

Lab1: Setting up

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Why young digital makers

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

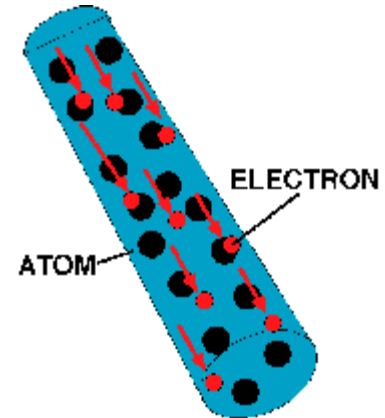
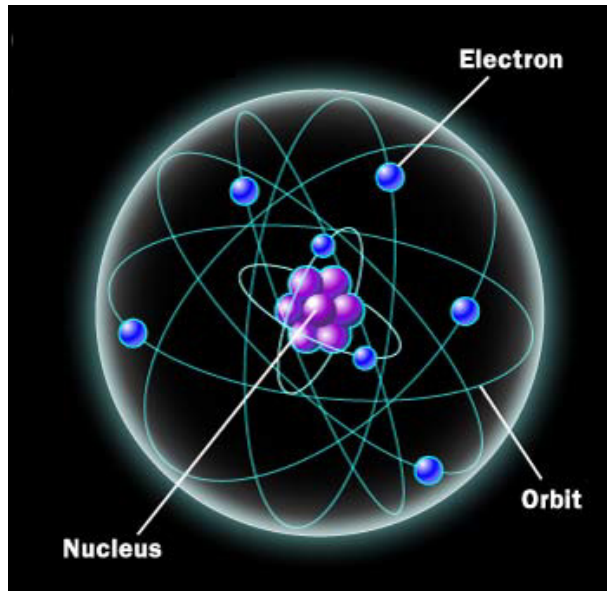
<https://www.youtube.com/watch?v=wcSGd2i1BFg>

