

# Arduino基礎教學

控制 LED 、使用開關

# **Lesson 1**

**Let's get start!**

# Lesson 1 - Let's get start!

- 事前準備
- 利用 USB 線將 ESP32 D1 連接上電腦
- 了解 ESP32 I/O board
- 了解 Arduino IDE
- 了解麵包板
- 最簡單的電路
- 範例一 Hello Arduino: blink LED!
- 範例二 LED loop
- 第二簡單的電路
- 範例三 Button

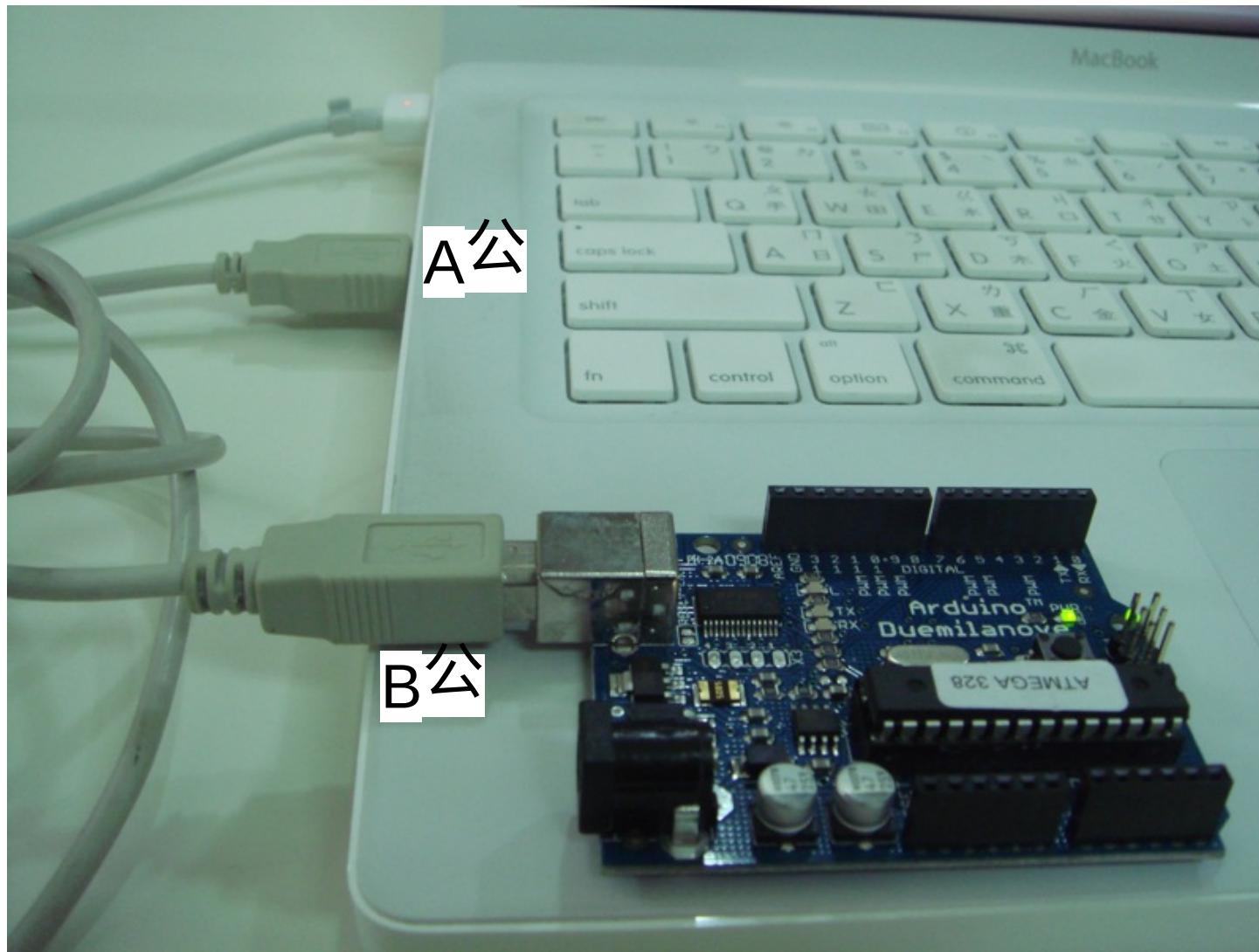
# 事前準備

1. 取得 Arduino I/O board
2. 下載安裝 Arduino IDE

<http://arduino.cc/en/Main/Software>

3. 下載 Arduino IDE 後，利用 USB 將 Arduino 和 PC 相連接後，  
螢幕上會出現

# 利用 USB 線 (A 公 -B 公) 將 Arduino 連接上電腦



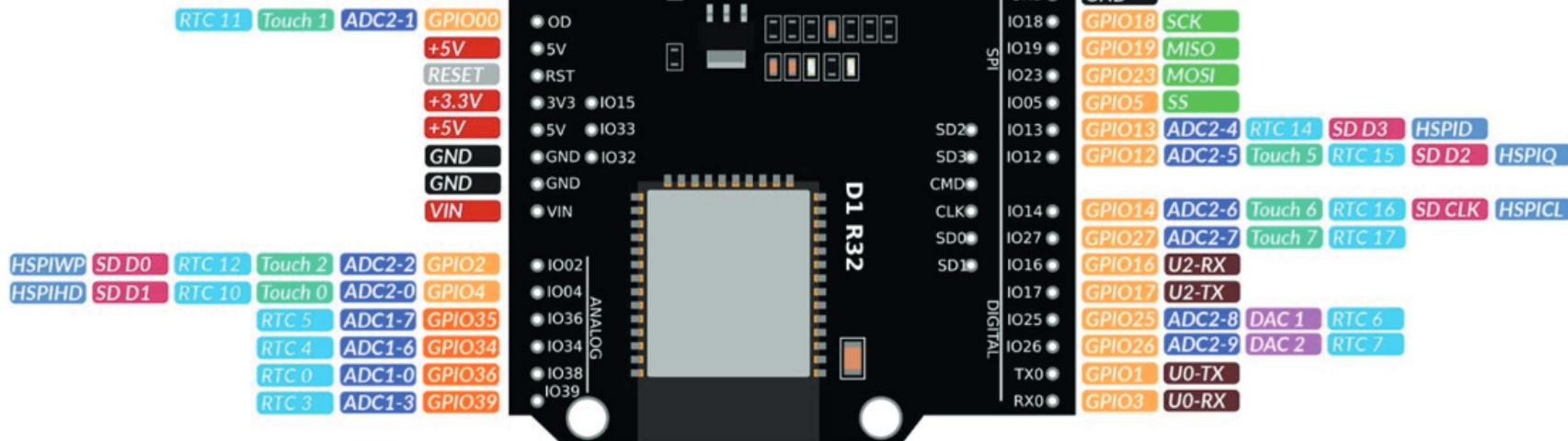
PS. Windows使用者此時若出現 " 發現新硬體 " 的視窗，一直點選下一步安裝 USB 驅動程式即可  
( 請參考 [Arduino 官網](http://arduino.cc/en/Guide/Windows))

# 了解 Arduino I/O board



## D1 R32 Board Pinout

- Digital In/Out ports (PWM)
- Digital Input ports
- Analog Inputs 12bit, 0 - 3V
- Analog Outputs 8bit, 0 - 3V
- Capacitive Touch Sensor ports
- I/O -pins from RTC ultra low power processor, usable in deep sleep mode
- SD card interface
- I2C bus (Wire)
- SPI bus interface
- Serial interfaces
- HSPi bus



