Molecular Biomedical Informatics

Social Web Design & Research

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App Programming
手機程式設計
Again, we have only two hours
Basic idea

- There is a browser component, WebView
  - you could imagine that every new platform will have such a component
- When users open our app, we show them a full-screen browser and load our homepage immediately
  - remember to hide the address bar
- The remaining things are HTML, CSS, JavaScript and, if needed, CGI
Today we will show you

- Basic app (windows) programming
  - WYSIWYG form design, event driven...

- Basic Android app programming
  - Activity (a page in an app), especially its life cycle
  - Intent (information from an Activity to another)

- Techniques needed for our basic idea
  - WebView
  - bind JS code to Android code
WYSIWYG form design
Event driven
Android life cycle

- **LifeCycle**

  手機的特性是能隨時離開正在使用的程式，切換到接電話、接收簡訊模式，而且在回來時能看到一樣的內容

- 使用者已經習慣了多工(Multi-Task)的作業系統

- 同時執行多個程式需要更多記憶體，而手機裡的記憶體是相當有限的。當同時執行的程式過多，或是關閉的程式沒有正確釋放記憶體，系統就會越來越慢。為了解決這個問題，Android引入了一個新的機制：生命週期
This is not new
Any Questions?

about the life cycle
What actions cause onPause()?
More detailed one
Intent

- AndroidIntent
- Intent 是一個動作與內容的集合。Intent 像是一串網址，傳送「意圖」給其他 Activity 來處理網址中所指定的動作跟內容。Android 使用 Intent 來完成在螢幕間切換的動作
- 從另一個角度來說，Intent 包含 Activity 間切換所需的動作、分類、傳送資料等訊息，就像是 Activity 之間的宅急便一樣
- Intent intent = new Intent();
  intent.setClass(foo.this, bar.class); // from foo to bar
  // retrieve and pack variables
  Bundle bundle = new Bundle();
  bundle.putString("FOO_VAR1", foo_var1.getText().toString());
  bundle.putString("FOO_VAR2", foo_var2.getText().toString());
  intent.putExtras(bundle);
  startActivity(intent); // start another activity
WebView

- android开发中WebView的使用(附完整程序)

- WebView 相當於一個迷你的瀏覽器，採用 Webkit 核心，因此完美支援 HTML, CSS 以及 JavaScript 等。有時可以把 UI 甚至數據處理都交給 WebView，配合 PHP 等伺服器端程式，這樣 Android 開發就變成了網頁開發

- 上面網址中提供一個 WebView 的簡單例子，如果把所有功能都交給伺服器端處理，你只要寫好網頁，把 URL 填上，再編譯，就是一個新 app。

- WebView | Android Developers
- Building Web Apps in WebView | Android Developers

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WebView code snippet

- `wv = (WebView) findViewById(R.id.wv);`
- `wv.getSettings().setJavaScriptEnabled(true);` // enable JavaScript
- `wv.setScrollBarStyle(0);` // hide scroll bar
- `wv.setWebChromeClient(new WebChromeClient(){
   public boolean onJsAlert(...){
      return super.onJsAlert(...);
   }
   // when JS alert()
   public void onProgressChanged(...){
      if ( 100 == progress ) { ... }
      super.onProgressChanged(...);
   }
   // when progress changed
});` // WebChromeClient handles dialogs, progress...
Any Questions?

about the code snippet
What is “R.id.wv”

```java
wv = (WebView) findViewById(R.id.wv);
```
Layout

- Arrange widgets/controls/components
- FrameLayout, LinearLayout, RelativeLayout, AbsoluteLayout and TableLayout
- Layout classes are also widgets
- Android的Layout整理
- [新手完全手册] Hello Android Layout
- User Interface | Android Developers
It was specified in the `res/layout/xxx.xml`
Activity-WebView communication

- **Building Web Apps in WebView**
- Activity can change the URL of WebView to pass data
- The difficult part is how to retrieve data from WebView
  - call `addJavascriptInterface()` and pass it a class instance to bind an interface name that your JS can call to access the class
- Once the communication between Activity and WebView is connected, you are actually developing an web app.

![Diagram showing the communication between app (Activity), WebView, web server, and CGI programs using Java, HTML, CSS, and JavaScript, plus Perl, PHP, or anything you like.](image)
Reminders

- Make sure all the required SDKs were installed
  - Android 2.1 (API 7), 2.3.3 (API 10) or 4.2 (API 17)
  - Google APIs, if you used the map widget

- Set up a suitable virtual device and make sure you selected it
  - SD Card, screen resolution, GPS support, Keyboard support

- Check the run configuration
  - Project, target (virtual device), Command Line Options
  - some settings are in the AndroidManifest.xml

- Make sure your server program is correct

- This is usually the most painful stage (try and error) when learning a new platform. It can be largely eased if you have a good mentor, or at least a partner to discuss. That’s what this course tries to provide.
One more thing
Launch/ 發佈

- Find the file at bin/xxx.apk, upload it to a web server and share the url
- Of course you can launch to the market (Google Play), which is beyond the scope of this slide
- Once again, you will see the power of web technology in launching. You can launch new version immediately and cross-platform (web, Android and iOS).
Today’s assignment
今天的任務
Create an app

- Two options, you may create a very simple app. Another option is to make a mobile version (small screen version) for your site. So that mobile users feel good when browsing your site.

- Reference
  - Android Developers
  - How To Build A Mobile Website
  - mobile web - Google 搜尋
  - 開發手機版網頁

- Your web site (http://merry.ee.ncku.edu.tw/~xxx/cur/) will be checked not before 23:59 5/29 (Tue). You may send a report (such as some important modifications) to me in case I did not notice your features.
Appendix
Thread

- [Android] 多執行緒-Handler和Thread的關係
- 在 Android 當中，一件事如果做超過 5 秒被系統強制關閉(收到Application not Responded, ANR)；在onCreate() 中如果做超過 10 秒就會跳ANR
- 所以繁重的事情不能在 onCreate() 裡頭做。解決的辦法就是 thread (執行緒)
- Main thread for UI, worker threads for long-time work and use handers to find other threads

- Thread | Android Developers
- android裡的thread的朋友：Handler