<https://www.youtube.com/watch?v=3MI9j1UkeI4>

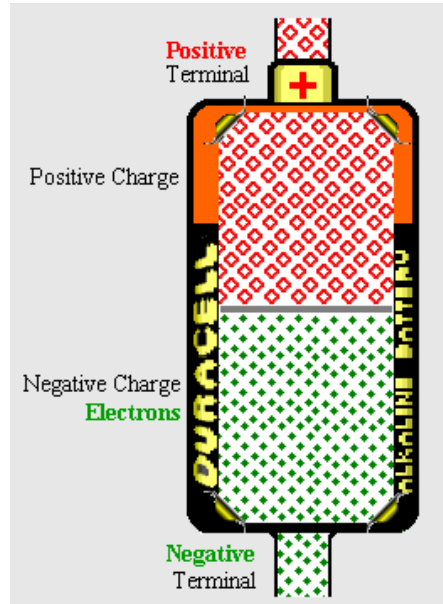


1.1 พื้นฐานอิเล็กทรอนิกส์

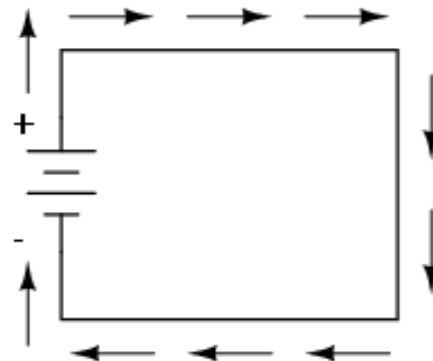
1.1 Current



1.1 Current

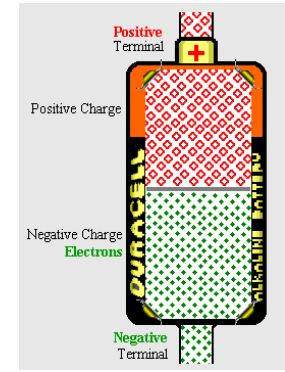


Conventional flow notation

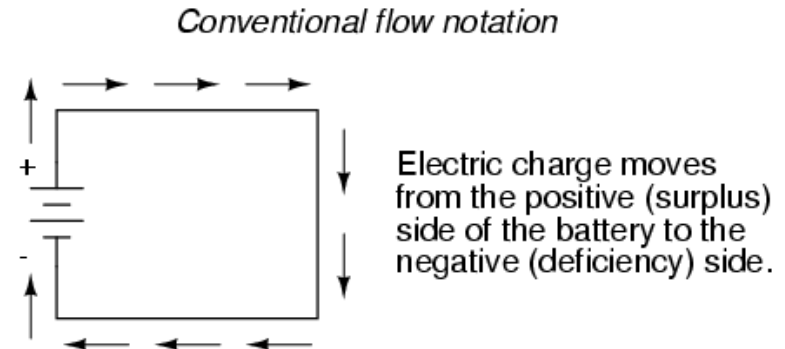
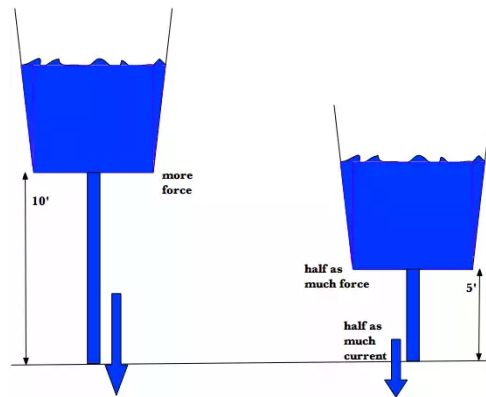


Electric charge moves from the positive (surplus) side of the battery to the negative (deficiency) side.

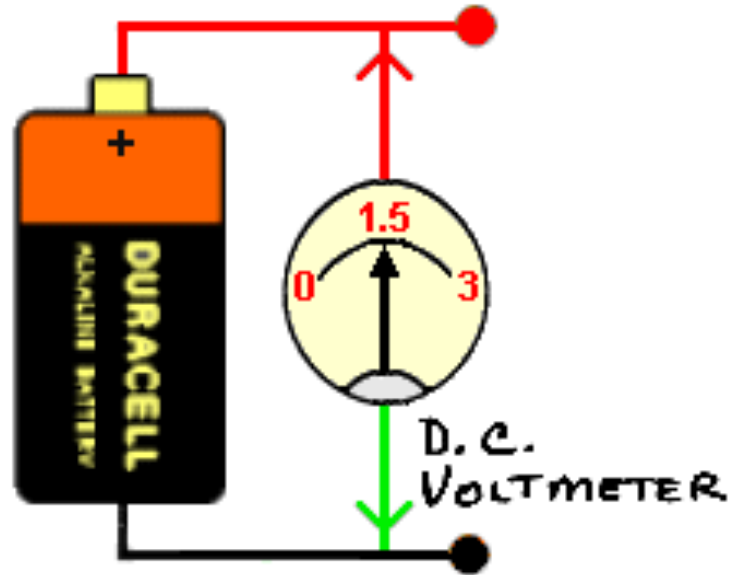
1.2 Voltage



- 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.



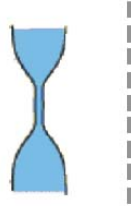
1.2 Voltage





1.3 Resistance

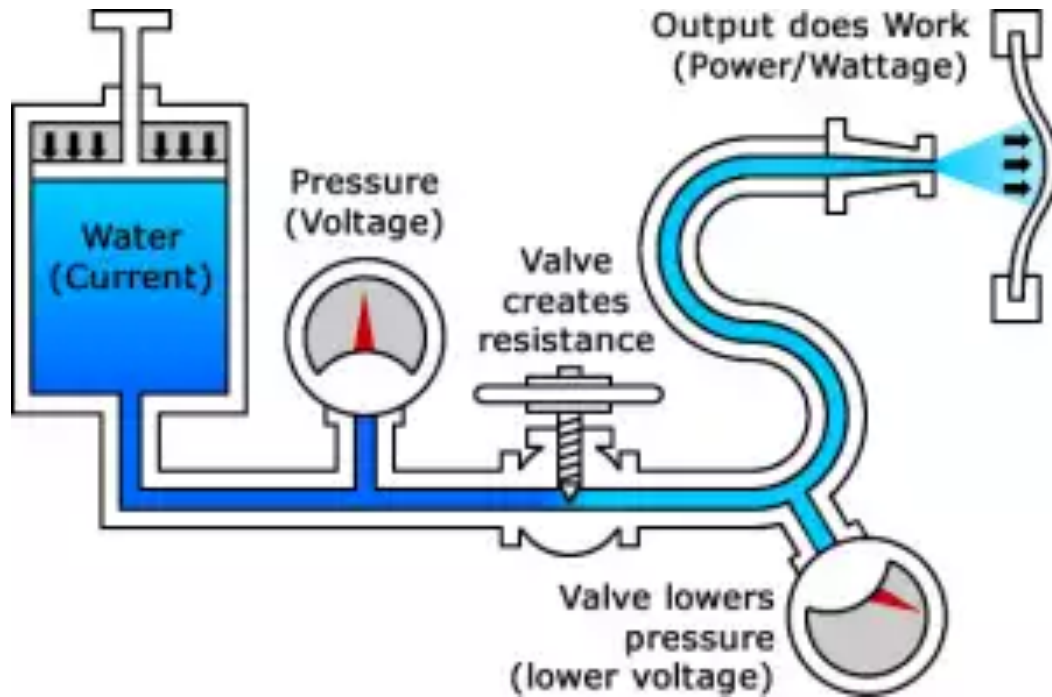
Constriction
creates
Resistance to water flow



