手機藍芽通訊實驗課程

課程：情境感知學習設計實務

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課程介紹

- Bluetooth 介紹篇
  - 藍芽介紹
  - 藍芽工具
- Bluetooth 實作篇
  - 開發環境介紹
  - 範例
  - 程式介紹
- Bluetooth 課堂作業
  - 動手做做看

Bluetooth 介紹篇

藍芽介紹

- Bluetooth
  - 來自10世紀的丹麥國王Harald Gormsson的外號，用來暗示藍芽是統一通訊協定的通用標準
- 使用低耗電、成本小、短距離（1至100公尺）的無線裝置
- 藍牙的標準通訊協定是IEEE 802.15.1
- 最高速度可達723.1kb/s
- 藍牙協定將該頻段劃分成79頻道，（頻寬為1MHZ）每秒的頻道轉換可達1600次

藍芽介紹

- 從行動電話而起，為了要解決行動電話及其周邊相互連線的方便性

- 藍芽技術與紅外線傳輸技術(IrDA)相似
  - 均是短距離的無線傳輸技術

- 藍芽在進行傳輸時
  - 資料從發射點以球狀向四面八方進行傳輸，故在應用性及方便性上而言，藍芽傳輸是比紅外線傳輸來的方便

藍芽工具

- 藍芽有許多應用如下
  - 耳機
  - 手機
  - 電腦
  - 印表機
  - 滑鼠
  - 鍵盤

Keyboard
Mouse
Printer
PDA
Desktop
Cellphone
Headset

Bluetooth 實作篇

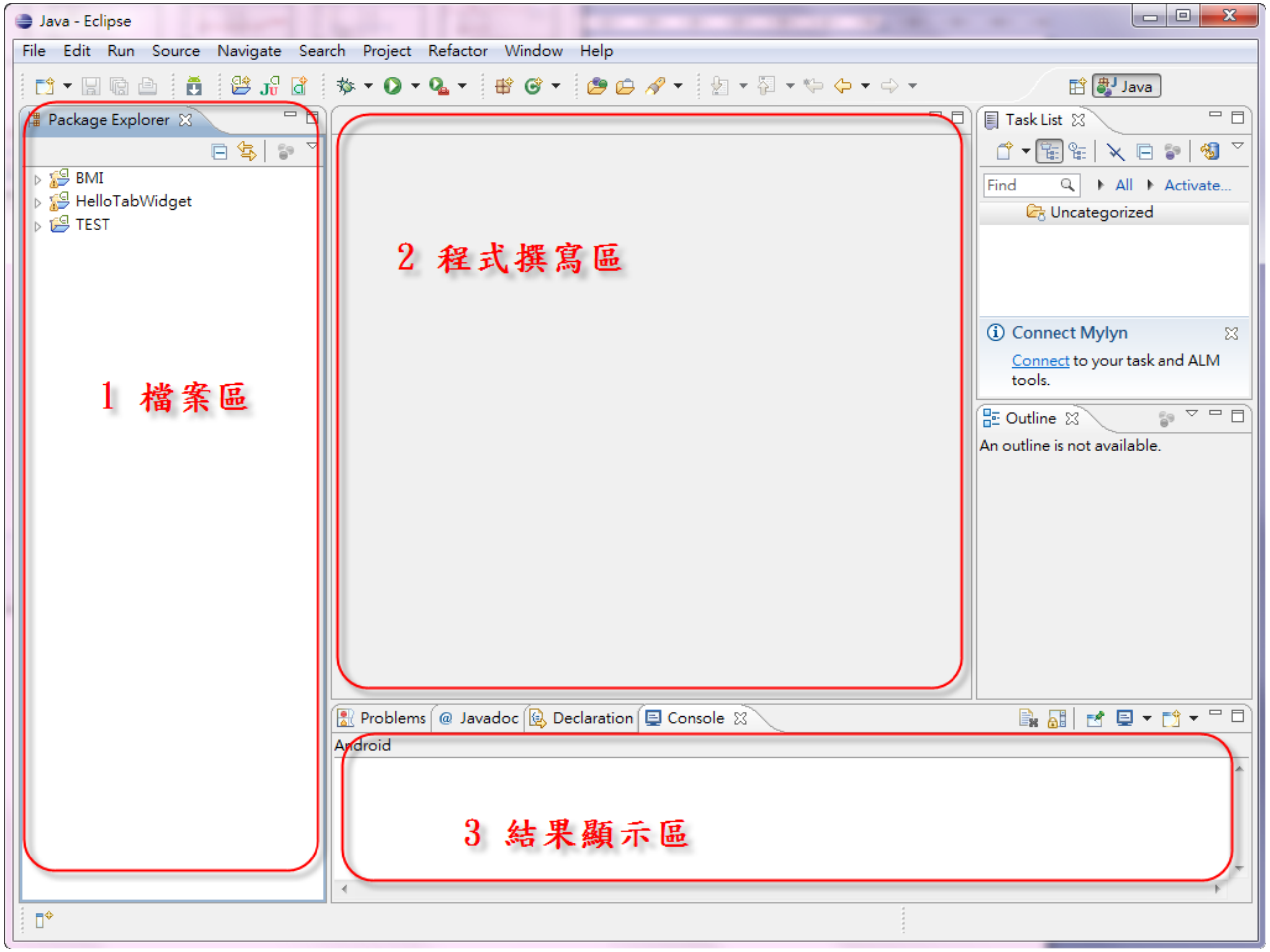
開發環境介紹

- Eclipse
  - 是著名的跨平台的自由整合式開發環境（IDE）
  - 最初主要用來Java語言開發
  - 透過外掛程式使其作為C++、Python等語言的開發工具

