Arduino-
無線傳輸
nrf24L01篇

童贏毅、陳美如

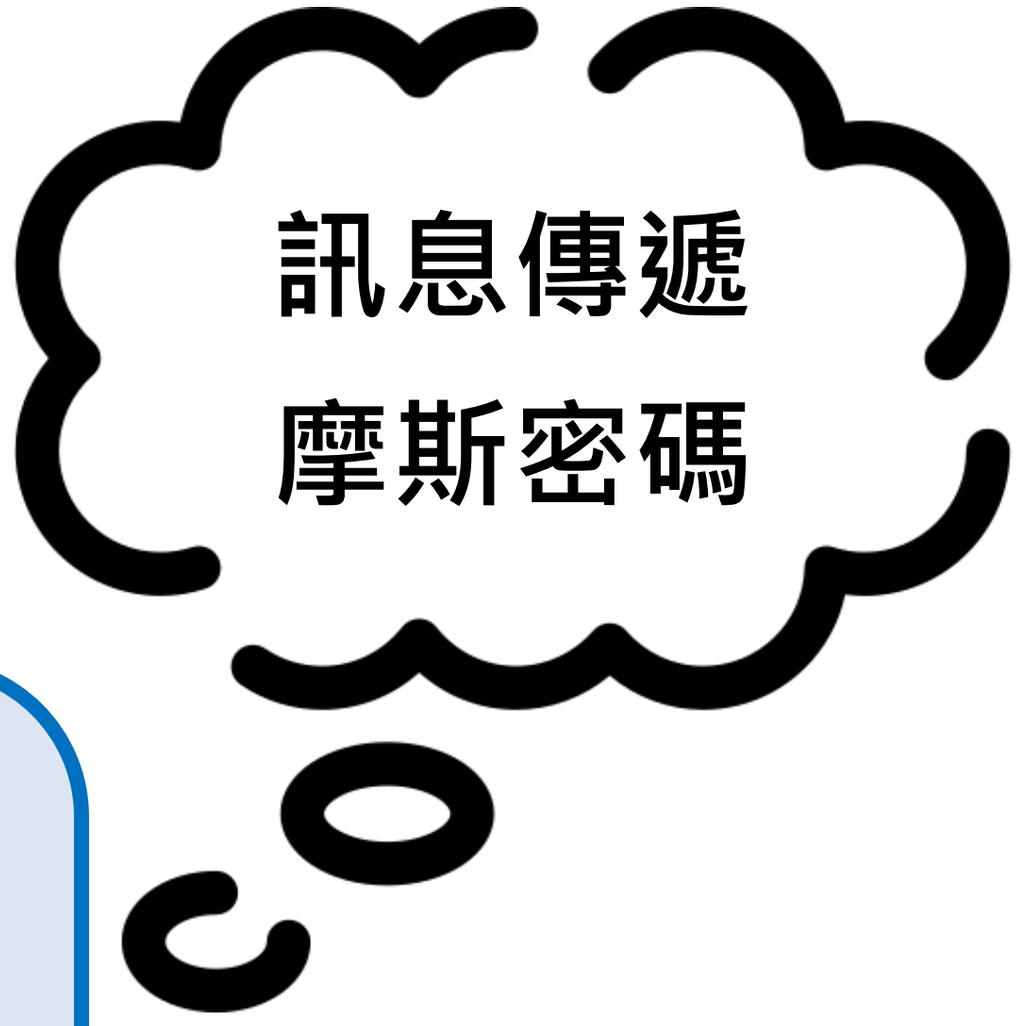
Category

簡介無線通訊

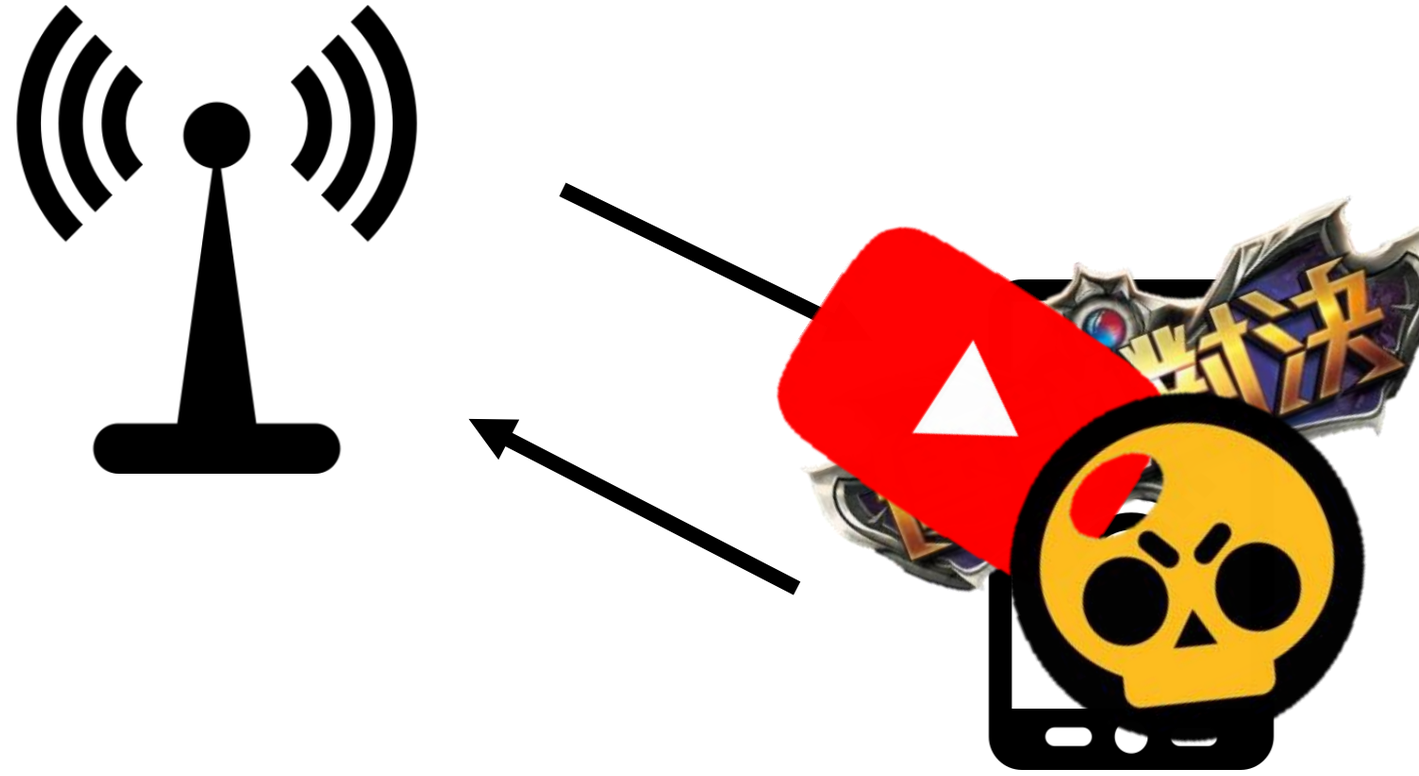
介紹Arduino、腳位、功用

按鍵學習

nrf24L01無線模組



無線傳輸是什麼？



主要分為三種：

WIFI

BT

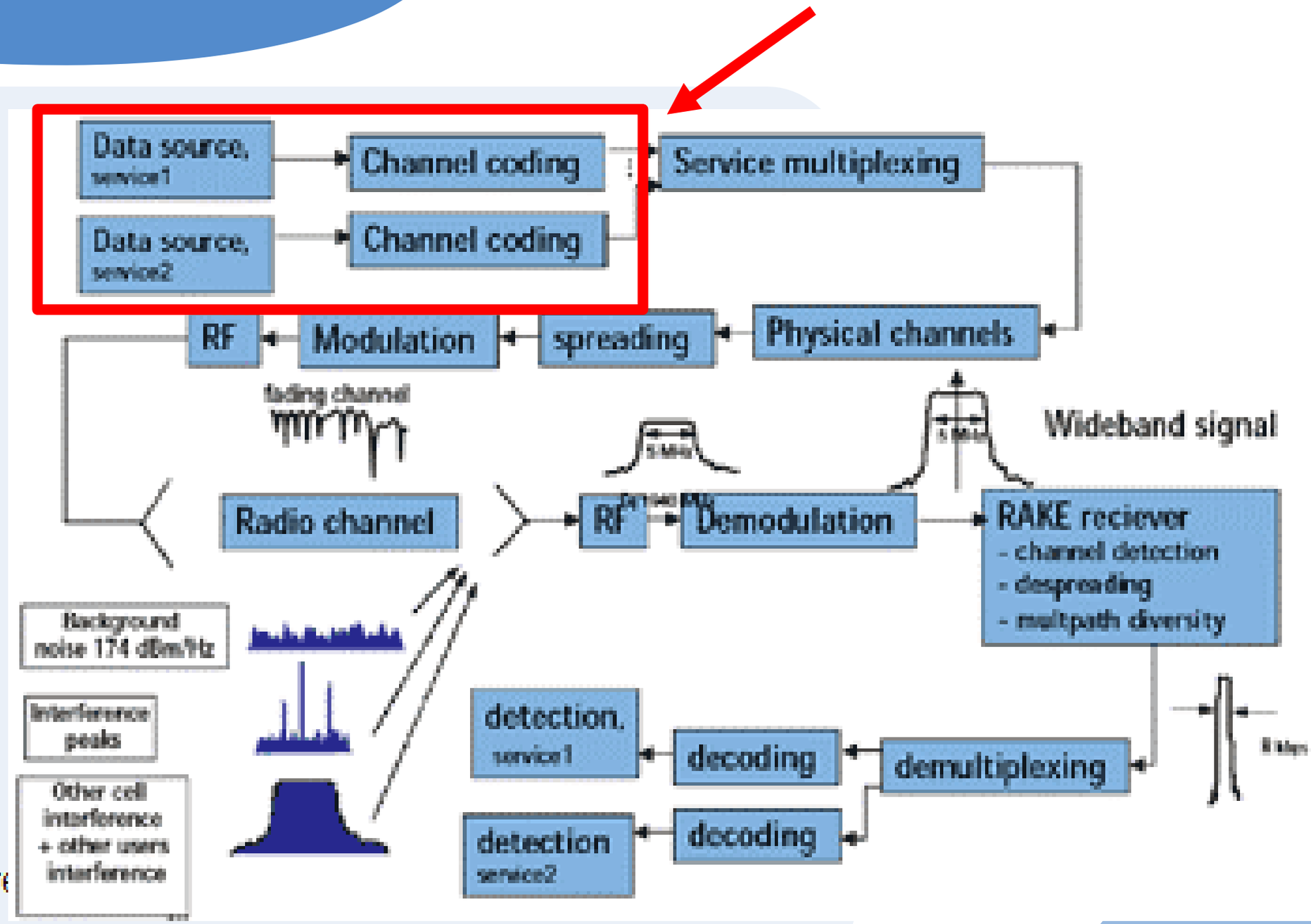
RF

RF還有什麼應用？

NFC

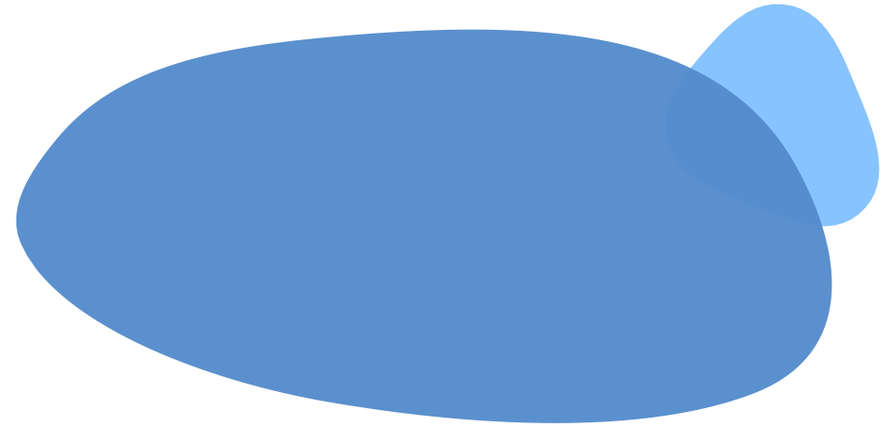
Zigbee

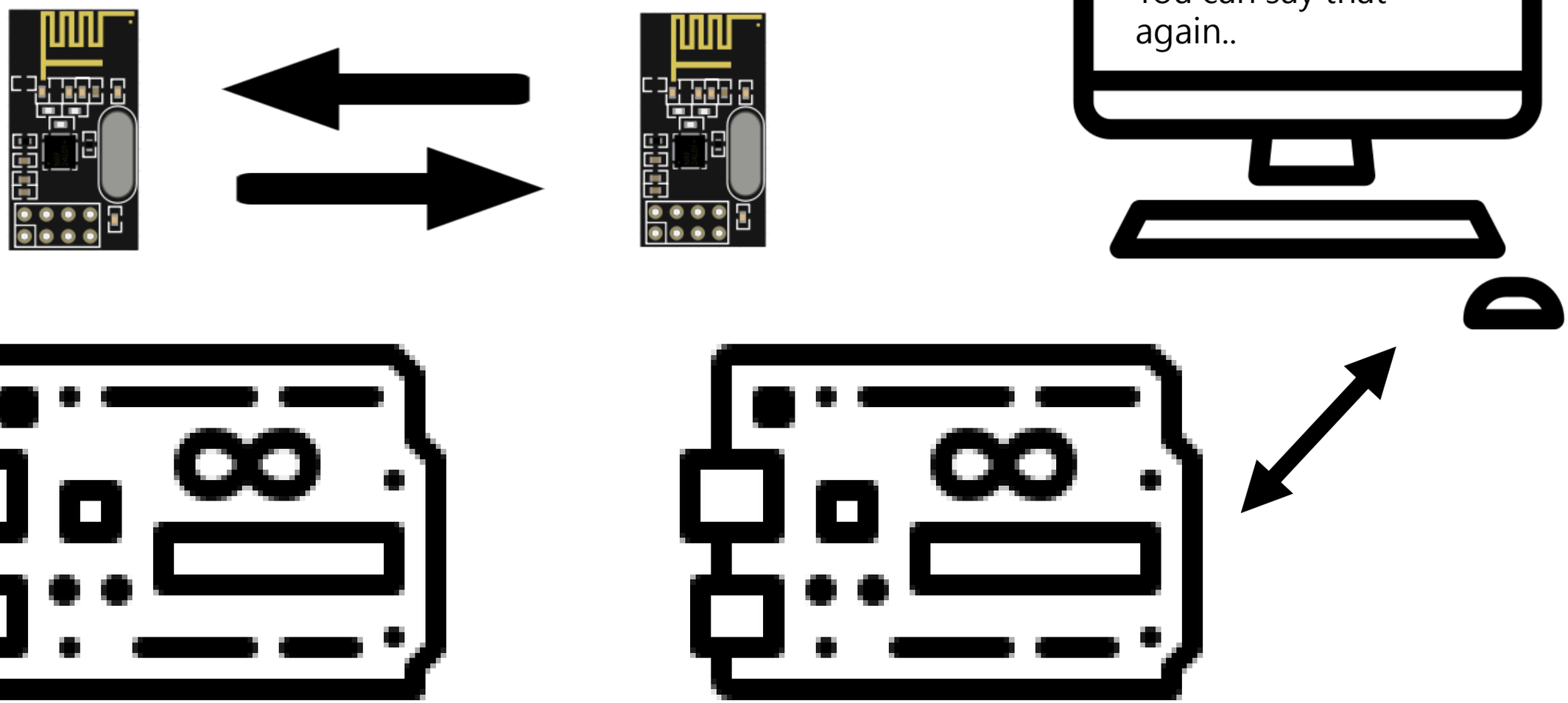
無線傳輸架構



Figur

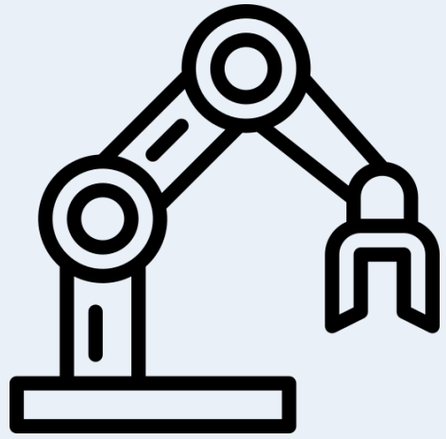
那如何實現無線傳輸呢？





Arduino可以幹嘛？

可以吃嗎？

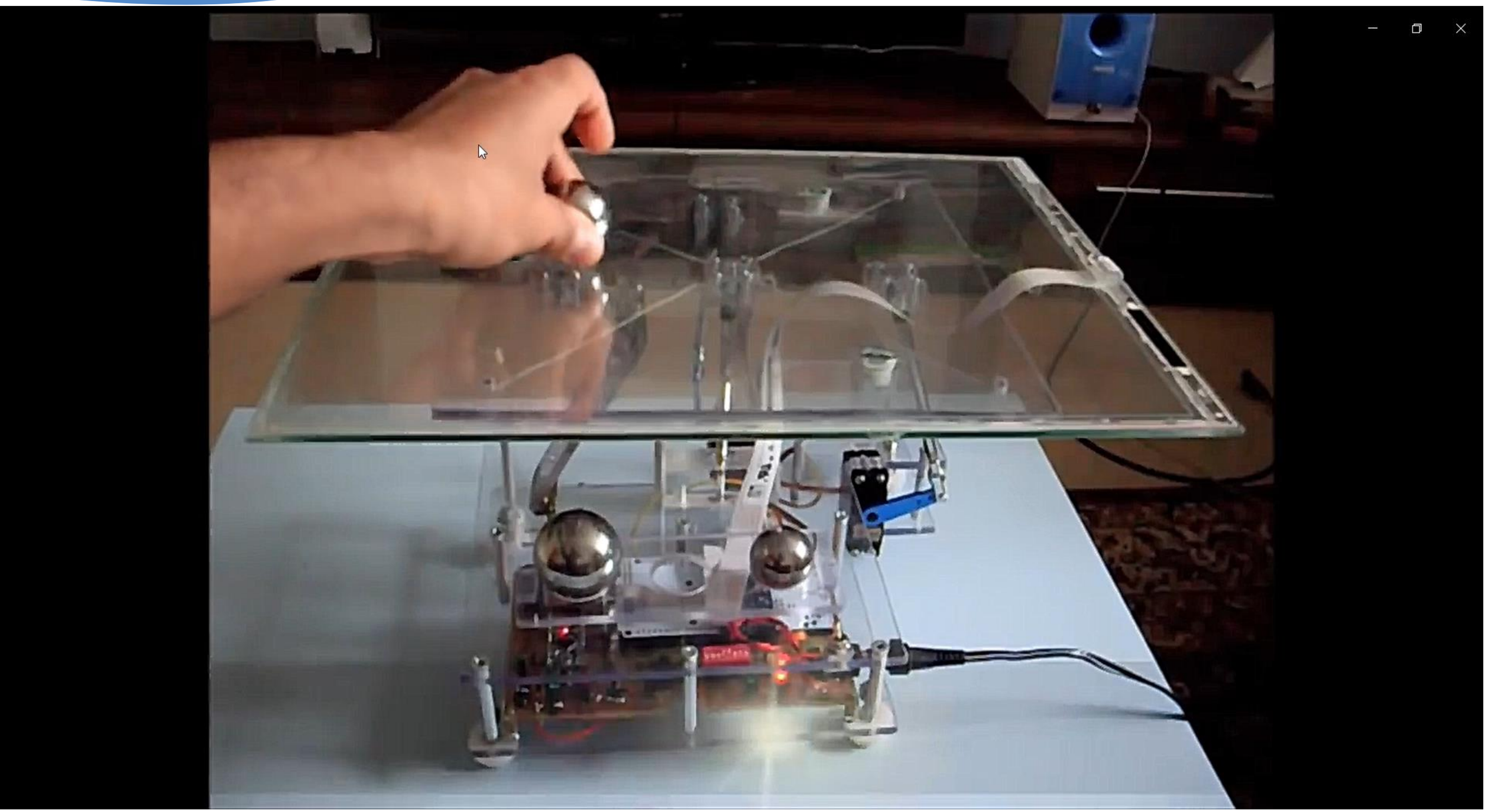


