User Interaction: Intro to Android

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INF 134 Fall 2012

- Today
  - a few things to note about developing Assignment 2
  - open development time to make sure you aren’t blocked

http://developer.android.com/guide/components/intents-filters.html

Editing the Android Manifest

- Every application must have an AndroidManifest.xml file
  - with precisely that name
  - in its root directory.
- It presents information about the application to the Android system
  - The system must have it can run any of the application's code. It names the Java package for the application. The package name serves as a unique identifier for the application.
- It describes the components of the application — the activities, services, broadcast receivers, and content providers that the

http://developer.android.com/guide/topics/manifest/manifest-intro.html

the Android Manifest

- What does it do?
  - It names the Java package for the application.
    - The package name serves as a unique identifier for the application.

http://developer.android.com/guide/topics/manifest/manifest-intro.html

the Android Manifest

- What does it do?
  - It describes the components of the application
    - Activities, services, broadcast receivers, and content providers
    - It names the classes that implement each of the components and publishes their capabilities.
      - (for example, which Intent messages they can handle).
      - These declarations let the Android system know what the components are and under what conditions they can be launched.

http://developer.android.com/guide/topics/manifest/manifest-intro.html

the Android Manifest

- What does it do?
  - It determines which processes will host application components.
  - It declares which permissions the application must have in order to access protected parts of the API and interact with other applications.
  - It also declares the permissions that others are required to have in order to interact with the application's components.