- Eclipse的本身只是一個框架平台，但是眾多外掛程式的支援，使得Eclipse擁有較佳的靈活性

- 許多軟體開發商以Eclipse為框架開發自己的IDE

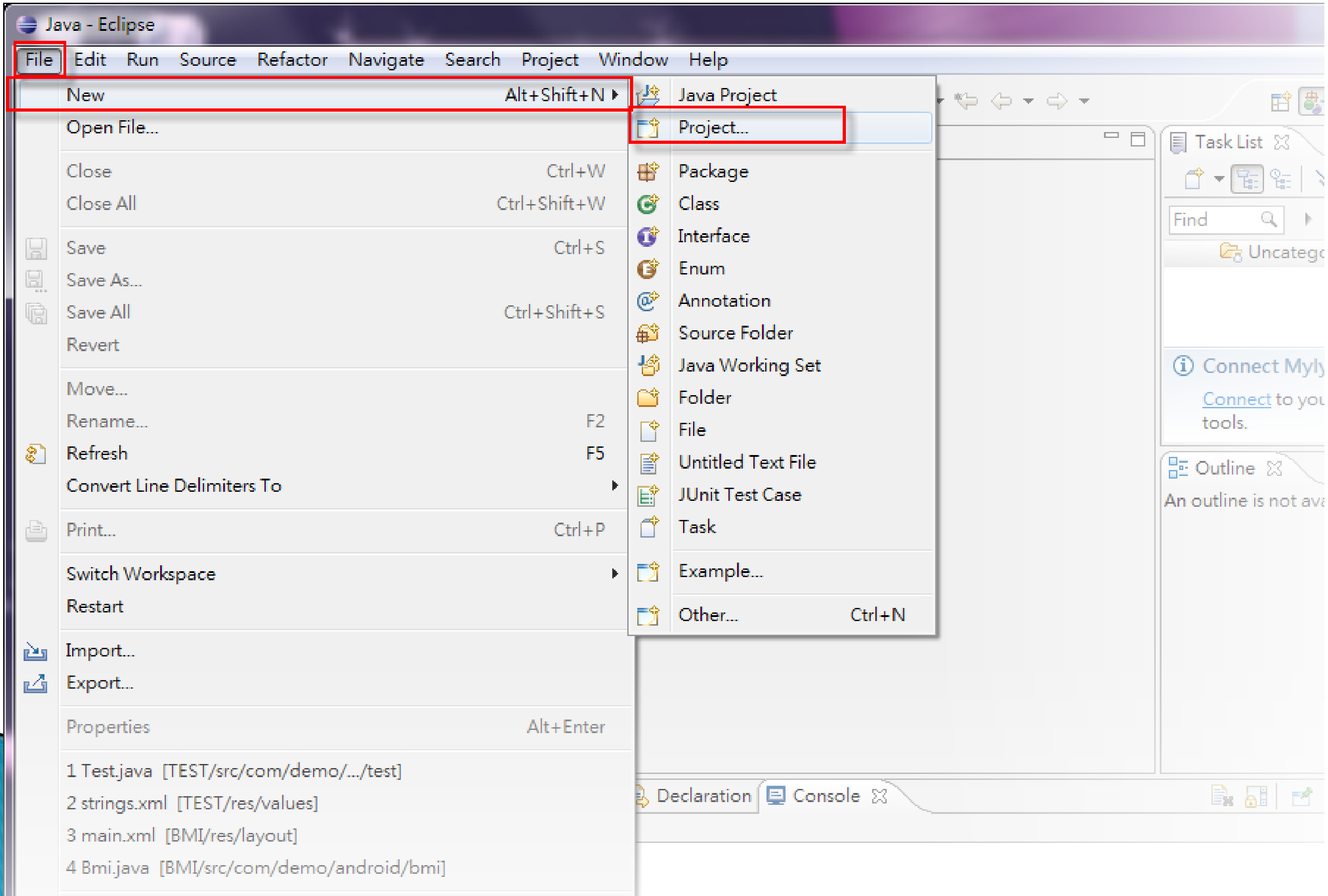
Eclipse介紹



Java - Eclipse
File Edit Run Source Navigate Search Project Refactor Window Help
Java
Package Explorer
BMI
HelloTabWidget
TEST
1 檔案區
2 程式撰寫區
Task List
Find
All
Activate...
Uncategorized
Connect Mylyn
Connect to your task and ALM tools.
Outline
An outline is not available.
Problems
Javadoc
Declaration
Console
Android
3 結果顯示區

