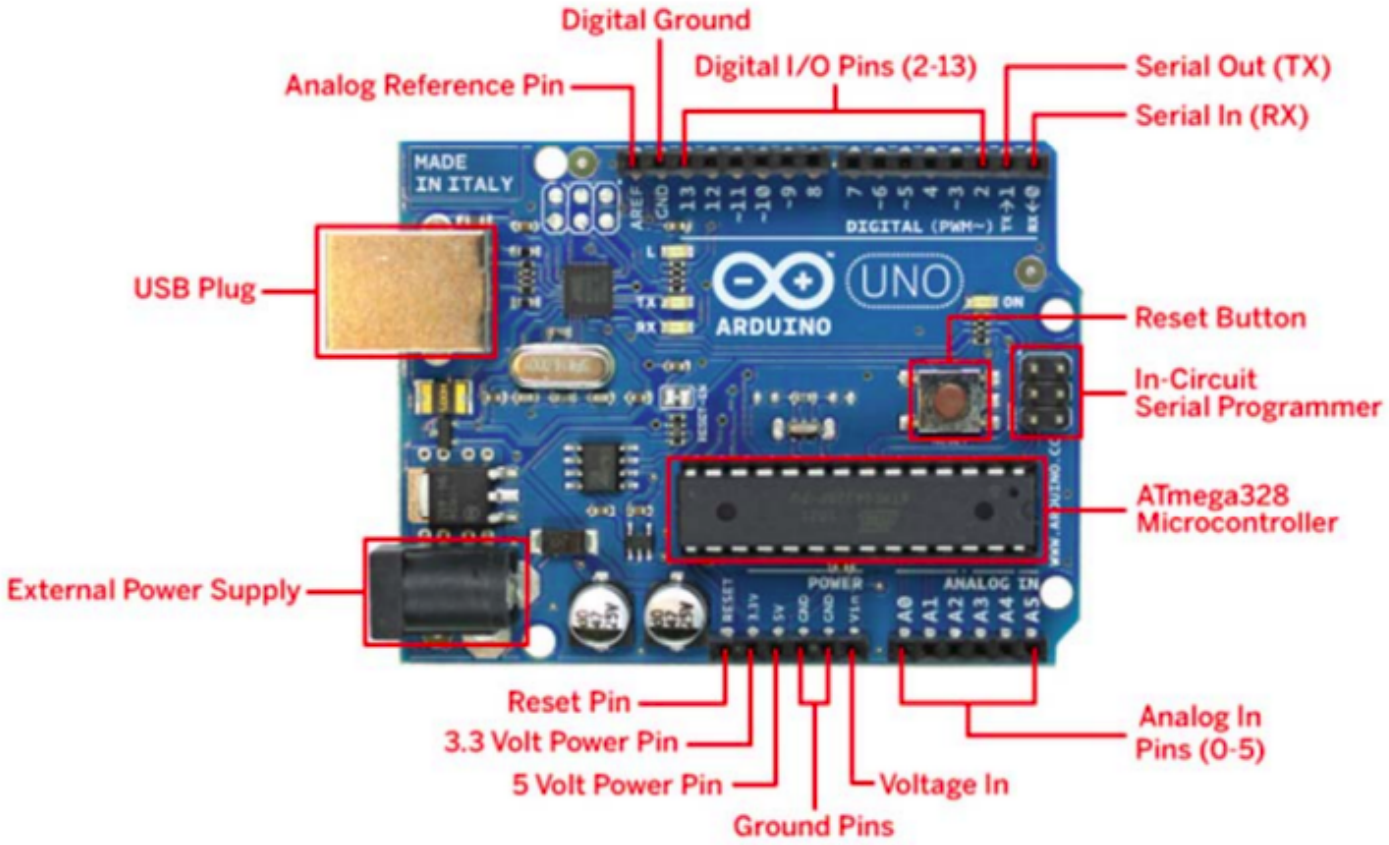
Digital? Analog?

- Digital – only has two values: on/off
- Analog – has many (infinite) values



1.3 แนะนำ Arduino

Arduino Board



1.4 อุปกรณ์ที่ใช้ในการเรียน

อุปกรณ์

1. Arduino

2. Breadboard

3. สายไฟ (Jumper)