Resistor creates
Resistance to current
flow

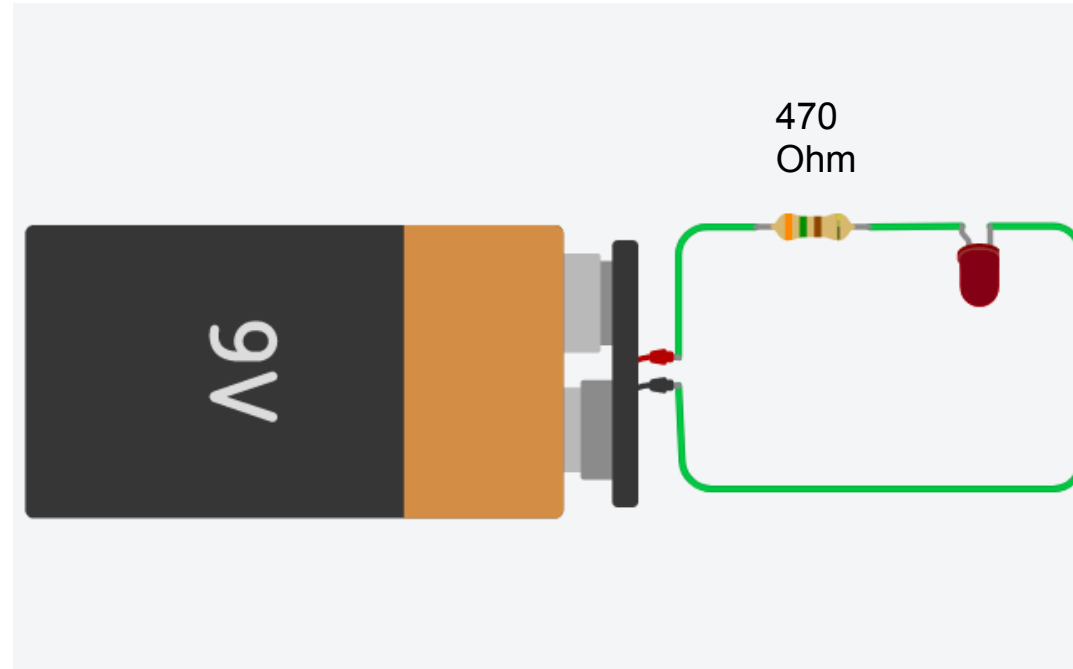


Summation

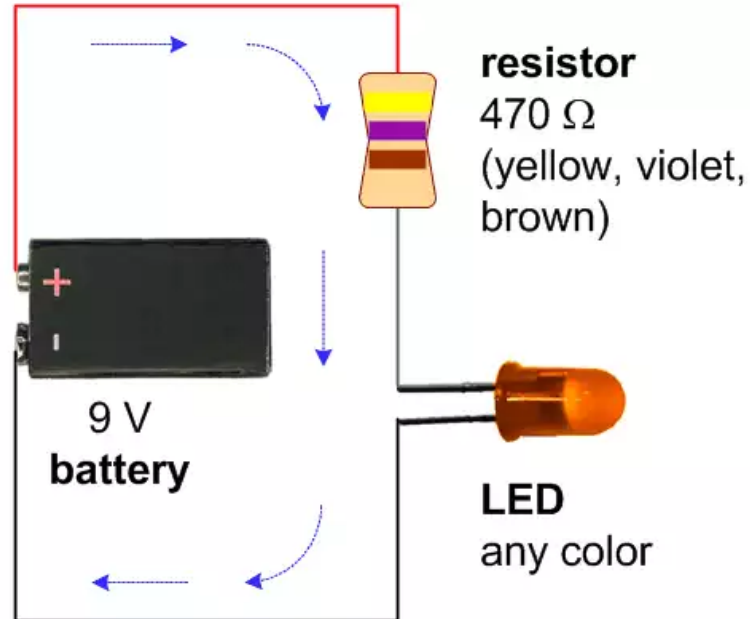




Experiment 1



Experiment 1 (Explain)

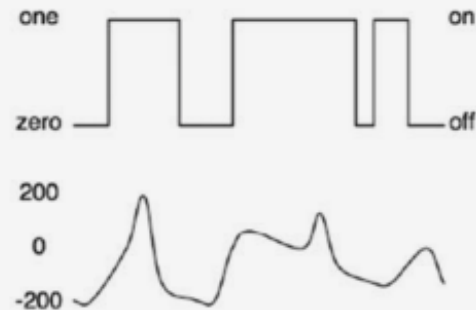




1.2 Digital & Analog

Digital? Analog?

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





1.3 แนะนำ Arduino



1.4 อุปกรณ์ที่ใช้ในการเรียน

อุปกรณ์



1. Arduino



2. Breadboard



3. สายไฟ (Jumper)



อุปกรณ์



4. resistor, LED, และ switches แบบต่างๆ



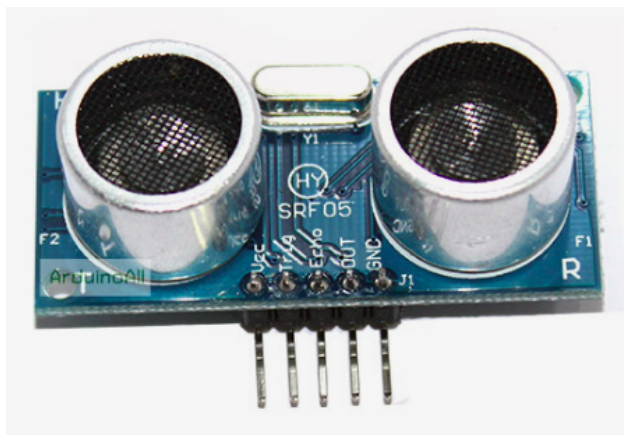
5. 7-Segment LED



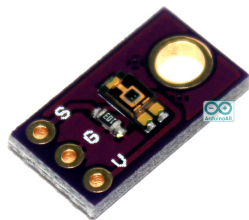
6. Led RGB



อุปกรณ์



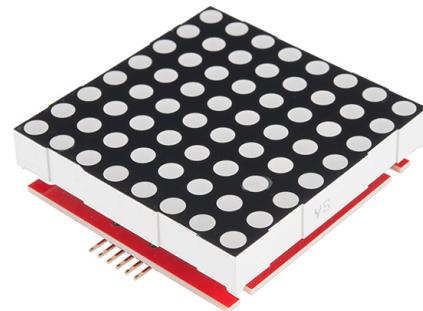
6. Ultrasonic วัด
ระยะทาง



8. Sensor แสง



7. Sensor อุณหภูมิ



9. LED matrix



1.5 ติดตั้ง Ardunio IDE

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



The screenshot shows the Arduino website's software download page. The header is teal with the Arduino logo on the left and navigation links (HOME, BUY, SOFTWARE, PRODUCTS, LEARNING, COMMUNITY, SUPPORT) in the center. On the right of the header are icons for search, a shopping bag, and a 'SIGN IN' link. The main content area has a light gray background. The title 'Download the Arduino IDE' is centered. Below it, there's a large teal circle containing the Arduino logo. To the right of the logo, the text 'ARDUINO 1.8.5' is displayed in bold, followed by a paragraph describing the IDE as open-source software that runs on Windows, Mac OS X, and Linux. Below this paragraph, it states that the software can be used with any Arduino board and refers to the 'Getting Started' page for installation instructions. On the right side of the page, there's a teal sidebar with links for 'Windows Installer', 'Windows ZIP file for non admin install', 'Windows app' (with a 'Get' button), 'Mac OS X 10.7 Lion or newer', 'Linux 32 bits', 'Linux 64 bits', 'Linux ARM', 'Release Notes', 'Source Code', and 'Checksums (sha512)'.