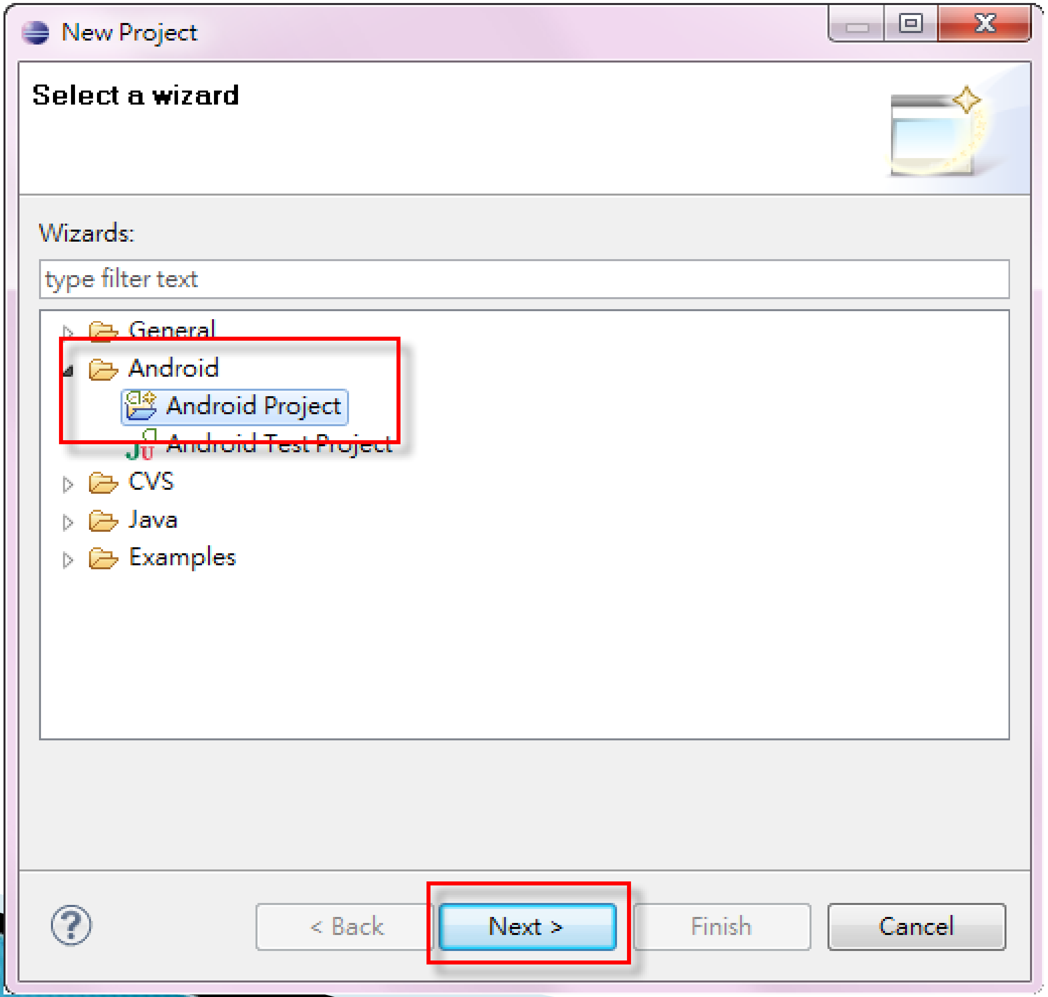
Eclipse介紹

新增一個Project
首先『File』→『New』→『Project』



Eclipse介紹

接著點『Android』→『Android Project』→『Next』


New Project

Select a wizard

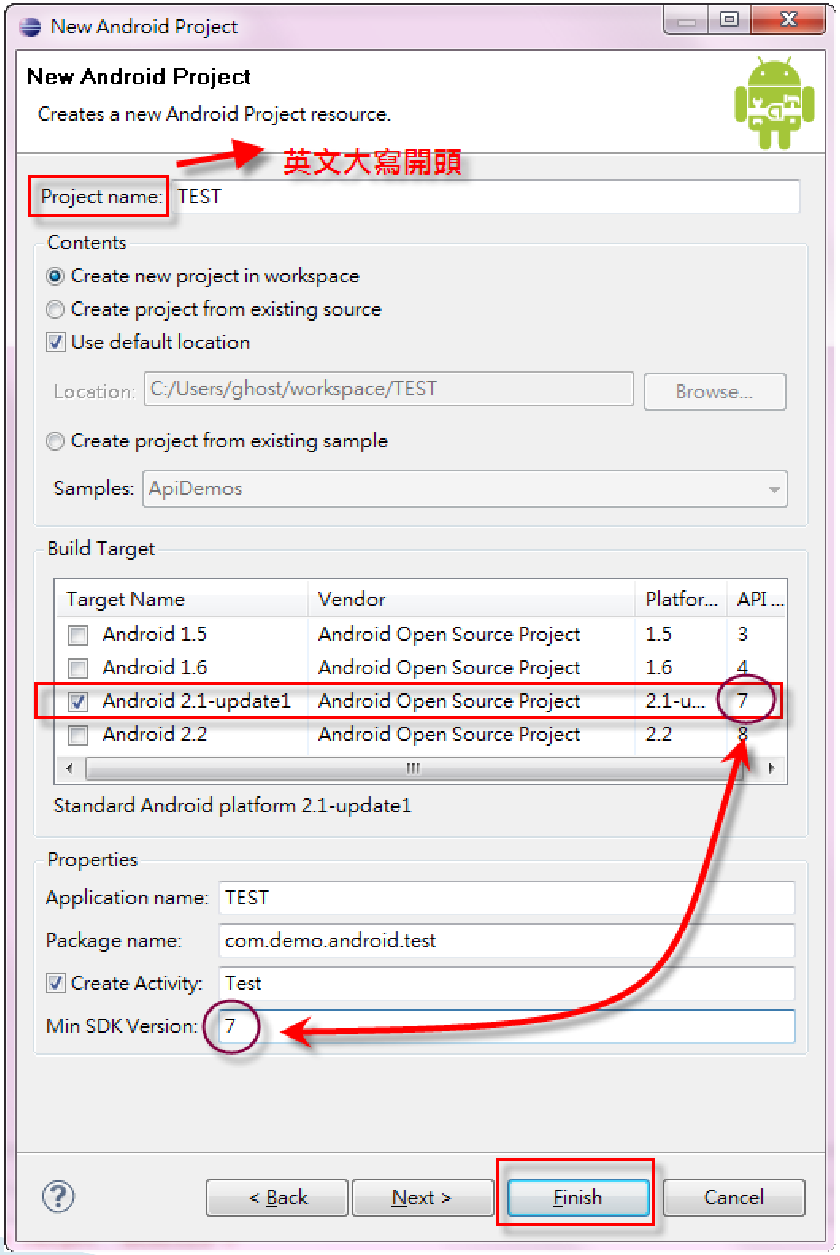
Wizards:

type filter text

Eclipse介紹

在『Project name』輸入英文名稱
(開頭必是英文大寫勿用數字)

在『Build Target』選擇你要安裝的版本(本設定為Android2.1)



New Android Project

New Android Project

Creates a new Android Project resource.

英文大寫開頭

Project name: TEST

Contents

● Create new project in workspace

○ Create project from existing source

☑ Use default location

Location: C:/Users/ghost/workspace/TEST

○ Create project from existing sample

Samples: ApiDemos

Build Target

	Target Name	Vendor	Platfor...	API ...
□	Android 1.5	Android Open Source Project	1.5	3
□	Android 1.6	Android Open Source Project	1.6	4
☑	Android 2.1-update1	Android Open Source Project	2.1-u...	7
□	Android 2.2	Android Open Source Project	2.2	8