Robot arm

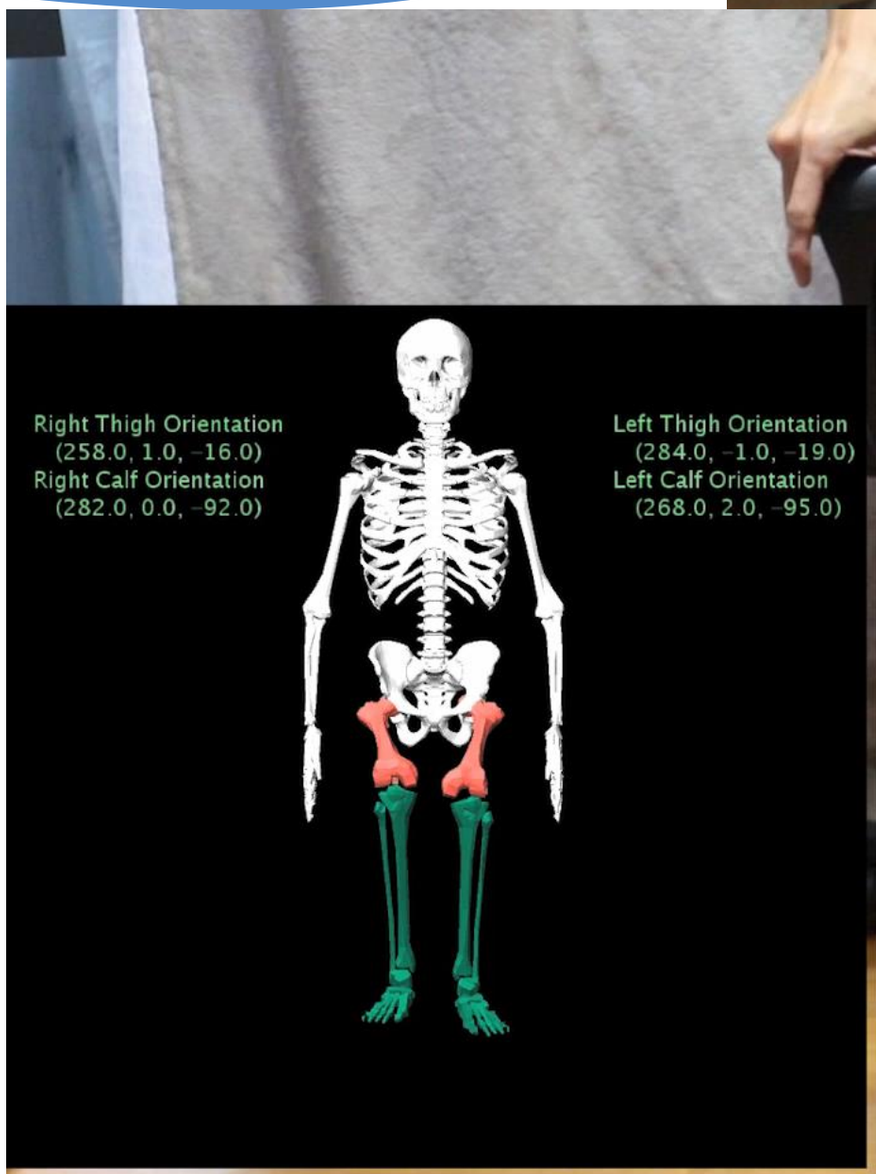
Quadcopter

Game controller

Arduino Project



Arduino Project



Arduino 簡介

認識 Arduino

Q1.Arduino源自於哪裡？

ANS:義大利

Q2.Arduino 多少錢就能買到？

ANS:120元

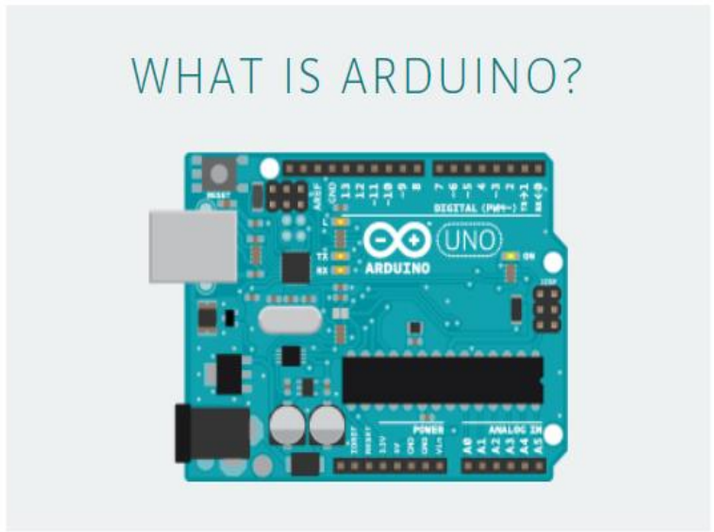
Q3.除了arduino 外你還知道有那些開發版？

ANS: nodeMCU、stm32、樹莓派、香橙派、橘子派、香蕉派

Arduino 由來

下載安裝
Arduino IDE

按download

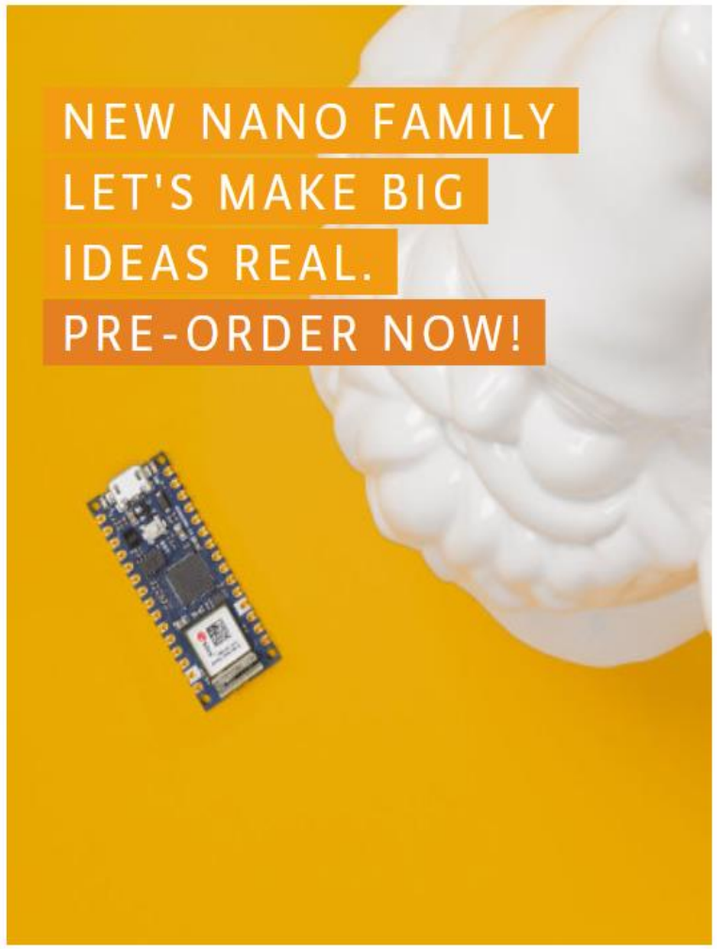


BUY AN ARDUINO

LEARN ARDUINO

DONATE

ANNOUNCING THE NEW ARDUINO CREATE MAKER PLAN!



