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Android Intents

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Notes are based on:

Android Developers
http://developer.android.com/index.html

Intents

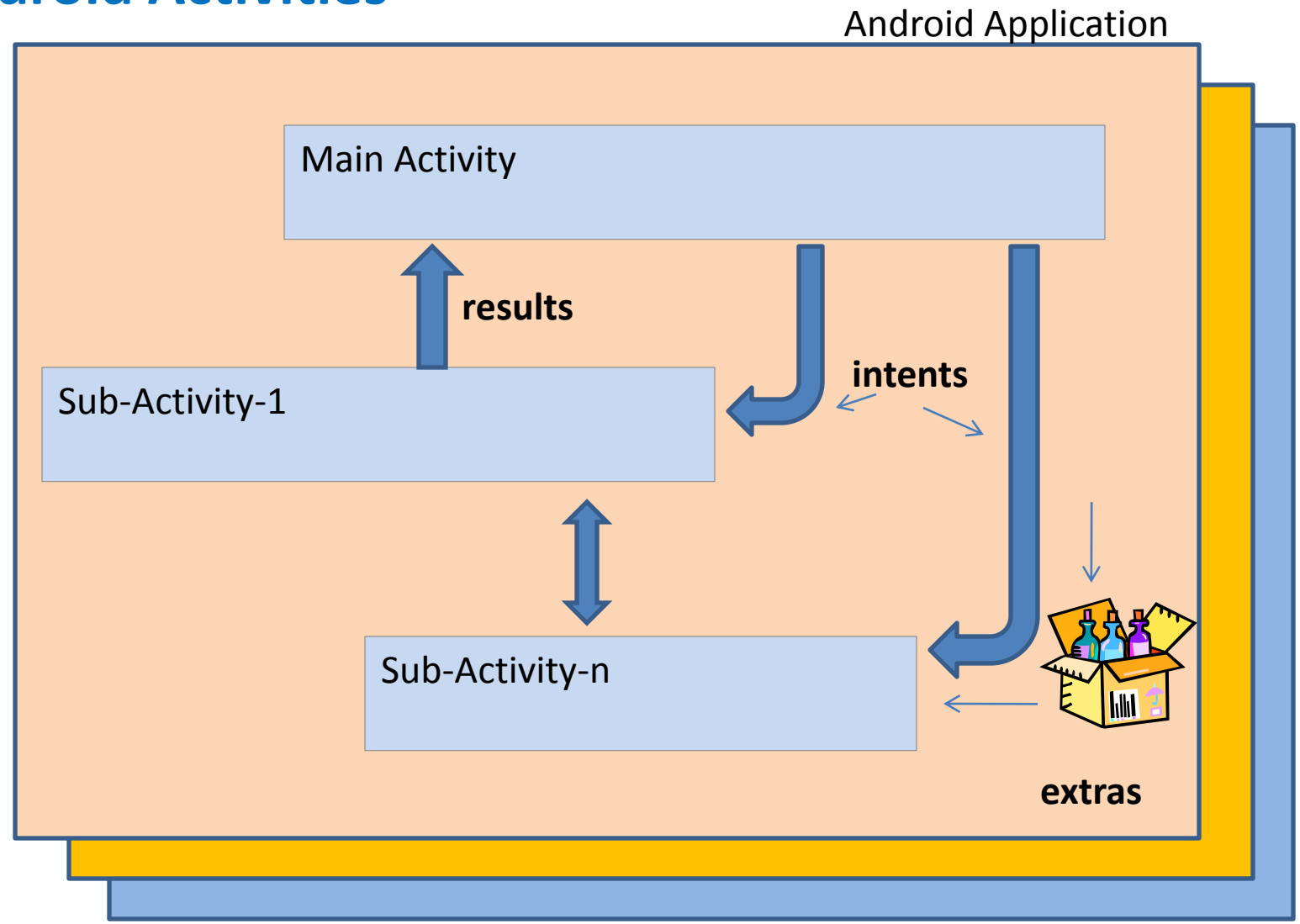
Android Activities

An Android application could include any number of activities.

