

人機介面

Arduino + Android

授課教師:

開課單位:

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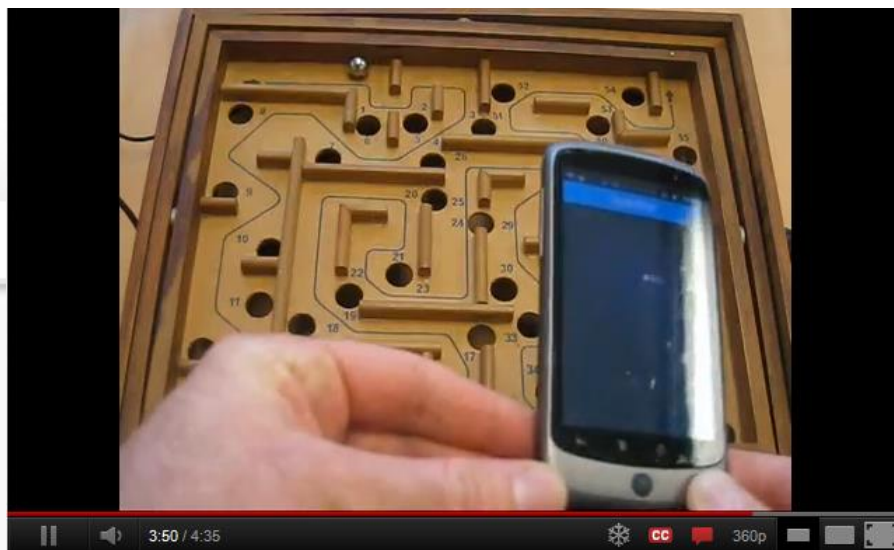


Arduino + Android 應用

- Arduino: 簡單易用的開放源碼電子原型平台 (electronics prototyping platform)
- Android: 相當受歡迎的行動裝置作業系統平台
- 兩者相遇，可以創造哪些可能的應用？



更多應用案例



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溝通方案

- 📎 使用 Android ADK: Android Open Accessory Development Kit
- 📎 透過藍芽通訊作雙向溝通 Amarino:
<http://www.amarino-toolkit.net/>
- 📎 Build your own solution:
 - <http://jdesbonnet.blogspot.com/2011/05/arduino-to-android-io-on-cheap-aka-poor.html>
 - [Arduino + Android Projects for the evil genius](#)

Google I/O 2011 Video

- Introducing Android Open Accessory API and Development Kit (ADK)



ADK 相容開發板

- ✍ The [Arduino Store](#) provides the Arduino Mega ADK (in [EU nations](#) or [non-EU nations](#)) that is based on the ATmega2560 and supports the ADK firmware.
- ✍ [DIY Drones](#) provides an Arduino-compatible board geared towards RC (radio controlled) and UAV (unmanned aerial vehicle) enthusiasts.
- ✍ [mbed](#) provides a microcontroller and a library to develop accessories that support the Android accessory protocol. For more information, see [mbed with the Android ADK](#).
- ✍ [Microchip](#) provides a PIC based USB microcontroller board.
- ✍ [Modern Device](#) provides an Arduino-compatible board that supports the ADK firmware.
- ✍ [RT Corp](#) provides an Arduino-compatible board based on the Android ADK board design.
- ✍ [Seeed Studio](#) provides an Arduino-compatible board that supports the ADK firmware.
- ✍ [SparkFun](#)'s IOIO board now has beta support for the ADK firmware.

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相關文件



[Android developers 官方網站](#)



[Android 課程](#) (中文教學:關於ADK部分)

完整案例說明: DIY Android Ball Maze

<http://www.instructables.com/id/DIY-Android-Ball-Maze-An-Introduction-to-the-And/?ALLSTEPS>



Amarino

 Amarino 是 MIT High-Low Tech 小組的專案，取意 Android meets Arduino，功能與 Android-Firmata 相同，但採用更簡單的協定。Amarino 協定封包格式非常單純，只是把要傳輸的資料夾在一個 0x12 起始符號和 0x13 確認符號中間而已。

 要開發 Amarino 的互動應用，Arduino 這端的程式要用 MeetAndroid 函式庫，而 Android 這端的程式則要使用 AmarinoLibrary.jar 函式庫，這兩個函式庫都可以在 Amarino 官網取得。

Amarino Documentation

Documentation

Here you find instructions how to use the Amarino toolkit to connect Android phones to Arduinos.