HSPICS SDCMD RTC 13 Touch 3 ADC2-3 GPIO15 O IO15  
RTC 8 Touch 8 ADC1-5 GPIO33 O IO33  
RTC 9 Touch 9 ADC1-4 GPIO32 O IO32

SD2 O  
SD3 O  
CMD O Internal Flash Memory control pins.  
CLK O Not for use!  
SD0 O  
SD1 O

# 了解 ESP32 I/O board

摘要：

- 39 輸入 / 輸出
- 34 个 通用輸入 / 輸出
- 4 个 邏輯輸入
- 18 个 類比輸入 (12-bit)
- 2 个 真正類比輸出 (8-bit)
- 3 个 串行通訊端口
- 16 个 模擬類比
- 藍牙 v4.2
- WiFi 802.11 n (2.4 GHz)

# 了解 Arduino IDE

Arduino - 0015

工具列

程式碼分頁

程式內容

訊息顯示區

```
/*
 * Blink
 *
 * The basic Arduino example. Turns on an LED on for one second,
 * then off for one second, and so on... We use pin 13 because,
 * depending on your Arduino board, it has either a built-in LED
 * or a built-in resistor so that you need only an LED.
 *
 * http://www.arduino.cc/en/Tutorial/Blink
 */

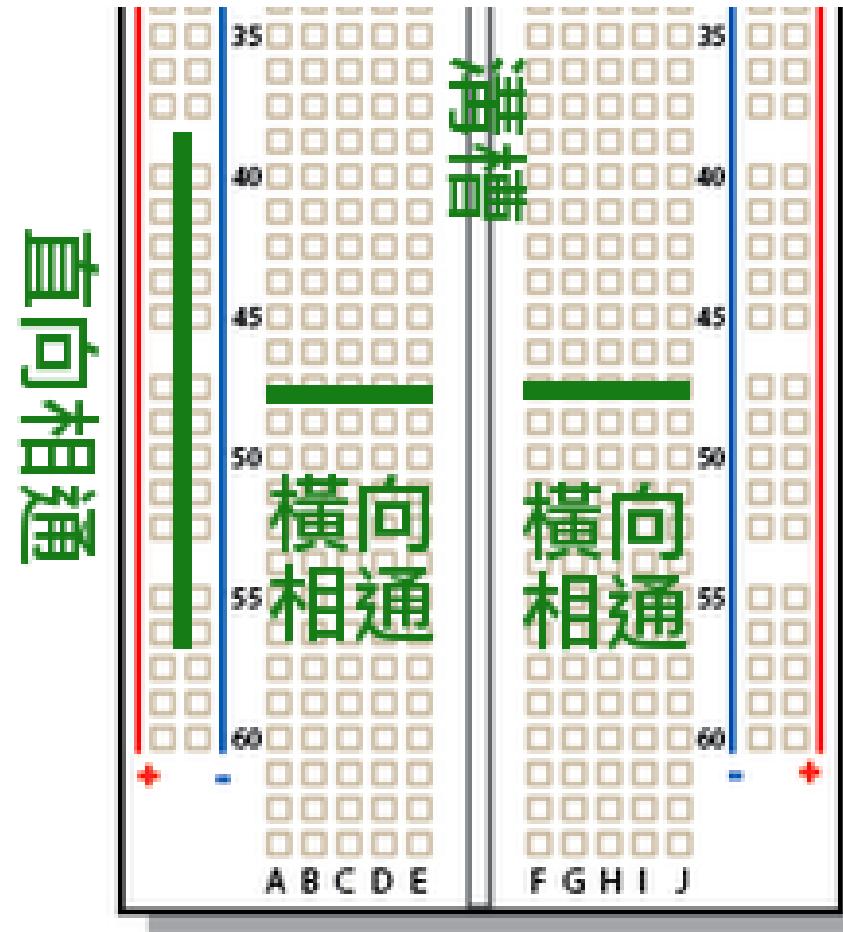
int ledPin = 13; // LED connected to digital pin 13

void setup() // run once, when the sketch starts
{
    pinMode(ledPin, OUTPUT); // sets the digital pin as output
}

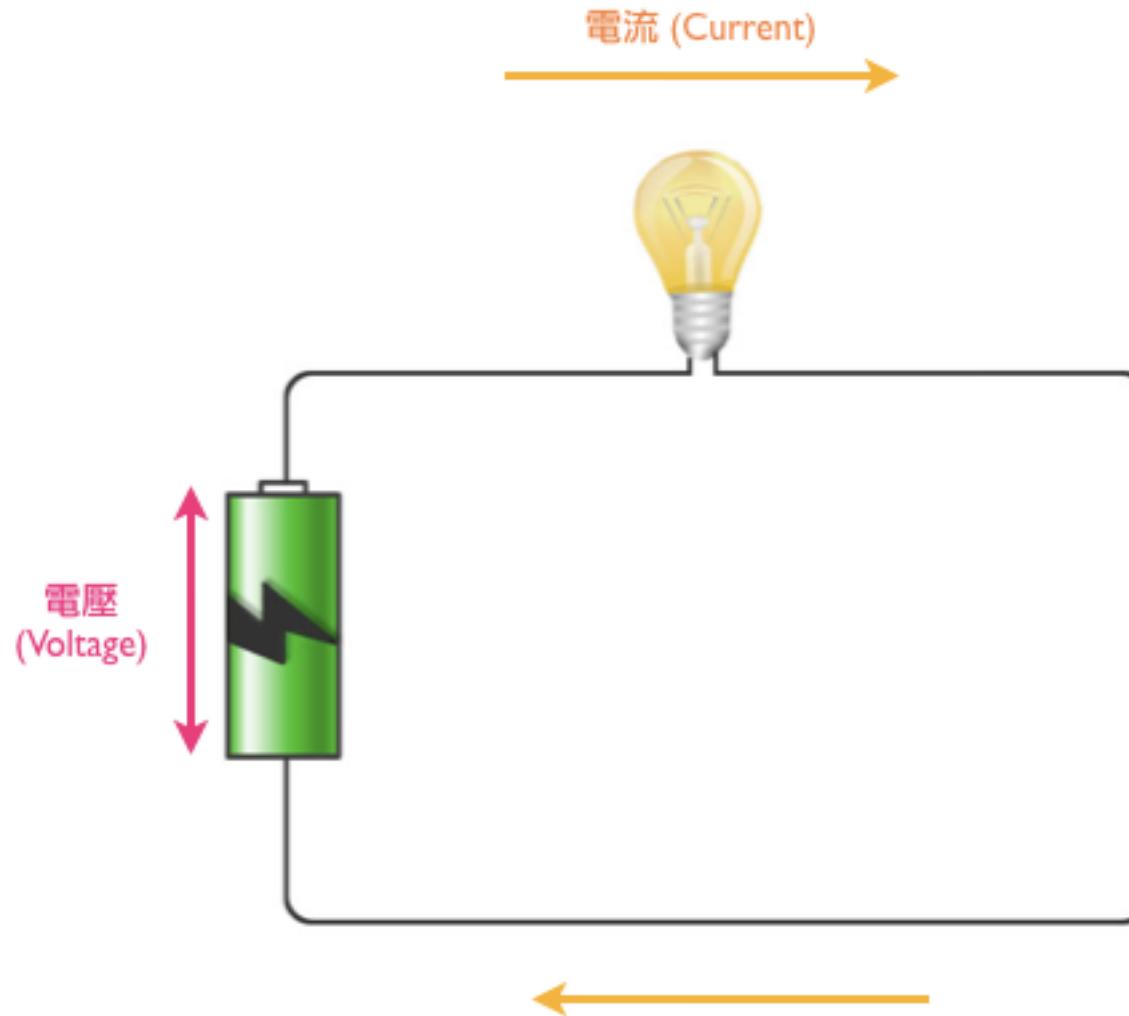
void loop() // run over and over again
{
    digitalWrite(ledPin, HIGH); // sets the LED on
    delay(1000); // waits for a second
    digitalWrite(ledPin, LOW); // sets the LED off
    delay(1000);
}
```