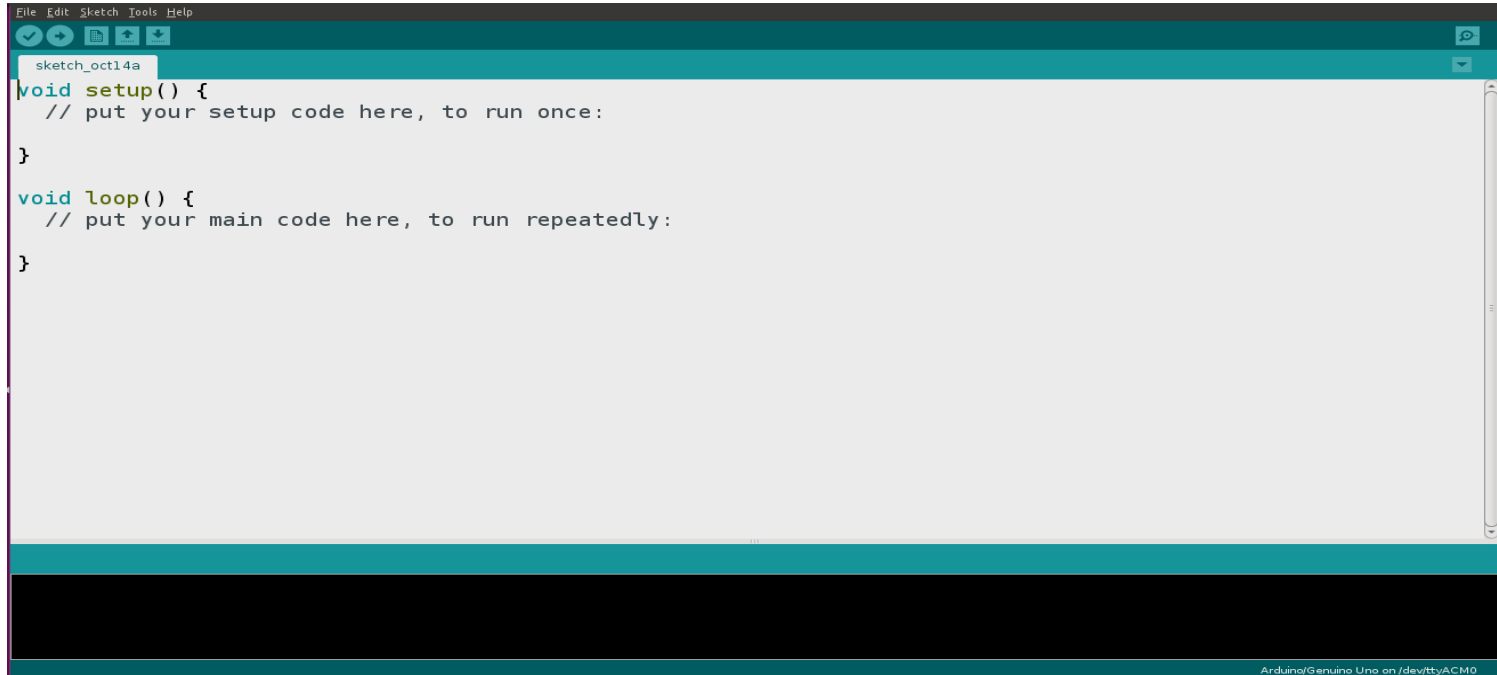
ARDUINO 1.8.5

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.

This software can be used with any Arduino board. Refer to the [Getting Started](#) page for Installation instructions.

