User Interaction: Intro to Android

Assoc. Professor Donald J. Patterson INF 134 Fall 2012



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



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

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



• What does it do?

launched.

- 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

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

- 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.



- 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

• You can edit it in raw XML

☐ SoftKeyboardSkeleton Manifest ☎ <?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"</pre> 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 Θ <!-- //TODO: Add the fully qualified class name of your key board b <service android:name="foo.bar.com.SoftKeyboardSkeleton"</pre> Θ android:permission="android.permission.BIND_INPUT_METHOD" > <!-- //TODO: Add an intent filter below that captures all the a <meta-data android:name="android.view.im" android:resource="@xml </service> </application> </manifest>

http://developer.android.cor Manifest A Application Permissions I Instrumentation AndroidManifest.xml

he Android Manifest	G SoftKeyboardSkeleton Manifest ☎
	Android Manifest
You can edit it in or with a	Manifest General Attributes Defines general information about the AndroidManifest yml
	Package foo.bar.com
Glll that changes the raw	Version code 1
Gor that changes the law	Version name 1.0 Browse
	Shared user id Browse
XIVIL	Shared user label Browse
	Install location
	Manifest Extras USPUCUOAz
	Uses Sdk Add
	Remove
	Up
	Down
	 Exporting To export the application for distribution, you have the following actions
	Use the Export Wizard to export and sign an APK
	Export an unsigned APK and sign it manually
	Links The content of the Android Maria is a second se
	A <u>Application</u> : Activities, intent filters, providers, services and receivers
	P Permission: Permissions defined and permissions used.
	<u>Instrumentation</u> : Instrumentation defined. <u>XML Source</u> : Directly edit the AndroidManifest.xml file.
	Documentation : Documentation from the Android SDK for AndroidManifest.xml.
and a second still and	Marifest A Application P Permissions I Instrumentation F AndroidManifest.xml
http://developer.android.com/g	guide/topics/manifest/manifest-intro.numl

Debugging

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

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

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

🖾 LogCat 🔀

All messages (no filters) (12)					To a	Taut
Soft (101)	Lev Time	PID	TID	Application	Tag	Text
edu uci ics. luci inf134.winter2013 (Session Filter)	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	keybownop an Einich Tanut
	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	SoftKeyboara	CC CONCURRENT freed 1448K 50% free 2787K/66
	D 01-17 16:41:59.982	8969	8971	edu.uci.ics.luci.inf134.winter2013	dalvikvm	GC_CUNCORRENT Freed 1446K, 55% free 2rork/oc
					1.1.1.1	CC CONCURRENT Freed 479K EOK free 2760K/666
	D 01-17 16:42:38.082	8969	8971	edu.uci.ics.luci.inf134.winter2013	dalvikvm	GC_CUNCURRENT Treed 476K, 55% Tree 2700K/000
						k, pausea oms+zms
	and the second			7. 4883 red		
						ATTAC A