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# 了解麵包板

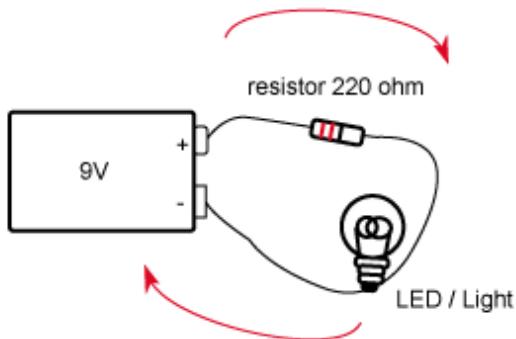


# 最簡單的電路

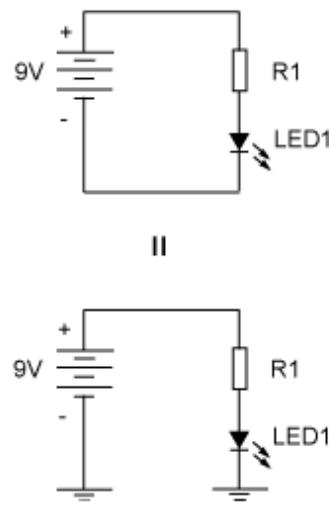


圖片來源 :<http://interactive2go.blogspot.com/2009/04/digital-out.html>

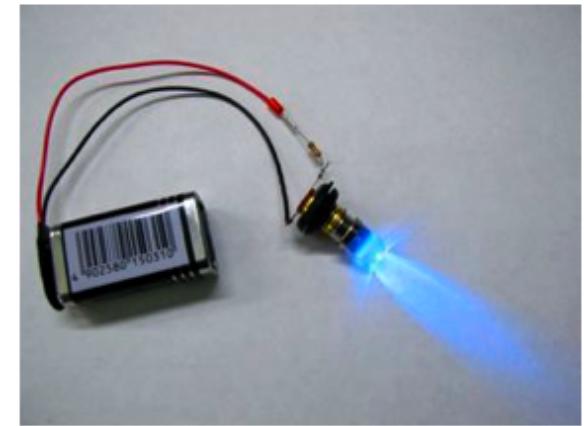
# 最簡單的電路（加上電阻）



線路示意圖



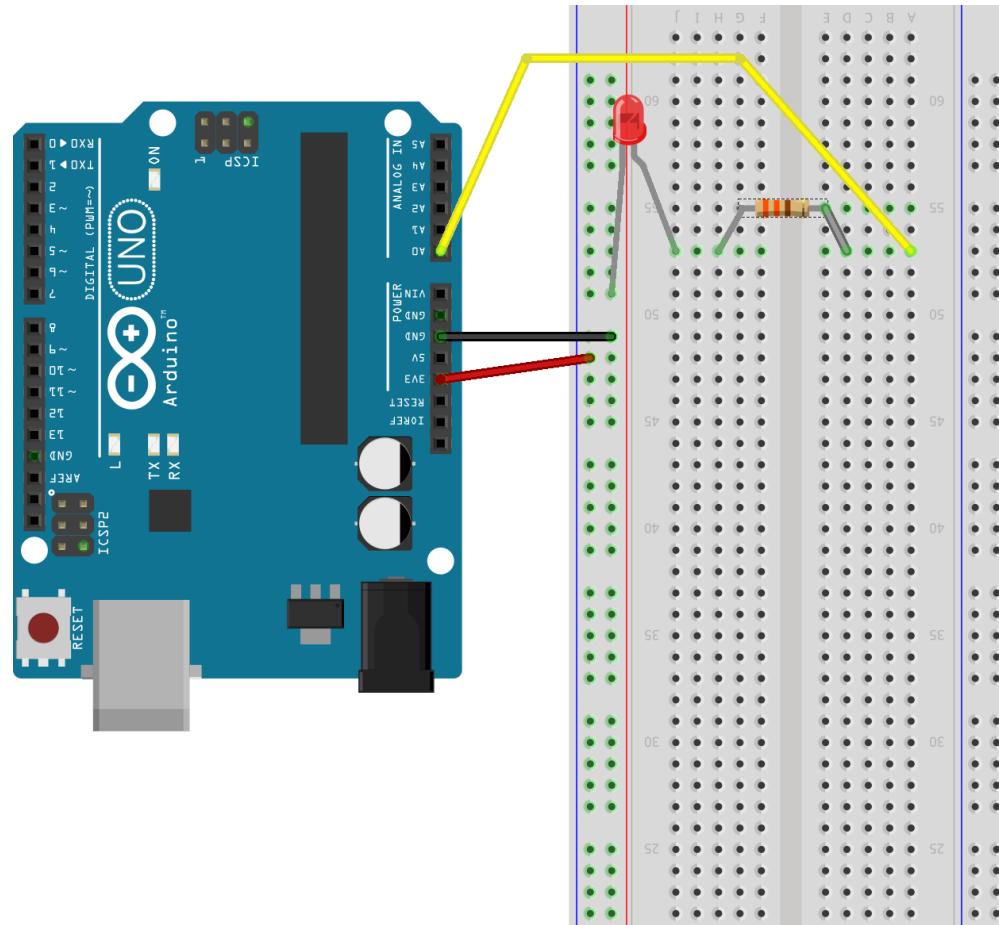
電路圖



實作此電路

圖片來源 <http://interactive2go.blogspot.com/2009/04/digital-out.html>

# 範例一 Hello Arduino: blink LED!



程式檔：Arduino IDE 的 File > Sketchbooks > Example > Digital > Blink

# 上傳程式至 Arduino 板子

1. 撰寫 Arduino 程式

2. 檢查程式是否有誤



3. 設定 Arduino 板子型號：

Tools > Board > ESP32 Dev Module

4. 設定 USB serial port :

Tools > Serial Port > (windows跟 mac 不同 )