- Windows Installer
- Windows ZIP file for non admin install
- Windows app [Get](#)
- Mac OS X 10.7 Lion or newer
- Linux 32 bits
- Linux 64 bits
- Linux ARM
- Release Notes
- Source Code
- Checksums (sha512)

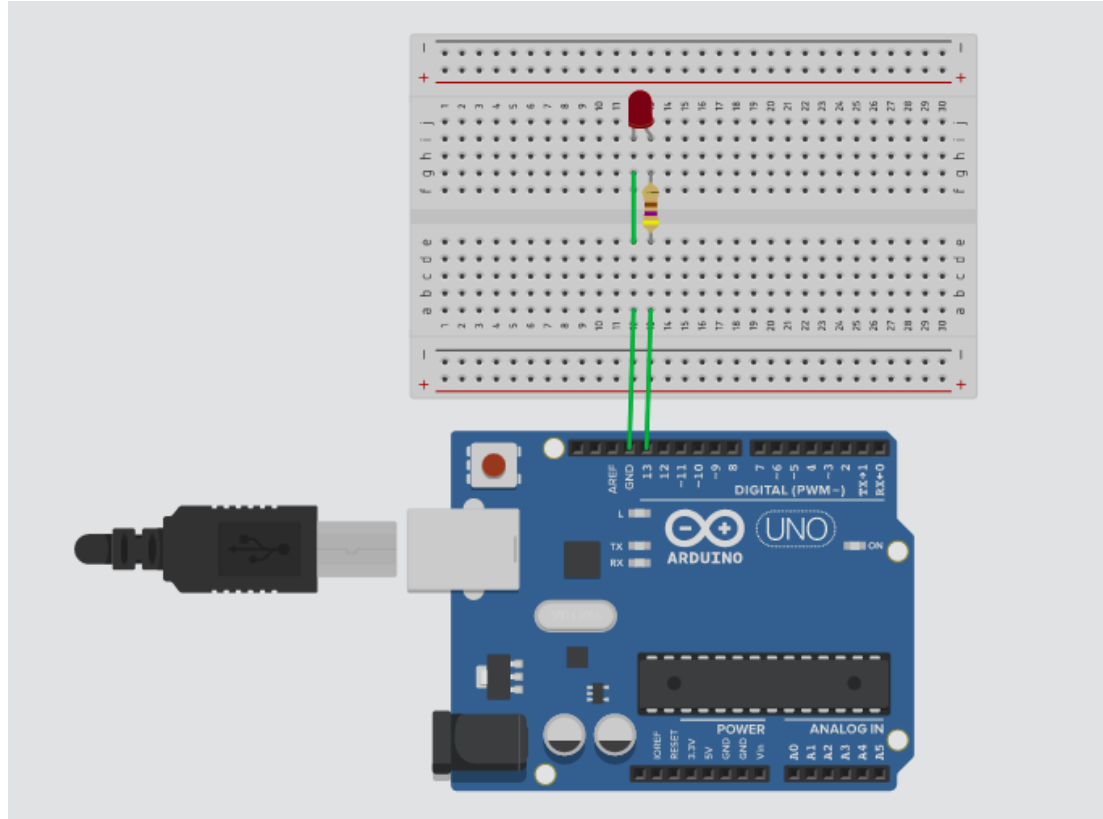
Run Program





1.6 Hello world

วงจร Hello world: LED กระพริบ