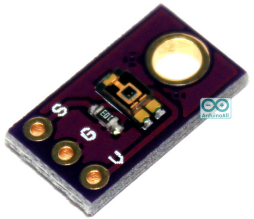
อุปกรณ์

4. resistor, LED, และ switches แบบต่างๆ

5. 7-Segment LED

6. Led RGB

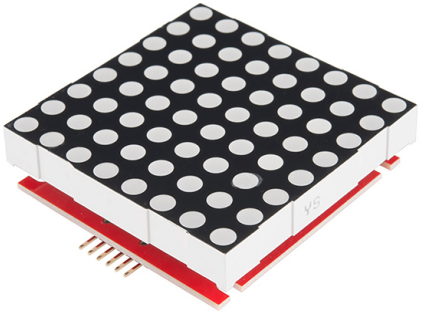
อุปกรณ์



8. Sensor แสง

6. Ultrasonic วัดระยะทาง

7. Sensor อุณหภูมิ

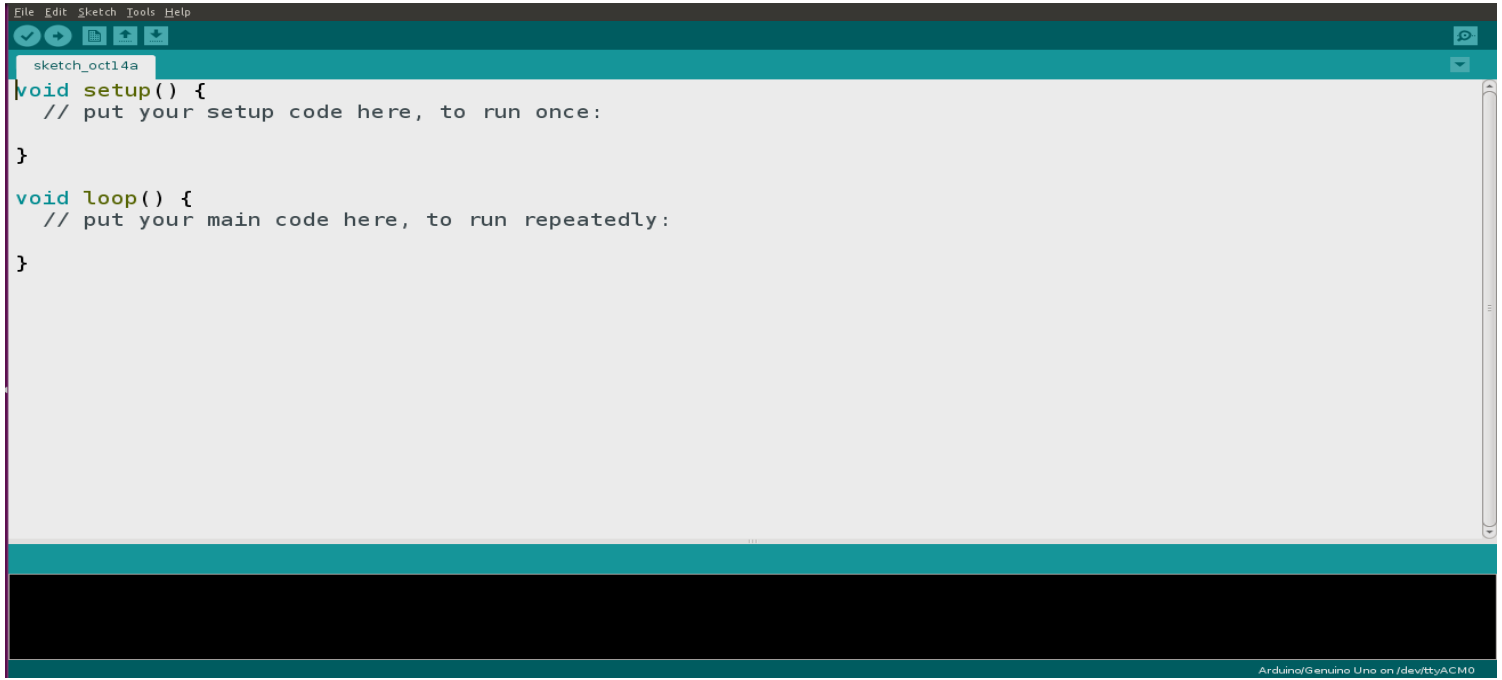


9. LED matrix

1.5 ติดตั้ง Ardunio IDE