- An *activity* uses the *setContentView*(...) method to expose (usually) a single UI from which a number of actions could be performed.
- Activities are independent of each other; however they usually cooperate exchanging data and actions.
- Typically, one of the activities is designated as the first one (*main*) that should be presented to the user when the application is launched.
- Moving from one activity to another is accomplished by asking the current activity to execute an ***intent***.
- Activities interact with each other in an **asynchronous** mode.

Intents

Android Activities



Intents

Taken from: http://code.google.com/android/reference/android/content/Intent.html

Intents are invoked using the following options

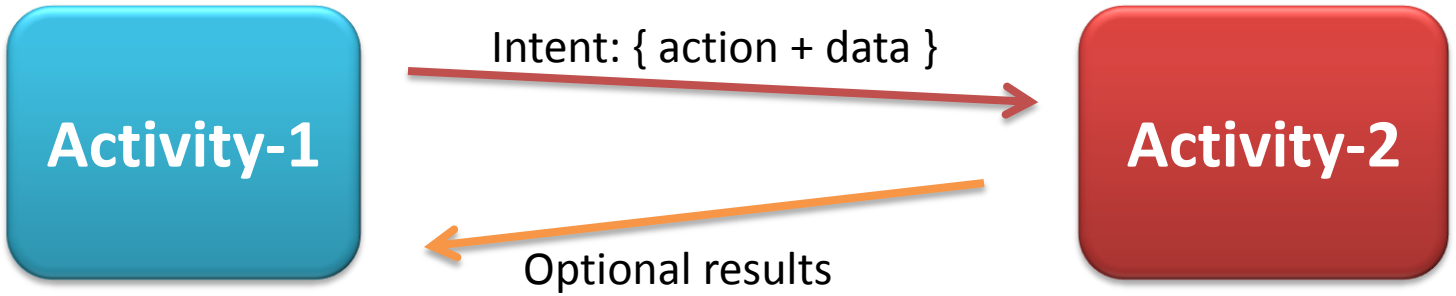
startActivity **(intent)**	launches an *Activity*
sendBroadcast **(intent)**	sends an intent to any interested *BroadcastReceiver* components
startService**(intent)** or ***bindService*****(intent, …)**	communicate with a background Service.

Intents

Taken from: http://code.google.com/android/reference/android/content/Intent.html

The main arguments of an Intent are:

1. **Action** The built-in action to be performed, such as `ACTION_VIEW`, `ACTION_EDIT`, `ACTION_MAIN`, … or *user-created-activity*
2. **Data** The primary data to operate on, such as a phone number to be called (expressed as a **Uri**).



Intents

Taken from: http://code.google.com/android/reference/android/content/Intent.html

Typically an intent is called as follows:

```
Intent  myActivity = new Intent (action, data);

startActivity (myActivity);
```

Built-in or user-created activity

Primary data (as an URI)
tel://
http://
sendto://

Intents

Taken from: http://code.google.com/android/reference/android/content/Intent.html

Examples of **action/data** pairs are:

ACTION_DIAL ***tel:123***
Display the phone dialer with the given number filled in.

ACTION_VIEW ***http://www.google.com***
Show Google page in a browser view. Note how the VIEW action does what is considered the most reasonable thing for a particular URI.

ACTION_EDIT ***content://contacts/people/2***
Edit information about the person whose identifier is "2".

ACTION_VIEW ***content://contacts/people/2***
Used to start an activity to display 2-*nd* person.

ACTION_VIEW ***content://contacts/*** **people/**
Display a list of people, which the user can browse through. Selecting a particular person to view would result in a new intent

Intents

Built-in Standard Actions

List of standard actions that Intents can use for launching activities (usually through *startActivity(Intent).*

ACTION_MAIN	ACTION_ANSWER
ACTION_VIEW	ACTION_INSERT
ACTION_ATTACH_DATA	ACTION_DELETE
ACTION_EDIT	ACTION_RUN
ACTION_PICK	ACTION_SYNC
ACTION_CHOOSER	ACTION_PICK_ACTIVITY
ACTION_GET_CONTENT	**ACTION_SEARCH**
ACTION_DIAL	**ACTION_WEB_SEARCH**
ACTION_CALL	ACTION_FACTORY_TEST
ACTION_SEND	
ACTION_SENDTO	

