

Android 210 - Lecture 7

Intent, IntentFilter, BroadcastReceiver

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Agenda

- Intent and IntentFilter
- Broadcast Receiver
- Final Project checkup

Sample Code:

- SampleIntent, SampleImageIntent,
- SampleIntentFilter
- SampleReceiver

Android News

- Android sees uptick in market share in 2014 after one billion device sales
- Google Starts Testing Mobile App Ads In The Google Play Store
- Google will launch Android Pay at I/O in May

Review from last week

- SharedPreferences vs. Database
- Where is the sqlite db stored?
- How do you create a sqlite db in Android?

Intent - What is it?

- A method of inter-process communication
- An operation to be performed
 - “The glue between activities”
 - “A passive data structure holding an abstract description of an action to be performed”

Intent - Primary Usage

1. Start an Activity (implicitly or explicitly)
2. Start a Service (always explicitly)
3. Deliver a broadcast (within or outside of the app)

Intent

An intent can contain:

- Action
- Category
- Component (optional for an implicit intent)
- Data
- Extras
 - key/value pairs
 - allows you to attach primitive value to an intent

Intent Action

- The implicit "action" to be performed
 - A full list of Actions is defined by the Intent class
<http://developer.android.com/reference/android/content/Intent.html>
- Example -
 - `android.intent.action.MAIN`
 - Similar to `public static void main(String [] args) { }`

Intent Action

- ACTION_DIAL
“android.intent.action.DIAL”
- ACTION_BATTERY_LOW
“android.intent.action.BATTERY_CHANGED”
- ACTION_PACKAGE_ADDED
“android.intent.action.PACKAGE_ADDED”
- ACTION_DO_SOMETHING
“com.myawesomecompany.app.action.DO_SOMETHING”

Intent Category

Further implicit Intent classification to help determine how to execute the Intent action

- `CATEGORY_BROWSABLE`
- `CATEGORY_CAR_DOCK`
- `CATEGORY_PREFERENCE`

Intent Component

Used to explicitly call an Activity or Service

- Specifies the package and class name
 - `com.company.app.MyActivity`
 - `edu.uw.aad.mzm.sample.helloworld.SecondActivity`

Intent Data

The Uri or MIME type of the data

- setData() ← set the Uri
- setType() ← set the MIME type
- setDataAndType() ← set both the Uri and MIME type

Intent Data

The data to be acted on

- Data Type
 - Uses `android:mimeType` to match a specific MIME type or wildcard
 - MIME sub-type: ("audio/*", "text/*", etc.)
- Data Scheme
 - Uses `android:scheme` to match the Intent's scheme
- Data Authority
 - Uses "scheme://host:port/path" to match the Intent's data authority
- Data Path
 - Uses the `android:path|pathPrefix|pathPattern` to match

Intent Data

The URI could point to anything

- An image
- A database row
- A contact
- A website
- Etc...

Intent Extras

Key / Value pairs passed along with the Intent

- *intent.putExtra(key, value);*

Break

Intent Types

1. **Explicit** - explicitly specify the component to start by the fully-qualified class name
2. **Implicit** -
 - do not name a specific component
 - declare a general action to perform
 - allows a component from another app to handle the action

Intent

Implicit Intent

Implicit Intent

How to construct an implicit Intent?

- Action
- Uri (optional)
- Extras (optional)

Implicit Intent - Example

- Allow users to make a call from app
- Android resolves the intent and start an activity that can handle the dial action, i.e. a phone dialer

```
Intent intent = new Intent(Intent.ACTION_DIAL, Uri.parse("tel:206-123-4567"));
```

Implicit Intent - Example

What happens if we pass a website URI to ACTION_VIEW?

```
Intent intent = new Intent(Intent.ACTION_VIEW);      intent.  
setData(Uri.parse("http://www.google.com"));
```

Hands-on

Walk through SampleIntent -
a few examples of using intent:

- call a phone number
- open web browser to URL
- share some text

Intent

Starting an Activity

Intent - startActivity()

This is what you most familiar with so far:
Activity A starts Activity B

```
Intent i = new Intent(this, ActivityB.class);  
intent.putExtra("key1", "value");  
intent.putExtra("key2", "value");  
startActivity(i);
```


Intent - startActivityForResult()

- Activity A starts Activity B,
- get some data, finish Activity B
- then returns to Activity A, override `onActivityResult()` to capture the returned data

Hands-on

Walk through SampleImageIntent

- get image from gallery or
- take a photo with camera app

Intent

Receiving Intents

Receiving Intents - in Activity

The inbound Activity has info about the Intent that started it

From within the Activity we can call `getIntent()`

```
Intent intent = this.getIntent();
```

```
String key1 = intent.getStringExtra("key1"); // "value"
```

```
String key2 = intent.getStringExtra("key2"); // "value"
```

Receiving Intent Data - broadcast

ACTION_HEADSET_PLUG

- "android.intent.action.HEADSET_PLUG"
- Wired Headset plugged in or unplugged
- Extras
 - "state"
 - 0 for unplugged, 1 for plugged.
 - "name"
 - Headset type, human readable string
 - "microphone"
 - 1 if headset has a microphone, 0 otherwise

Break

Intent Filter

- A match filter to respond to Intent requests
- Defined in AndroidManifest.xml
- Defined for a
 - Activity
 - Service
 - Receiver

Intent Filter

- Composed of
 - Action
 - Data
 - Category
- Can set a priority

Intent Filter - define default launcher

Define an activity as the first to launch when app starts:

```
<intent-filter>  
    <action android:name="android.intent.action.MAIN" />  
    <category android:name="android.intent.category.LAUNCHER" />  
</intent-filter>
```

Intent Filter - handle a MIME type

Allow other apps to start your app(activity)

Define an activity to launch to view text/html:

```
<intent-filter>  
    <action android:name="android.intent.action.VIEW" />  
    <data android:mimeType="text/html" />  
</intent-filter>
```

Hands-on

Walk through SampleIntentFilter

- use intent filter to launch the sample app

Receiver

- **Broadcast Receiver**
 - Responds to messages from the system or other applications
 - Sent via the Context
- **Local Broadcast Receiver**
 - Responds to messages from the application
 - Sent via the LocalBroadcastManager

How to create a Receiver

- Extends BroadcastReceiver
- Override onReceive event handler
- Register the receiver
 - in AndroidManifest.xml or
 - in an Activity

Registering a receiver

Choose one of the two methods to register a receiver:

1. In `AndroidManifest.xml`
 - app doesn't need to be running
 - can have zero or more `IntentFilters`
2. In an Activity
 - `onResume()`, `Context.registerReceiver()`
 - `onPause()`, `Context.unregisterReceiver()` ← remember to unregister the receiver!

Android System Broadcast

Full list of all Android broadcasts:

- Android sdk
- \platforms\<platform_version>\data\broadcast_actions.txt

Hands-on

Walk through SampleReceiver -
it monitors network connection status

Upcoming

- Homework due on March 9, 2015
- We will cover threading, AsyncTask and IntentService on March 9, 2015
- Final project due in 2 weeks - how is everyone doing on this?