Programming Handheld Systems

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The Intent Class
Today’s Topics

The Intent Class

Starting Activities with Intents

Explicit Activation

Implicit Activation via Intent resolution
The Intent Class

A data structure that represents:
- An operation to be performed, or
- An event that has occurred
Today’s focus

Using Intents to specify operations to be performed, not for event notification

i.e., Intents used to start a single activity

We’ll cover using intents for event notification when we talk about BroadcastReceiver
Intents as Desired Operations

Intents provide a flexible language for specifying operations to be performed

  e.g., Pick a contact, take a photo, dial a phone number
INTENTS AS DESIRED OPERATIONS

Intent is constructed by one component that wants some work done

Received by one activity that can perform that work
Intent Fields

Action
Data
Category
Type
Component
Extras
Flags
Action

String representing desired operation
Examples

ACTION_DIAL – Dial a number
ACTION_EDIT – Display data to edit
ACTION_SYNC – Synchronize device data with server
ACTION_MAIN – Start as initial activity of app
Setting the Intent Action

Intent newInt = new Intent(Intent.ACTION_DIAL);

Or

Intent newInt = new Intent();
newInt.setAction(Intent.ACTION_DIAL);
Data

Data associated with the Intent
Formatted as a Uniform Resource Identifier (URI)
Examples

Data to view on a map

Uri.parse("geo:0,0?q=1600+Pennsylvania+Ave+Washington+DC")

Number to dial in the phone dialer

Uri.parse("tel:+15555555555")
**Setting Intent data**

```
Intent newInt = new Intent(Intent.ACTION_DIAL,
    Uri.parse("tel:+15555555555"));

Or

Intent newInt = new Intent(Intent.ACTION_DIAL);
newInt.setData(Uri.parse("tel:+15555555555"));
```
Category

Additional information about the components that can handle the intent
Examples

Category_browsable – can be invoked by a browser to display data ref’s by a URI

Category_launcher – can be the initial activity of a task & is listed in top-level app launcher
Type

Specifies the MIME type of the Intent data
Examples

image/*, image/png, image/jpg

text/plain, text/html

If unspecified, Android will infer the type
Setting the type

Intent.setType(String type)

Or

Intent.setDataAndType(Uri data, String type)
**Component**

The component that should receive this intent

Use this when there’s exactly one component that should receive the intent
Setting the component

Intent newInt =
    Intent(Context packageContext, Class<? cls);
Setting the component

Or

Intent newInt = new Intent ();

and one of:

setComponent(), setClass(), or setClassName()
Extras

Add’l information associated with Intent
Treated as a map (key-value pairs)
Examples

**Intent.EXTRA_EMAIL: EMAIL RECIPIENTS**

```java
Intent newInt = new Intent(Intent.ACTION_SEND);
newInt.putExtra(android.content.Intent.EXTRA_EMAIL,
    new String[]{
        "aporter@cs.umd.edu", "ceo@microsoft.com",
        "potus@whitehouse.gov", "mozart@musician.org"
    }
    );
```
Setting the Extra attribute

Several forms depending on data types, e.g.,
putExtra(String name, String value);
putExtra(String name, float[] value);
...

FLAGS

Specify how Intent should be handled
Examples

FLAG_ACTIVITY_NO_HISTORY
Don’t put this Activity in the History stack

FLAG_DEBUG_LOG_RESOLUTION
Print extra logging information when this Intent is processed
SETTLING FLAGS

Intent newInt = new Intent(Intent.ACTION_SEND);
newInt.setFlags(Intent.FLAG_ACTIVITY_NO_HISTORY);
Starting Activities with Intents

`startActivity(Intent intent, ...)`

`startActivityForResult(Intent intent, ...)`
The target Activity

Can be named explicitly by setting the intent's component

Can be determined implicitly
Explicit Activation

HelloWorldWithLogin

two Activities

LoginActivity checks username & password and then starts HelloAndroidActivity

HelloAndroidActivity shows “hello Android” message
Implicit Activation

When the Activity to be activated is not explicitly named, Android tries to find Activities that match the Intent.

This process is called intent resolution.
**Intent Resolution Process**

An Intent describing a desired operation

IntentFilters which describe which operations an Activity can handle

Specified either in AndroidManifest.xml or programmatically
Intent Resolution Data

Action

Data (both URI & TYPE)

Category
Specifying Intent Filters

<activity ...
<intent-filter ...
    ...
    <action android:name="actionName" />
    ...
</intent-filter>
...
</activity>
HANDLING Intent.ACTION_DIAL

<activity ...>
  <intent-filter ...>
    ...
    <action android:name="android.intent.action.DIAL" />
    ...
  </intent-filter>
  ...
</activity>
**Adding data to IntentFilter**

```xml
<intent-filter ...>
...
<data android:host="string"
    android:mimeType="string"
    android:path="string"
    android:pathPattern="string"
    android:pathPrefix="string"
    android:port="string"
    android:scheme="string" />
...
</intent-filter>
```

Handling geo: scheme Intents

<intent-filter ...>
  ...
  <data android:scheme="geo" />
  ...
</intent-filter>
**Adding A Category to IntentFilter**

```xml
<intent-filter ...>

    ...

    <category android:name="string" />

    ...

</intent-filter>
```
Example: Maps Application
Example: Maps Application

<intent-filter ...>
  <action android:name = "android.intent.action.VIEW" />
  <category android:name = "android.intent.category.DEFAULT" />
  <category android:name = "android.intent.category.BROWSEABLE"/>
  <data android:scheme = "geo"/>
</intent-filter>
Receiving Implicit Intents

Note: to receive implicit intents an Activity should specify an IntentFilter with the category

"android.intent.category.DEFAULT" category
Priority

`android:priority` - Priority given to the parent component when handling matching Intents

Causes Android to prefer one activity over another

Value should be greater than -1000 & less than 1000

Higher values represent higher priorities
Investigate Intent Filters

% adb shell dumpsys package
Next Time

Permissions