Standard Android platform 2.1-update1

Properties

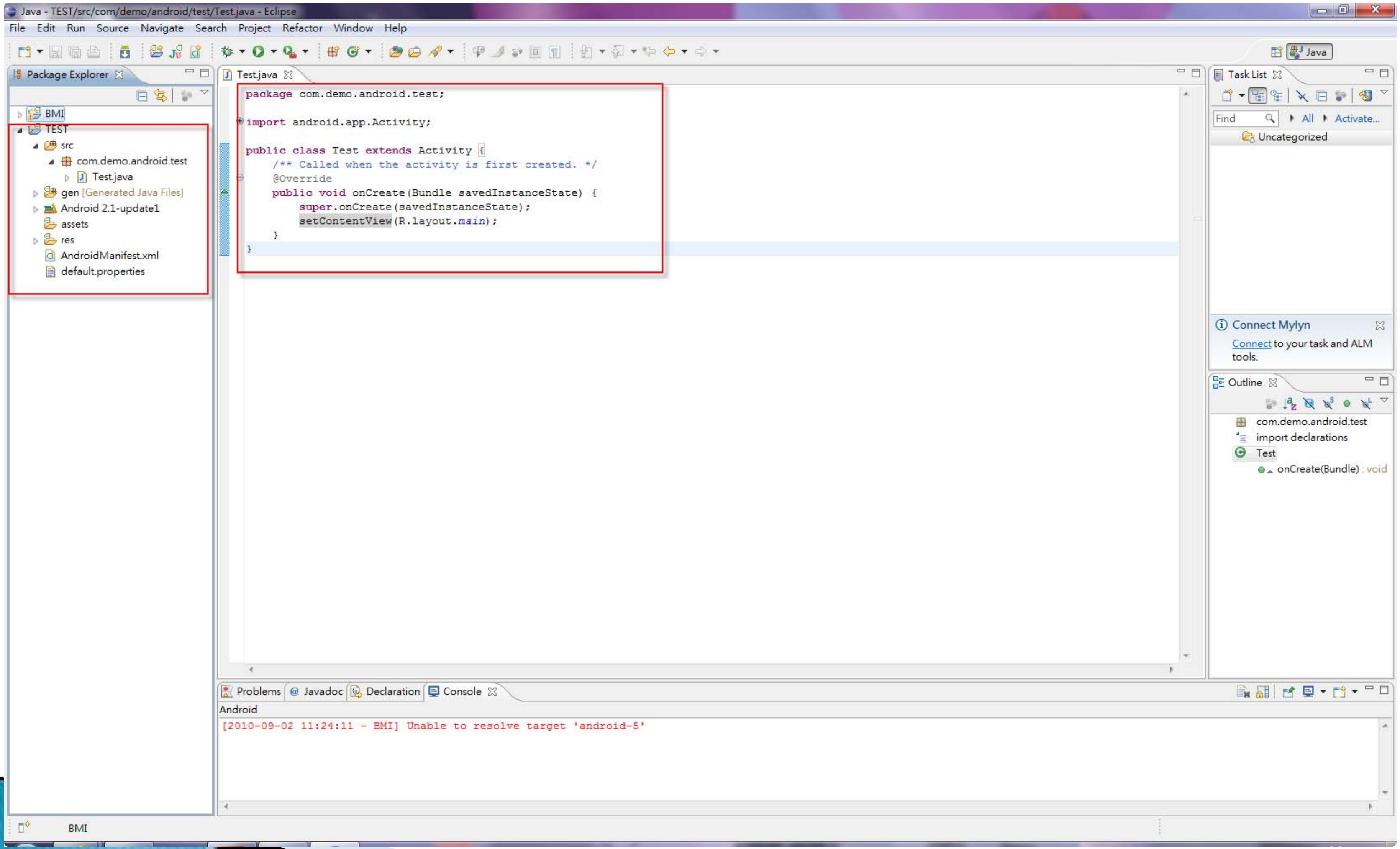
Application name: TEST

Package name: com.demo.android.test

☑ Create Activity: Test

Min SDK Version: 7

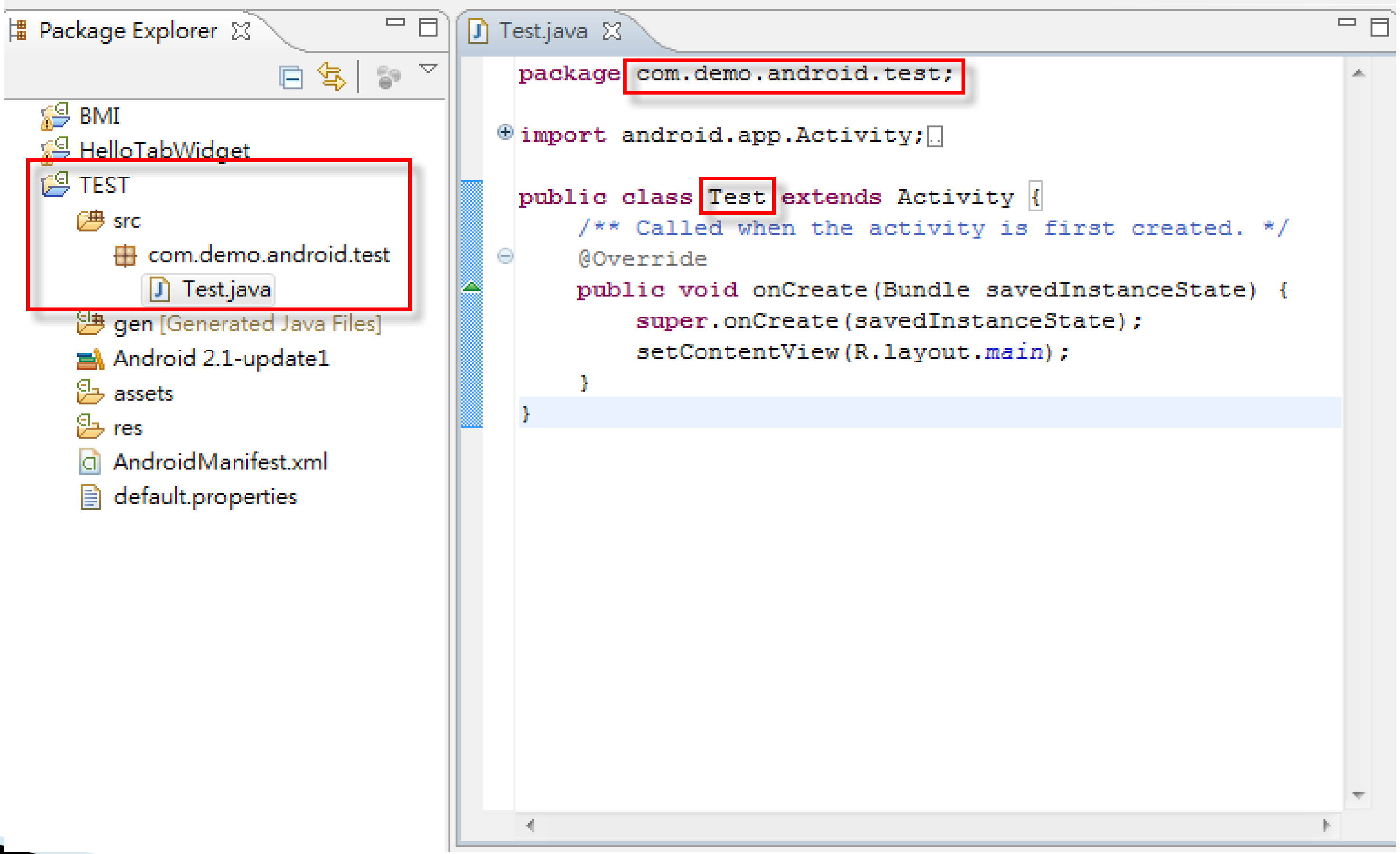
Eclipse介紹



```java
package com.demo.android.test;

import android.app.Activity;

public class Test extends Activity {
    /** Called when the activity is first created. */
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
    }
}
```

```
[2010-09-02 11:24:11 - BMI] Unable to resolve target 'android-5'
```