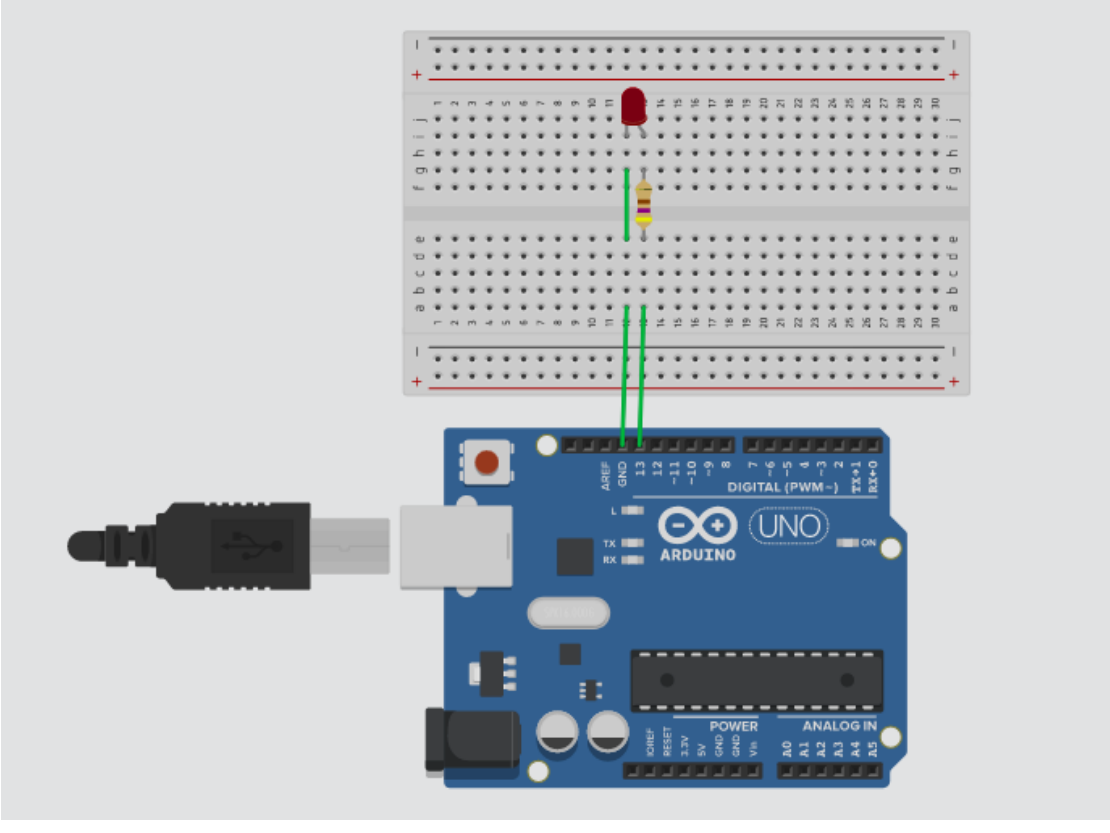
https://www.arduino.cc/en/Main/Software

Run Program


File Edit Sketch Tools Help
sketch_oct14a
void setup() {
// put your setup code here, to run once:
}
void loop() {
// put your main code here, to run repeatedly:
}
Arduino/Genuino Uno on /dev/ttyACM0