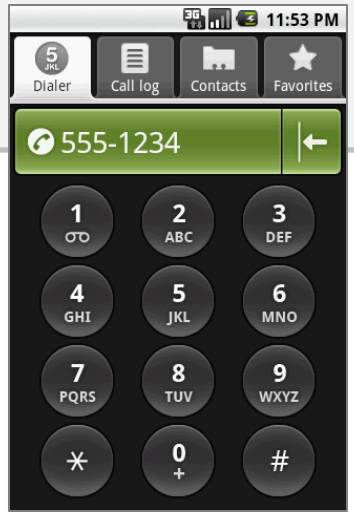
Intents

Taken from: http://code.google.com/android/reference/android/content/Intent.html

Example

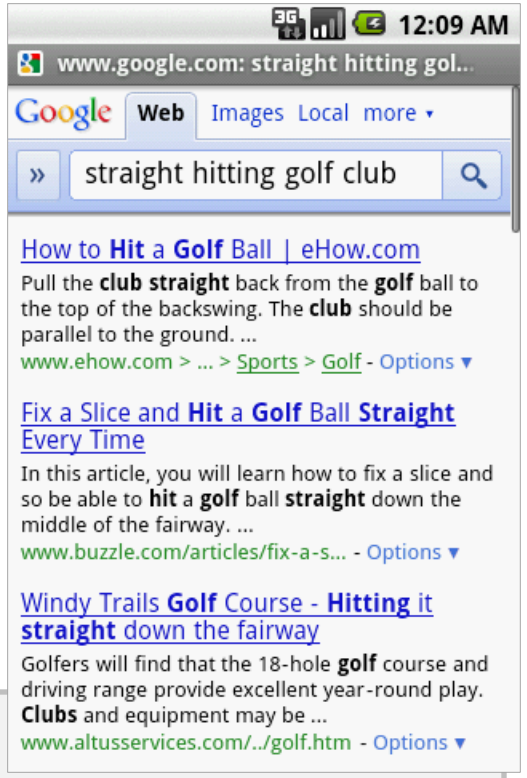
Display the phone dialer with the given number filled in.

```
Intent myActivity2 = new Intent (Intent.ACTION_DIAL,
                                 Uri.parse( "tel:555-1234"));
startActivity(myActivity2);
```



Intents

Taken from: http://code.google.com/android/reference/android/content/Intent.html



Intents - Secondary Attributes

In addition to the primary *action/data* attributes, there are a number of ***secondary attributes*** that you can also include with an intent, such as:

1. Category
2. Components
3. Type
4. Extras

Example: Doing a Google search looking for golf clubs

```
Intent intent = new Intent (Intent.ACTION_WEB_SEARCH );

intent.putExtra(SearchManager.QUERY,
                "straight hitting golf clubs");

startActivity(intent);
```

Secondary data

Apparently the Google answer is 'none'

Intents

Taken from: http://code.google.com/android/reference/android/content/Intent.html

Intents - Secondary Attributes

Example: Sending a text message (using extra attributes)

```
Intent intent = new Intent( Intent.ACTION_SENDTO,
                            Uri.parse("sms:5551234"));

intent.putExtra("sms_body", "are we playing golf next Saturday?");

startActivity(intent);
```

"address", "sms_body" are keywords

Intents

Taken from: http://code.google.com/android/reference/android/content/Intent.html

Intents - Secondary Attributes

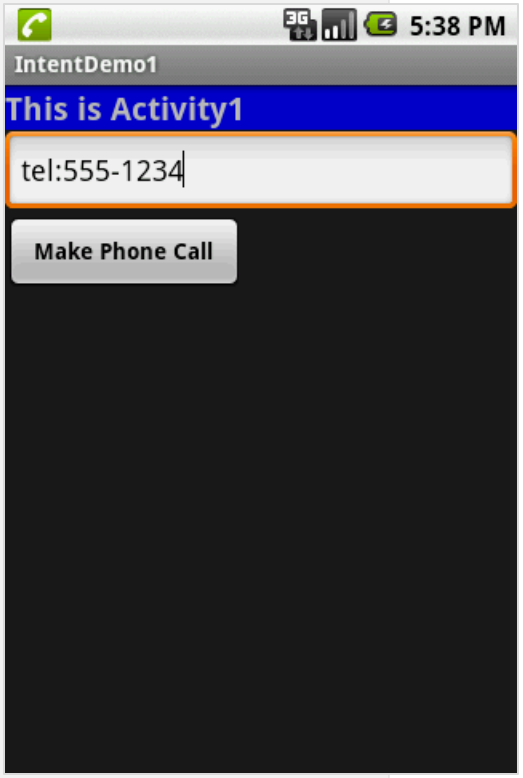
Example: Showing Pictures (using extra attributes)

```
Intent myIntent = new Intent();

myIntent.setType("image/pictures/*");
myIntent.setAction(Intent.ACTION_GET_CONTENT);

startActivity(myIntent);
```

