第二章

藍芽連線

藍芽連線步驟

藍芽連線角色

- 至少兩個裝置，都有藍芽
- 裝置分為一個Server與多個Client
- Sever
  - 時常是負責提供資料的一端，e.g. Sensor的數值
  - 超過一個以上的連線由Server管理
- Client
  - 時常是負責接收資料的一端

藍芽配對

- Client和Server都須開啟藍芽
- 設定Server端為可搜尋狀態(Discoverable)

- Client進行裝置掃描

- Client針對找尋到要連線的裝置進行「配對」

- 裝置間的配對僅需進行一次，之後則可以直接連線

SERVER連線步驟

- 開啟藍芽
- 建立Sever端
- 等待連線

- 待Client連入後，在使用串流進行資料的接收與傳送

- 不使用時進行斷線

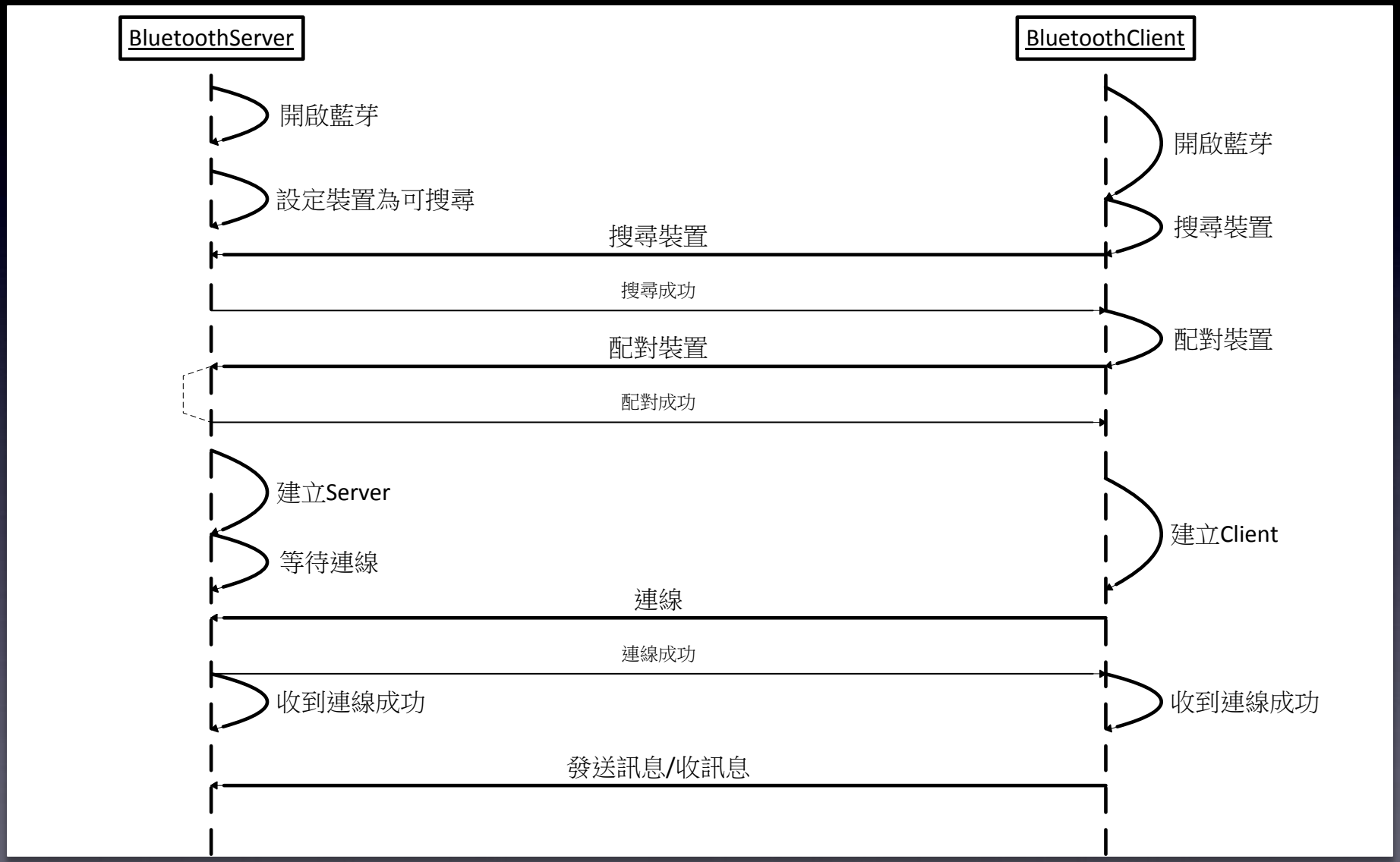
CLIENT連線步驟

- 開啟藍芽
- 建立藍芽Client端 (BluetoothSocket)
- 使用UUID對已配對且在等待連線的裝置進行連線

- 連入Server後，建立InputStream, OutputStream進行資料的接收與傳送

- 不使用時進行斷線

藍芽連線循序圖


BluetoothServer
BluetoothClient
開啟藍芽
開啟藍芽
設定裝置為可搜尋
搜尋裝置
搜尋裝置
搜尋成功
配對裝置
配對裝置
配對成功
建立Server
建立Client
等待連線
連線
連線成功
收到連線成功
收到連線成功
發送訊息/收訊息

使用函式庫

- 因為Android藍芽連線有許多細節需要處理
- 本範例將細節處理完畢，直接使用Library則不用處理連線問題、Stream問題
- 下頁為配對和連線的步驟對應的Library function

藍芽配對對應FUNCTION

- Client開啟藍芽
  - LocalBluetoothManager.turnOnBluetooth()
- Client進行裝置掃描
  - LocalBluetoothManager.discoverDevice()
- Client針對找尋到要連線的裝置進行「配對」
  - LocalBluetoothManager.pairDevice()

CLIENT連線步驟

- 建立藍芽Client端
  - BluetoothConnectionHelper.createClient()
- 使用UUID對已配對且在等待連線的裝置進行連線
  - BluetoothConnectionHelper.connect()
- 連入Server後，建立InputStream, OutputStream進行資料的接收與傳送
  - OnBluetoothMessageListener.onConnected()
  - OnBluetoothMessageListener.onMessageReceived()
  - OnBluetoothMessageListener.sendMessage()
- 不使用時進行斷線
  - BluetoothConnectionHelper.close()