下載安裝
Arduino IDE

ARDUINO 1.8.9

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, for Windows XP and up
Windows ZIP file for non admin install

Windows app Requires Win 8.1 or 10
Get

Mac OS X 10.8 Mountain Lion or newer

Linux 32 bits
Linux 64 bits
Linux ARM 32 bits
Linux ARM 64 bits

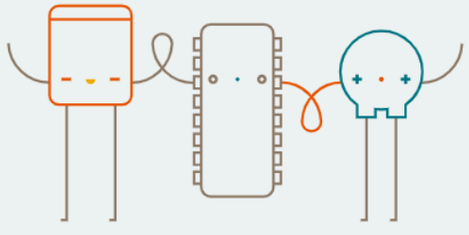
Release Notes
Source Code
Checksums (sha512)

ARDUINO

HOME STORE SOFTWARE EDUCATION RESOURCES COMMUNITY HELP

Contribute to the Arduino Software

Consider supporting the Arduino Software by contributing to its development. (US tax payers, please note this contribution is not tax deductible). Learn more on how your contribution will be used.



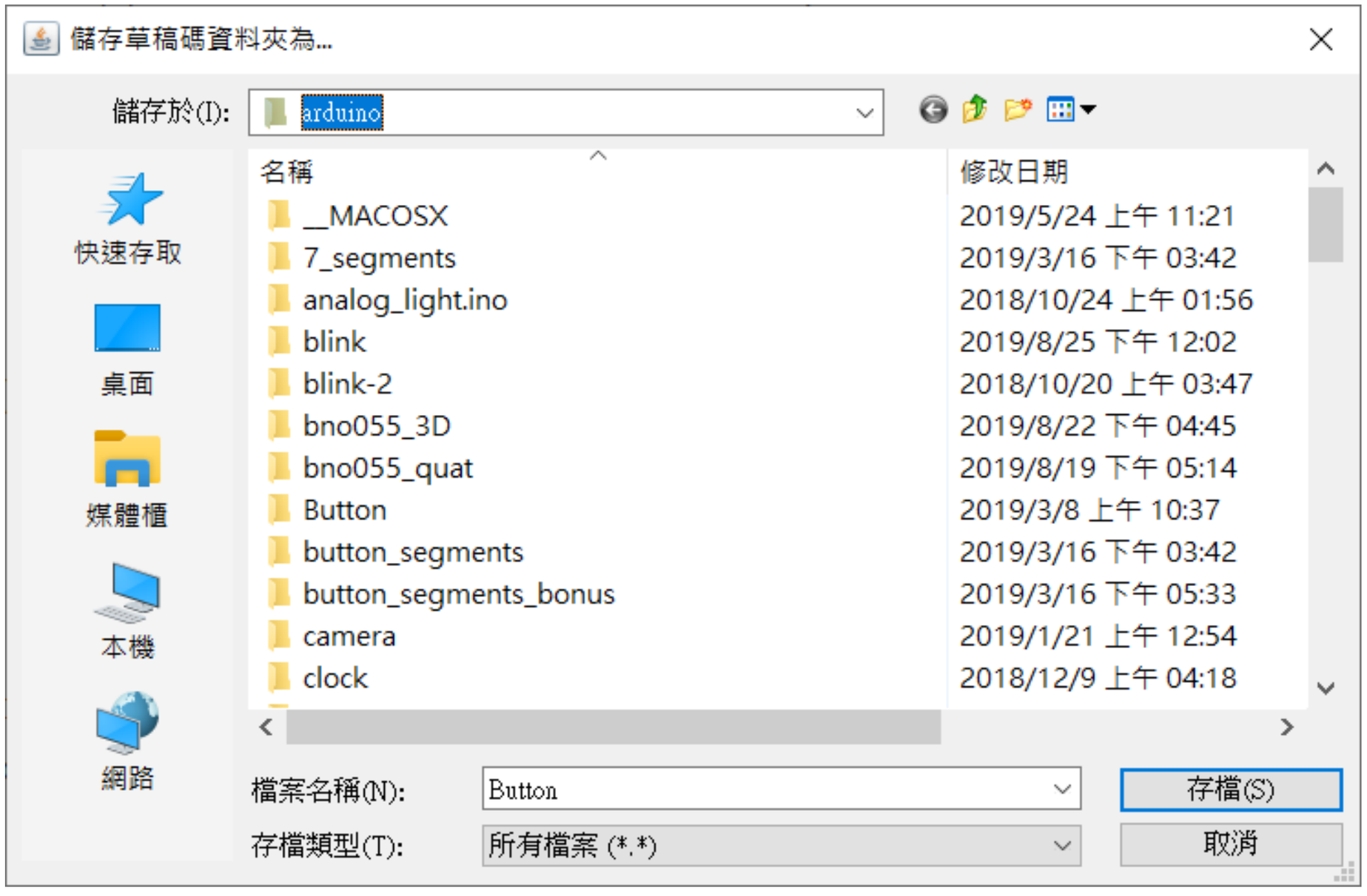
SINCE MARCH 2015, THE ARDUINO IDE HAS BEEN DOWNLOADED 33,982,283 TIMES. (IMPRESSIVE!) NO LONGER JUST FOR ARDUINO AND GENUINO BOARDS, HUNDREDS OF COMPANIES AROUND THE WORLD ARE USING THE IDE TO PROGRAM THEIR DEVICES, INCLUDING COMPATIBLES, CLONES, AND EVEN COUNTERFEITS. HELP ACCELERATE ITS DEVELOPMENT WITH A SMALL CONTRIBUTION! REMEMBER: OPEN SOURCE IS LOVE!