Windows用戶請參考：<http://arduino.cc/en/Guide/Windows>

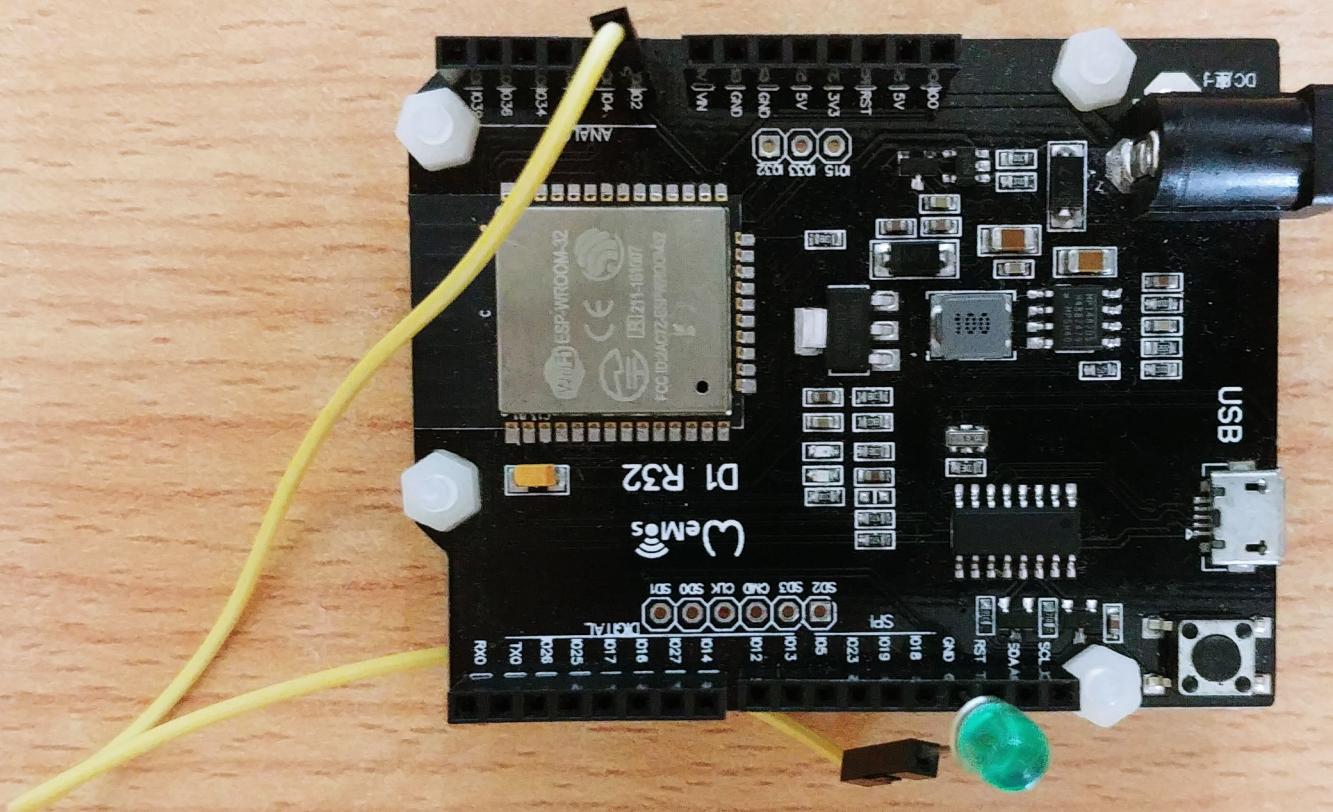
Mac用戶請參考：<http://arduino.cc/en/Guide/MacOSX>

5. 上傳程式至 Arduino 板子



# 範例一 Hello Arduino: blink LED!

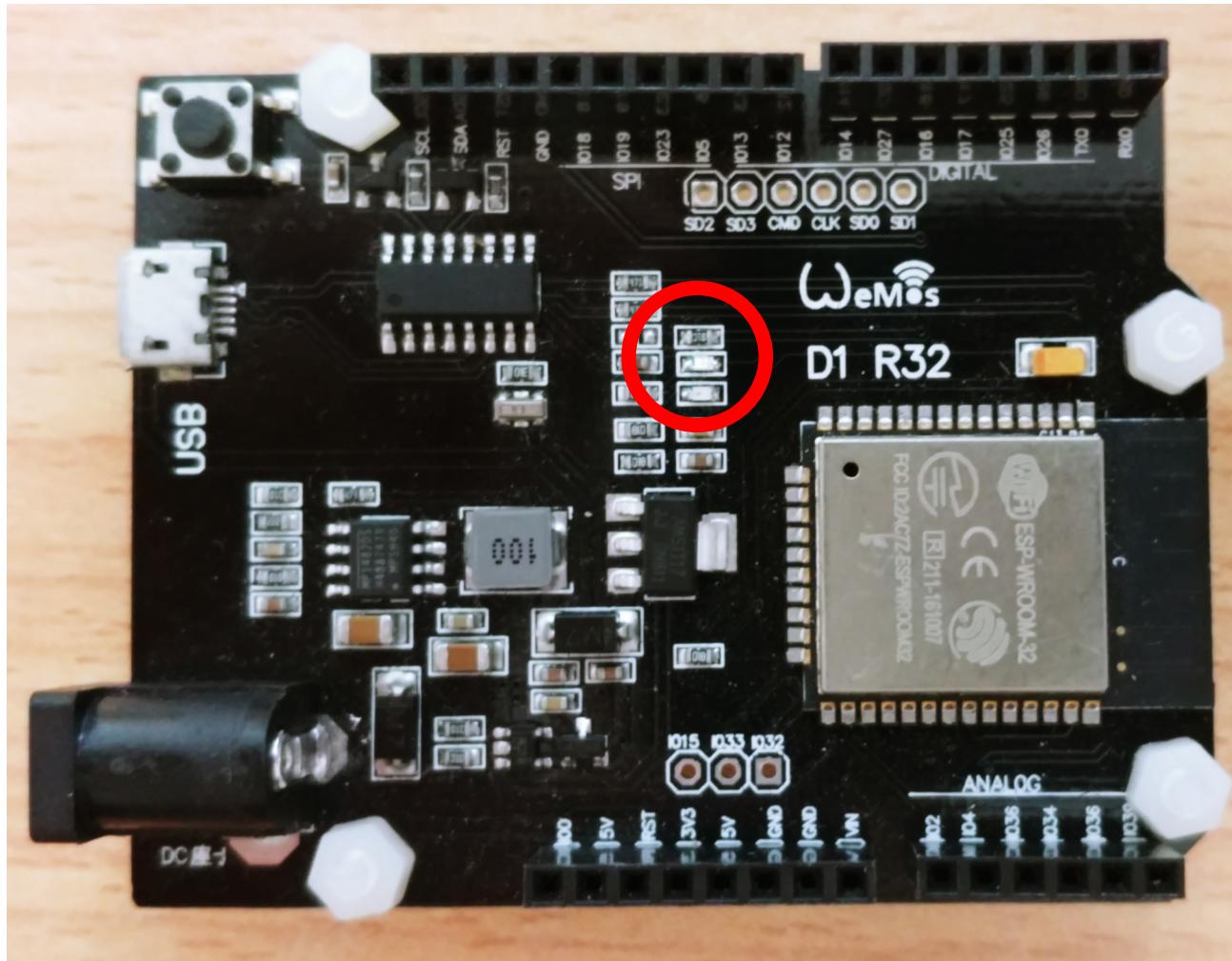
使用 ESP32 板子上的 pin 2 跟 GND 實作  
(ESP32 板子已內建電阻 )



# 範例一 Hello Arduino: blink LED!

ESP32 D1 R32

已內建接在 pin 2 的 LED 燈



# Blink 程式碼解說

```
void setup()          //初始設定區塊（只執行一次）
{
}

void loop()          //重複執行區塊（不斷地重複執行）
{
}
```

# Blink 程式碼解說

```
int ledPin = 2; // 設定第 2pin 為接 LED 燈的 pin 腳  
  
void setup()  
{  
  
}  
  
void loop()  
{  
  
}
```