對應專案
bluetooth/arduino/bt_led.ino

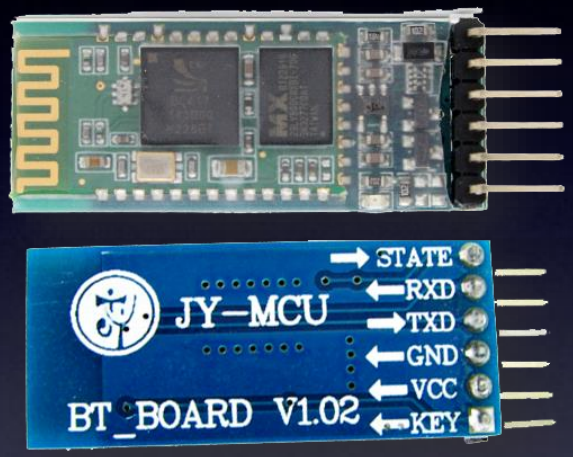
藍芽開關ARDUINO連接之LED

範例說明

- 以手機的藍芽程式控制Arduino Leonardo上的LED開關

藍芽HC-05

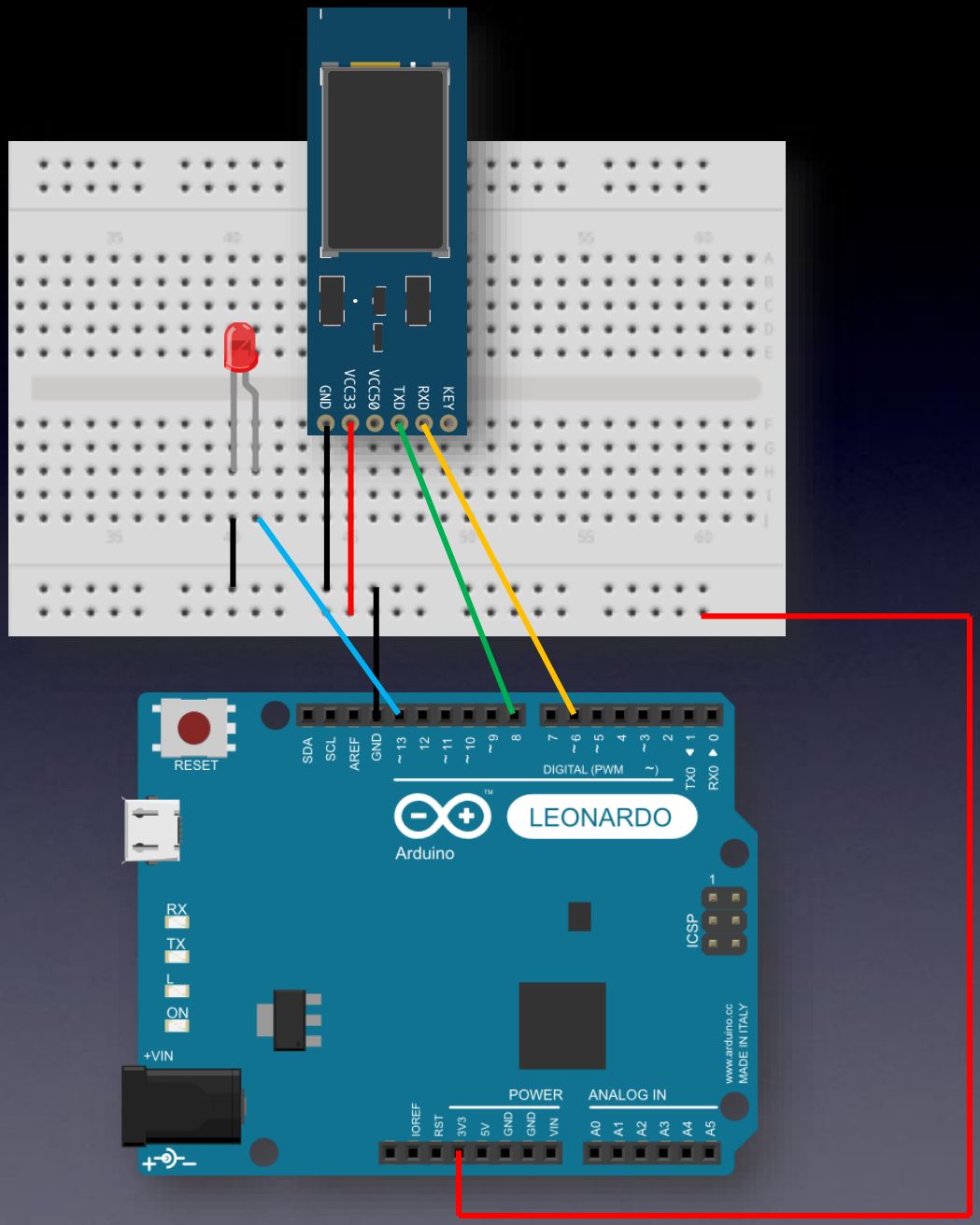
- 很普遍的藍芽晶片
- RXD為接收針腳
- TXD為傳送針腳
- GND接地線
- VCC電源
  - VCC33 – 3.3v
  - VCC50 – 5.0v
- KEY 寫入高電壓表示讓晶片進入AT Command模式



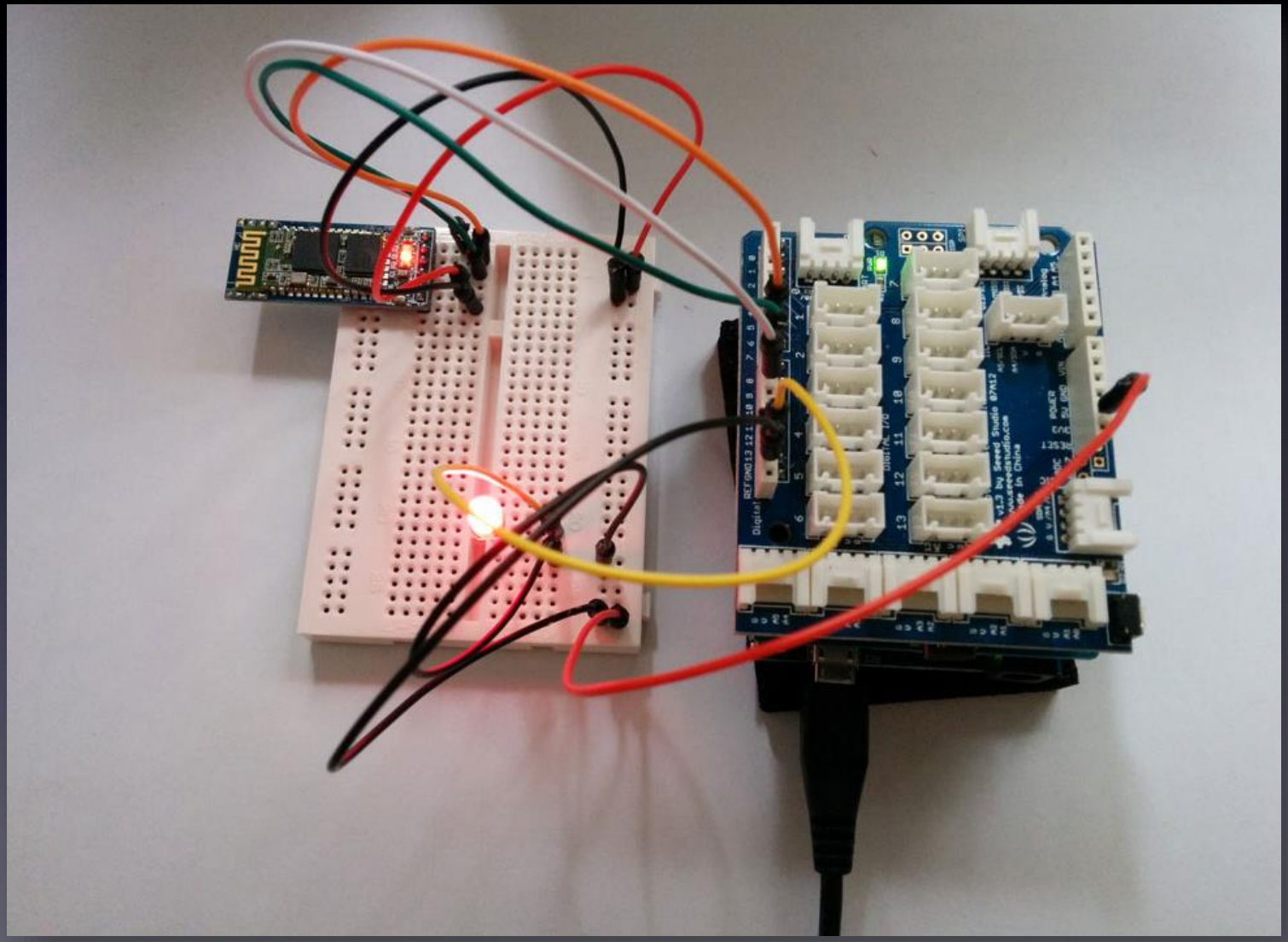
LED

- 一般常見的3mm LED
- 長的針腳接Arduino任一數位輸出孔
- 短的針腳接接地線

電路圖


GND
VCC3.3
VCC5.0
TXD
RXD
KEY
RESET
SDA
SCL
AREF
GND
~13
12
~11
~10
~9
8
7
~6
~5
4
~3
2
TX0 1
RX0 0
DIGITAL (PWM ~)
LEONARDO
Arduino
RX
TX
L
ON
+VIN
ICSP
POWER
ANALOG IN
IOREF
RST
3V3
5V
GND
GND
VIN
A0
A1
A2
A3
A4
A5
www.arduino.cc
MADE IN ITALY