$3 $5 $10 $25 $50 OTHER

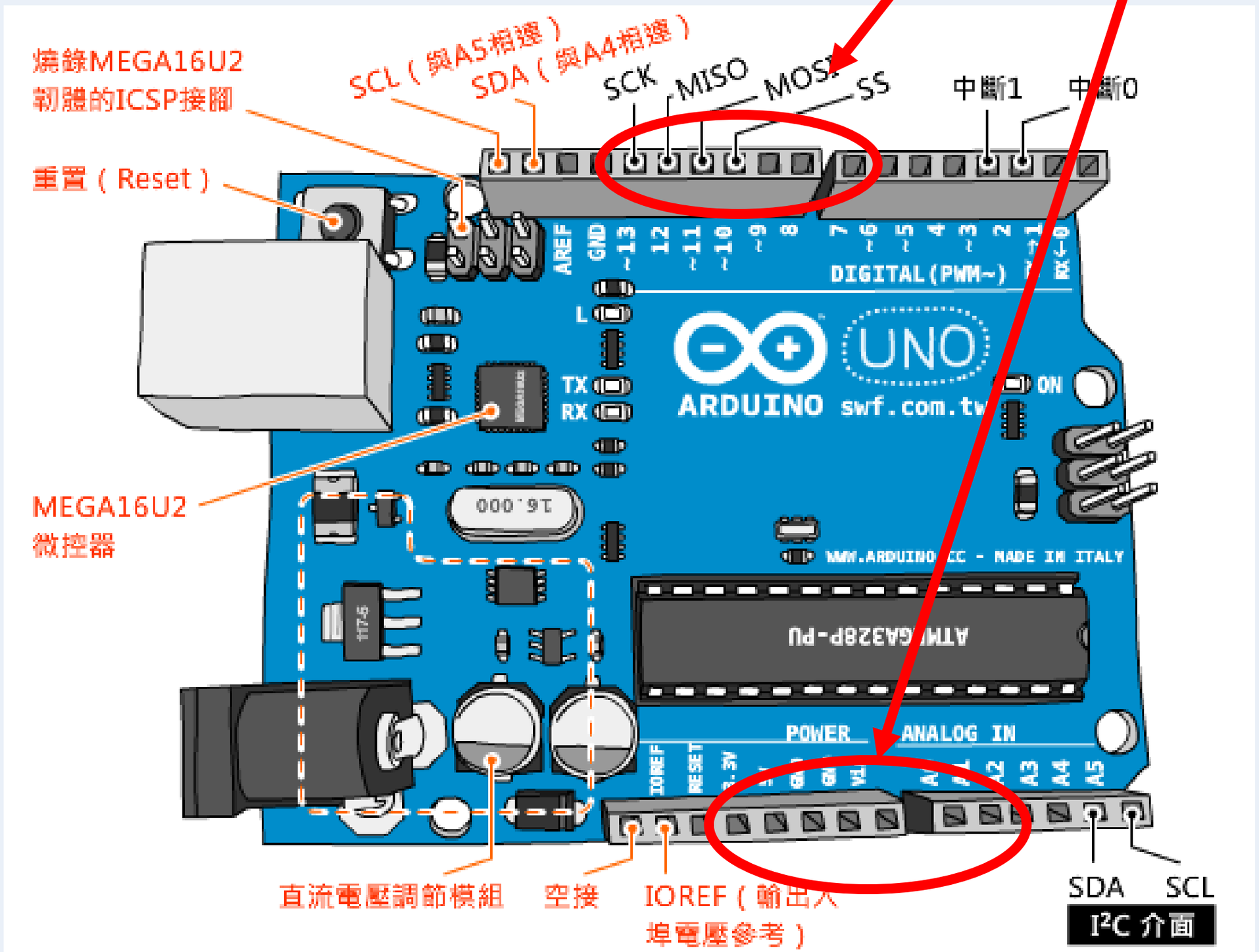
JUST DOWNLOAD CONTRIBUTE & DOWNLOAD

檔案存取

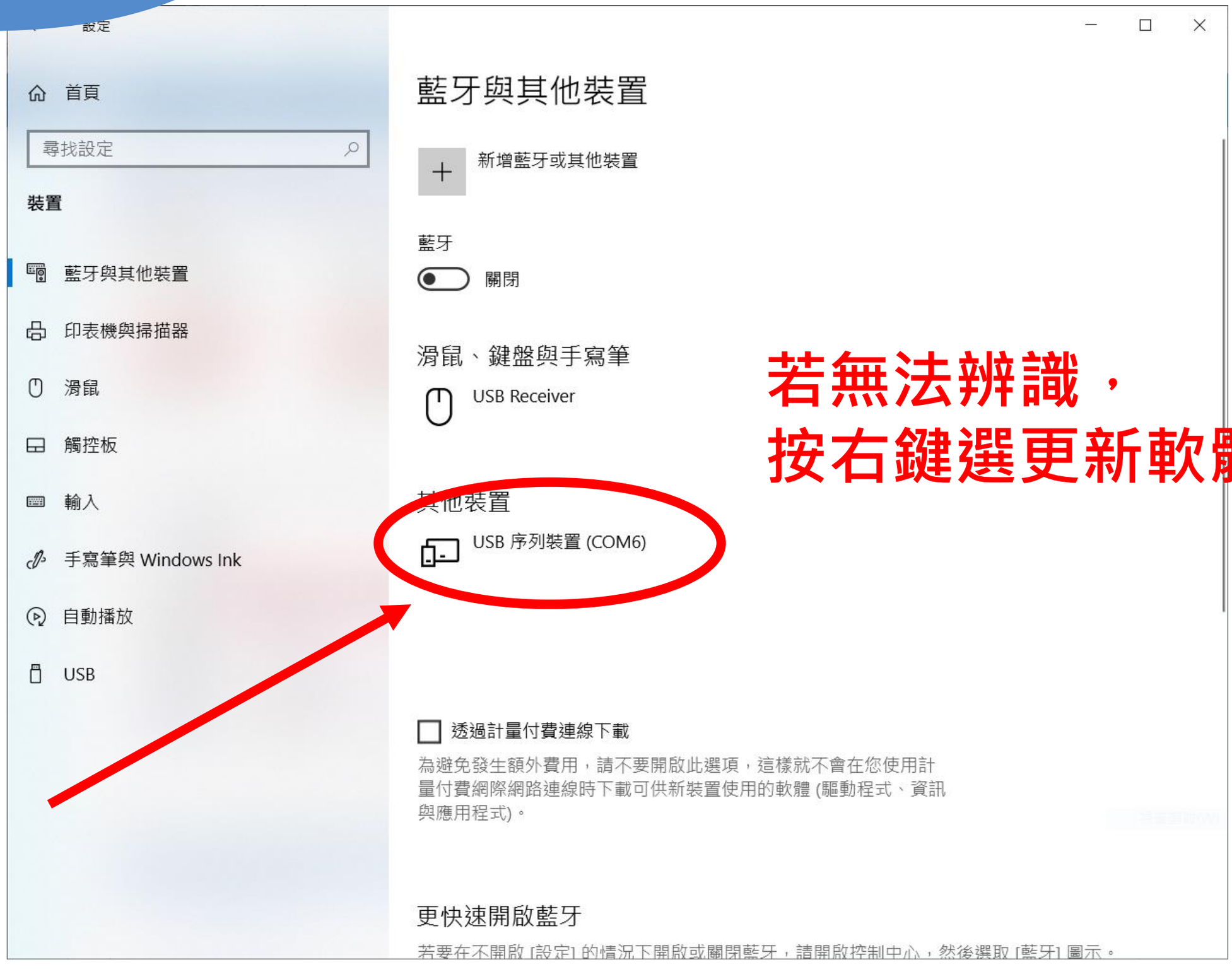
自製資料夾各別打名字存



Arduino 腳位介紹



下載安裝
Arduino IDE



選擇板子

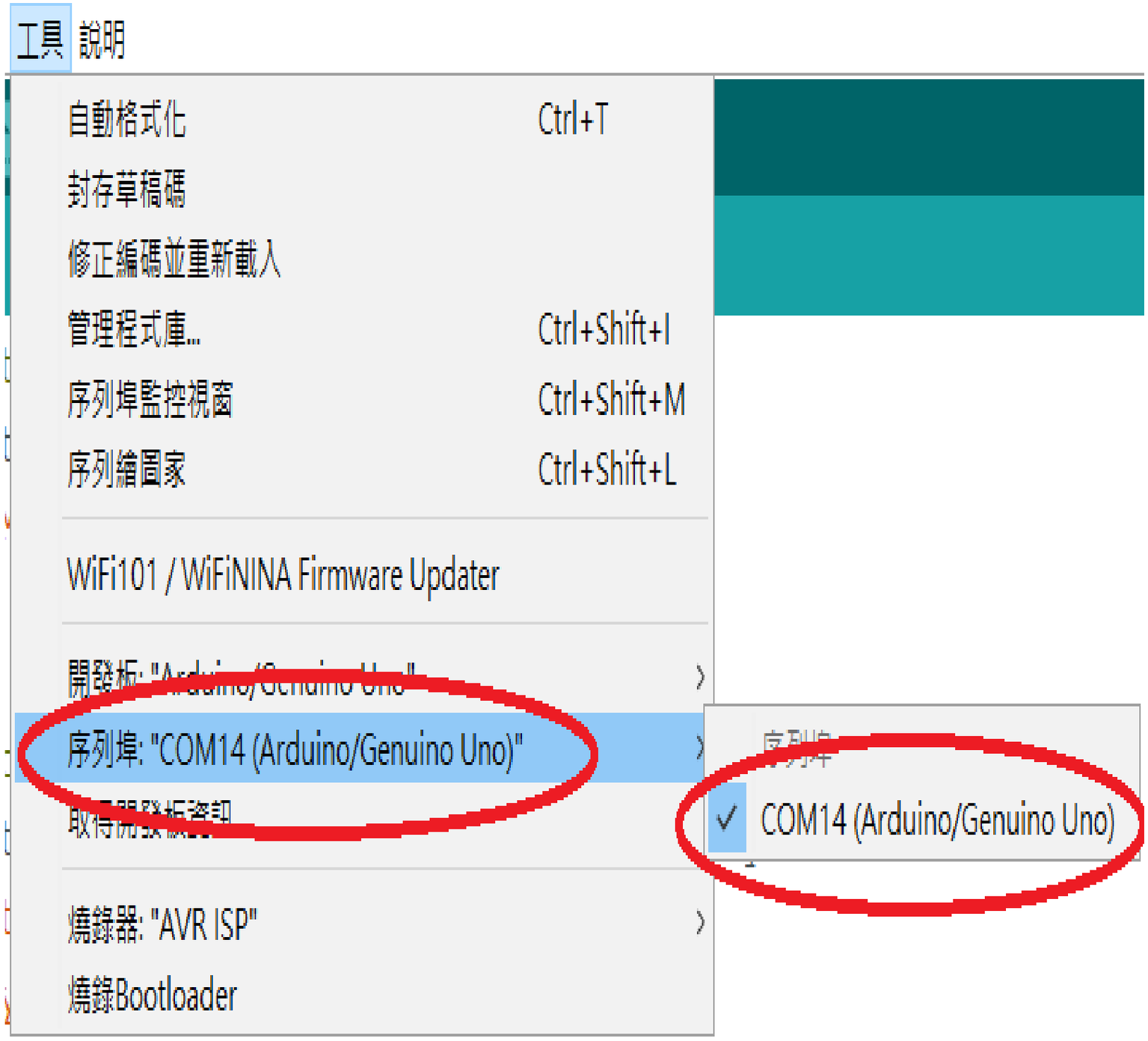
按工具
選擇開發板

選擇 arduino/ Genuino Uno

選擇序列埠

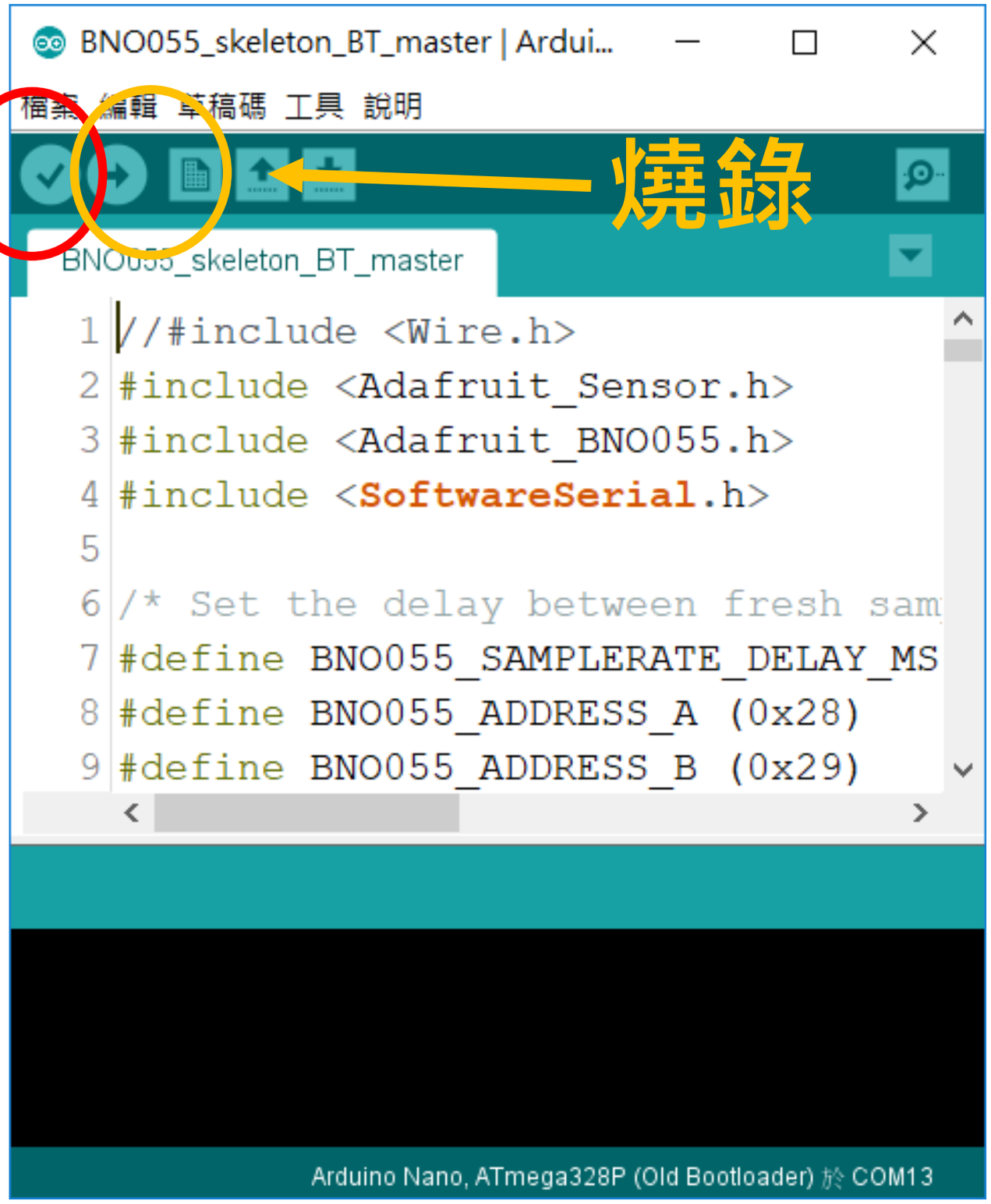
按工具
選擇序列埠

選擇COM?

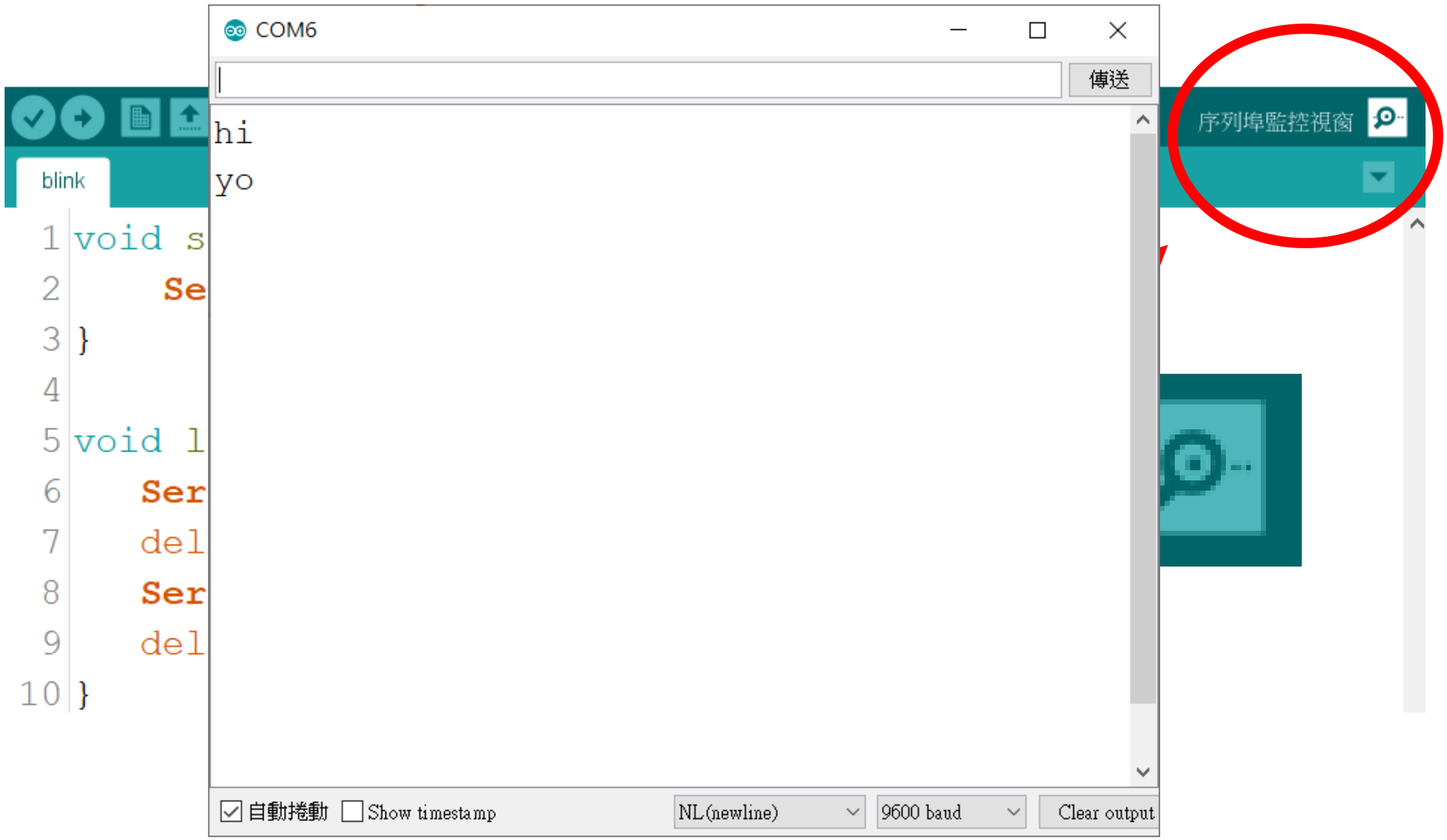


編譯 燒錄
Arduino

編譯



序列埠視窗


COM6
傳送
hi
yo
自動捲動
Show timestamp
NL(newline)
9600 baud
Clear output
序列埠監控視窗
blink
1 void s
2 Se
3 }
4
5 void l
6 Ser
7 del
8 Ser
9 del
10 }