Code: Hello world: LED กระพริบ

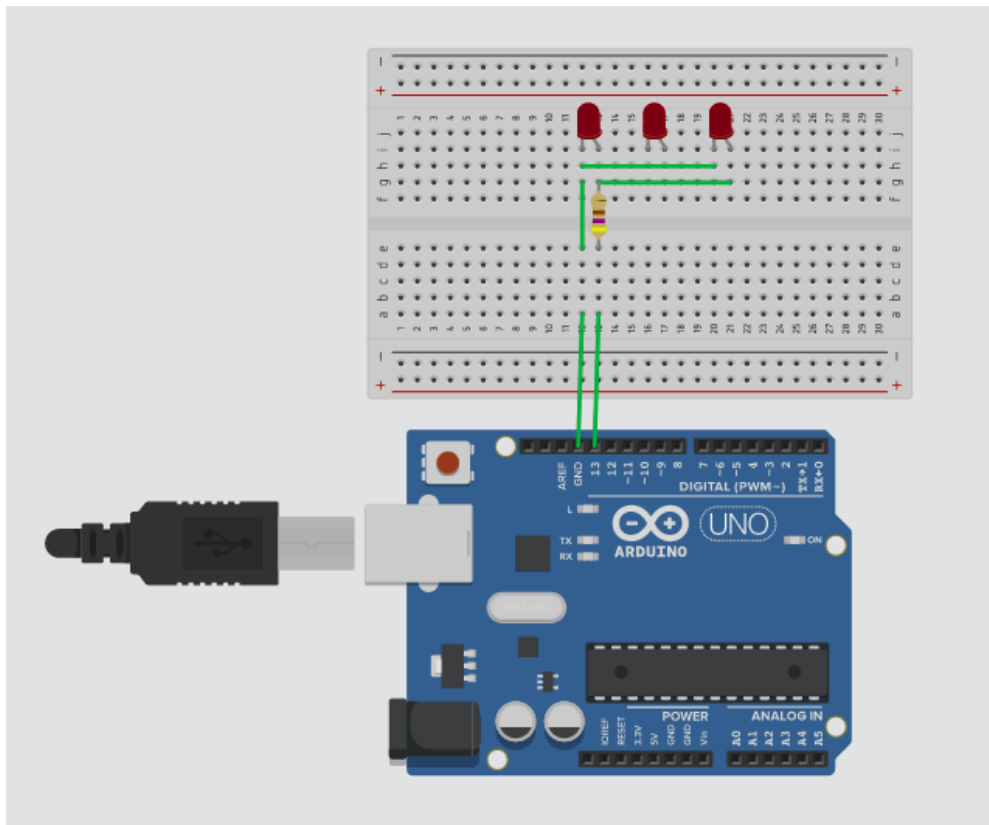
```
void setup()
{
    pinMode(13, OUTPUT);
}

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

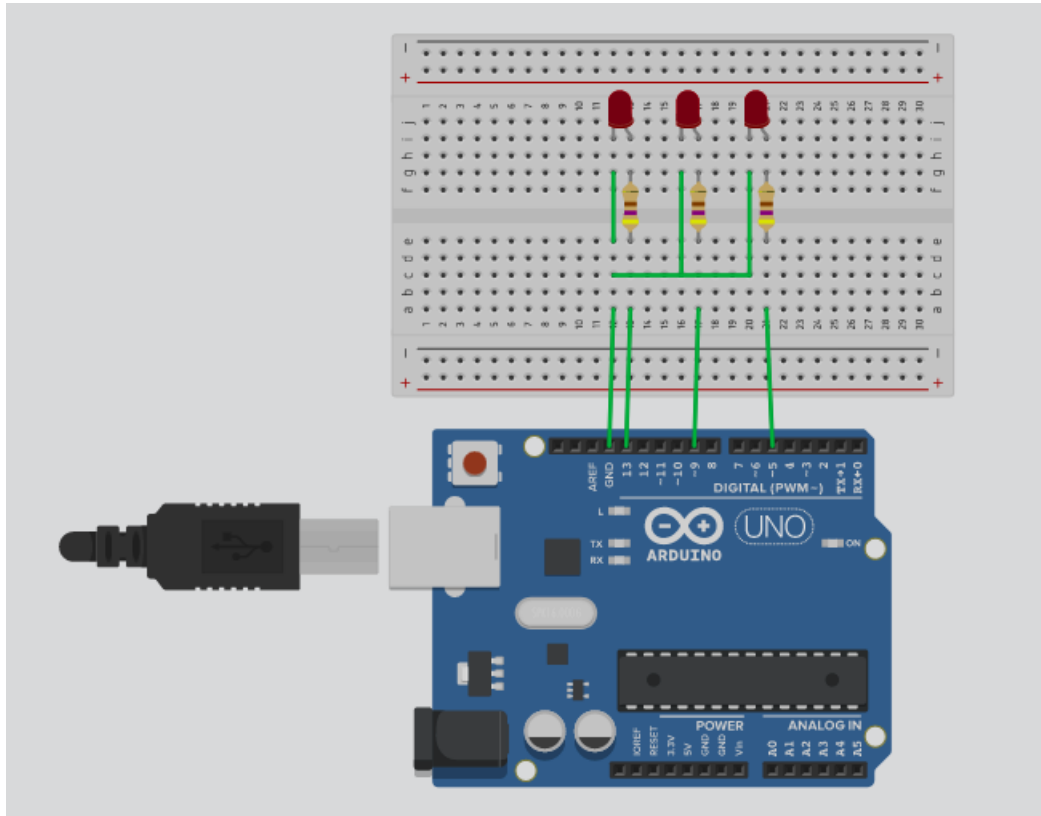


2.1 การทดลอง LED: ไฟกระพริบหลายดวง

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 รینگไปแล้วรینگกลับ