http://developer.android.com/guide/topics/manifest/manifest-intro.html

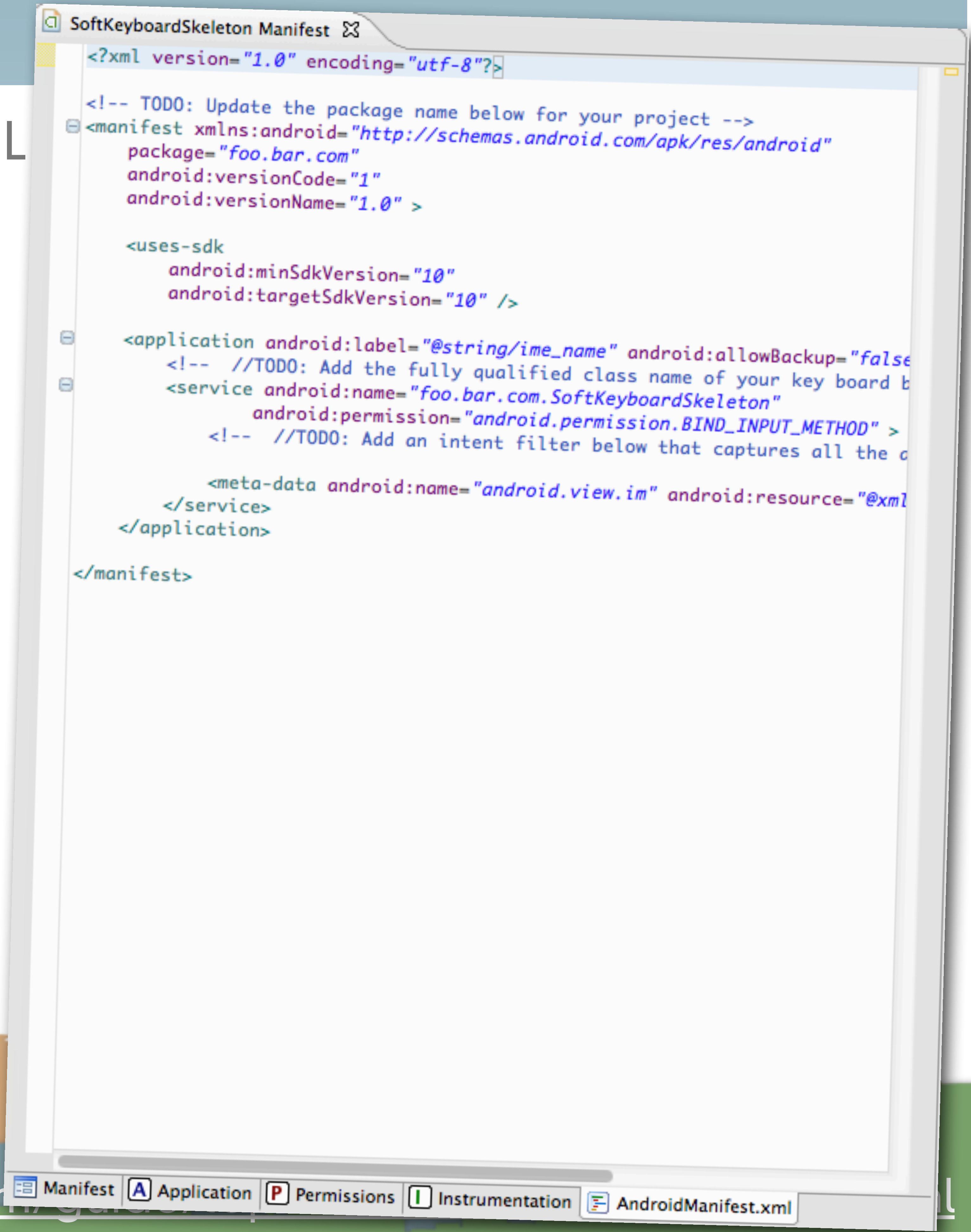
the Android Manifest

- What does it do?
  - It lists the Instrumentation classes that provide profiling and other information as the application is running. These declarations are present in the manifest only while the application is being developed and tested; they're removed before the application is published.
  - It declares the minimum level of the Android API that the application requires.
  - It lists the libraries that the application must be linked against.

http://developer.android.com/guide/topics/manifest/manifest-intro.html

the Android Manifest

- You can edit it in raw XML

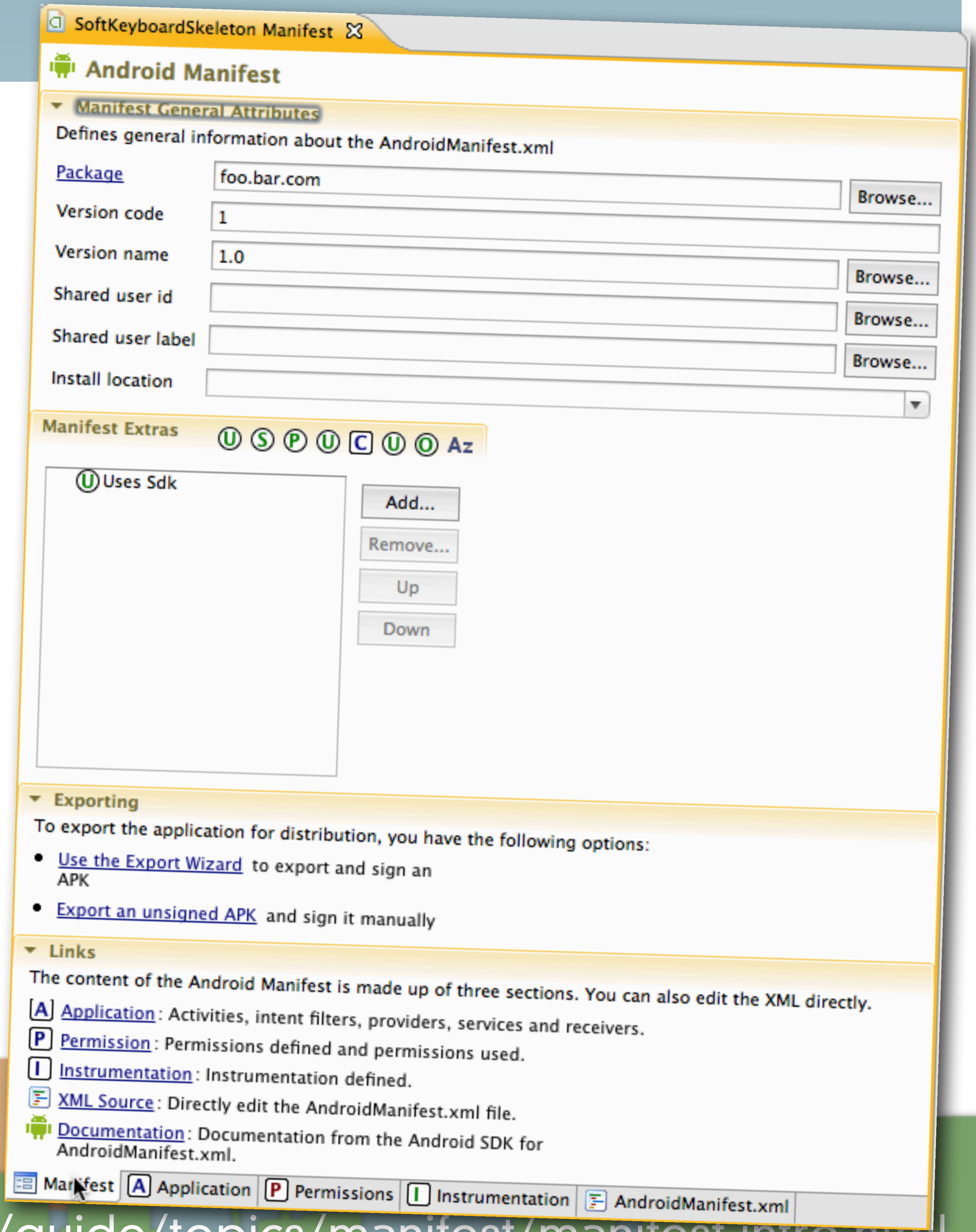


```
<?xml version="1.0" encoding="utf-8"?>

<!-- TODO: Update the package name below for your project -->
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="foo.bar.com"
    android:versionCode="1"
    android:versionName="1.0" >

    <uses-sdk
        android:minSdkVersion="10"
        android:targetSdkVersion="10" />

    <application android:label="@string/ime_name" android:allowBackup="false
        <!--  //TODO: Add the fully qualified class name of your key board b
        <service android:name="foo.bar.com.SoftKeyboardSkeleton"
                android:permission="android.permission.BIND_INPUT_METHOD" >
            <!--  //TODO: Add an intent filter below that captures all the c

            <meta-data android:name="android.view.im" android:resource="@xml
        </service>
    </application>

</manifest>
```