基本語法介紹

Void setup(){

}

Void loop(){

}

基本語法介紹

Seri

Se

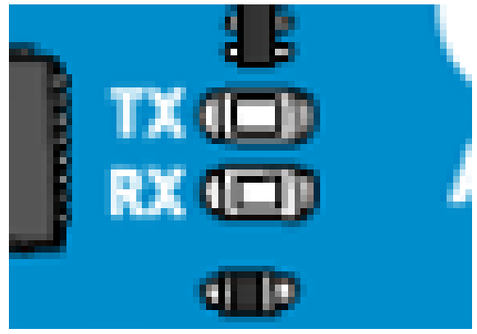
Se

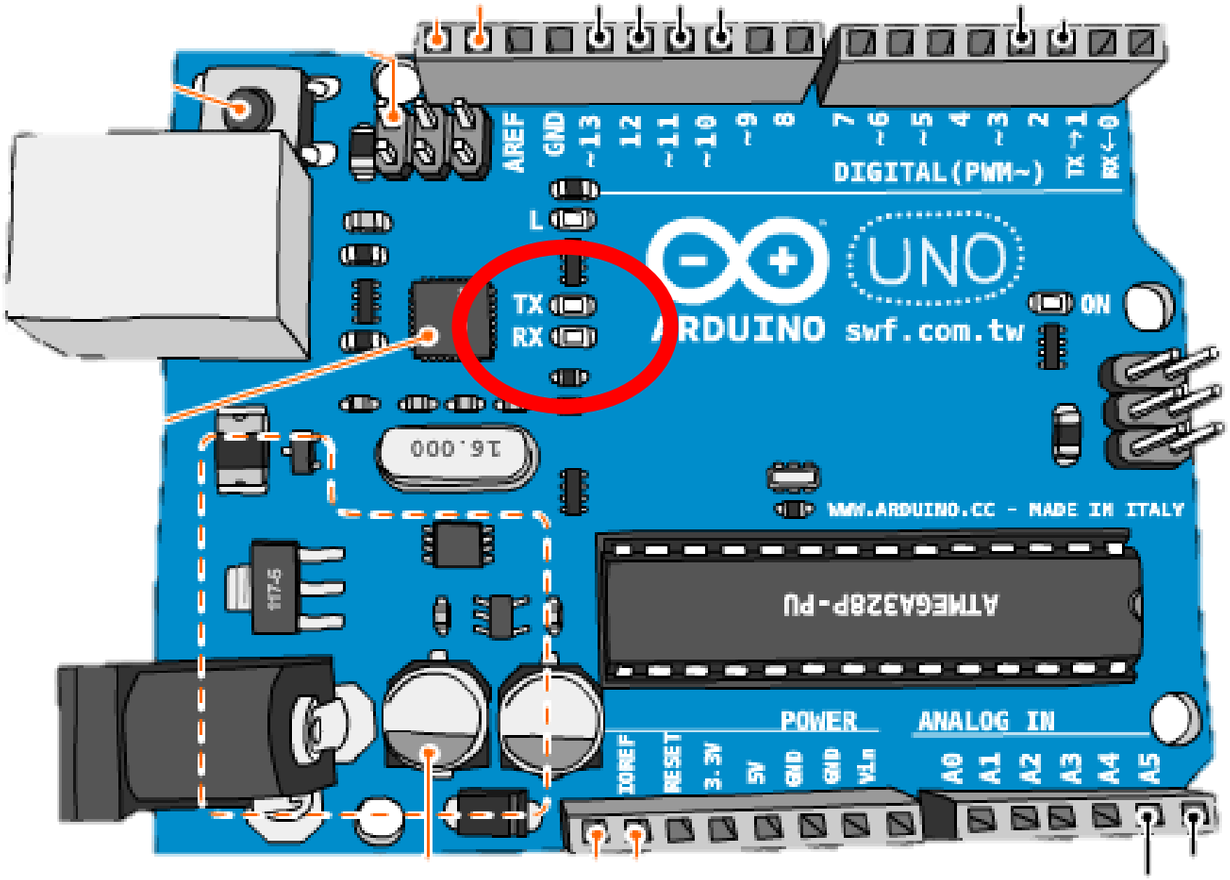
```
blink

1  void setup() {
2      Serial.begin(9600);
3  }
4
5  void loop() {
6      Serial.println("hi");
7      delay(1000);
8      Serial.println("yo");
9      delay(300);
10 }
```

```
COM14

yo
hi
yo
```

裡面

補充小站





TX 寫入

RX 讀取

基本語法介紹

pinMode(腳位,INPUT/OUTPUT);

放在void setup()裡面

digitalWrite(腳位,HIGH/LOW);

放在void loop()裡面

delay(ms);

都可放

練習led 開關燈

blink | Arduino 1.8.9 (Windows Store 1.8.21.0)

檔案 編輯 草稿碼 工具 說明

```
void setup() {
  // put your setup code here, to run once:
    pinMode(9, OUTPUT);
}

void loop() {
  // put your main code here, to run repeatedly:
   digitalWrite(9, HIGH);
   delay(1000);
   digitalWrite(9, LOW);
   delay(300);
}
```

12 Arduino/Genuino Uno 於 COM13

extra

請將led用序列埠顯示
當led亮時序列埠顯示的值為1或High
當led暗時序列埠顯示的值為0或Low

Ω

輸入序列埠

Serial.available()

Arduino板看序列埠
有沒有傳值過來

Serial.read();

Arduino 讀取我們在
序列埠打的值

輸入序列埠

serial_read §

```
1  void setup() {
2    Serial.begin(9600);
3  }
4  char r='\0';
5  void loop() {
6    if(Serial.available()){
7      while((r=Serial.read())!=-1){
8        if(r!='\n'){
9          Serial.print(r);
10       }
11       else if(r=='\n'){
12         Serial.println();
13       }
14     }
15   }
16 }
```

COM4

lalalalala.....

```
hello everyone
how are you today?
```

按鈕教學

練習

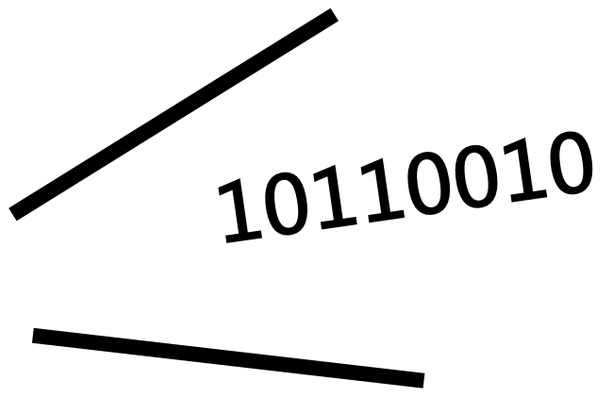
Serial read+nrf！！

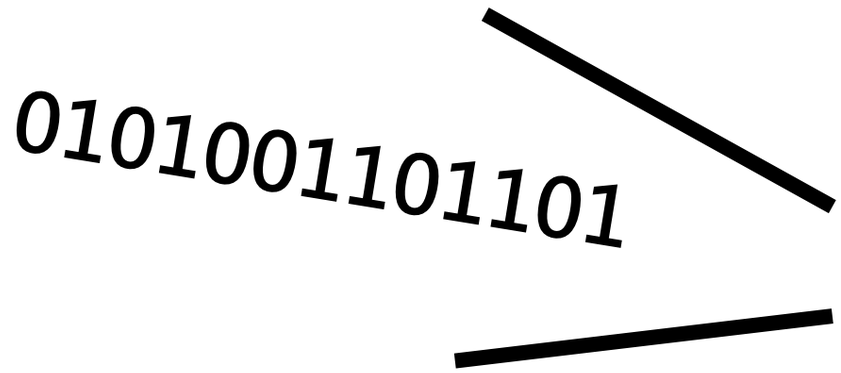
How are you?

I am fine. Thank you.