Intents

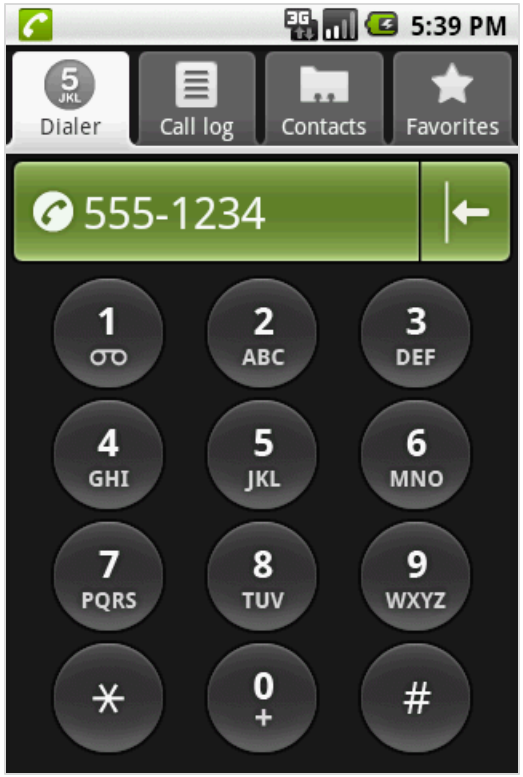
1. A Complete Example: Activity1 displays an interface to accept a phone number and requests (built-in) Activity2 to make the call.

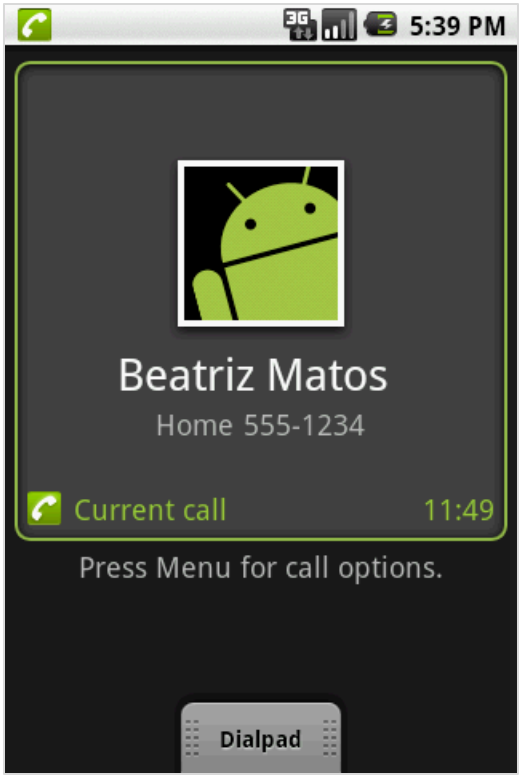
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"  >
<TextView
      android:id="@+id/label1"
      android:layout_width="fill_parent"
      android:layout_height="wrap_content"
      android:background="#ff0000cc"
      android:text="This is Activity1"
      android:textStyle="bold"
      android:textSize="20sp"   />
<EditText
      android:id="@+id/text1"
      android:layout_width="fill_parent"
      android:layout_height="54px"
      android:text="tel:555-1234"
      android:textSize="18sp"  />