Amarino basically consists of three main parts (two mandatory and one optional):

- Android application called "Amarino"
- Arduino library called "MeetAndroid"
- Amarino Plug-In Bundle (optional)

If you want to work with Amarino you need at least:

- An Android phone (Android 2.x works best, however Android 1.6 is also supported but not all models will work, e.g. HTC Hero and Samsung Behold II with Android 1.x won't work)
- An Arduino board (Lilypad, Duemilanove, ArduinoBT ...)
- A Bluetooth shield for your Arduino. (BlueSMiRF Gold and Bluetooth Mate do well. Also much cheaper modules like SURE Bluetooth GP-GC021 and Seeed Studio Bluetooth module have been reported to work flawlessly, but are a bit tricky to use)
- Some electronic components to make your Arduino happy (whatever you need to realize your ideas)

Amarino Presentation



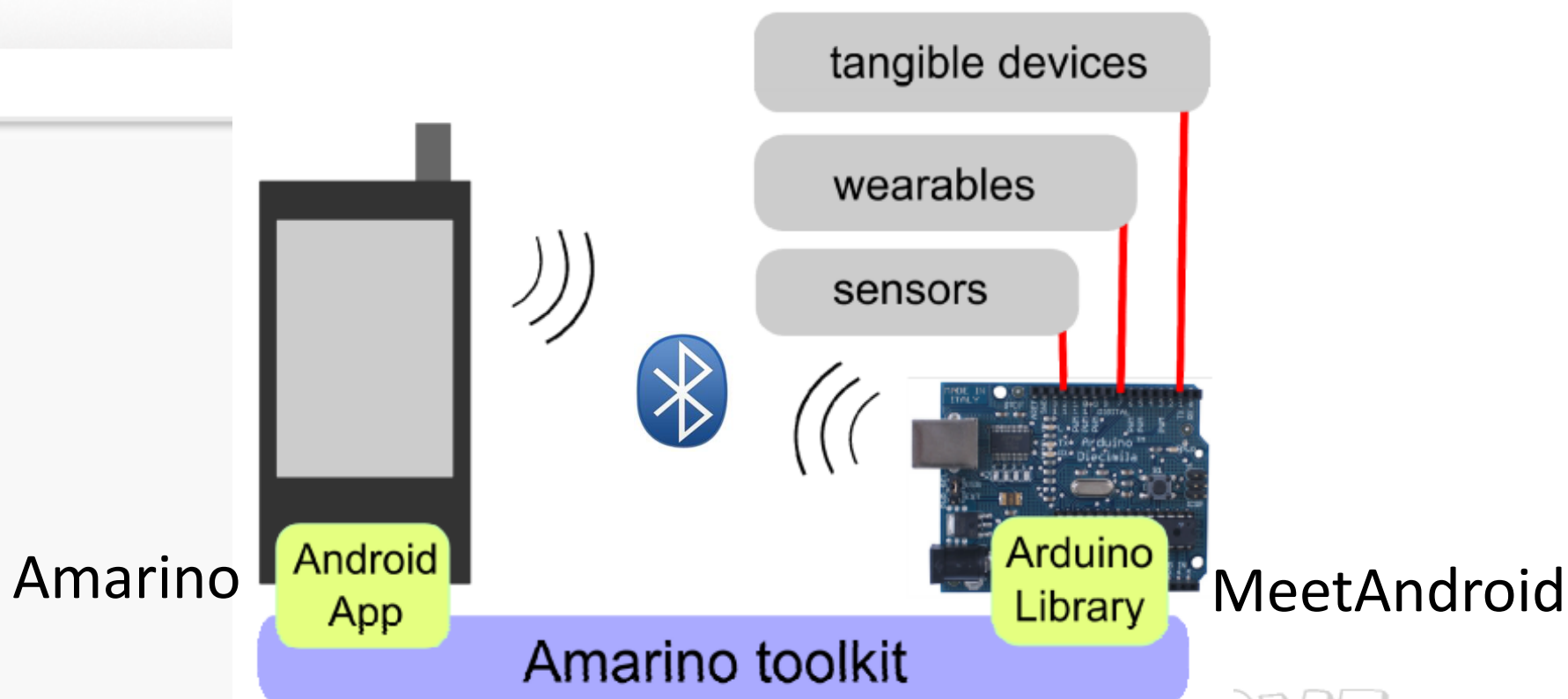
Amarino: a toolkit for the rapid
prototyping of mobile ubiquitous
computing