練習

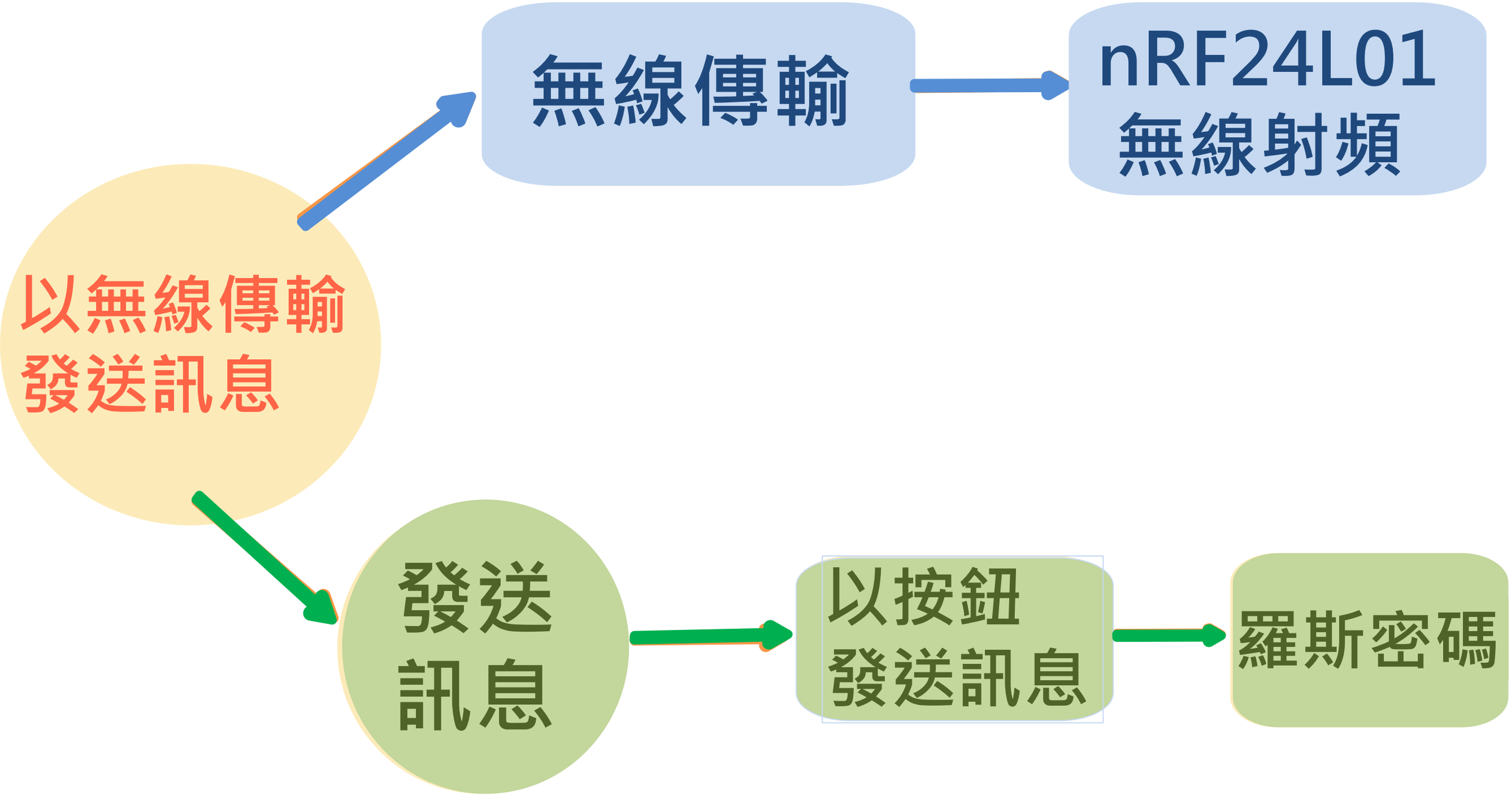
button+nrf！！





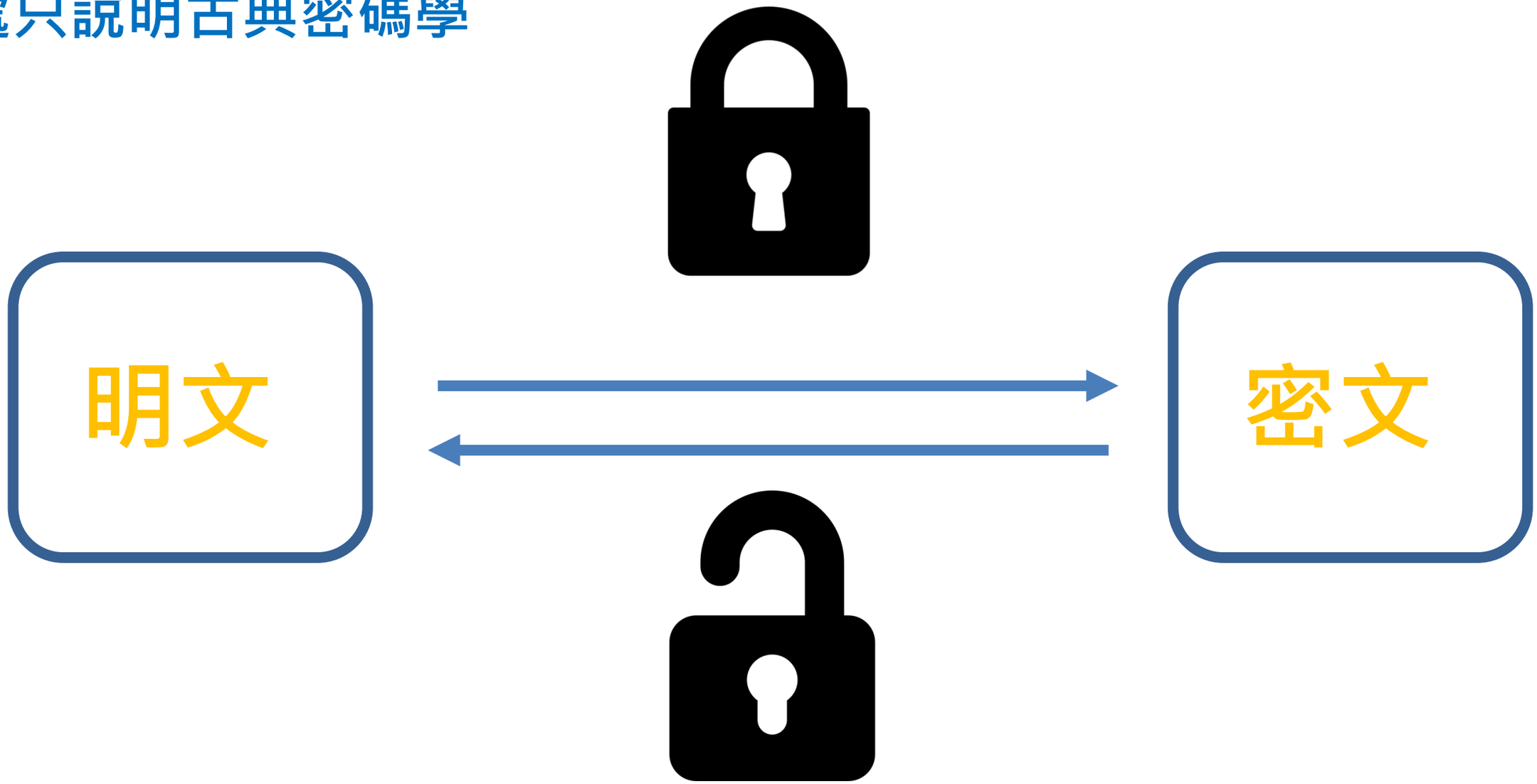
羅斯密碼教學

課程地圖



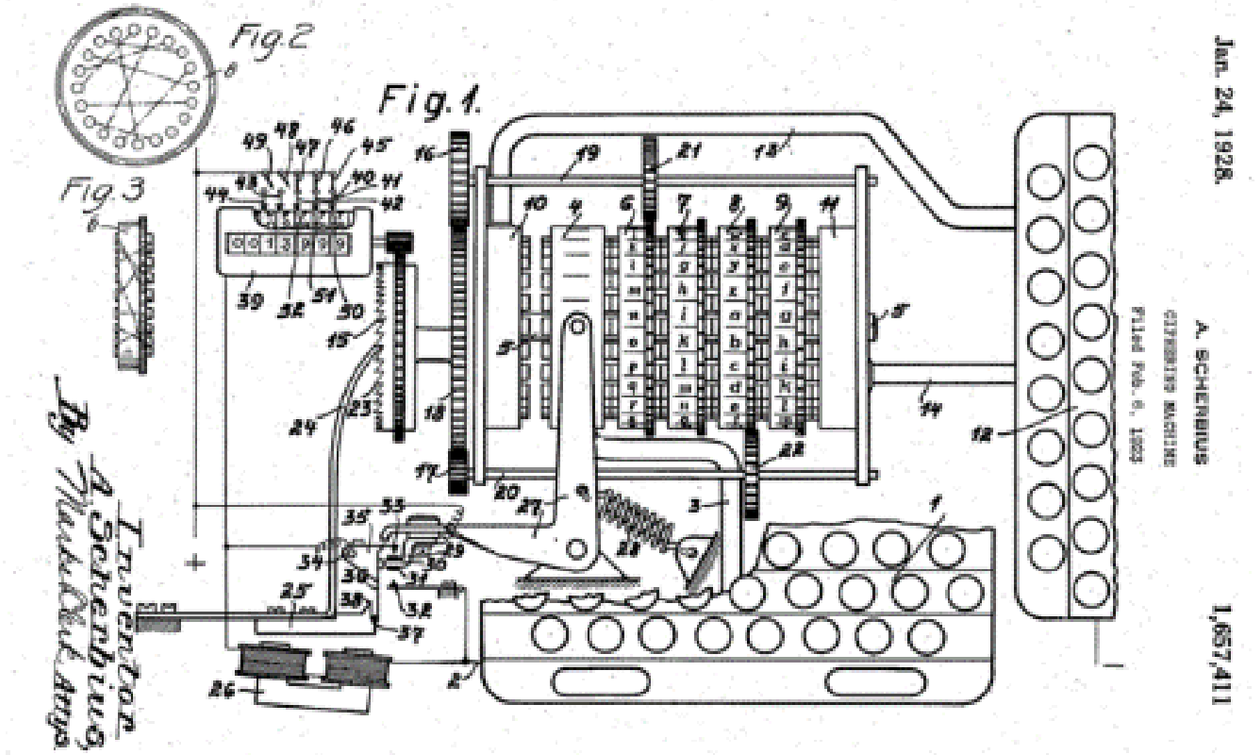
何謂密碼學？

此處只說明古典密碼學



何謂密碼學？

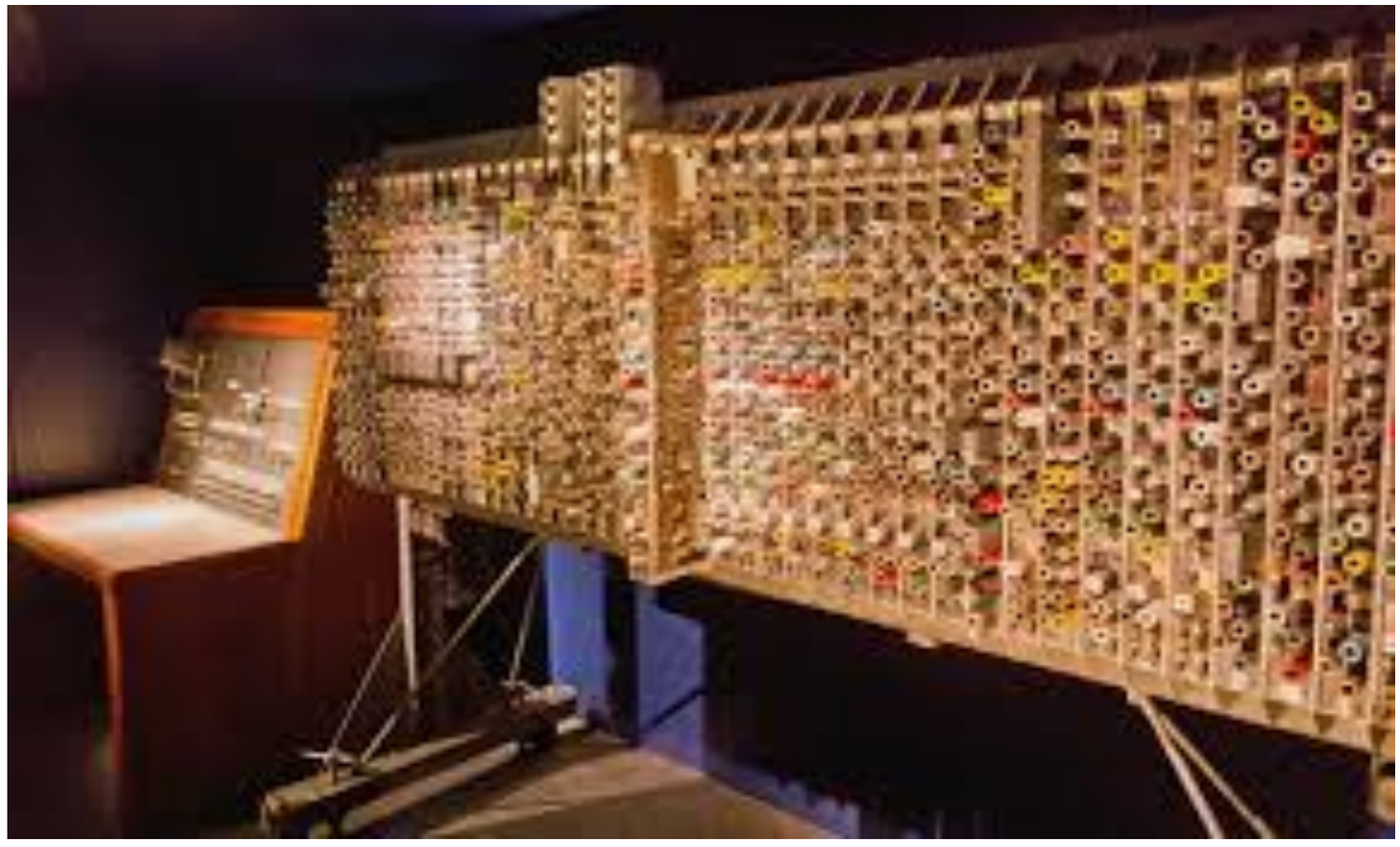
159,000,000,000,000,000,000種加密方式！



Ans: Enigma

模仿遊戲

發展



Bombe

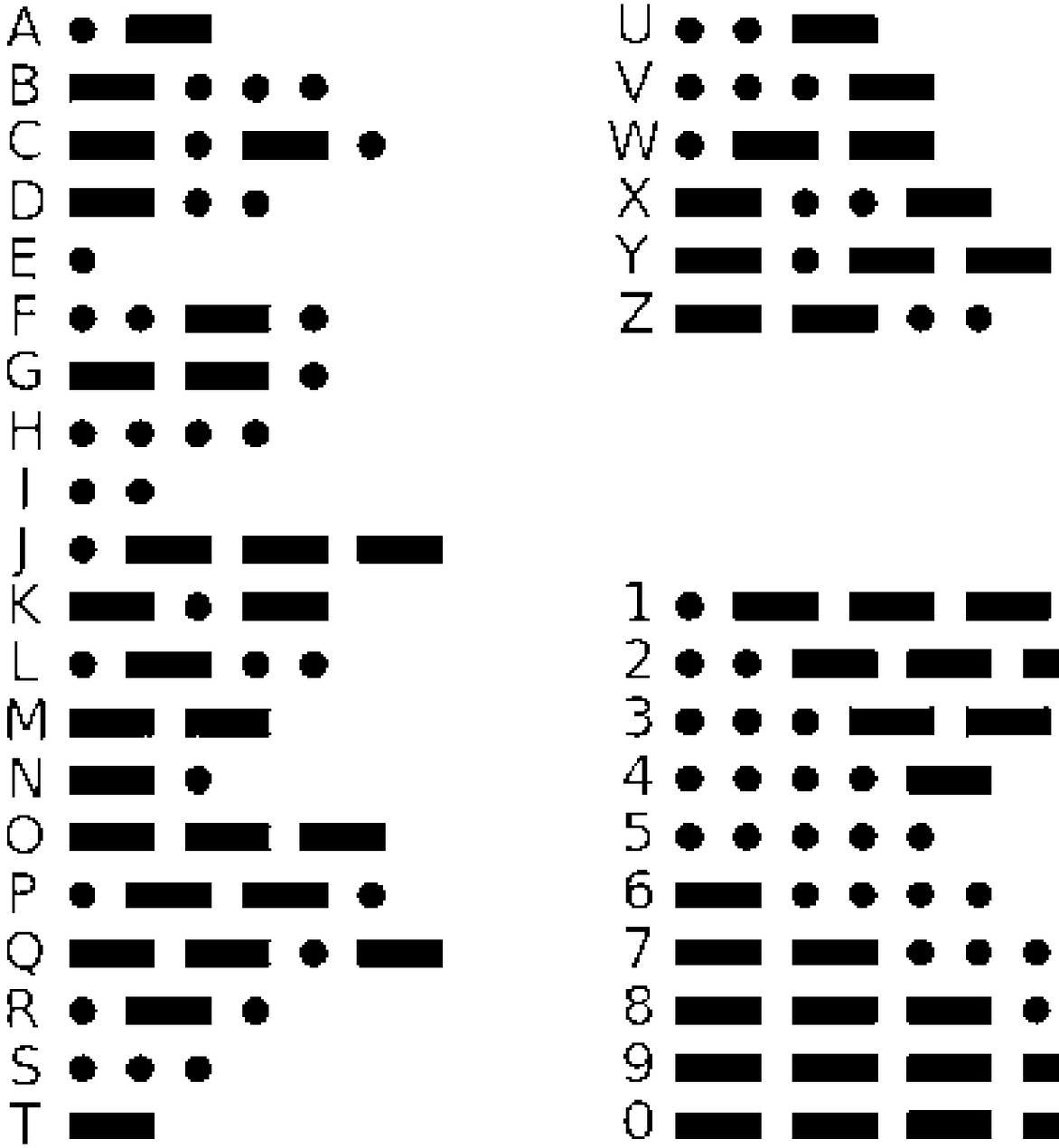
Automatic Computing Engine

Colossus computer

發展

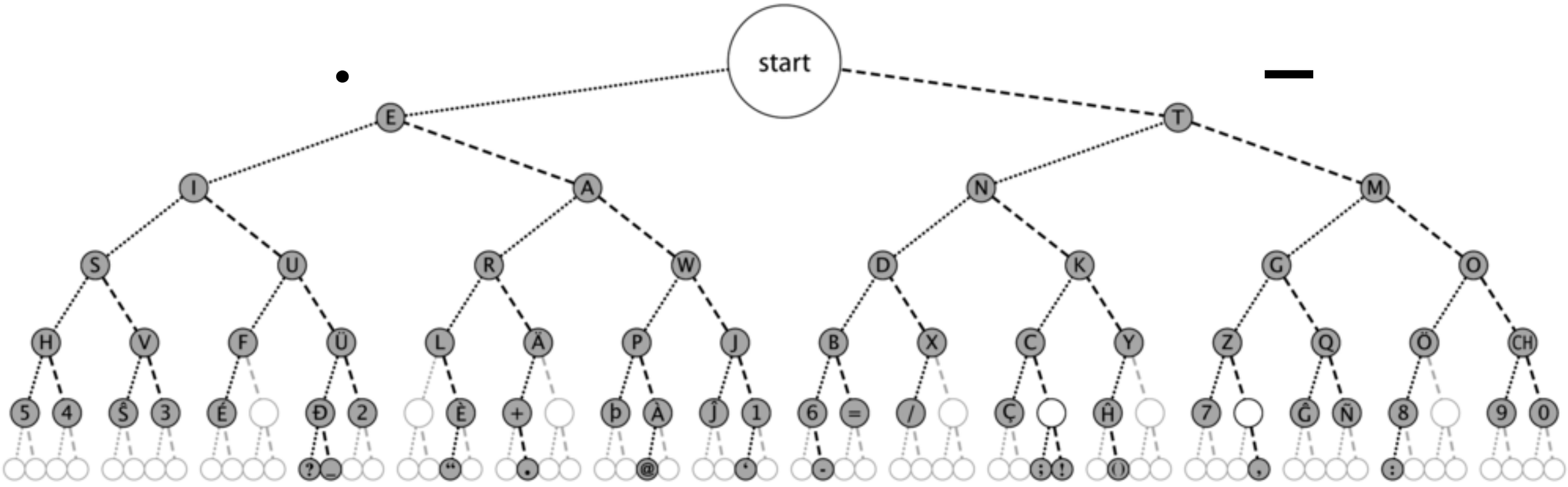
自己試試看
如何做加密訊息

摩斯密碼架構



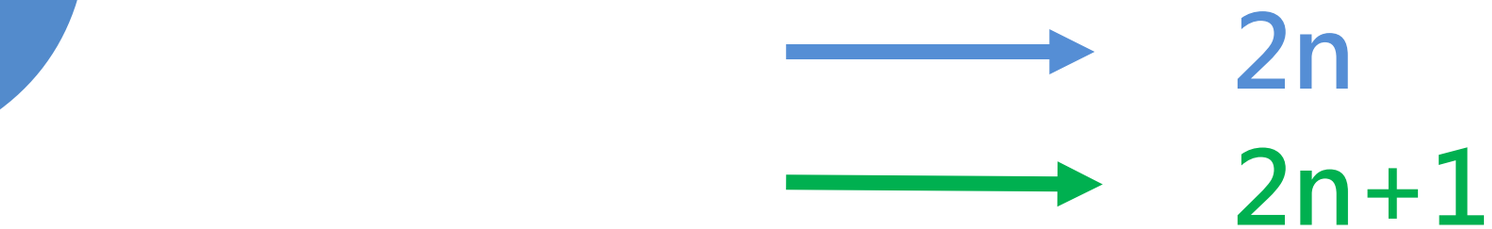
摩斯密碼架構

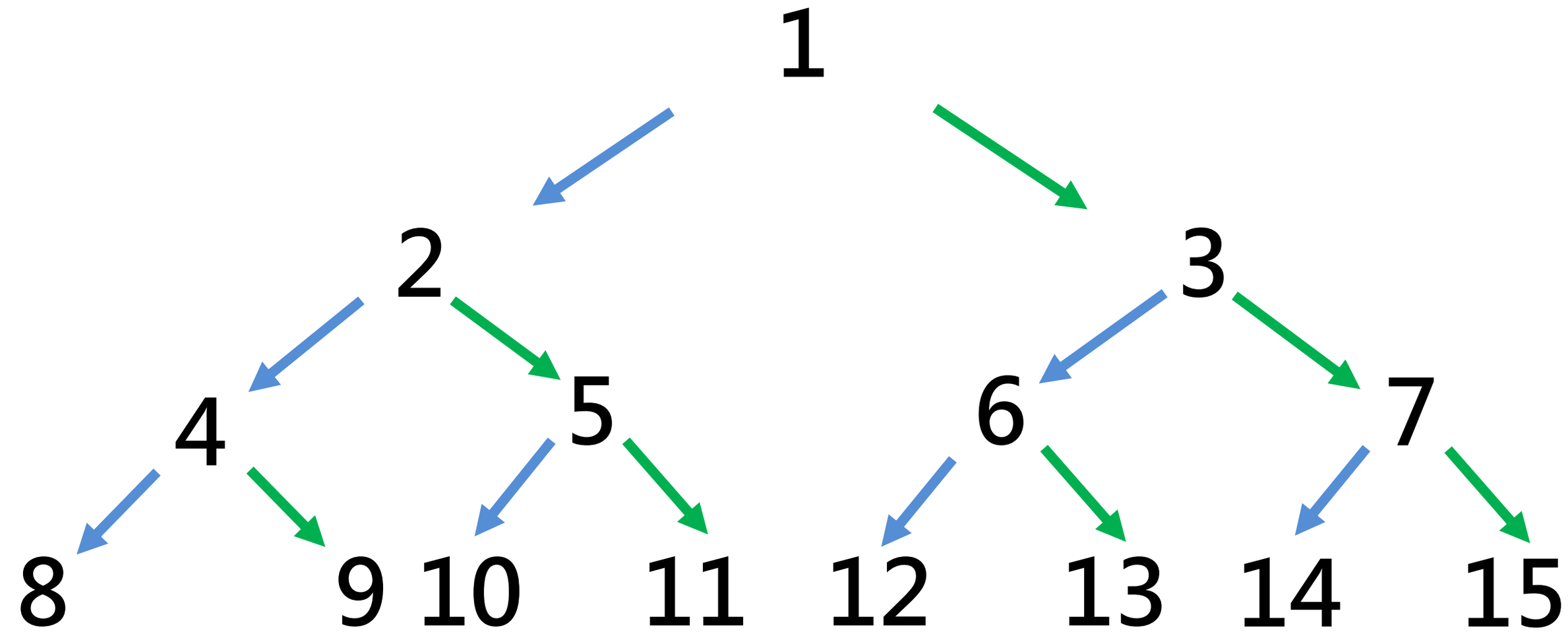
tree(二元樹)



· 放左子樹，–放右子樹

摩斯密碼架構



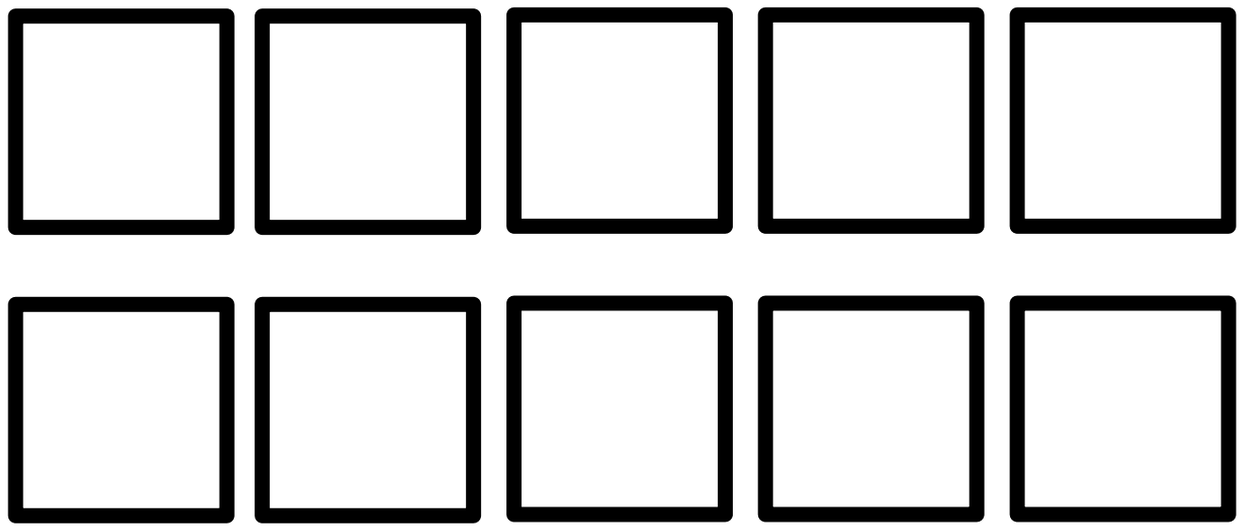


摩斯密碼架構

用陣列方式打樹

```
char alphabet[29]={'e','t','i','a','n','m','s','u','r','w','d','k','g','o','h','v','f',';','l',';','p','j','b','x','c','y','z','q','\n'};
char morse[31][5]={{'\n','\n','\n','\n','\n'},
                   {'\n','\n','\n','\n','\n'},
                   {'0', ' ', ' ', ' ', ' '},//e 2
                   {'1', ' ', ' ', ' ', ' '},//t 3
                   {'0','0' , ' ', ' ', ' '},//i 4
                   {'0','1' , ' ', ' ', ' '},//a 5
                   {'1','0' , ' ', ' ', ' '},//n 6
                   {'1','1' , ' ', ' ', ' '},//m 7