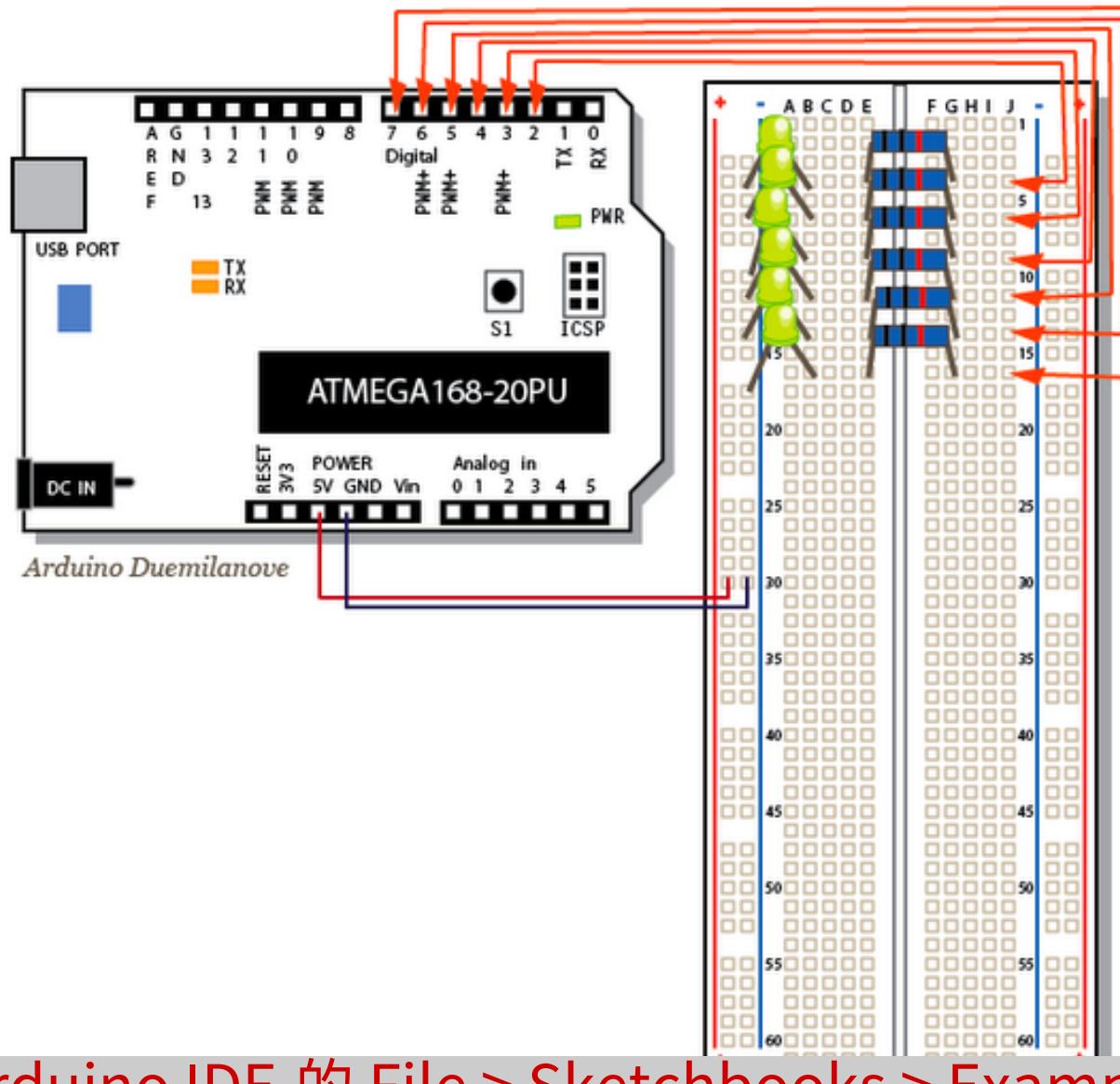
# Blink 程式碼解說

```
int ledPin = 2; //設定第 2pin 為接 LED 燈的 pin 腳

void setup()
{
    pinMode(ledPin, OUTPUT); //設定 pin 腳模式為輸出
}

void loop()
{
    digitalWrite(ledPin, HIGH); //給 pin 腳高電壓 (LED 通電就亮)
    delay(1000); //延遲 1 秒鐘 (1000 毫秒)
    digitalWrite(ledPin, LOW); //給 pin 腳低電壓 (LED 不通電就暗)
    delay(1000); //延遲 1 秒鐘 (1000 毫秒)
}
```