1.6 Hello world

วงจร Hello world: LED กระพริบ

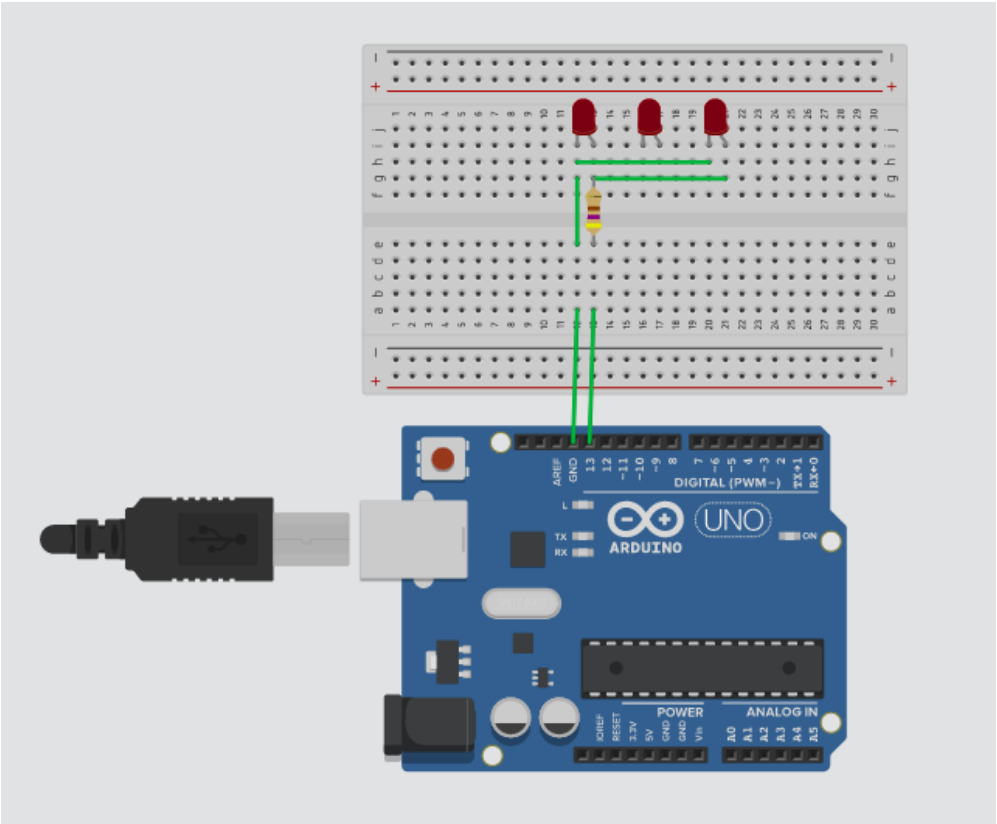


Code: Hello world: LED กระพริบ

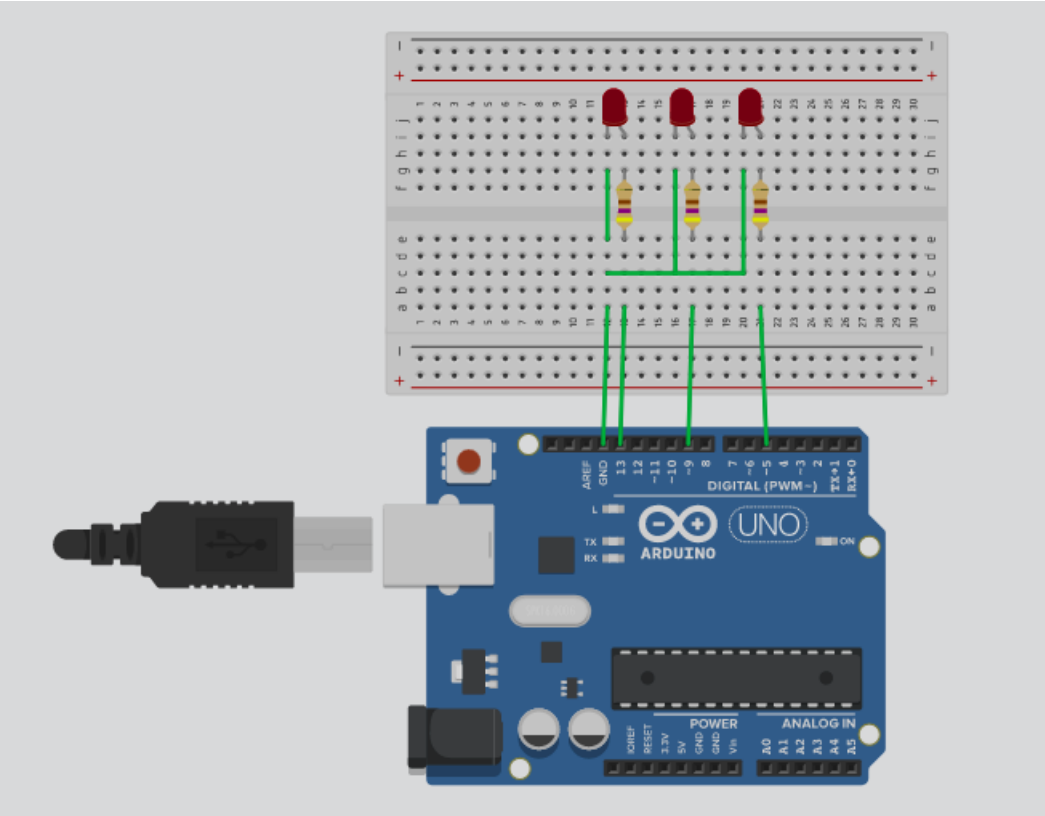
```
void setup()
{
        pinMode(13, OUTPUT);
}

void loop()
{
    digitalWrite(13, HIGH);
    delay(1000);
    digitalWrite(13, LOW);
    delay(1000);
}
```

2.1 การทดลอง LED: ไฟกระพริบหลายดวง

วงจร LED กระพริบหลายดวง



วงจร LED ไฟวิ่ง



Code: LED ไฟวิ่ง

```
void setup()
{
		pinMode(5, OUTPUT);
		pinMode(9, OUTPUT);
		pinMode(13, OUTPUT);
}

void loop()
{
		digitalWrite(13, HIGH);
		digitalWrite(5,LOW);
		delay(1000);

		digitalWrite(13, LOW);
		digitalWrite(9, HIGH);
		delay(1000);

		digitalWrite(9, LOW);
		digitalWrite(5, HIGH);
		delay(1000);
}
```

Exercise 1

1.1 ให้ทำวงจรไฟ LED วิ่งไปแล้ววิ่งกลับ