                   {'0','0' ,'0' , ' ', ' '},//s 8
                   {'0','0' ,'1' , ' ', ' '},//u 9
                   {'0','1' ,'0' , ' ', ' '},//r 10
                   {'0','1' ,'1' , ' ', ' '},//w 11
                   {'1','0' ,'0' , ' ', ' '},//d 12
                   {'1','0' ,'1' , ' ', ' '},//k 13
                   {'1','1' ,'0' , ' ', ' '},//g 14
                   {'1','1' ,'1' , ' ', ' '},//o 15
                   {'0','0' ,'0' ,'0' , ' '},//h 16
                   {'0','0' ,'0' ,'1' , ' '},//v 17
                   {'0','0' ,'1' ,'0' , ' '},//f 18
                   {'0','0' ,'1' ,'1' , ' '},//none 19
                   {'0','1' ,'0' ,'0' , ' '},//l 20
                   {'0','1' ,'0' ,'1' , ' '},//none 21
                   {'0','1' ,'1' ,'0' , ' '},//p 22
                   {'0','1' ,'1' ,'1' , ' '},//j 23
                   {'1','0' ,'0' ,'0' , ' '},//b 24
                   {'1','0' ,'0' ,'1' , ' '},//x 25
                   {'1','0' ,'1' ,'0' , ' '},//c 26
                   {'1','0' ,'1' ,'1' , ' '},//y 27
                   {'1','1' ,'0' ,'0' , ' '},//z 28
                   {'1','1' ,'0' ,'1' , ' '},//q 29
                   {'\n','\n','\n','\n','\n'}};
```