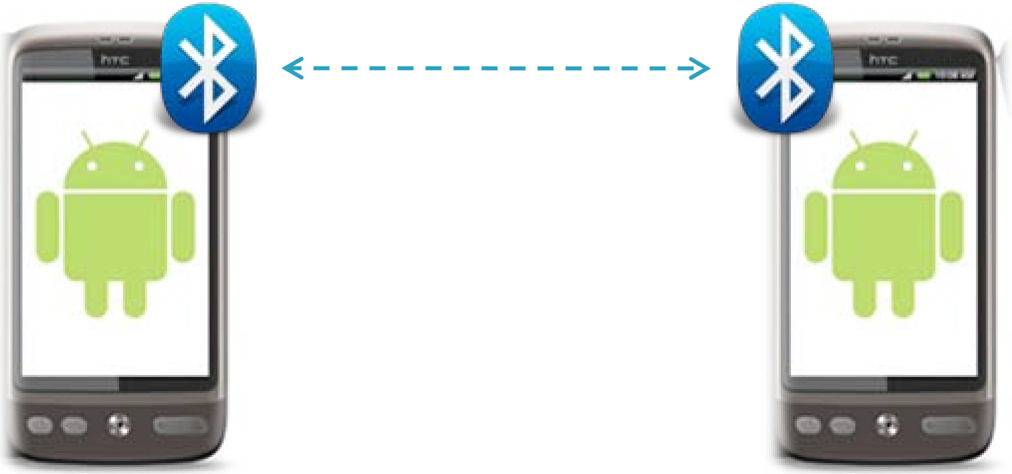
Eclipse介紹



```java
package com.demo.android.test;

import android.app.Activity;

public class Test extends Activity {
    /** Called when the activity is first created. */
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
    }
}
```