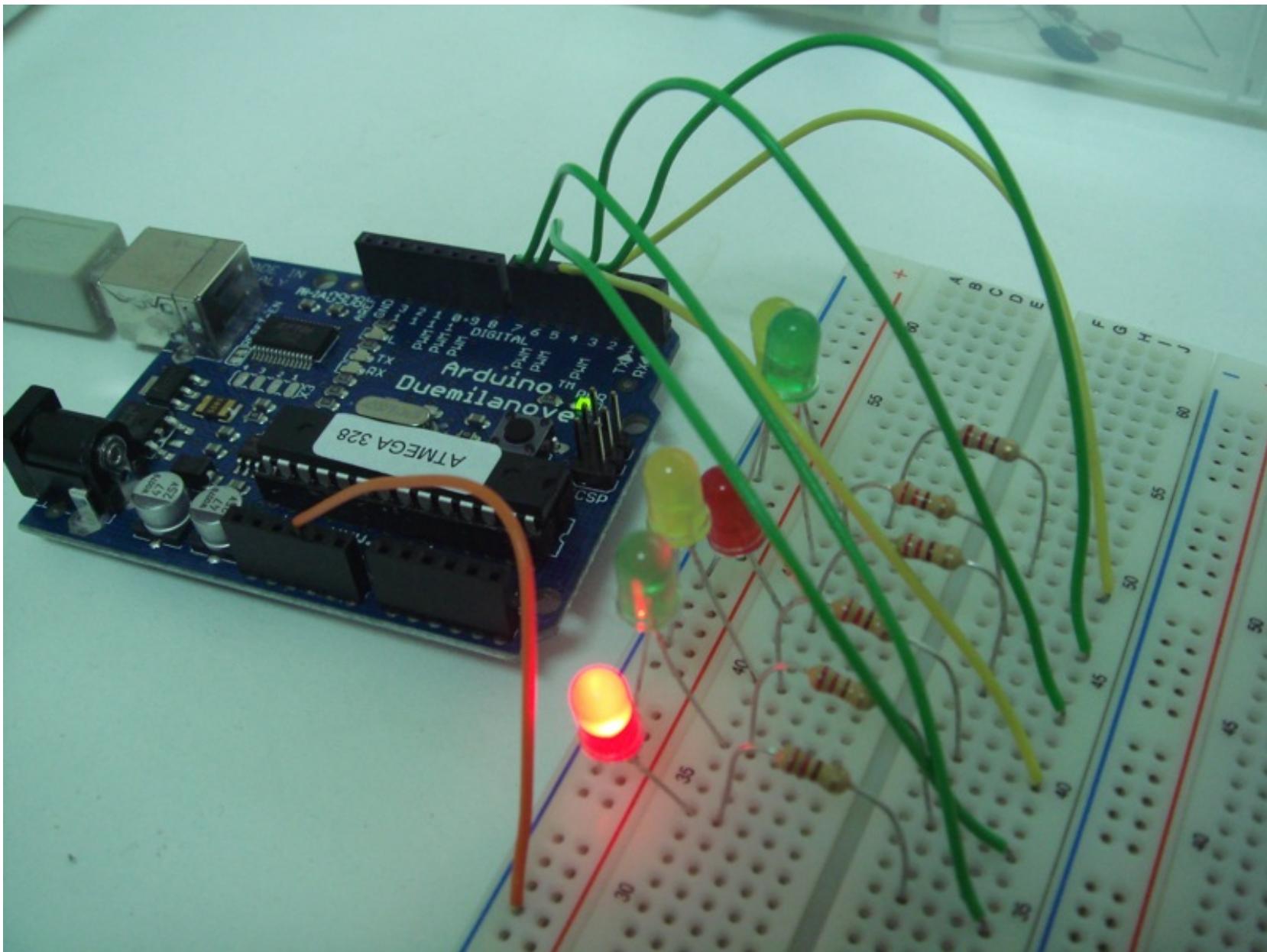
# 範例二 LED loop



程式檔：Arduino IDE 的 File > Sketchbooks > Example > Digital > Loop

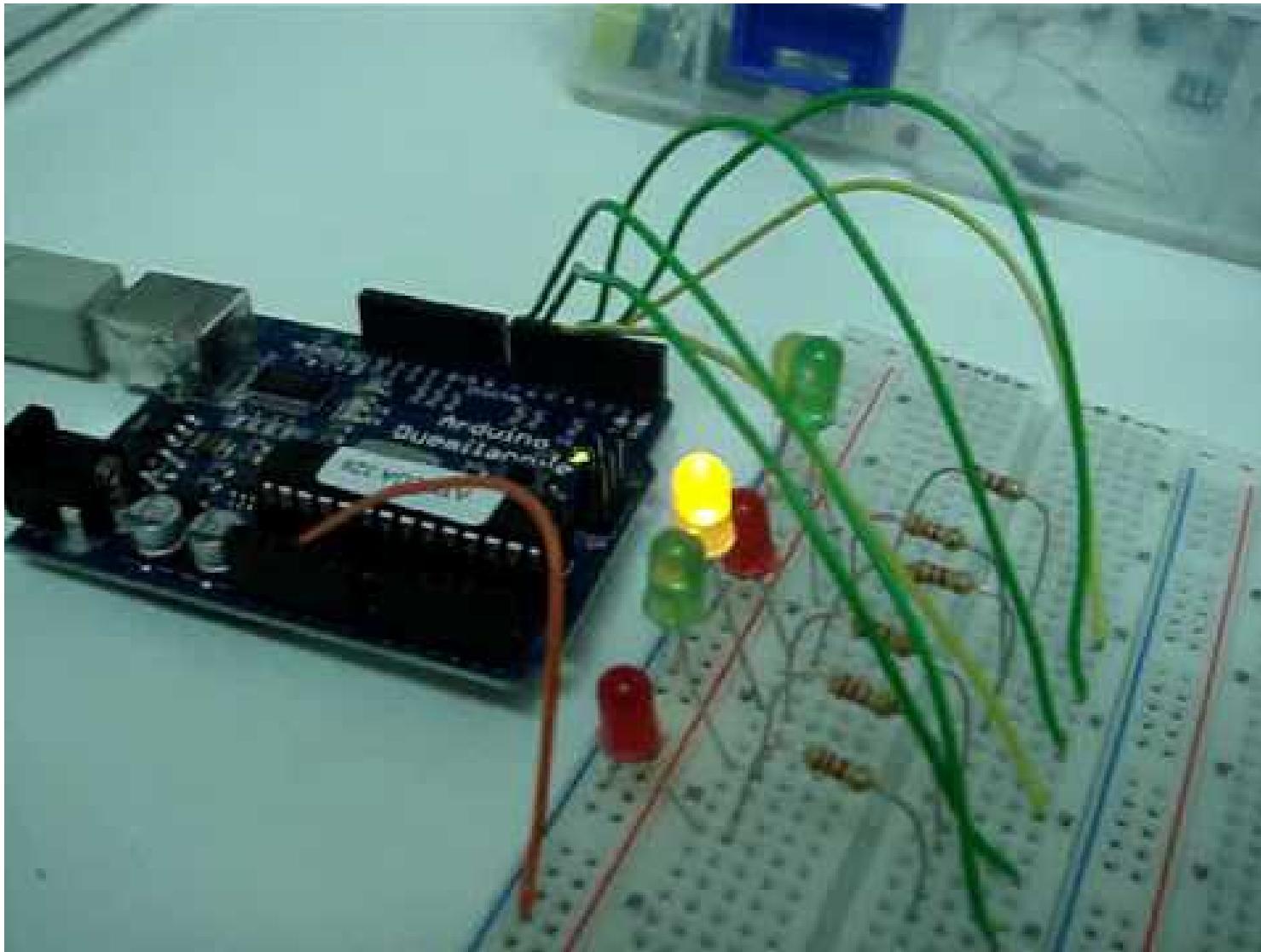
圖片來源：<http://interactive2go.blogspot.com/2009/04/digital-out.html>