http://developer.android.com/guide/...

the Android Manifest

- You can edit it in or with a GUI that changes the raw XML


SoftKeyboardSkeleton Manifest

Android Manifest

Manifest General Attributes

Defines general information about the AndroidManifest.xml

Package	foo.bar.com
Version code	1
Version name	1.0
Shared user id	
Shared user label	
Install location	

Manifest Extras

Uses Sdk

Add... Remove... Up Down

Exporting

To export the application for distribution, you have the following options:

- Use the Export Wizard to export and sign an APK
- Export an unsigned APK and sign it manually

Links

The content of the Android Manifest is made up of three sections. You can also edit the XML directly.

[A] Application: Activities, intent filters, providers, services and receivers.
[P] Permission: Permissions defined and permissions used.
[I] Instrumentation: Instrumentation defined.
XML Source: Directly edit the AndroidManifest.xml file.
Documentation: Documentation from the Android SDK for AndroidManifest.xml.

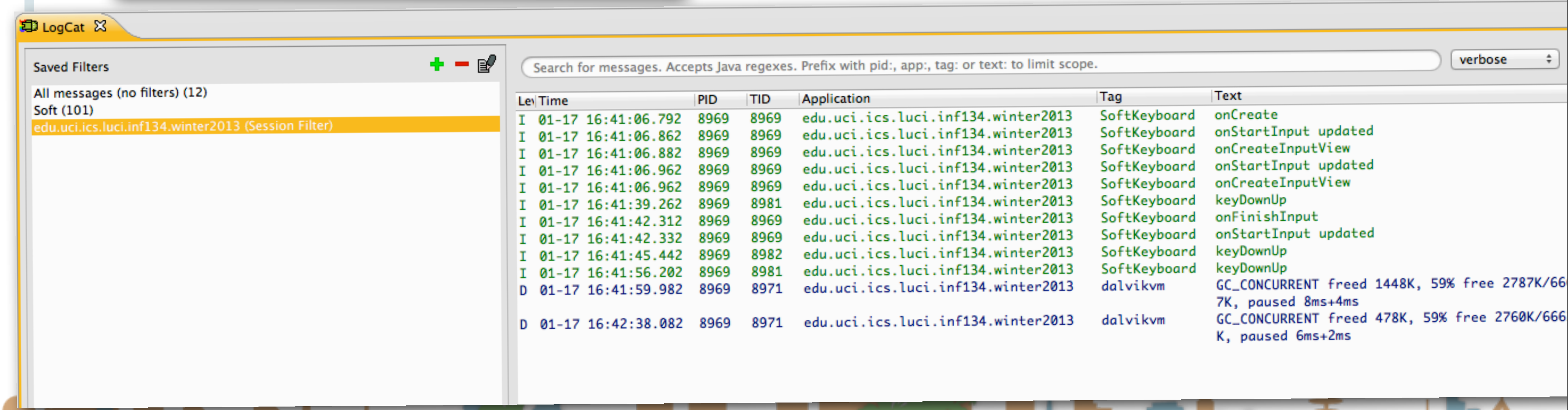
http://developer.android.com/guide/topics/manifest/manifest-intro.html