實機圖



ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

使用SoftwareSerial作為藍芽傳遞資料的管道

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

Arduino板子的接收腳設定為8
傳送腳設定為6
LED則接在13

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

建立藍芽傳輸用的Serial

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 9;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

進入到Arduino初始化的function

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

設定LED的Pin腳是輸出用

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

設定SoftwareSerial的連線速度為38400

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

HC-05晶片多半預設為38400
可以使用AT command改變

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

進入到Arduino迴圈的function

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

當藍芽連接後有接收到資料
available就會是true

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

讀取出藍芽所接收到的內容
讀取出來的皆是char

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

若收到的是1，則讓LED亮起
反之，則讓LED暗下

ARDUINO程式碼

```
#include <SoftwareSerial.h>
const int RX = 8;
const int TX = 6;
const int LED = 13;
SoftwareSerial blueToothSerial(RX, TX);
void setup() {
  pinMode(LED, OUTPUT);
  blueToothSerial.begin(38400);
}
void loop() {
  if(blueToothSerial.available()){
    char c = blueToothSerial.read();
    if (c == '1') {
      digitalWrite(LED, HIGH);
    }
    else {
      digitalWrite(LED, LOW);
    }
  }
  delay(500);
}
```

讓程式暫停一下子
參數是暫停的微秒

ANDROID前置作業

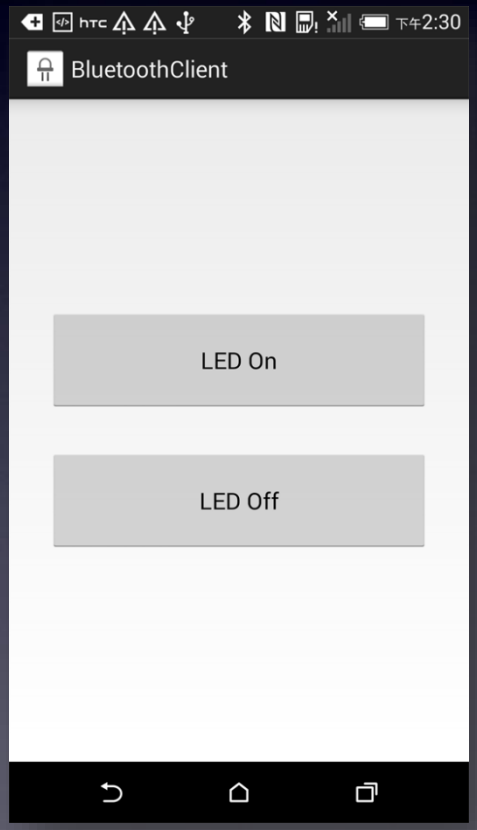
ANDROID送出控制

對應專案
bluetooth/android/
ArduinoLEDController

- 本專案有兩個Activity
- ClientConnectionActivity
  - 負責與Arduino裝置連線送出控制代碼0或1
- DiscoveryActivity
  - 負責找尋附近的裝置
  - HC-05藍芽晶片基本上搜尋都是開啟的
    配對的預設密碼為1234

ANDROID送出控制

- 介面更改為兩個大型按鈕，分別是ON與OFF



權限設定

- 打開AndroidManifest.xml

```
<uses-permission
android:name="android.permission.BLUETOOTH"/>
<uses-permission
android:name="android.permission.BLUETOOTH_ADMIN"/>
```

- 加上述兩項權限，App才能夠使用藍芽連線

權限設定

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.arduinoledcontroller"
    android:versionCode="1"
    android:versionName="1.0" >
    <uses-sdk android:minSdkVersion="14" android:targetSdkVersion="21" />
    <uses-permission android:name="android.permission.BLUETOOTH" />
    <uses-permission android:name="android.permission.BLUETOOTH_ADMIN" />
    <application android:icon="@drawable/ic_launcher"
        android:label="@string/app_name"
        android:theme="@style/AppTheme" >
        <activity android:name=".DiscoveryActivity"
            android:icon="@drawable/ic_launcher"
            android:screenOrientation="portrait" >
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <activity android:name=".ClientConnectionActivity"
            android:icon="@drawable/ic_launcher"
            android:label="@string/bluetooth_client"
            android:screenOrientation="portrait" />
    </application>
</manifest>
```

準備使用LIBRARY

- 將bluetooth.jar擺進專案的lib資料夾中
- 使用藍芽連線的Library時，主要會應用到兩個class
- LocalBluetoothManager
  - 管理藍芽的開關、搜尋、配對
- BluetoothConnectionHelper
  - 建立Server、Client、收發訊息、斷線連線

ANDROID開啟藍芽、掃描及配對裝置

ANDROID 初始化

對應專案
bluetooth/android/
ArduinoLEDController

```
public class DiscoveryActivity extends Activity {
    private ListView mListView;
    private BluetoothListAdapter mAdapter;
    private Button mScanButton;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.discovery_activity);
        mListView = (ListView) findViewById(R.id.device_list);
        mAdapter = new BluetoothListAdapter(this);
        mListView.setAdapter(mAdapter);
        mListView.setOnItemClickListener(mItemClickListener);
        mScanButton = (Button) findViewById(R.id.btn_scan);
        mScanButton.setOnClickListener(mScanButtonOnClickListener );
        LocalBluetoothManager.getInstance().startSession(this);
        if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
            LocalBluetoothManager.getInstance().turnOnBluetooth(this);
        } else {
            showBindDevices();
        }
    }
```

……(之後還有)

ANDROID 初始化

```
public class DiscoveryActivity extends Activity {
    private ListView mListView;
    private BluetoothListAdapter mAdapter;
    private Button mScanButton;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.discovery_activity);
        mListView = (ListView) findViewById(R.id.device_list);
        mAdapter = new BluetoothListAdapter(this);
        mListView.setAdapter(mAdapter);
        mListView.setOnItemClickListener(mItemClickListener);
        mScanButton = (Button) findViewById(R.id.btn_scan);
        mScanButton.setOnClickListener(mScanButtonOnClickListener );
        LocalBluetoothManager.getInstance().startSession(this);
        if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
            LocalBluetoothManager.getInstance().turnOnBluetooth(this);
        } else {
            showBindDevices();
        }
    }
```

目前在 DiscoveryActivity

……(之後還有)

ANDROID 初始化

準備ListView和使用的Adapter

```
public class DiscoveryActivity extends Activity {
    private ListView mListView;
    private BluetoothListAdapter mAdapter;
    private Button mScanButton;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.discovery_activity);
        mListView = (ListView) findViewById(R.id.device_list);
        mAdapter = new BluetoothListAdapter(this);
        mListView.setAdapter(mAdapter);
        mListView.setOnItemClickListener(mItemClickListener);
        mScanButton = (Button) findViewById(R.id.btn_scan);
        mScanButton.setOnClickListener(mScanButtonOnClickListener );
        LocalBluetoothManager.getInstance().startSession(this);
        if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
            LocalBluetoothManager.getInstance().turnOnBluetooth(this);
        } else {
            showBindDevices();
        }
    }
```

……(之後還有)

ANDROID 初始化