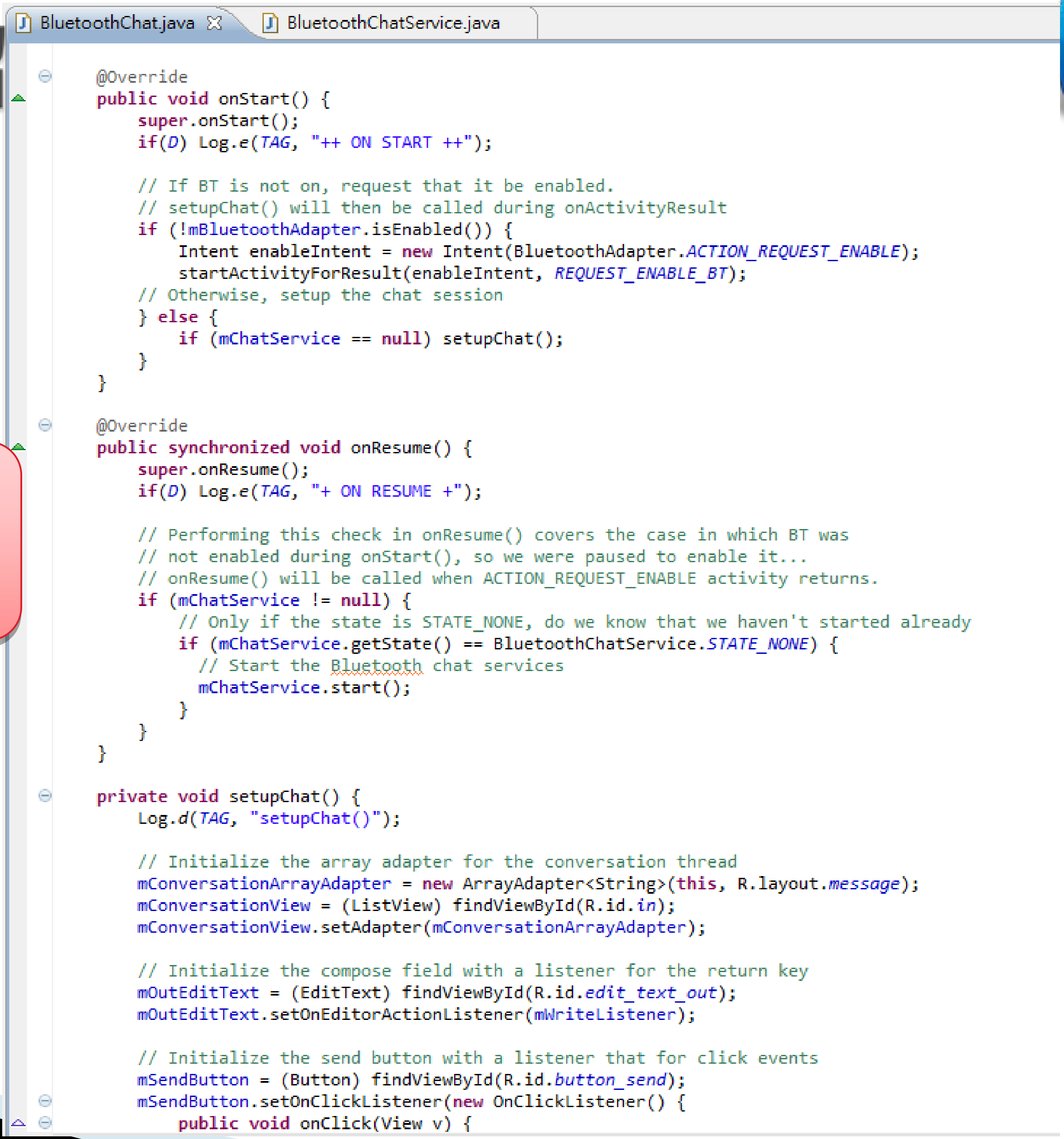
範例 - 藍芽傳輸

1. 兩台手機透過藍芽互相連線
2. 利用藍芽互相傳送訊息



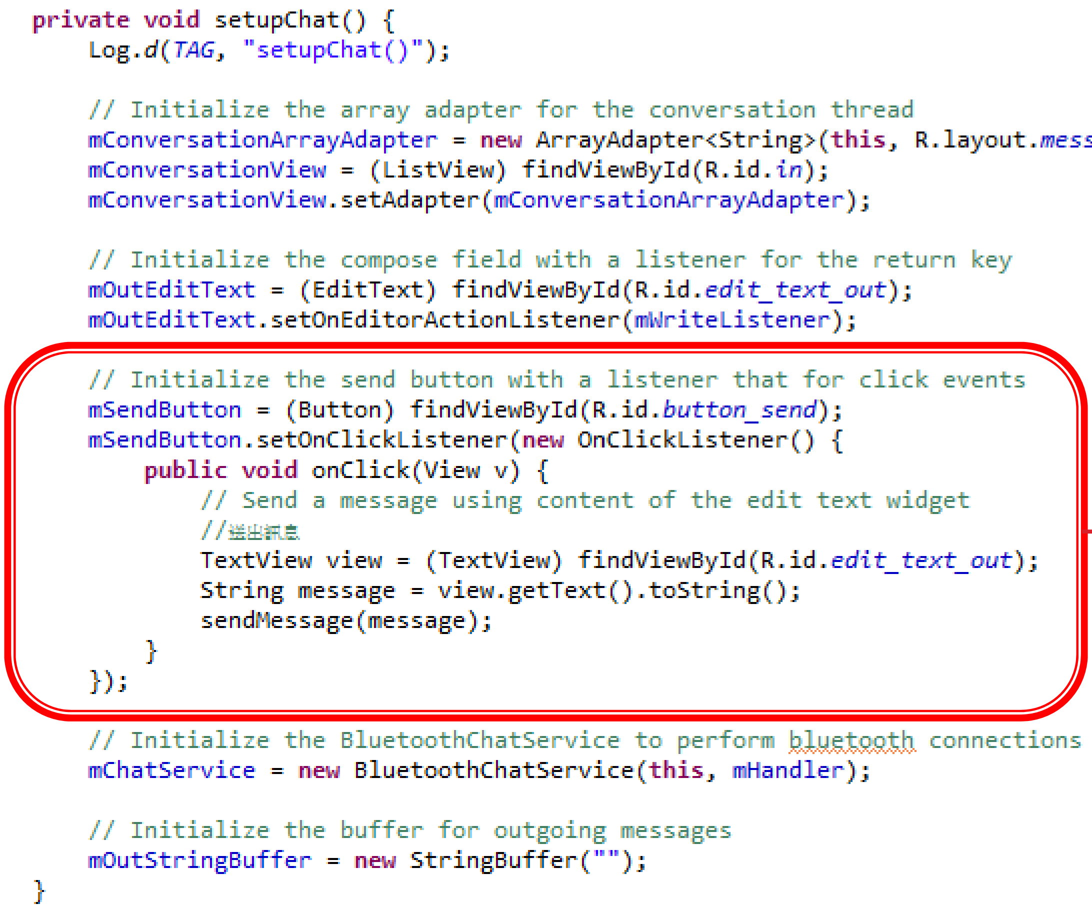
程式介紹

搜尋手機上
藍芽的資訊



```
    @Override
    public void onStart() {
        super.onStart();
        if(D) Log.e(TAG, "++ ON START ++");

        // If BT is not on, request that it be enabled.
        // setupChat() will then be called during onActivityResult
        if (!mBluetoothAdapter.isEnabled()) {
            Intent enableIntent = new Intent(BluetoothAdapter.ACTION_REQUEST_ENABLE);
            startActivityForResult(enableIntent, REQUEST_ENABLE_BT);
        // Otherwise, setup the chat session
        } else {
            if (mChatService == null) setupChat();
        }
    }

    @Override
    public synchronized void onResume() {
        super.onResume();
        if(D) Log.e(TAG, "+ ON RESUME +");

        // Performing this check in onResume() covers the case in which BT was
        // not enabled during onStart(), so we were paused to enable it...
        // onResume() will be called when ACTION_REQUEST_ENABLE activity returns.
        if (mChatService != null) {
            // Only if the state is STATE_NONE, do we know that we haven't started already
            if (mChatService.getState() == BluetoothChatService.STATE_NONE) {
              // Start the Bluetooth chat services
              mChatService.start();
            }
        }
    }

    private void setupChat() {
        Log.d(TAG, "setupChat()");

        // Initialize the array adapter for the conversation thread
        mConversationArrayAdapter = new ArrayAdapter<String>(this, R.layout.message);
        mConversationView = (ListView) findViewById(R.id.in);
        mConversationView.setAdapter(mConversationArrayAdapter);

        // Initialize the compose field with a listener for the return key
        mOutEditText = (EditText) findViewById(R.id.edit_text_out);
        mOutEditText.setOnEditorActionListener(mWriteListener);

        // Initialize the send button with a listener that for click events
        mSendButton = (Button) findViewById(R.id.button_send);
        mSendButton.setOnClickListener(new OnClickListener() {
            public void onClick(View v) {
```