Debugging

- LogCat
  - This enables you to output console messages
  - Only when in debug mode!

```java
import android.os.AsyncTask;
import android.util.Log;
import android.view.KeyEvent;
```

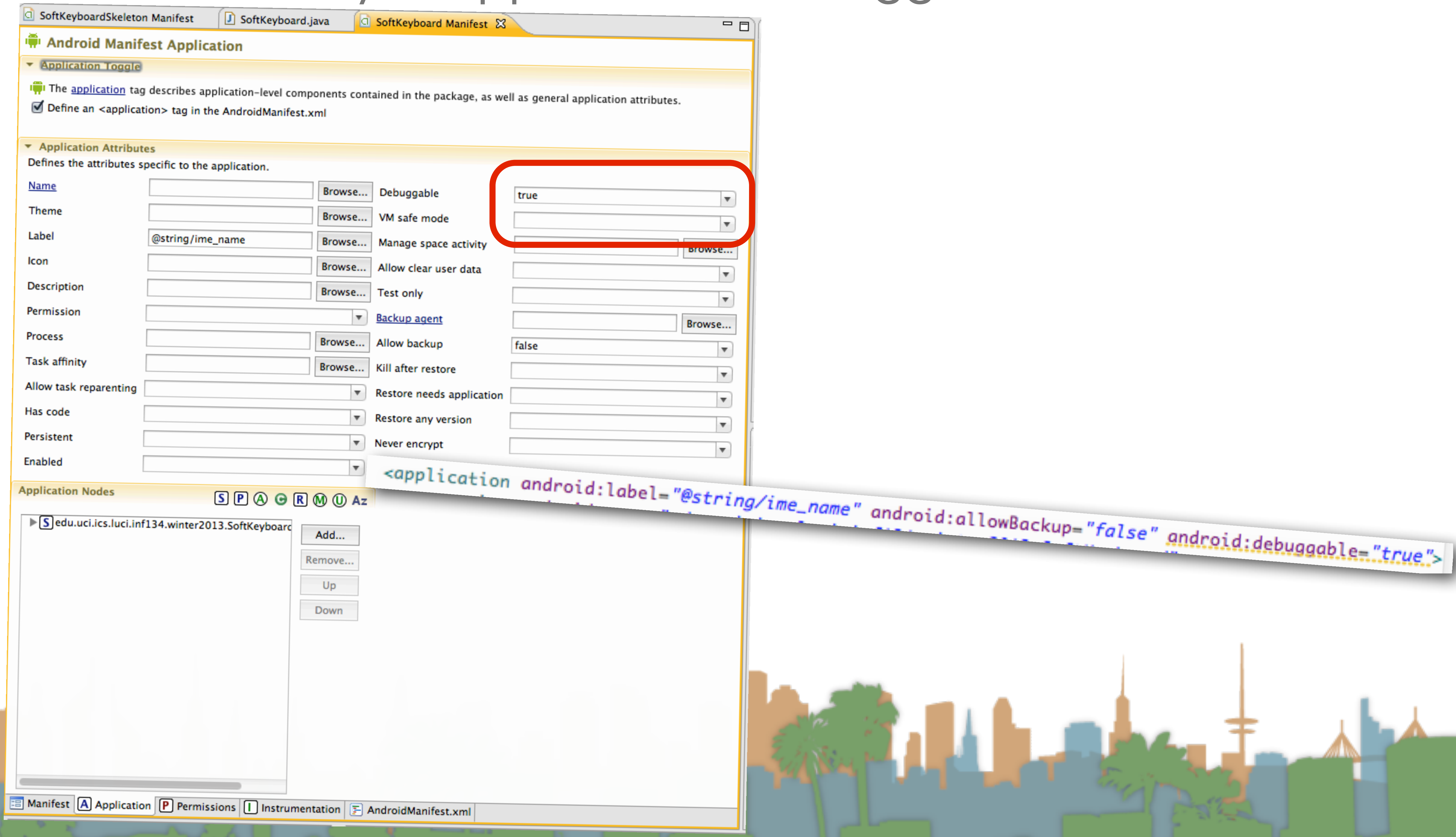
```java
@Override public void onCreate() {
    Log.i("SoftKeyboard","onCreate");
    super.onCreate();
```