```
public class DiscoveryActivity extends Activity {
    private ListView mListView;
    private BluetoothListAdapter mAdapter;
    private Button mScanButton;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.discovery_activity);
        mListView = (ListView) findViewById(R.id.device_list);
        mAdapter = new BluetoothListAdapter(this);
        mListView.setAdapter(mAdapter);
        mListView.setOnItemClickListener(mItemClickListener);
        mScanButton = (Button) findViewById(R.id.btn_scan);
        mScanButton.setOnClickListener(mScanButtonOnClickListener );
        LocalBluetoothManager.getInstance().startSession(this);
        if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
            LocalBluetoothManager.getInstance().turnOnBluetooth(this);
        } else {
            showBindDevices();
        }
    }
```

準備點下後會開始做藍芽掃描的Button

.....(之後還有)

ANDROID 初始化

```
public class DiscoveryActivity extends Activity {
    private ListView mListView;
    private BluetoothListAdapter mAdapter;
    private Button mScanButton;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.discovery_activity);
        mListView = (ListView) findViewById(R.id.device_list);
        mAdapter = new BluetoothListAdapter(this);
        mListView.setAdapter(mAdapter);
        mListView.setOnItemClickListener(mItemClickListener);
        mScanButton = (Button) findViewById(R.id.btn_scan);
        mScanButton.setOnClickListener(mScanButtonOnClickListener );
        LocalBluetoothManager.getInstance().startSession(this);
        if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
            LocalBluetoothManager.getInstance().turnOnBluetooth(this);
        } else {
            showBindDevices();
        }
    }
```

找出ListView並且建立Adapter
設定ListView需要的事件接收器

……(之後還有)

ANDROID 初始化

```
public class DiscoveryActivity extends Activity {
    private ListView mListView;
    private BluetoothListAdapter mAdapter;
    private Button mScanButton;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.discovery_activity);
        mListView = (ListView) findViewById(R.id.device_list);
        mAdapter = new BluetoothListAdapter(this);
        mListView.setAdapter(mAdapter);
        mListView.setOnItemClickListener(mItemClickListener);
        mScanButton = (Button) findViewById(R.id.btn_scan);
        mScanButton.setOnClickListener(mScanButtonOnClickListener );
        LocalBluetoothManager.getInstance().startSession(this);
        if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
            LocalBluetoothManager.getInstance().turnOnBluetooth(this);
        } else {
            showBindDevices();
        }
    }
```

找出Button並且設定Button需要的事件接收器

.....(之後還有)

ANDROID 初始化

```
public class DiscoveryActivity extends Activity {
    private ListView mListView;
    private BluetoothListAdapter mAdapter;
    private Button mScanButton;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.discovery_activity);
        mListView = (ListView) findViewById(R.id.device_list);
        mAdapter = new BluetoothListAdapter(this);
        mListView.setAdapter(mAdapter);
        mListView.setOnItemClickListener(mDeviceClickListener);
        mScanButton = (Button) findViewById(R.id.btn_scan);
        mScanButton.setOnClickListener(mScanButtonOnClickListener );
        LocalBluetoothManager.getInstance().startSession(this);
        if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
            LocalBluetoothManager.getInstance().turnOnBluetooth(this);
        } else {
            showBindDevices();
        }
    }
```

呼叫startSession讓LocalBluetoothManager初始化

.....(之後還有)

ANDROID 初始化

```
public class DiscoveryActivity extends Activity {
    private ListView mListView;
    private BluetoothListAdapter mAdapter;
    private Button mScanButton;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.discovery_activity);
        mListView = (ListView) findViewById(R.id.device_list);
        mAdapter = new BluetoothListAdapter(this);
        mListView.setAdapter(mAdapter);
        mListView.setOnItemClickLi
        mScanButton = (Button) fin
        mScanButton.setOnClickListe
        LocalBluetoothManager.getInstance().startSession(this);
        if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
            LocalBluetoothManager.getInstance().turnOnBluetooth(this);
        } else {
            showBindDevices();
        }
    }
```

使用isBluetoothTurnOn檢查
目前藍芽是否開啟

.....(之後還有)

ANDROID 初始化

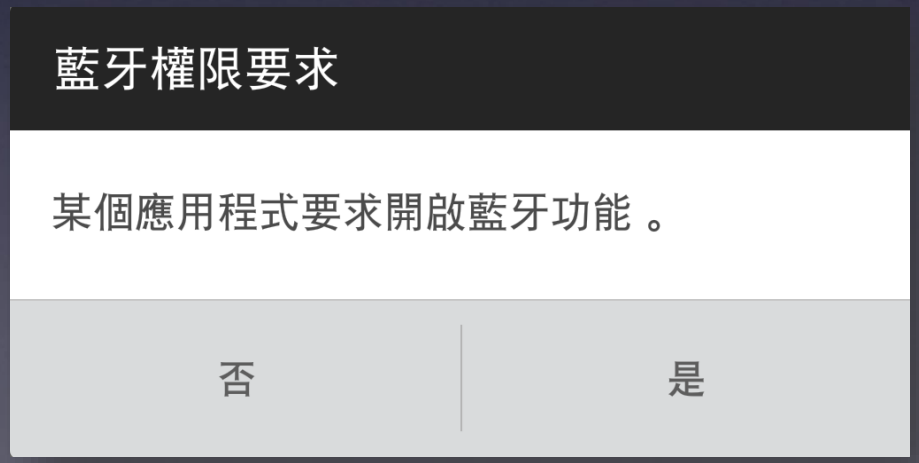
```
public class DiscoveryActivity extends Activity {
    private ListView mListView;
    private BluetoothListAdapter mAdapter;
    private Button mScanButton;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.discovery_activity);
        mListView = (ListView) findViewById(R.id.device_list);
        mAdapter = new BluetoothListAdapter(this);
        mListView.setAdapter(mAdapter);
        mListView.setOnItemClickL
        mScanButton = (Button) fi
        mScanButton.setOnClickLis
        LocalBluetoothManager.ge
        if (!LocalBluetoothManager.getInstance().isBl
            LocalBluetoothManager.getInstance().turnOnBluetooth(this);
        } else {
            showBindDevices();
        }
    }
```

若檢查沒開啟
呼叫turnOnBluetooth來開啟

.....(之後還有)

ANDROID 初始化

- `LocalBluetoothManager.getInstance().turnOnBluetooth(this)`
  - 在Android中開啟藍芽屬於系統保護的功能
  - 要開啟藍芽必須得經由系統規定的流程
  - 所以當呼叫turnOnBluetooth()時，會讓目前的Activity暫停，啟動系統外觀如Dialog的Activity



ANDROID 初始化

```
public class DiscoveryActivity extends Activity {
    private ListView mListView;
    private BluetoothListAdapter mAdapter;
    private Button mScanButton;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.discovery_activity);
        mListView = (ListView) findViewById(R.id.device_list);
        mAdapter = new BluetoothListAdapter(this);
        mListView.setAdapter(mAdapter);
        mListView.setOnItemClickListener(mItemClickListener);
        mScanButton = (Button) findViewById(R.id.btn_scan);
        mScanButton.setOnClickListener(mScanButtonOnClickListener );
        LocalBluetoothManager.getInstance().startSession(this);
        if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
            LocalBluetoothManager.getInstance().turnOnBluetooth(this);
        } else {
            showBindDevices();
        }
    }
```

.....(之後還有)

已經開啟了
就顯示已經綁定過的藍芽裝置

ANDROID 初始化

```
@Override
public void onDestroy() {
        super.onDestroy();
        LocalBluetoothManager.getInstance().endSession();
}
```

記得在Activity的onDestroy呼叫endSession來關閉藍芽和釋放資源

ANDROID 開啟藍芽

- 前頁投影片提到藍芽開啟是受系統保護的功能
- 所以開啟藍芽後系統會透過特殊的方式通知我們就是在Activity的方法onActivityResult()

ANDROID 開啟藍芽