## 範例二 LED loop

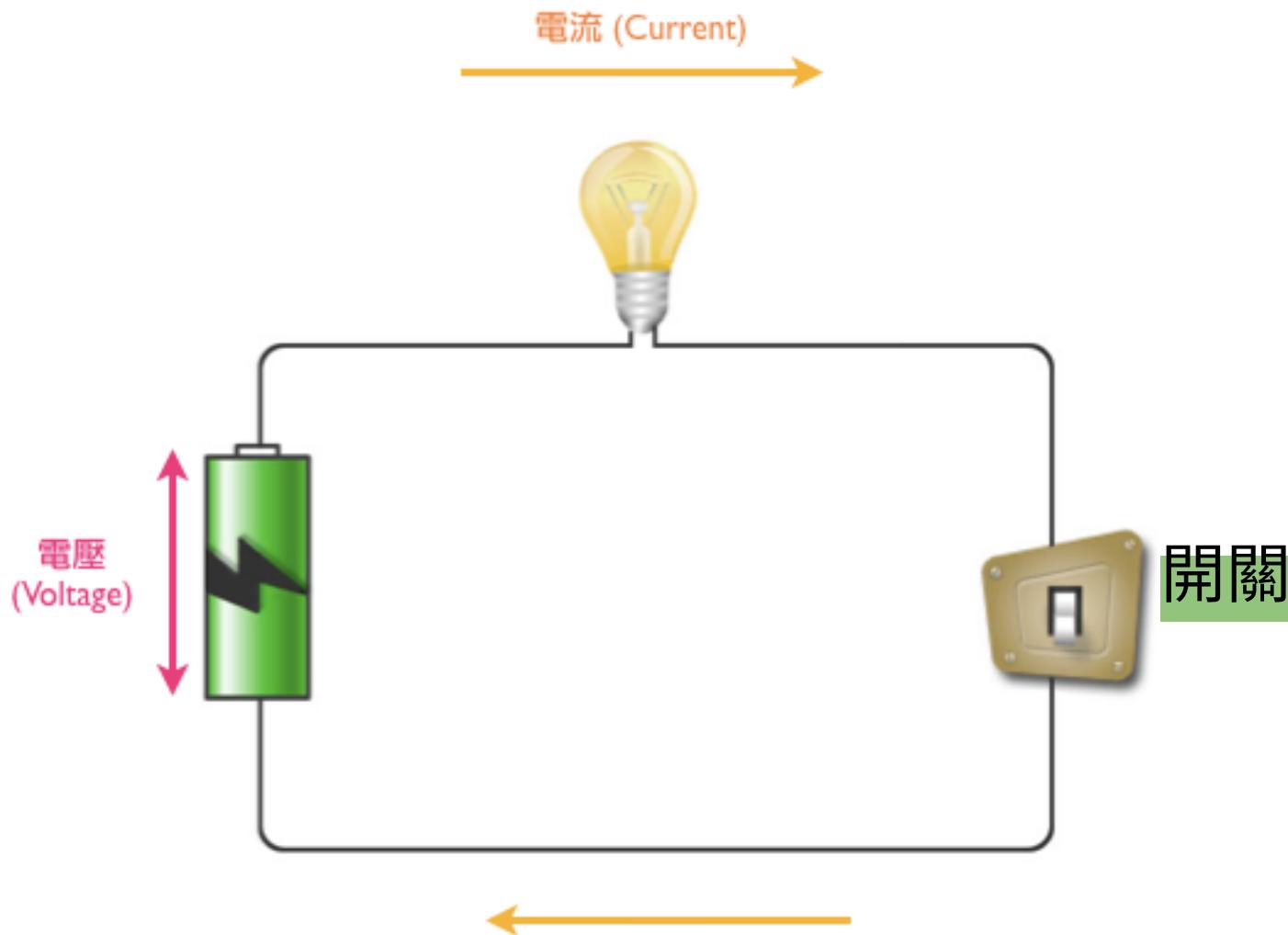


# 範例二 LED loop

影片來源：<http://www.youtube.com/watch?v=2q2jiePq6Ww>

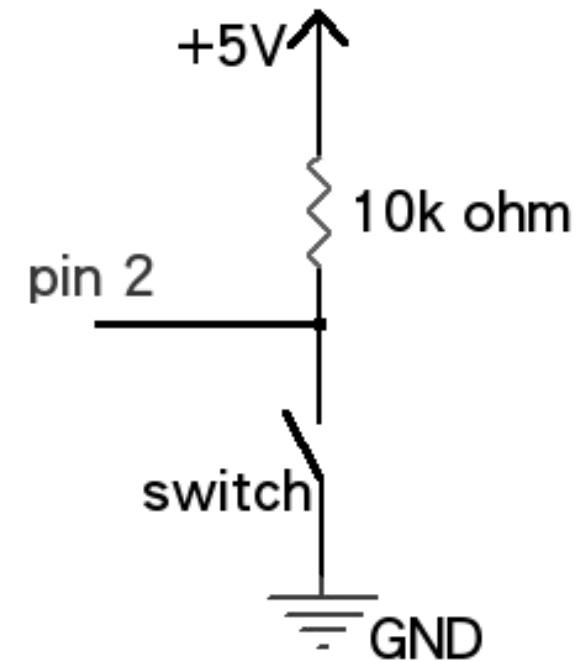
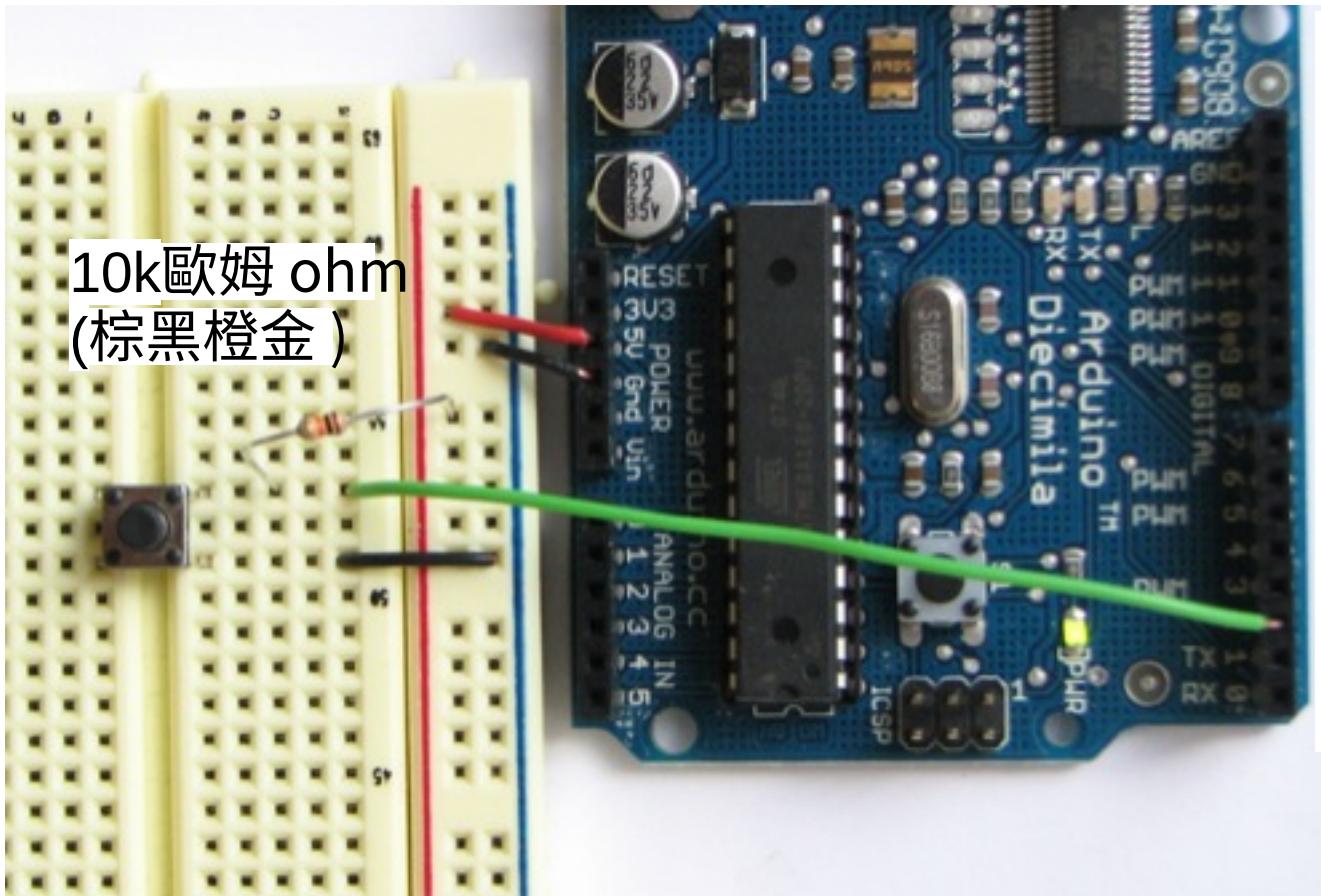


# 第二簡單的電路（加上開關）



圖片來源 : <http://interactive2go.blogspot.com/2009/04/digital-out.html>

# 範例三 Button (接法一)



程式檔：Arduino IDE 的 File > Sketchbooks > Example > Digital > Button  
圖片來源：<http://arduino.cc/en/Tutorial/Button>