LogCat
Saved Filters
All messages (no filters) (12)
Soft (101)
edu.uci.ics.luci.inf134.winter2013 (Session Filter)
Search for messages. Accepts Java regexes. Prefix with pid:, app:, tag: or text: to limit scope.
verbose

```
Le Time                PID   TID   Application                          Tag           Text
I  01-17 16:41:06.792  8969  8969  edu.uci.ics.luci.inf134.winter2013  SoftKeyboard  onCreate
I  01-17 16:41:06.862  8969  8969  edu.uci.ics.luci.inf134.winter2013  SoftKeyboard  onStartInput updated
I  01-17 16:41:06.882  8969  8969  edu.uci.ics.luci.inf134.winter2013  SoftKeyboard  onCreateInputView
I  01-17 16:41:06.962  8969  8969  edu.uci.ics.luci.inf134.winter2013  SoftKeyboard  onStartInput updated
I  01-17 16:41:06.962  8969  8969  edu.uci.ics.luci.inf134.winter2013  SoftKeyboard  onCreateInputView
I  01-17 16:41:39.262  8969  8981  edu.uci.ics.luci.inf134.winter2013  SoftKeyboard  keyDownUp
I  01-17 16:41:42.312  8969  8969  edu.uci.ics.luci.inf134.winter2013  SoftKeyboard  onFinishInput
I  01-17 16:41:42.332  8969  8969  edu.uci.ics.luci.inf134.winter2013  SoftKeyboard  onStartInput updated
I  01-17 16:41:45.442  8969  8982  edu.uci.ics.luci.inf134.winter2013  SoftKeyboard  keyDownUp
I  01-17 16:41:56.202  8969  8981  edu.uci.ics.luci.inf134.winter2013  SoftKeyboard  keyDownUp
D  01-17 16:41:59.982  8969  8971  edu.uci.ics.luci.inf134.winter2013  dalvikvm      GC_CONCURRENT freed 1448K, 59% free 2787K/66
                                                                                      7K, paused 8ms+4ms

D  01-17 16:42:38.082  8969  8971  edu.uci.ics.luci.inf134.winter2013  dalvikvm      GC_CONCURRENT freed 478K, 59% free 2760K/666
                                                                                      K, paused 6ms+2ms
```

Live Debugging

- Service may require special effort to set breakpoints
  - Make sure you application is debuggable in the manifest



SoftKeyboardSkeleton Manifest | SoftKeyboard.java | SoftKeyboard Manifest

Android Manifest Application

Application Toggle

The application tag describes application-level components contained in the package, as well as general application attributes.

☑ Define an <application> tag in the AndroidManifest.xml

Application Attributes

Defines the attributes specific to the application.

Name		Debuggable	true
Theme		VM safe mode	
Label	@string/ime_name	Manage space activity	
Icon		Allow clear user data	
Description		Test only	
Permission		Backup agent	
Process		Allow backup	false
Task affinity		Kill after restore	
Allow task reparenting		Restore needs application	
Has code		Restore any version	
Persistent		Never encrypt	
Enabled			