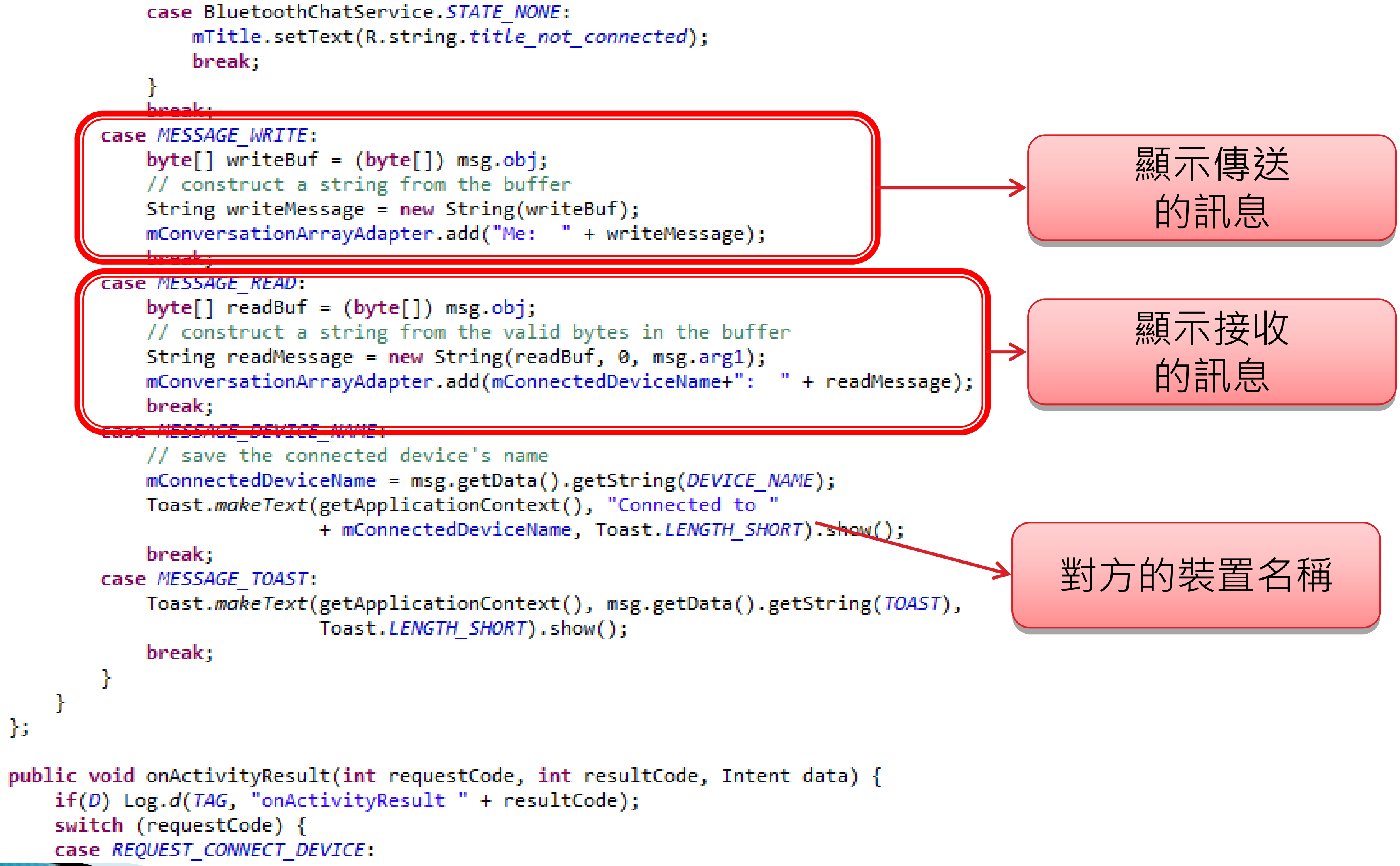
程式介紹



```java
private void setupChat() {
    Log.d(TAG, "setupChat()");

    // Initialize the array adapter for the conversation thread
    mConversationArrayAdapter = new ArrayAdapter<String>(this, R.layout.message);
    mConversationView = (ListView) findViewById(R.id.in);
    mConversationView.setAdapter(mConversationArrayAdapter);

    // Initialize the compose field with a listener for the return key
    mOutEditText = (EditText) findViewById(R.id.edit_text_out);
    mOutEditText.setOnEditorActionListener(mWriteListener);

    // Initialize the send button with a listener that for click events
    mSendButton = (Button) findViewById(R.id.button_send);
    mSendButton.setOnClickListener(new OnClickListener() {
        public void onClick(View v) {
            // Send a message using content of the edit text widget
            //送出訊息
            TextView view = (TextView) findViewById(R.id.edit_text_out);
            String message = view.getText().toString();
            sendMessage(message);
        }
    });

    // Initialize the BluetoothChatService to perform bluetooth connections
    mChatService = new BluetoothChatService(this, mHandler);

    // Initialize the buffer for outgoing messages
    mOutStringBuffer = new StringBuffer("");
}
```