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示意圖

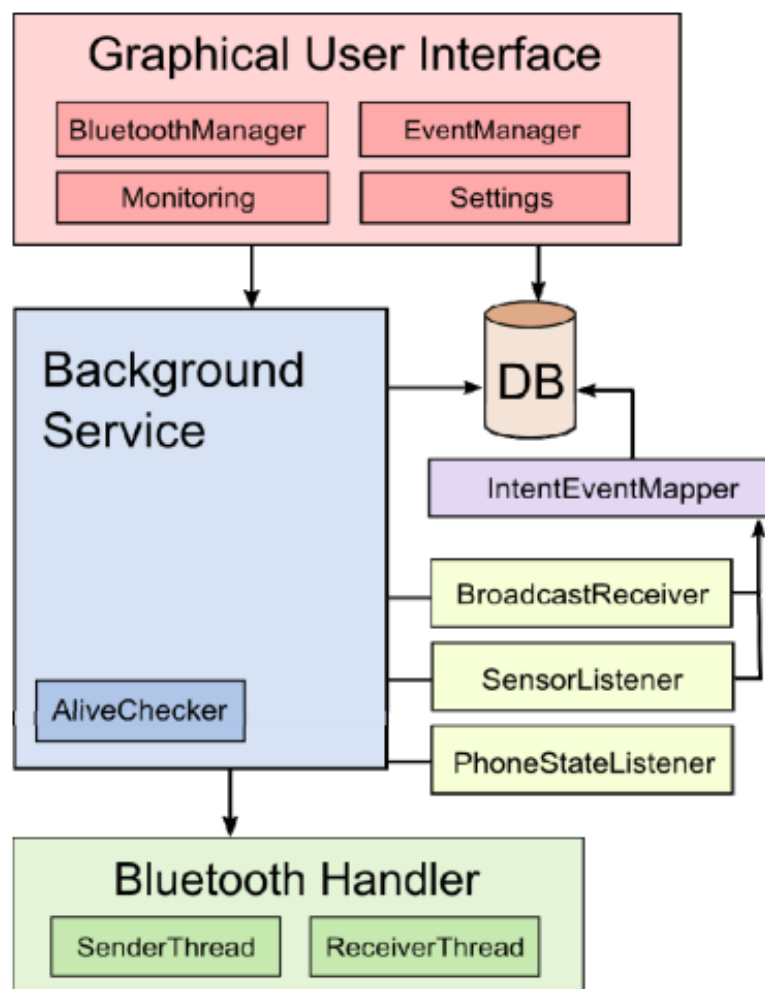


Amarino 函式庫內建 Event

Table 1: List of all built-in events in Amarino

Built-in Event	Description
Test Event	Sends an empty message every 5 secs
Time Tick	Fires each minute
Phone state (Ringing)	Fires once when phone is ringing [incoming number attached]
Phone state (Idle)	Fires once when phone is idle
Phone state (Offhook)	Fires once when phone is hung up
Compass	Sends heading in degrees [0-359]
Orientation Sensor	Sends orientation data in degrees [azimuth, pitch, roll]
Accelerometer Sensor	Sends acceleration data in m/s^2 [x,y,z]
Magnetic Field Sensor	Sends magnetic field data in micro-Tesla [x,y,z]
Temperature Sensor	Sends temperature in Celsius degree
Light Sensor	Sends ambient light level in SI lux units
Battery Level	Fires whenever the phone's battery level changes [0-100]
Receive SMS	Fires when an SMS has been received
Earthquake	Fires when an earthquake occurs somewhere on earth with magnitude [0-10]

架構



Android與 Arduino 間資料傳輸

Your Android App

```
Intent intent = new Intent("amarino.send.my.data");  
intent.putExtra("data", 612);  
sendBroadcast(intent);
```

1

Amarino App

1. Create new Custom Event
2. Action = **amarino.send.my.data**
3. Flag = **'c'**
4. Add data with + and select the type Integer, your key is **"data"**
5. Add your custom event to your collection by using the "Add Event" button

The screenshot shows the Amarino App interface for creating a custom event. It has three main sections: 'Action', 'Flag', and 'Data'. The 'Action' field contains the text 'amarino.send.my.data'. The 'Flag' section shows 'Ascii: 'c'' and 'Byte: 99'. The 'Data' section has a dropdown menu set to 'Integer' and a text field containing 'data'. There are '+' and '-' buttons next to the data field, and 'Save' and 'Discard' buttons at the bottom.

2

Your Arduino Sketch

```
#include <MeetAndroid.h>  
  
MeetAndroid meetAndroid;  
  
void setup() {  
  Serial.begin(57600);  
  
  // register callback function for events with flag 'c'  
  meetAndroid.registerFunction(getMyData, 'c');  
}  
  
void loop(){  
  // you need to keep this in your loop() to receive events  
  meetAndroid.receive();  
}  
  
// this function is called as soon as your Android app broadcasts  
// the intent  
void getMyData(byte flag, byte numOfValues) {  
  int value = meetAndroid.getInt(); // value is now 612  
}
```

3

Amarino Example



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Book site: <http://www.duinodroid.com/home>



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