```
@Override
protected void onActivityResult(
        int requestCode, int resultCode, Intent data)
{
    if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
        finish();
    } else {
        showBindDevices();
    }
}
```

ANDROID 開啟藍芽

詢問使用者藍芽開啟畫面關閉後
系統會自動呼叫這個方法

```
@Override
protected void onActivityResult(
        int requestCode, int resultCode, Intent data)
{
    if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
        finish();
    } else {
        showBindDevices();
    }
}
```

ANDROID 開啟藍芽

```
@Override
protected void onActivityResult(
        int requestCode, int resultCode, Intent data)
{
    if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
        finish();
    } else {
        showBindDevices();
    }
}
```

在此處再次檢查藍芽是不是開啟的

ANDROID 開啟藍芽

```
@Override
protected void onActivityResult(
        int requestCode, int resultCode, Intent data)
{
    if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
        finish();
    } else {
        showBindDevices();
    }
}
```

若不是則直接關閉Activity

ANDROID 開啟藍芽

```
@Override
protected void onActivityResult(
        int requestCode, int resultCode, Intent data)
{
    if (!LocalBluetoothManager.getInstance().isBluetoothTurnOn()) {
        finish();
    } else {
        showBindDevices();
    }
}
```

若開啟成功
顯示已經配對的藍芽裝置

ANDROID 顯示已配對裝置

```
private void showBindDevices() {
    List<BluetoothDevice> list =
LocalBluetoothManager.getInstance().getPairedDevices();
    mAdapter.setDeviceList(list);
}
```

ANDROID 顯示已配對裝置

getPairedDevices可以得到目前已經配對裝置的List

```
private void showBindDevices() {
    List<BluetoothDevice> list =
LocalBluetoothManager.getInstance().getPairedDevices();
    mAdapter.setDeviceList(list);
}
```

ANDROID 顯示已配對裝置

```
private void showBindDevices() {
    List<BluetoothDevice> list =
LocalBluetoothManager.getInstance().getPairedDevices();
    mAdapter.setDeviceList(list);
}
```

直接使用BluetoothListAdapter
的setDeviceList方法讓畫面呈現

ANDROID 搜尋藍芽裝置

```
private OnClickListener mScanButtonOnClickListener =
new OnClickListener()
{
    @Override
    public void onClick(View v) {
        mScanButton.setEnabled(false);
        LocalBluetoothManager.getInstance()
                .discoverDevice(mDiscoverListener);
    }
};
```

ANDROID 搜尋藍芽裝置

```
private OnClickListener mScanButtonOnClickListener =
new OnClickListener()
{
    @Override
    public void onClick(View v) {
        mScanButton.setEnabled(false);
        LocalBluetoothManager.getInstance()
                .discoverDevice(mDiscoverListener);
    }
};
```

使用View的setEnable(false)停用按鈕
免得在掃描裝置同時又被按下第二次

ANDROID 搜尋藍芽裝置

```
private OnClickListener mScanButtonOnClickListener =
new OnClickListener()
{
    @Override
    public void onClick(View v) {
        mScanButton.setEnabled(false);
        LocalBluetoothManager.getInstance()
                .discoverDevice(mDiscoverListener);
    }
};
```

呼叫discoverDevice
讓手機進行藍芽裝置掃描

ANDROID 搜尋藍芽裝置

```
private OnClickListener mScanButtonOnClickListener =
new OnClickListener()
{
    @Override
    public void onClick(View v) {
        mScanButton.setEnabled(false);
        LocalBluetoothManager.getInstance()
                .discoverDevice(mDiscoverListener);
    }
};
```

藍芽裝置掃描是非同步的工作
所以設定事件接收器
負責接收掃描到的結果

ANDROID 搜尋藍芽裝置

```
private OnBluetoothDiscoverEventListener mDiscoverListener = new
OnBluetoothDiscoverEventListener() {
    @Override
    public void discoverFinish() {
        Toast.makeText(
                DiscoveryActivity.this,
                "discoverFinish",
                Toast.LENGTH_LONG).show();
        mScanButton.setEnabled(true);
    }
    @Override
    public void discoveredDevice(BluetoothDevice device, int rssi) {
        mAdapter.addItem(device);
    }
};
```

ANDROID 搜尋藍芽裝置

```
private OnBluetoothDiscoverEventListener mDiscoverListener = new
OnBluetoothDiscoverEventListener() {
    @Override
    public void discoverFinish() {
        Toast.makeText(
                DiscoveryActivity.this,
                "discoverFinish",
                Toast.LENGTH_LONG).show();
        mScanButton.setEnabled(true);
    }
    @Override
    public void discoveredDevice(BluetoothDevice device, int rssi) {
        mAdapter.addItem(device);
    }
};
```

OnBluetoothDiscoverEventListener
是掃描藍芽專用的事件接收器

ANDROID 搜尋藍芽裝置

discoverFinish是第一種事件
表示掃描藍芽裝置結束

```
private OnBluetoothDiscoverEventListener mDiscoverListener = new
OnBluetoothDiscoverEventListener() {
    @Override
    public void discoverFinish() {
        Toast.makeText(
                DiscoveryActivity.this,
                "discoverFinish",
                Toast.LENGTH_LONG).show();
        mScanButton.setEnabled(true);
    }
    @Override
    public void discoveredDevice(BluetoothDevice device, int rssi) {
        mAdapter.addItem(device);
    }
};
```

ANDROID 搜尋藍芽裝置

```
private OnBluetoothDiscoverEventListener mDiscoverListener = new
OnBluetoothDiscoverEventListener() {
    @Override
    public void discoverFinish() {
        Toast.makeText(
                DiscoveryActivity.this,
                "discoverFinish",
                Toast.LENGTH_LONG).show();
        mScanButton.setEnabled(true);
    }
    @Override
    public void discoveredDevice(BluetoothDevice device, int rssi) {
        mAdapter.addItem(device);
    }
};
```

顯示Toast並且將
掃描裝置的按鈕重新啟用

ANDROID 搜尋藍芽裝置

```
private OnBluetoothDiscoverEventListener mDiscoverListener = new
OnBluetoothDiscoverEventListener() {
    @Override
    public void discoverFinish() {
        Toast.makeText(
                DiscoveryActivity.this,
                "discoverFinish"
                Toast.LENGTH_SHORT).show();
        mScanButton.setEnabled(true);
    }
    @Override
    public void discoveredDevice(BluetoothDevice device, int rssi) {
        mAdapter.addItem(device);
    }
};
```

第二種事件，掃描到裝置
當藍芽掃描到一個裝置馬上就呼叫
這個方法一次

ANDROID 搜尋藍芽裝置

```
private OnBluetoothDiscoverEventListener mDiscoverListener = new
OnBluetoothDiscoverEventListener() {
    @Override
    public void discoverFinish() {
        Toast.makeText(
                DiscoveryActivity.this,
                "discoverFinish",
                Toast.LENGTH_LONG).show();
        mScanButton.setEnabled(true);
    }
    @Override
    public void discoveredDevice(BluetoothDevice device, int rssi) {
        mAdapter.addItem(device);
    }
};
```

參數1是掃描到的裝置的資訊
參數2是該裝置的訊號強弱值

ANDROID 搜尋藍芽裝置