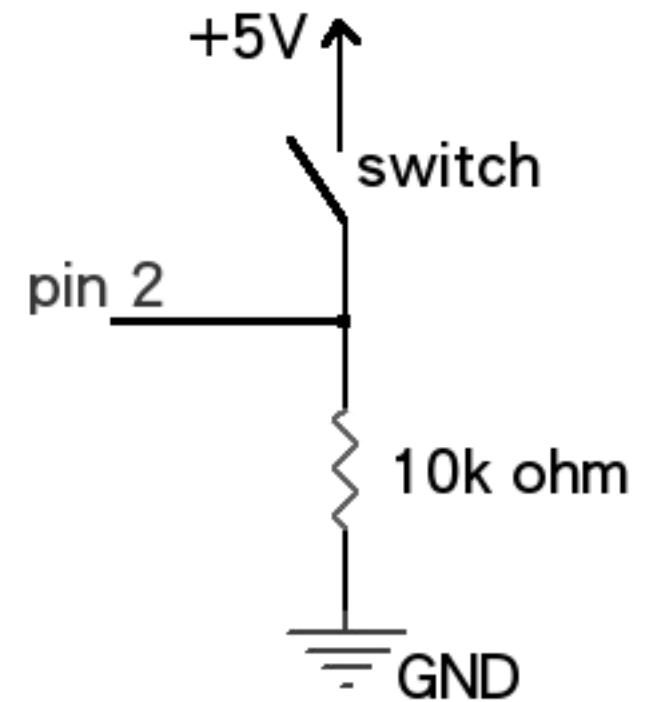
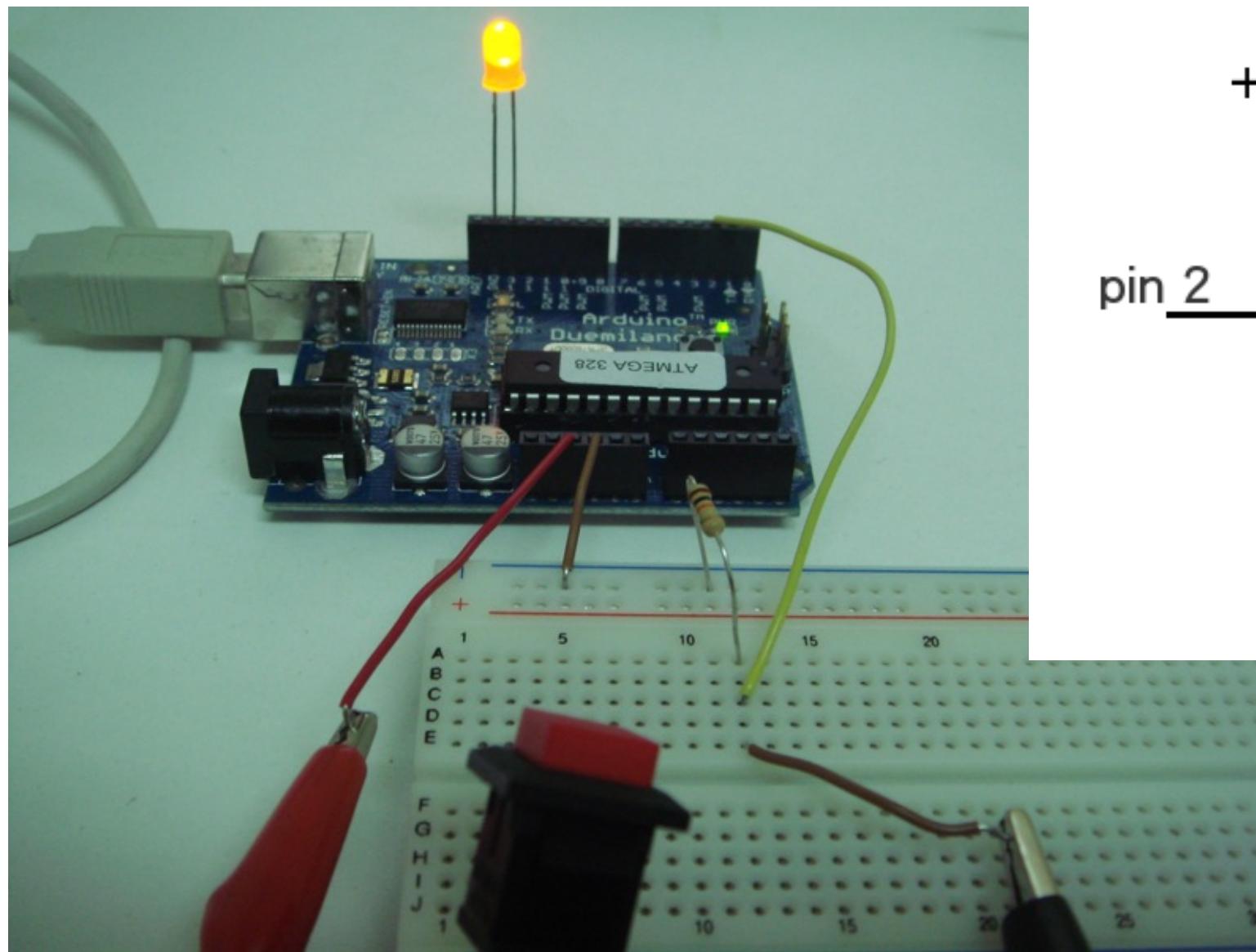
# Button (接法一) 程式碼解說

```
int ledPin = 13;      //設定第 13 pin 給 LED 燈
int inPin = 2;        //設定第 2 pin 為輸入 pin (為了讀取按鈕狀態)
int val = 0;          //讀取按鈕狀態

void setup() {
    pinMode(ledPin, OUTPUT); //設定 LED pi腳狀態為輸出
    pinMode(inPin, INPUT);   //設定第 2 pin 狀態為輸入
}

void loop(){
    val = digitalRead(inPin); //讀取輸入 pi腳的值
    if (val == HIGH) {        //確認是否輸入為高電壓 (按鈕壓下)
        digitalWrite(ledPin, LOW); //給 pi腳低電壓 (關掉 LED 燈)
    } else {
        digitalWrite(ledPin, HIGH); //給 pi腳高電壓 (開啟 LED 燈)
    }
}
```

# 範例三 Button ( 接法二 )



# 參考資料

- Arduino官網 <http://arduino.cc>
- Arduino樂園 <http://arduino.tw/>
- 小毛的 Interactive2Go <http://interactive2go.blogspot.com>
- ladyada的 Arduino Tutorial <http://www.ladyada.net/learn/arduino/index.html>
- 基本電學常識 <http://tw.group.knowledge.yahoo.com/primary-school/listitem/view?iid=190>
- 電阻色碼計算 [http://samengstrom.com/nxl/3660/4\\_band\\_resistor\\_color\\_code\\_page.en.html](http://samengstrom.com/nxl/3660/4_band_resistor_color_code_page.en.html)
- 線上相關電學計算網站 <http://bbs.audiohall.net/viewtopic.php?t=1337&sid=999ddd2b9f932f45c95e192388a5dfa3>
- 電阻概論 <http://sun.cis.scu.edu.tw/~lab/knowledge/r.htm>
- 歐姆定律 [http://en.wikipedia.org/wiki/Ohm%27s\\_law](http://en.wikipedia.org/wiki/Ohm%27s_law)