Live Debugging

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

Android Manifest Application Android Manifest Application-level components contained in the package, as well as general application attributes. Define an <application>tag in the AndroidManifest.xml Application Attributes Perfines the attributes specific to the application. Android Manifest Application Android Manifest Application Application Attributes Perfines the attributes specific to the application. Android Manifest Application Application Attributes Perfines the attributes specific to the application. Android Manifest Application Application Attributes Perfines the attributes specific to the application. Android Manifest Application Android Manifest Application Android Manifest Application Application Attributes Perfines the attributes specific to the application. Android Manifest Application Android Manife</application>	SoftKeyboardSkelster	Manifest Dara	6		
Import 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> Application Attributes Defines the attributes specific to the application. Name Browse Debuggable true Theme Browse Label @string/ime_name Browse Allow clear user data Description Browse Permission Browse Process Browse Allow task reparenting Restore needs application Has code Restore any version Persistent Never encrypt Enabled S P & G R & Q & Az	- SourceyboardSkeleton	Softk	Keyboard.java	SoftKeyboard Manifest 🔀	3
• Application Toggle • Application tag describes application-level components contained in the package, as well as general application attributes. • Application > tag in the AndroidManifest.xml • Application Attributes Defines the attributes specific to the application. Name Browse Debuggable Theme Label @string/ime_name Browse Allow clear user data Description Permission Process Browse Allow backup false Allow task reparenting Persistent Pisedu.ucl.ics.lucl.inf134.winter2013.SoftKeyboart	🖶 Android Manife	est Application			
Import The application tag describes application-level components contained in the package, as well as general application attributes. Import Define an <application> tag in the AndroidManifest.xml Defines the attributes specific to the application. Name Browse Theme Browse Label @string/ime_name Browse Allow clear user data Description Browse Process Browse Allow backup false Allow task reparenting Restore needs application Has code Restore any version Persistent Never encrypt Enabled Import Contained attributes (S) P (a) C (R (b) Az (b) Down</application>	 Application Toggle 				
Oefine an <application> tag in the AndroidManifest.xml • Application Attributes Defines the attributes specific to the application. Name Browse Debuggable true Theme Browse Label @string/ime_name Browse Allow clear user data Description Browse Permission Packup agent Process Browse Allow task reparenting Restore needs application Has code Restore needs application Allow task reparenting Restore needs application Restore needs application Application Nodes S P & P</application>	The <u>application</u> tag	g describes application-l	level components co	ntained in the package, as we	vell as general application attributes
Application Attributes Defines the attributes specific to the application. Name Theme Browse Debuggable true true true Label Browse VM safe mode Label Browse VM safe mode Label Browse Allow clear user data Description Browse Test only Permission Browse Allow backup false Task affinity Browse Allow backup false Task affinity Browse Kill after restore Allow task reparenting Restore needs application Persistent Restore any version Persistent Process SP Proces SP Proces SP Process Browse Kill after restore Allow task reparenting Restore needs application Persistent Process SP Proces SP	Define an <application< p=""></application<>	tion> tag in the Android	Manifest.xml		
Defines the attributes specific to the application. Name Theme Browse VM safe mode Label @string/ime_name Browse Allow clear user data Description Browse Allow clear user data Description Browse Task affinity Allow task reparenting Persistent Persistent Persistent Persistent Persistent Persistent Persistent Persistent Piscedu.uci.ics.luci.inf134.winter2013.SoftKeyboar Add Remove Up Down	Application Auril				
Name Browse Debuggable Theme Browse Label @string/ime_name Browse Allow clear user data Description Browse Allow clear user data Description Browse Permission Task affinity Browse Allow backup false Browse Allow backup false Browse Allow task reparenting Restore needs application Has code Prisistent Restore any version Persistent Paplication Nodes S. P. & G. R. W W Az	Defines the attributes s	es pecific to the application	2		
Theme Browse Label @string/ime_name Browse Allow clear user data Description Permission VB aak up agent Browse Allow backup false Task affinity Allow task reparenting Restore needs application Has code VR Restore nercypt Persistent VB @ R M U Az * S P @ @ R M U Az	Name				
Label @string/ime_name Browse Manage space activity Icon Browse Description Browse Permission Image space activity Permission Image space activity Process Browse Task affinity Browse Allow backup false Task affinity Browse Allow task reparenting Image space activity Has code Image space activity Persistent Image space activity Enabled Image space activity Application Nodes S S P<(A)	Theme		Browse	Debuggable	true v
Label @string/ime_name Browse Manage space activity Brows Icon Browse Allow clear user data Description Browse Test only Browse Test only Brows Permission Browse Test only false Process Browse Allow backup false Task affinity Browse Kill after restore Allow task reparenting Restore needs application Has code Restore any version Persistent Never encrypt Enabled Restore encrypt Enabled S P & G R M O Az PS edu.uci.ics.luci.inf134.winter2013.SoftKeyboarc Up Down	Labol		Browse	. VM safe mode	v
Icon Browse Allow clear user data Description Browse Test only Permission Browse Process Browse Allow backup false Browse Task affinity Browse Allow task reparenting Restore needs application Has code Restore any version Persistent Never encrypt Enabled <	Ladel	@string/ime_name	Browse	. Manage space activity	Browse
Description Browse Permission Browse Allow backup false Process Browse Allow backup false Task affinity Browse Allow task reparenting Restore needs application Has code Restore any version Persistent Never encrypt Enabled Capplication android:label= Sedu.uci.ics.luci.inf134.winter2013.SoftKeyboarc Up Down 	lcon		Browse	. Allow clear user data	
Permission Backup agent Browse Allow backup false Task affinity Browse Kill after restore Allow task reparenting Restore needs application Has code Restore any version Persistent Never encrypt Enabled Application Nodes S P A Remove Up Down 	Description		Browse	. Test only	
Process Browse Allow backup false Task affinity Browse Allow task reparenting Restore needs application Has code Restore needs application Has code Restore encrypt Persistent Never encrypt Enabled Capplication android:label= "@sti<"	Permission			Backup agent	· · · · · · · · · · · · · · · · · · ·
Task affinity Browse Allow task reparenting Restore needs application Has code Restore any version Persistent Never encrypt Enabled Capplication android:label= "@sti<"	Process		Browse	Allow backup	Browse
Allow task reparenting Has code Persistent Enabled Application Nodes S P A O R M U Az S edu.uci.ics.luci.inf134.winter2013.SoftKeyboard Up Down	Task affinity		Browse	Kill ofter rest	Taise v
Has code Persistent Restore any version Persistent Never encrypt Enabled Application Nodes S P S P S P Add Remove Up Down	Allow task reparenting		browse	Nill after restore	
Persistent Persistent Enabled Application Nodes S P Agenove Up Down	Has code		v	Restore needs application	T
Persistent Enabled Application Nodes S P G R M Down Never encrypt <application @stri<="" android:label="@still</td><td>Porrietent</td><td></td><td>•</td><td>Restore any version</td><td>T</td></tr><tr><td>Enabled Application Nodes S P A C A</td><td>resistent</td><td></td><td>v</td><td>Never encrypt</td><td>▼</td></tr><tr><td>Application Nodes S P A G R M O Az > S edu.uci.ics.luci.inf134.winter2013.SoftKeyboard Add Up Down</td><td>inabled</td><td></td><td>•</td><td><application</td><td></td></tr><tr><td>Sedu.uci.ics.luci.inf134.winter2013.SoftKeyboard Add Remove Up Down Down</td><td>pplication Nodes</td><td>SPA</td><td></td><td>restouctor</td><td>n android:label=" td=""></application>					
Add Image: Description of the second s	Sedu uci ice luci inf				courtine and the second s
Remove Up Down	= [a]euu.uci.ics.iuci.inf	1134.winter2013.SoftKey	Add		
Up Down			Remove		
Down			Up		
DOMI			Down		
			Down		
Manifest A Application P Permissions L Instrumentation	Manifest A Applicatio	P Permissions	Instances of the Co		
AndroidManifest.xml	CO Application		instrumentation E	AndroidManifest.xml	
		1. A.	1 miles	24	

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



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

```
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
    }
};
```

new bigComputationClass().execute(event);



Things to know for Assignment 02

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

kr.



Things to know for Assignment 02

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

kr.