```
private OnBluetoothDiscoverEventListener mDiscoverListener = new
OnBluetoothDiscoverEventListener() {
    @Override
    public void discoverFinish() {
        Toast.makeText(
                DiscoveryActivity.this,
                "discoverFinish",
                Toast.LENGTH_LONG).show();
        mScanButton.setEnabled(true);
    }
    @Override
    public void discoveredDevice(BluetoothDevice device, int rssi) {
        mAdapter.addItem(device);
    }
};
```

將掃描到的裝置加入Adapter中
ListView就會呈現到畫面上

ANDROID 配對裝置與連線

- 當ListView呈現出掃描到的裝置，若裝置沒有配對過，是「不能進行連線」的
- 所以ListView的裝置被點到時，首先必須檢查該裝置有沒有配對過
- 若沒配對過，就要進行配對
- 已配對過，則進行連線

ANDROID 配對裝置與連線

```
private OnItemClickListener mItemClickListener = new OnItemClickListener() {
@Override
public void onItemClick(AdapterView<?> parent, View view, int position, long id)
{
    BluetoothDevice device = (BluetoothDevice) mAdapter.getItem(position);
    BluetoothDevice newDevice =
LocalBluetoothManager.getInstance().getDeviceWithLatestStatus(device);
    if (!LocalBluetoothManager.getInstance().isPairedDevice(newDevice)) {
        LocalBluetoothManager.getInstance().pairDevice(newDevice);
    } else {
        Intent intent = new Intent(DiscoveryActivity.this,
ClientConnectionActivity.class);
        intent.putExtra("device", newDevice);
        startActivity(intent);
    }
}
};
```

ANDROID 配對裝置與連線

取得目前點選到的藍芽資訊

```
private OnItemClickListener mItemClickListener = new OnItemClickListener() {
@Override
public void onItemClick(AdapterView<?> parent, View view, int position, long id)
{
    BluetoothDevice device = (BluetoothDevice) mAdapter.getItem(position);
    BluetoothDevice newDevice =
LocalBluetoothManager.getInstance().getDeviceWithLatestStatus(device);
    if (!LocalBluetoothManager.getInstance().isPairedDevice(newDevice)) {
        LocalBluetoothManager.getInstance().pairDevice(newDevice);
    } else {
        Intent intent = new Intent(DiscoveryActivity.this,
ClientConnectionActivity.class);
        intent.putExtra("device", newDevice);
        startActivity(intent);
    }
}
};
```

ANDROID 配對裝置與連線

```
private OnItemClickListener mItemClickListener = new OnItemClickListener() {
@Override
public void onItemClick(AdapterView<?> parent, View view, int position, long id)
{
    BluetoothDevice device = (BluetoothDevice) mAdapter.getItem(position);
    BluetoothDevice newDevice =
LocalBluetoothManager.getInstance().getDeviceWithLatestStatus(device);
    if (!LocalBluetoothManager.getInstance().isPairedDevice(newDevice)) {
        LocalBluetoothManager.getInstance().pairDevice(newDevice);
    } else {
        Intent intent = new Intent(DiscoveryActivity.this,
ClientConnectionActivity.class);
        intent.putExtra("device", newDevice);
        startActivity(intent);
    }
}
};
```

取得特定藍芽裝置在OS中最新的狀態
因為APP可能更新的不夠快速

ANDROID 配對裝置與連線

```
private OnItemClickListener mItemClickListener = new OnItemClickListener() {
@Override
public void onItemClick(AdapterView<?> parent, View view, int position, long id)
{
    BluetoothDevice device = (BluetoothDevice) mListAdapter.getItem(position);
    BluetoothDevice newDevice =
LocalBluetoothManager.getInstance().getDeviceWithCachedStatus(device);
    if (!LocalBluetoothManager.getInstance().isPairedDevice(newDevice)) {
        LocalBluetoothManager.getInstance().pairDevice(newDevice);
    } else {
        Intent intent = new Intent(DiscoveryActivity.this,
ClientConnectionActivity.class);
        intent.putExtra("device", newDevice);
        startActivity(intent);
    }
}
};
```

檢查該裝置是不是已經配對過

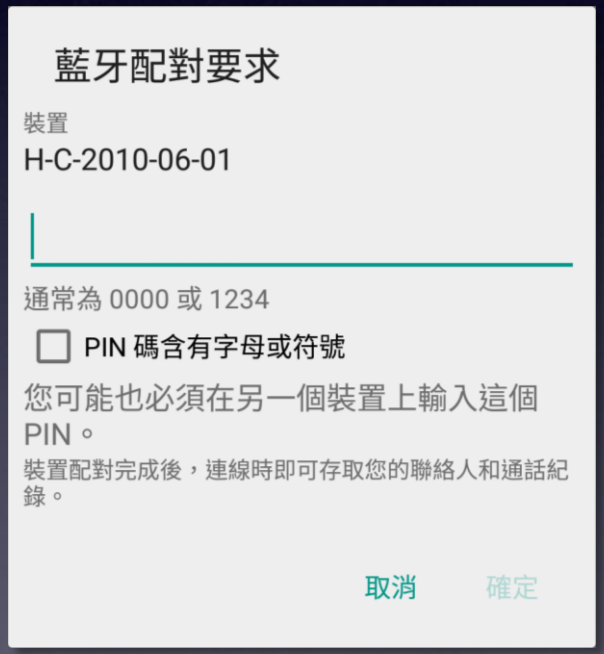
ANDROID 配對裝置與連線

```
private OnItemClickListener mItemClickListener = new OnItemClickListener() {
@Override
public void onItemClick(AdapterView<?> parent, View view, int position, long id)
{
    BluetoothDevice device = (BluetoothDevice) mAdapter.getItem(position);
    BluetoothDevice newDevice =
LocalBluetoothManager.getInstance().getDeviceWithLatestStatus(device);
    if (!LocalBluetoothManager.getInstance().isPairedDevice(newDevice)) {
        LocalBluetoothManager.getInstance().pairDevice(newDevice);
    } else {
        Intent intent = new Intent(DiscoveryActivity.this,
ClientConnectionActivity.class);
        intent.putExtra("device", newDevice);
        startActivity(intent);
    }
}
};
```

呼叫pairDevice進行配對

ANDROID 配對裝置與連線

- 配對裝置也屬於Android作業系統保護的功能
- 所以呼叫pairDevice()時，會出現如下的畫面



ANDROID 配對裝置與連線

```
private OnItemClickListener mItemClickListener = new OnItemClickListener() {
@Override
public void onItemClick(AdapterView<?> parent, View view, int position, long id)
{
    BluetoothDevice device = (BluetoothDevice) mAdapter.getItem(position);
    BluetoothDevice newDevice =
LocalBluetoothManager.getInstance().getDeviceWithLatestStatus(device);
    if (!LocalBluetoothManager.getInstance().isPairedDevice(newDevice)) {
        LocalBluetoothManager.getInstance().pairDevice(newDevice);
    } else {
        Intent intent = new Intent(DiscoveryActivity.this,
ClientConnectionActivity.class);
        intent.putExtra("device", newDevice);
        startActivity(intent);
    }
}
};
```

若是已經配對過的裝置
將裝置資訊放入Intent
切換至ClientConnectionActivity

ANDROID與ARDUINO藍芽連線

ANDROID 連線準備

```
public class ClientConnectionActivity extends Activity {
    private static final String APP_UUID = "00001101-0000-1000-8000-
00805F9B34FB";
    private BluetoothConnectionHelper mHelper;
    private Button mLedOnButton;
    private Button mLedOffButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.connection_activity);
        mLedOnButton = (Button) findViewById(R.id.btn_on);
        mLedOnButton.setOnClickListener(mLedOnClickListener);
        mLedOffButton = (Button) findViewById(R.id.btn_off);
        mLedOffButton.setOnClickListener(mLedOffClickListener);
        BluetoothDevice device = getIntent().getParcelableExtra("device");
        mHelper =
BluetoothConnectionHelper.createClient(UUID.fromString(APP_UUID), device);
        mHelper.setMessageReceiver(mListener);
        mHelper.connect();
    }
……(還有更多)
```

ANDROID 連線準備