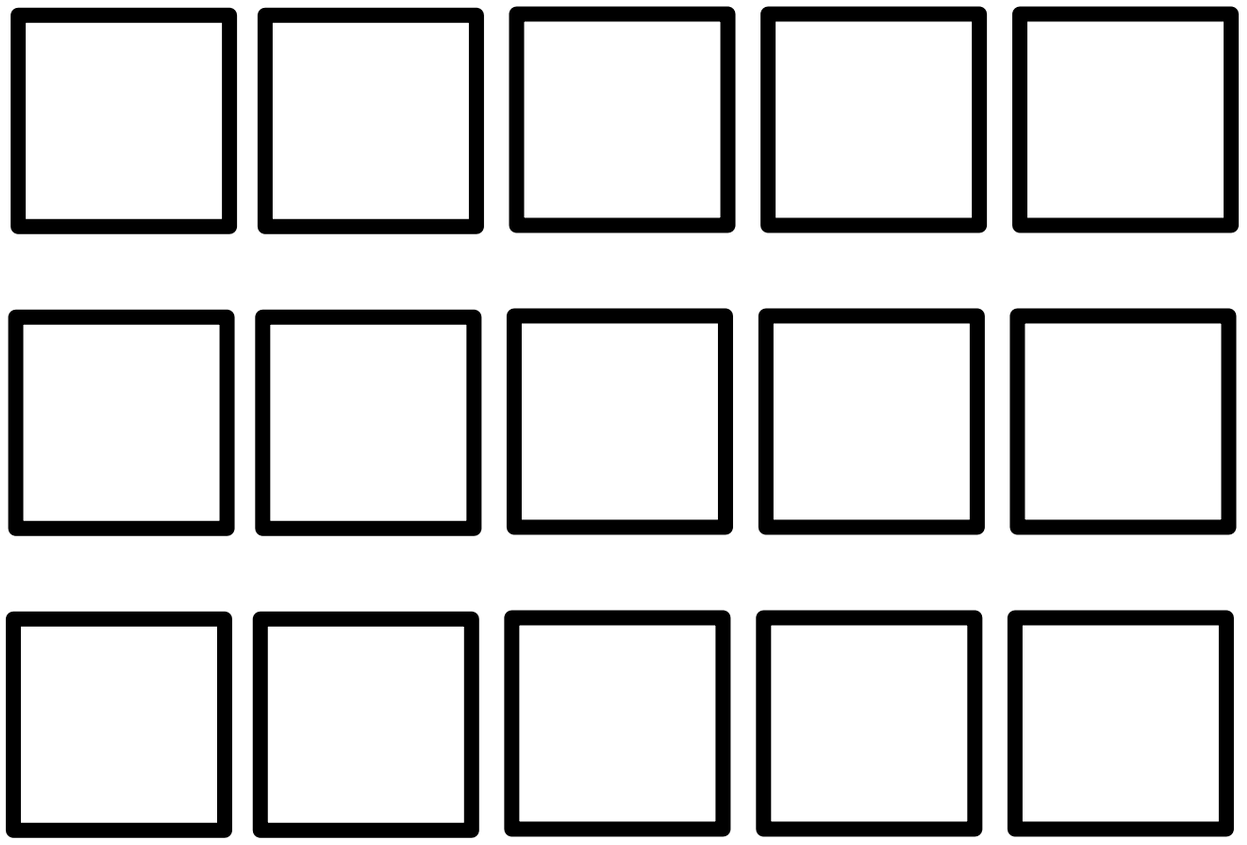
二維陣列



char (name) [5] [5]

row

column



摩斯密碼架構

加密程式流程

摩斯密碼架構

字母→摩斯密碼

```
Alphabet[i]==  ‘ the alphabet you want  ‘;//ex. a,b,c...
```

```
for loop(int j=0;j<5;j++)
buf[b]=morse[i][j]; //store the morse data into the buf
b++;
```

摩斯密碼架構

Serial.read();

字母轉成摩斯密碼

每轉摩斯密碼後
一定要空格 Why?

那空格如何處理？

rf24.write();

摩斯密碼架構

試試看如何加密吧！

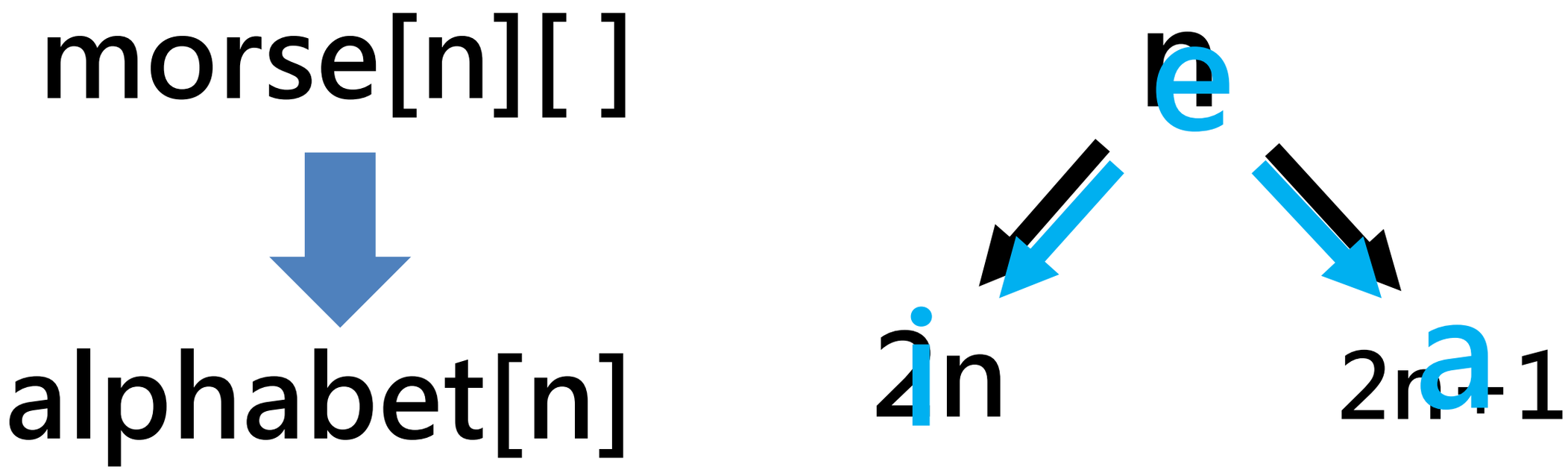
摩斯密碼架構

解密程式流程

摩斯密碼架構

摩斯密碼→字母

當．和－傳入時，用類似樹的陣列去做偵測



摩斯密碼架構

rf24.read();

摩斯密碼轉回字母

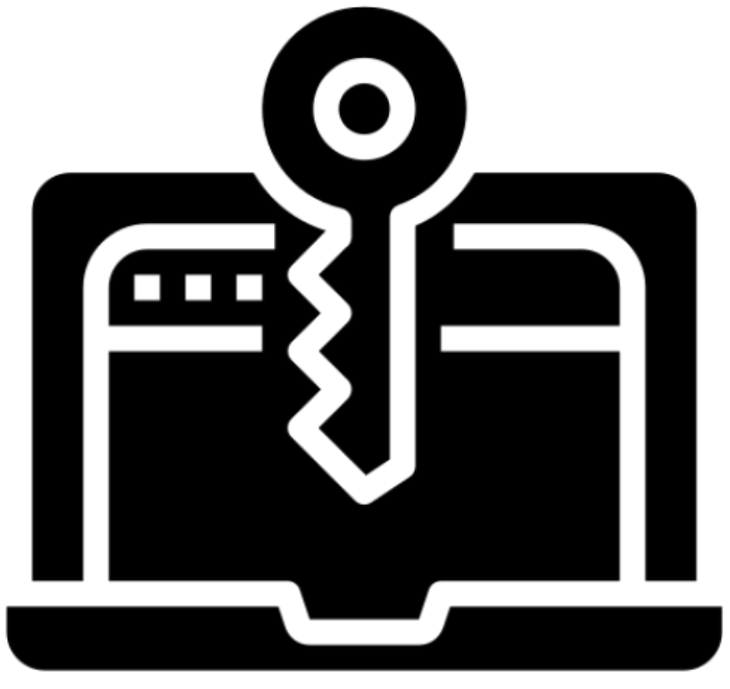
讀到空格後把前面的值轉回來

那真正的空格如何處理？

Serial.print();

摩斯密碼架構

試試看如何解密吧！

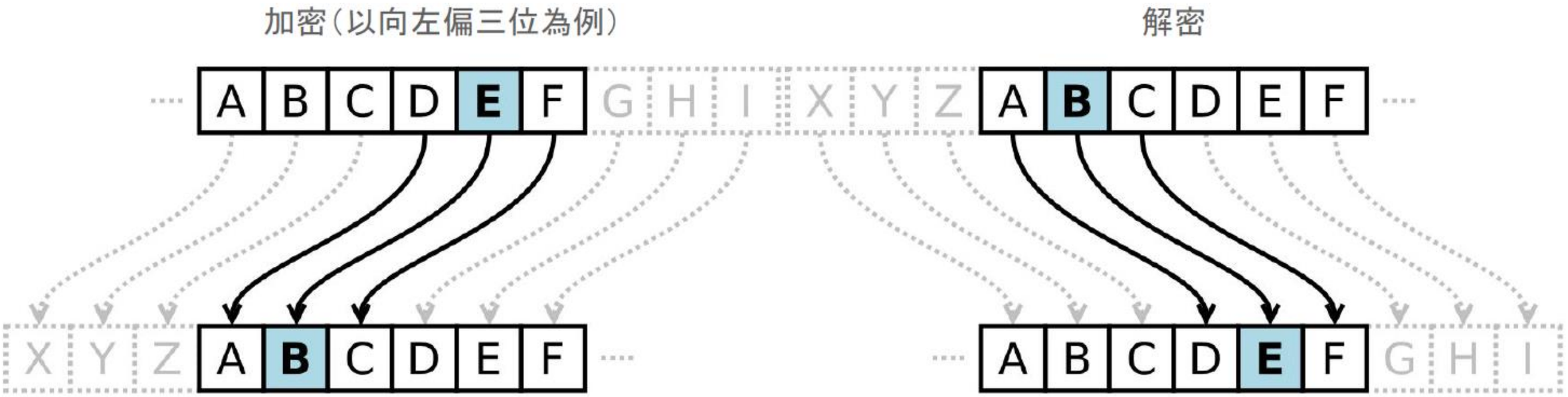


摩斯密碼架構

體驗按鈕傳電報！！

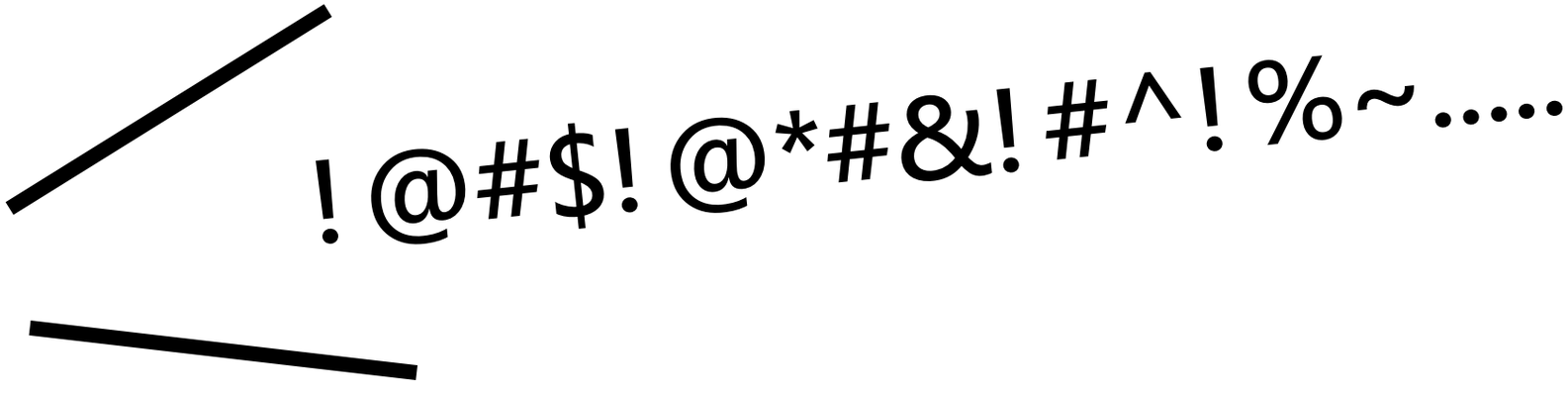
extra

Caesar cipher



extra

將傳的字數能無限制！！



實作才能發現問題！！