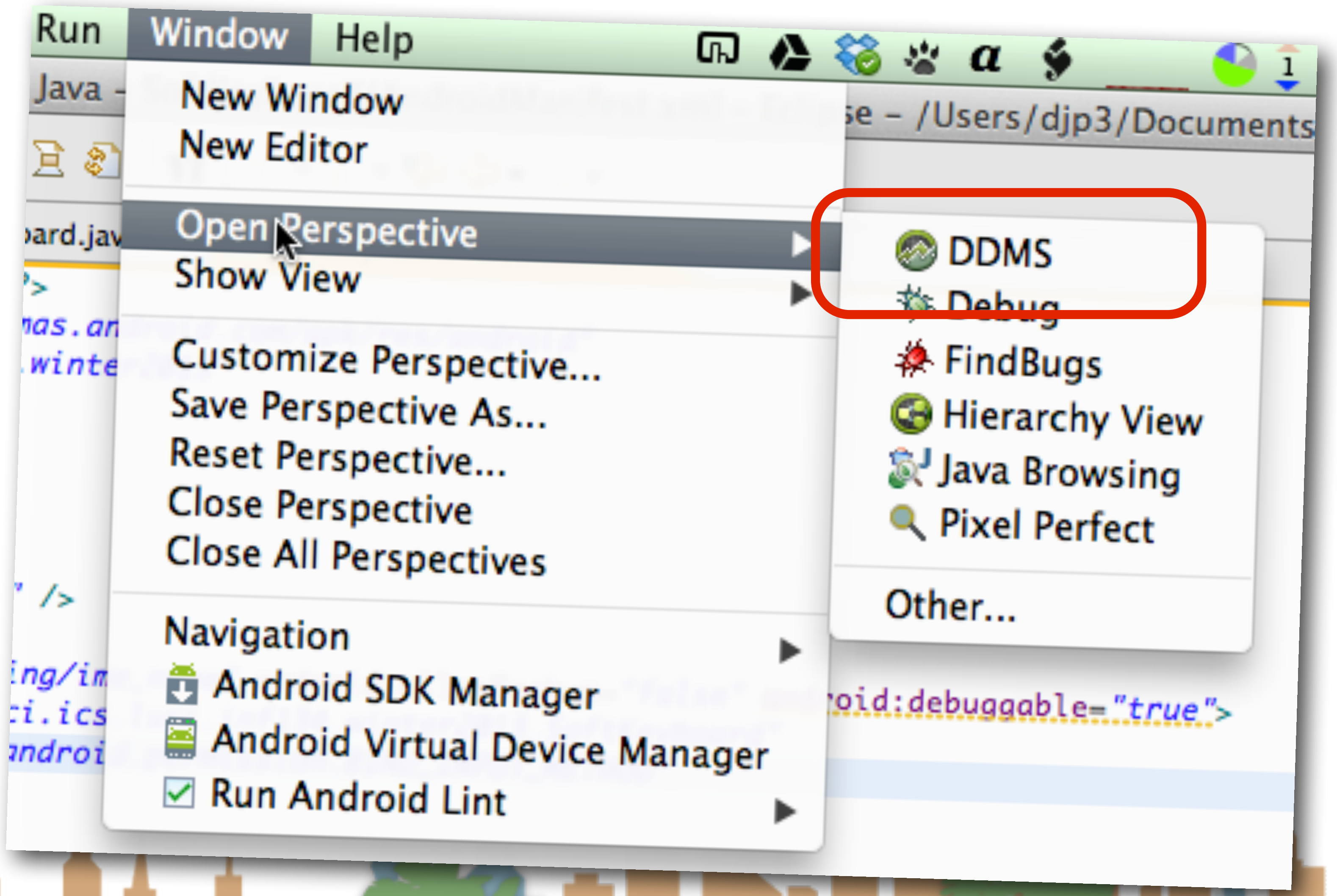
Application Nodes

S edu.uci.ics.luci.inf134.winter2013.SoftKeyboard

```
<application android:label="@string/ime_name" android:allowBackup="false" android:debuggable="true">
```