```
public class ClientConnectionActivity extends Activity {
    private static final String APP_UUID = "00001101-0000-1000-8000-
00805F9B34FB";
    private BluetoothConnectionHelper mHelper;
    private Button mLedOnButton;
    private Button mLedOffButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.connection_activity);
        mLedOnButton = (Button) findViewById(R.id.btn_on);
        mLedOnButton.setOnClickListener(mLedOnClickListener);
        mLedOffButton = (Button) findViewById(R.id.btn_off);
        mLedOffButton.setOnClickListener(mLedOffClickListener);
        BluetoothDevice device = getIntent().getParcelableExtra("device");
        mHelper =
BluetoothConnectionHelper.createClient(UUID.fromString(APP_UUID), device);
        mHelper.setMessageReceiver(mListener);
        mHelper.connect();
    }
……(還有更多)
```

目前在ClientConnectionActivity

ANDROID 連線準備

```
public class ClientConnectionActivity extends Activity {
    private static final String APP_UUID = "00001101-0000-1000-8000-
00805F9B34FB";
    private BluetoothConnectionHelper mHelper;
    private Button mLedOnButton;
    private Button mLedOffButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.connection_activity);
        mLedOnButton = (Button) findViewById(R.id.btn_on);
        mLedOnButton.setOnClickListener(mLedOnClickListener);
        mLedOffButton = (Button) findViewById(R.id.btn_off);
        mLedOffButton.setOnClickListener(mLedOffClickListener);
        BluetoothDevice device = getIntent().getParcelableExtra("device");
        mHelper =
BluetoothConnectionHelper.createClient(UUID.fromString(APP_UUID), device);
        mHelper.setMessageReceiver(mListener);
        mHelper.connect();
    }
……(還有更多)
```

先宣告連線要使用的UUID
這裡是使用序列Serial的服務

ANDROID 連線準備

```
public class ClientConnectionActivity extends Activity {
    private static final String APP_UUID = "00001101-0000-1000-8000-
00805F9B34FB";
    private BluetoothConnectionHelper mHelper;
    private Button mLedOnButton;
    private Button mLedOffButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.connection_activity);
        mLedOnButton = (Button) findViewById(R.id.btn_on);
        mLedOnButton.setOnClickListener(mLedOnClickListener);
        mLedOffButton = (Button) findViewById(R.id.btn_off);
        mLedOffButton.setOnClickListener(mLedOffClickListener);
        BluetoothDevice device = getIntent().getParcelableExtra("device");
        mHelper =
BluetoothConnectionHelper.createClient(UUID.fromString(APP_UUID), device);
        mHelper.setMessageReceiver(mListener);
        mHelper.connect();
    }
……(還有更多)
```

可參考網址，有常用藍芽UUID列表
http://www.douban.com/group/topic/20009323/

ANDROID 連線準備

```
public class ClientConnectionActivity extends Activity {
    private static final String APP_UUID = "00001101-0000-1000-8000-
00805F9B34FB";
    private BluetoothConnectionHelper mHelper;
    private Button mLedOnButton;
    private Button mLedOffButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.connection_activity);
        mLedOnButton = (Button) findViewById(R.id.btn_on);
        mLedOnButton.setOnClickListener(mLedOnClickListener);
        mLedOffButton = (Button) findViewById(R.id.btn_off);
        mLedOffButton.setOnClickListener(mLedOffClickListener);
        BluetoothDevice device = getIntent().getParcelableExtra("device");
        mHelper =
BluetoothConnectionHelper.createClient(UUID.fromString(APP_UUID), device);
        mHelper.setMessageReceiver(mListener);
        mHelper.connect();
    }
……(還有更多)
```

宣告連線時要使用的
BluetoothConnectionHelper

ANDROID 連線準備

```
public class ClientConnectionActivity extends Activity {
    private static final String APP_UUID = "00001101-0000-1000-8000-
00805F9B34FB";
    private BluetoothConnectionHelper mHelper;
    private Button mLedOnButton;
    private Button mLedOffButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.connection_activity);
        mLedOnButton = (Button) findViewById(R.id.btn_on);
        mLedOnButton.setOnClickListener(mLedOnClickListener);
        mLedOffButton = (Button) findViewById(R.id.btn_off);
        mLedOffButton.setOnClickListener(mLedOffClickListener);
        BluetoothDevice device = getIntent().getParcelableExtra("device");
        mHelper =
BluetoothConnectionHelper.createClient(UUID.fromString(APP_UUID), device);
        mHelper.setMessageReceiver(mListener);
        mHelper.connect();
    }
……(還有更多)
```

從Intent取出由DiscoveryActivity傳來的藍芽裝置資訊

ANDROID 連線準備

```
public class ClientConnectionActivity extends Activity {
    private static final String APP_UUID = "00001101-0000-1000-8000-
00805F9B34FB";
    private BluetoothConnectionHelper mHelper;
    private Button mLedOnButton;
    private Button mLedOffButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.connection_activity);
        mLedOnButton = (Button) findViewById(R.id.btn_on);
        mLedOnButton.setOnClickListener(mLedOnClickListener);
        mLedOffButton = (Button) findViewById(R.id.btn_off);
        mLedOffButton.setOnClickListener(mLedOffClickListener);
        BluetoothDevice device = getIntent().getParcelableExtra("device");
        mHelper =
BluetoothConnectionHelper.createClient(UUID.fromString(APP_UUID), device);
        mHelper.setMessageReceiver(mListener);
        mHelper.connect();
    }
……(還有更多)
```

createClient可以建立一個藍芽客戶端

ANDROID 連線準備

```
public class ClientConnectionActivity extends Activity {
    private static final String APP_UUID = "00001101-0000-1000-8000-
00805F9B34FB";
    private BluetoothConnectionHelper mHelper;
    private Button mLedOnButton;
    private Button mLedOffButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.connection_activity);
        mLedOnButton = (Button) findViewById(R.id.btn_on);
        mLedOnButton.setOnClickListener(mLedOnClickListener);
        mLedOffButton = (Button) findViewById(R.id.btn_off);
        mLedOffButton.setOnClickListener(mLedOffClickListener);
        BluetoothDevice device = getIntent().getParcelableExtra("device");
        mHelper =
BluetoothConnectionHelper.createClient(UUID.fromString(APP_UUID), device);
        mHelper.setMessageReceiver(mListener);
        mHelper.connect();
    }
……(還有更多)
```

參數1傳入
UUID轉為UUID物件

ANDROID 連線準備

```
public class ClientConnectionActivity extends Activity {
    private static final String APP_UUID = "00001101-0000-1000-8000-
00805F9B34FB";
    private BluetoothConnectionHelper mHelper;
    private Button mLedOnButton;
    private Button mLedOffButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.connection_activity);
        mLedOnButton = (Button) findViewById(R.id.btn_on);
        mLedOnButton.setOnClickListener(mLedOnClickListener);
        mLedOffButton = (Button) findViewById(R.id.btn_off);
        mLedOffButton.setOnClickListener(mLedOffClickListener);
        BluetoothDevice device = getIntent().getParcelableExtra("device");
        mHelper =
BluetoothConnectionHelper.createClient(UUID.fromString(APP_UUID), device);
        mHelper.setMessageReceiver(mListener);
        mHelper.connect();
    }
……(還有更多)
```

參數2傳入要連線的藍芽裝置資訊

ANDROID 連線準備