訊息傳送

程式介紹



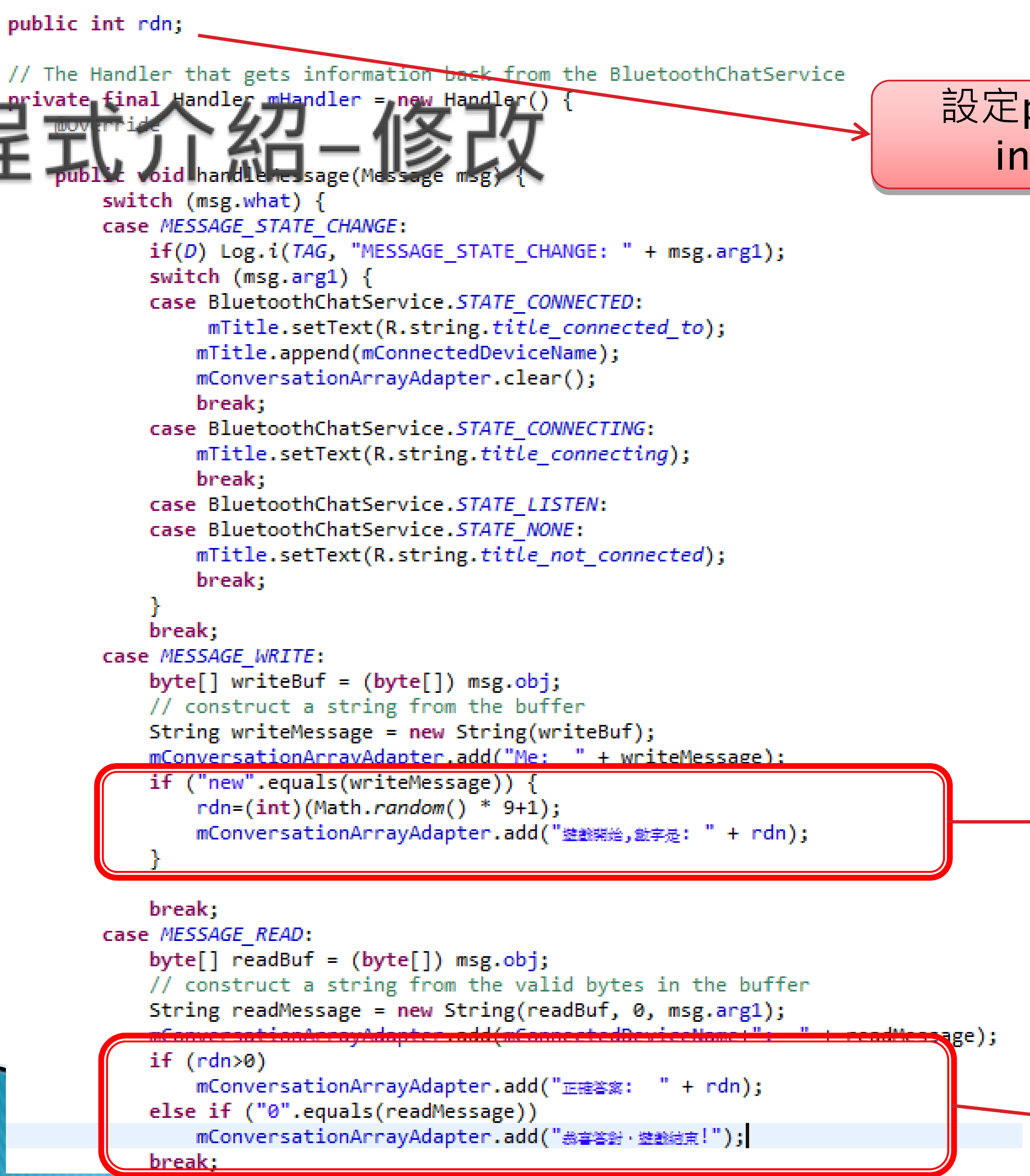
```
            case BluetoothChatService.STATE_NONE:
                mTitle.setText(R.string.title_not_connected);
                break;
            }
            break;
        case MESSAGE_WRITE:
            byte[] writeBuf = (byte[]) msg.obj;
            // construct a string from the buffer
            String writeMessage = new String(writeBuf);
            mConversationArrayAdapter.add("Me:  " + writeMessage);
            break;
        case MESSAGE_READ:
            byte[] readBuf = (byte[]) msg.obj;
            // construct a string from the valid bytes in the buffer
            String readMessage = new String(readBuf, 0, msg.arg1);
            mConversationArrayAdapter.add(mConnectedDeviceName+":  " + readMessage);
            break;
        case MESSAGE_DEVICE_NAME:
            // save the connected device's name
            mConnectedDeviceName = msg.getData().getString(DEVICE_NAME);
            Toast.makeText(getApplicationContext(), "Connected to "
                           + mConnectedDeviceName, Toast.LENGTH_SHORT).show();
            break;
        case MESSAGE_TOAST:
            Toast.makeText(getApplicationContext(), msg.getData().getString(TOAST),
                           Toast.LENGTH_SHORT).show();
            break;
        }
    }
};

public void onActivityResult(int requestCode, int resultCode, Intent data) {
    if(D) Log.d(TAG, "onActivityResult " + resultCode);
    switch (requestCode) {
    case REQUEST_CONNECT_DEVICE:
```

顯示傳送
的訊息

顯示接收
的訊息

對方的裝置名稱

程式介紹-修改



```
public int rdn;

// The Handler that gets information back from the BluetoothChatService
private final Handler mHandler = new Handler() {
    @Override
    public void handleMessage(Message msg) {
        switch (msg.what) {
        case MESSAGE_STATE_CHANGE:
            if(D) Log.i(TAG, "MESSAGE_STATE_CHANGE: " + msg.arg1);
            switch (msg.arg1) {
            case BluetoothChatService.STATE_CONNECTED:
                 mTitle.setText(R.string.title_connected_to);
                mTitle.append(mConnectedDeviceName);
                mConversationArrayAdapter.clear();
                break;
            case BluetoothChatService.STATE_CONNECTING:
                mTitle.setText(R.string.title_connecting);
                break;
            case BluetoothChatService.STATE_LISTEN:
            case BluetoothChatService.STATE_NONE:
                mTitle.setText(R.string.title_not_connected);
                break;
            }
            break;
        case MESSAGE_WRITE:
            byte[] writeBuf = (byte[]) msg.obj;
            // construct a string from the buffer
            String writeMessage = new String(writeBuf);
            mConversationArrayAdapter.add("Me:  " + writeMessage);
            if ("new".equals(writeMessage)) {
                rdn=(int)(Math.random() * 9+1);
                mConversationArrayAdapter.add("遊戲開始,數字是:  " + rdn);
            }

            break;
        case MESSAGE_READ:
            byte[] readBuf = (byte[]) msg.obj;
            // construct a string from the valid bytes in the buffer
            String readMessage = new String(readBuf, 0, msg.arg1);
            mConversationArrayAdapter.add(mConnectedDeviceName+":  " + readMessage);
            if (rdn>0)
                mConversationArrayAdapter.add("正確答案:   " + rdn);
            else if ("0".equals(readMessage))
                mConversationArrayAdapter.add("恭喜答對，遊戲結束!");
            break;
```

設定pubilc的int變數

當輸入字串為new時,出題目

當接收字串為0時,顯示遊戲結束

Bluetooth 課堂作業

動手做做看

來做做看你自己的藍芽小遊戲!