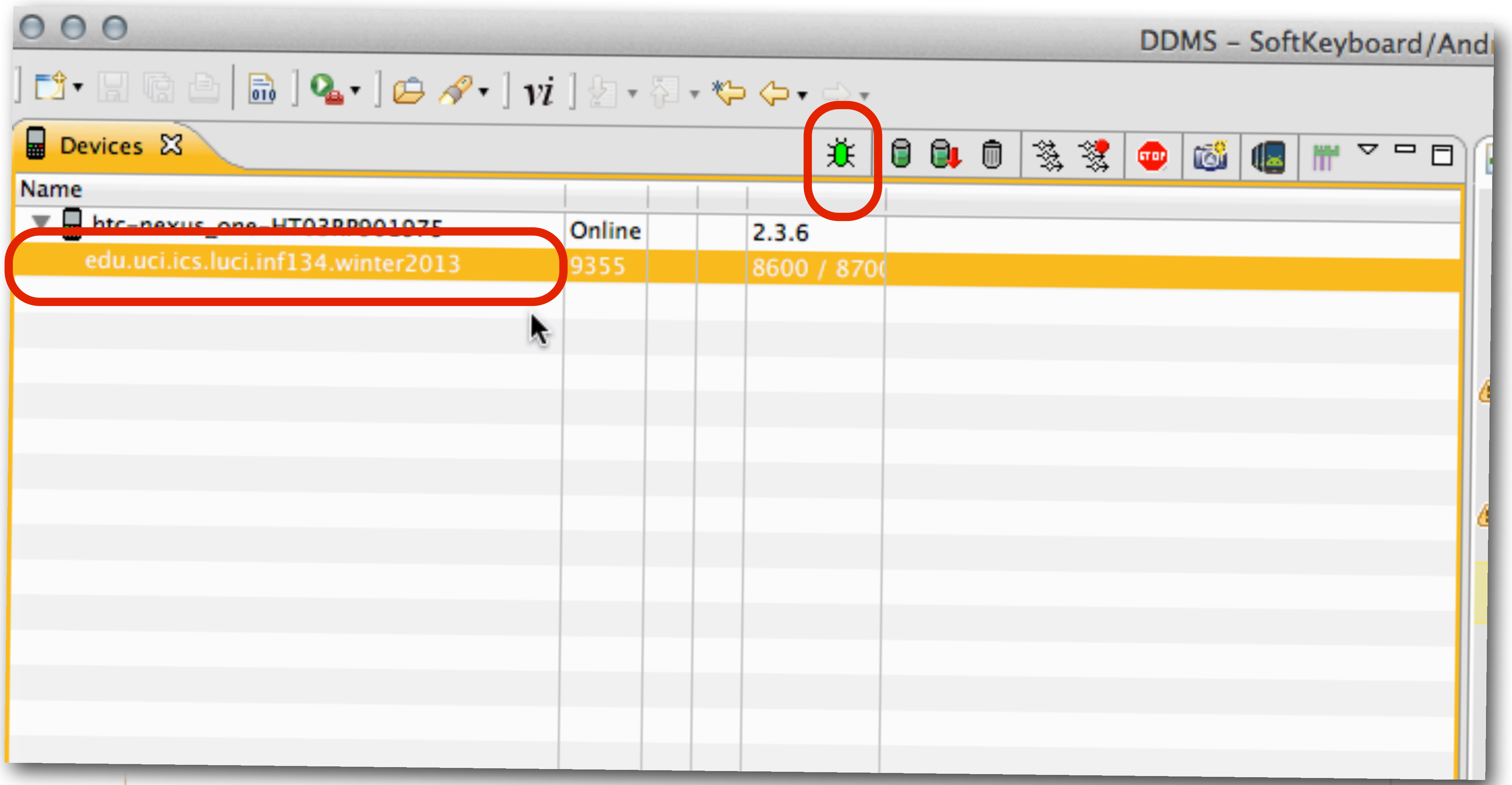
Live Debugging

- Service may require special effort to set breakpoints
  - If breakpoints aren't stopping execution in Eclipse
  - Switch to DDMS view (an Android tool)



Live Debugging

- Service may require special effort to set breakpoints
  - Manually indicate you want to debug your process



DDMS - SoftKeyboard/And
Devices
Name
htc-nexus_one-HT03RP901075
Online
2.3.6
edu.uci.ics.luci.inf134.winter2013
9355
8600 / 8700

Do not slow down your U/I thread!