```
public class ClientConnectionActivity extends Activity {
    private static final String APP_UUID = "00001101-0000-1000-8000-
00805F9B34FB";
    private BluetoothConnectionHelper mHelper;
    private Button mLedOnButton;
    private Button mLedOffButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.connection_activity);
        mLedOnButton = (Button) findViewById(R.id.btn_on);
        mLedOnButton.setOnClickListener(mLedOnClickListener);
        mLedOffButton = (Button) findViewById(R.id.btn_off);
        mLedOffButton.setOnClickListener(mLedOffClickListener);
        BluetoothDevice device = getIntent().getParcelableExtra("device");
        mHelper =
BluetoothConnectionHelper.createClient(UUID.fromString(APP_UUID), device);
        mHelper.setMessageReceiver(mListener);
        mHelper.connect();
    }
……(還有更多)
```

註冊事件接受器，可以接收到藍芽伺服端回傳的訊息

ANDROID 連線準備

```
public class ClientConnectionActivity extends Activity {
    private static final String APP_UUID = "00001101-0000-1000-8000-
00805F9B34FB";
    private BluetoothConnectionHelper mHelper;
    private Button mLedOnButton;
    private Button mLedOffButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.connection_activity);
        mLedOnButton = (Button) findViewById(R.id.btn_on);
        mLedOnButton.setOnClickListener(mLedOnClickListener);
        mLedOffButton = (Button) findViewById(R.id.btn_off);
        mLedOffButton.setOnClickListener(mLedOffClickListener);
        BluetoothDevice device = getIntent().getParcelableExtra("device");
        mHelper =
BluetoothConnectionHelper.createClient(UUID.fromString(APP_UUID), device);
        mHelper.setMessageReceiver(mListener);
        mHelper.connect();
    }
```

呼叫connect與藍芽伺服端進行連線

……(還有更多)

ANDROID 連線準備

```
protected void onDestroy() {
    super.onDestroy();
    if (mHelper != null) {
        mHelper.close();
    }
}
```

記得在onDestroy時
呼叫close與伺服端斷線

ANDROID 傳送訊息

```
private OnClickListener mLedOnClickListener = new OnClickListener(){
        @Override
        public void onClick(View v) {
            if (mHelper.isConnect()) {
               mHelper.sendMessage("1");
            }
        }
};
private OnClickListener mLedOffClickListener = new OnClickListener(){
        @Override
        public void onClick(View v) {
            if (mHelper.isConnect()) {
               mHelper.sendMessage("0");
            }
        }
};
```

ANDROID 傳送訊息

```
private OnClickListener mLedOnClickListener = new OnClickListener(){
        @Override
        public void onClick(View v) {
            if (mHelper.isConnect()) {
                mHelper.sendMessage("1");
            }
        }
};
private OnClickListener mLedOffClickListener = new OnClickListener(){
        @Override
        public void onClick(View v) {
            if (mHelper.isConnect()) {
                mHelper.sendMessage("0");
            }
        }
};
```

檢查目前是否與伺服端連線成功

ANDROID 傳送訊息

```
private OnClickListener mLedOnClickListener = new OnClickListener(){
        @Override
        public void onClick(View v) {
            if (mHelper.isConnect()) {
                mHelper.sendMessage("1");
            }
        }
};
private OnClickListener mLedOffClickListener = new OnClickListener(){
        @Override
        public void onClick(View v) {
            if (mHelper.isConnect()) {
                mHelper.sendMessage("0");
            }
        }
};
```

sendMessage()送出字串
此處送出1
Arduino收到後會開啟LED

ANDROID 傳送訊息

```
private OnClickListener mLedOnClickListener = new OnClickListener(){
        @Override
        public void onClick(View v) {
            if (mHelper.isConnect()) {
                mHelper.sendMessage("1");
            }
        }
};
private OnClickListener mLedOffClickListener = new OnClickListener(){
        @Override
        public void onClick(View v) {
            if (mHelper.isConnect()) {
                mHelper.sendMessage("0");
            }
        }
};
```

sendMessage()送出字串
此處送出0
Arduino收到後會關閉LED

ANDROID 客戶端事件接收

```
private OnBluetoothMessageListener mListener = new
OnBluetoothMessageListener() {
    @Override
    public void onMessageReceived(BluetoothDevice device, String message) {

    }
    @Override
    public void onDisconnect(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Disconnect", Toast.LENGTH_LONG).show();
        finish();
    }
    @Override
    public void onConnected(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Connect", Toast.LENGTH_LONG).show();
    }
};
```

ANDROID 客戶端事件接收

```
private OnBluetoothMessageListener mListener = new
OnBluetoothMessageListener() {
    @Override
    public void onMessageReceived(BluetoothDevice device, String message) {

    }
    @Override
    public void onDisconnect(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Disconnect", Toast.LENGTH_LONG).show();
        finish();
    }
    @Override
    public void onConnected(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Connect", Toast.LENGTH_LONG).show();
    }
};
```

藍芽客戶端事件接收器

ANDROID 客戶端事件接收

```
private OnBluetoothMessageListener mListener = new
OnBluetoothMessageListener() {
    @Override
    public void onMessageReceived(BluetoothDevice device, String message) {

    }
    @Override
    public void onDisconnect(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Disconnect", Toast.LENGTH_LONG).show();
        finish();
    }
    @Override
    public void onConnected(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Connect", Toast.LENGTH_LONG).show();
    }
};
```

第一種事件：
藍芽伺服端傳訊息過來

ANDROID 客戶端事件接收

```
private OnBluetoothMessageListener mListener = new
OnBluetoothMessageListener() {
    @Override
    public void onMessageReceived(BluetoothDevice device, String message) {

    }
    @Override
    public void onDisconnect(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Disconnect", Toast.LENGTH_LONG).show();
        finish();
    }
    @Override
    public void onConnected(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Connect", Toast.LENGTH_LONG).show();
    }
};
```

參數1 傳訊過來的藍芽裝置

ANDROID 客戶端事件接收

```
private OnBluetoothMessageListener mListener = new
OnBluetoothMessageListener() {
    @Override
    public void onMessageReceived(BluetoothDevice device, String message) {

    }
    @Override
    public void onDisconnect(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Disconnect", Toast.LENGTH_LONG).show();
        finish();
    }
    @Override
    public void onConnected(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Connect", Toast.LENGTH_LONG).show();
    }
};
```

參數2 傳遞的訊息

ANDROID 客戶端事件接收

```
private OnBluetoothMessageListener mListener = new
OnBluetoothMessageListener() {
    @Override
    public void onMessageReceived(BluetoothDevice device, String message) {

    }
    @Override
    public void onDisconnect(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Disconnect", Toast.LENGTH_LONG).show();
        finish();
    }
    @Override
    public void onConnected(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Connect", Toast.LENGTH_LONG).show();
    }
};
```

第二種事件：
藍芽伺服端與你斷線

ANDROID 客戶端事件接收

```
private OnBluetoothMessageListener mListener = new
OnBluetoothMessageListener() {
    @Override
    public void onMessageReceived(BluetoothDevice device, String message) {

    }
    @Override
    public void onDisconnect(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Disconnect", Toast.LENGTH_LONG).show();
        finish();
    }
    @Override
    public void onConnected(BluetoothDevice device) {
        Toast.makeText(ClientConnectionActivity.this,
                "Connect", Toast.LENGTH_LONG).show();
    }
};
```

第三種事件：
藍芽伺服端與你連線成功
發生在呼叫connect後

總結

- 使用輔助Library，Client的程式碼大約170行左右就可以完成(含空白行)

- 若要進階使用，依然得去研究Android的程式碼
- 也可以看輔助Library的程式碼，見BluetoothUtility

- http://developer.android.com/guide/topics/connectivity/bluetooth.html

作業

- 使用Arduino接上溫度的Sensor與藍芽
- Android負責搜尋藍芽裝置並且與Arduino進行連線
- 連線成功後Android發出要求給Arduino回傳溫度
- Android接收溫度後要將溫度顯示在畫面上

Q & A