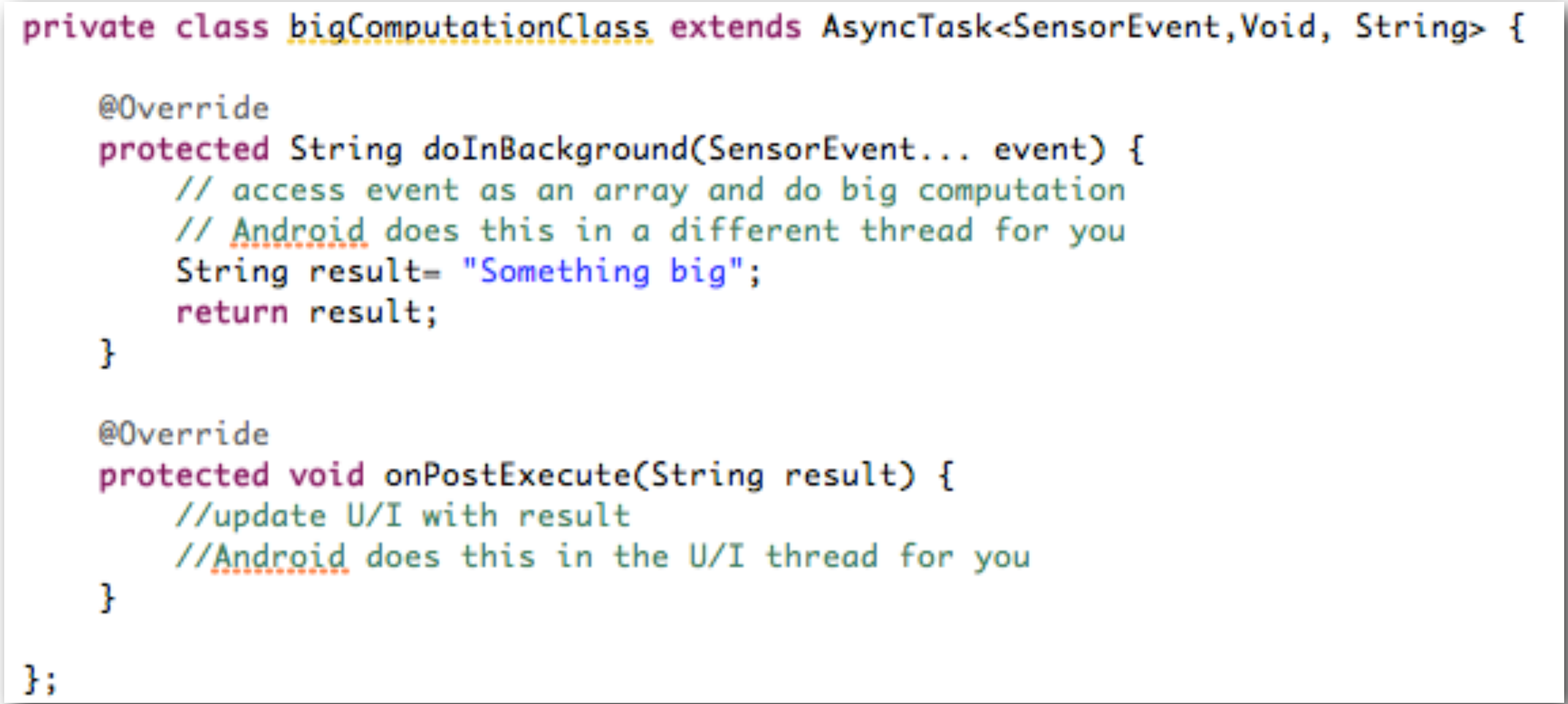
- Thread: a mini-process that runs your source code
    - if you use call-backs,
        - multiple threads may be running in your service at once
- The primary "thread" that runs your program is the "U/I" thread.
    - For a basic activity, nothing happens until a user touches the screen
    - When your code is running, the U/I does not update at all
        - The U/I "hangs"
    - This is a bad U/X

Do not slow down your U/I thread!

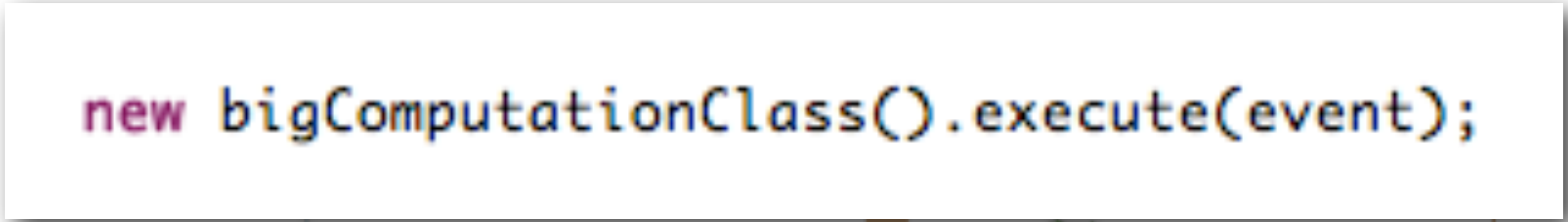
- The solution is to use a different thread to do your work that is going to take a little time: computations, network calls, etc.
- Problem: Only the U/I thread is allowed to update the U/I!
    - So what if at the end of the computation you want to change the U/I?
- Lame Solution: You must write complicated interprocess communication in order to tell your U/I to update when your computation is done. Very difficult to do correctly!

Do not slow down your U/I thread!

- Good Solution: Use the AsyncTask class in Android



```java
private class bigComputationClass extends AsyncTask<SensorEvent,Void, String> {

    @Override
    protected String doInBackground(SensorEvent... event) {
        // access event as an array and do big computation
        // Android does this in a different thread for you
        String result= "Something big";
        return result;
    }

    @Override
    protected void onPostExecute(String result) {
        //update U/I with result
        //Android does this in the U/I thread for you
    }

};
```



```java
new bigComputationClass().execute(event);
```

http://developer.android.com/guide/components/processes-and-threads.html

Things to know for Assignment 02

- Turn off auto-rotate
  - In preferences, not in code

http://developer.android.com/guide/components/intents-filters.html

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