<Button
      android:id="@+id/btnCallActivity2"
      android:layout_width="149px"
      android:layout_height="wrap_content"
      android:text="Make Phone Call"
      android:textStyle="bold" />
</LinearLayout>
```

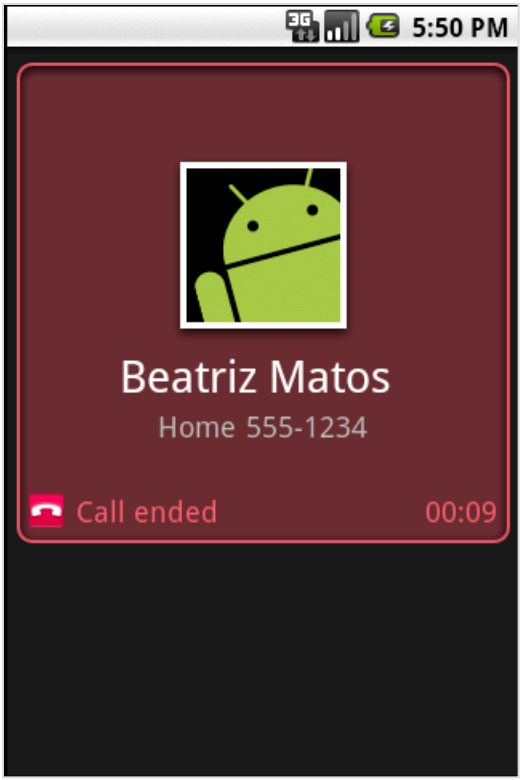


Intents

1. A Complete Example: Activity1 displays an interface to accept a phone number and requests (built-in) Activity2 to make the call.







Intents

1. A Complete Example: Activity1 displays an interface to accept a phone number and requests (built-in) Activity2 to make the call.

```
//IntentDemo1_Intent: making a phone call
package cis493.intents;
import android.app.Activity;
import android.content.Intent;
import android.net.Uri;
import android.os.Bundle;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.*;

public class IntentDemo1 extends Activity {
    TextView label1;
    EditText text1;
    Button   btnCallActivity2;
```

Intents

1. A Complete Example: Activity1 displays an interface to accept a phone number and requests (built-in) Activity2 to make the call.

```
@Override
    public void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    try {

        setContentView(R.layout.main);
        label1 = (TextView)findViewById(R.id.label1);
        text1 = (EditText)findViewById(R.id.text1);

        btnCallActivity2 = (Button)findViewById(R.id.btnCallActivity2);
        btnCallActivity2.setOnClickListener(new ClickHandler());
    }
   catch (Exception e) {
        Toast.makeText(getBaseContext(), e.getMessage(),
                       Toast.LENGTH_LONG).show();
    }
  }//onCreate
```

Intents

1. A Complete Example: Activity1 displays an interface to accept a phone number and requests (built-in) Activity2 to make the call.

```
private class ClickHandler implements OnClickListener {
        @Override
        public void onClick(View v) {
         try {
            // myActivity2 places a phone call
            // for ACTION_CALL or ACTION_DIAL
            // use 'tel:' formatted data: "tel:555-1234"
            // for ACTION_VIEW use data:  "http://www.youtube.com"
            // (you also need INTERNET permission - see Manifest)

            String myData = text1.getText().toString();
            Intent myActivity2 = new Intent(Intent.ACTION_DIAL,
                                            Uri.parse(myData));
            startActivity(myActivity2);
         }
         catch (Exception e) {
            Toast.makeText(getBaseContext(), e.getMessage(),
            Toast.LENGTH_LONG).show();
         }
        }//onClick
    }//ClickHandler
}//IntentDemo1
```

Intents

1. A Complete Example: Activity1 displays an interface that accepts from the user a phone number and requests (built-in) Activity2 to make the call.

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
      package="cis493.intents"
      android:versionCode="1"
      android:versionName="1.0">
<application android:icon="@drawable/icon"
             android:label="@string/app_name">
 <activity  android:name=".IntentDemo1"
            android:label="@string/app_name">
  <intent-filter>
    <action android:name="android.intent.action.MAIN" />
    <category android:name="android.intent.category.LAUNCHER" />
  </intent-filter>
 </activity>
  </application>
    <uses-sdk android:minSdkVersion="3" />

</manifest>
```

Action/category

Intents

Built-in Standard Broadcast Actions

List of standard actions that Intents can use for receiving broadcasts (usually through *registerReceiver(BroadcastReceiver, IntentFilter)* or a *<receiver>* tag in a manifest).

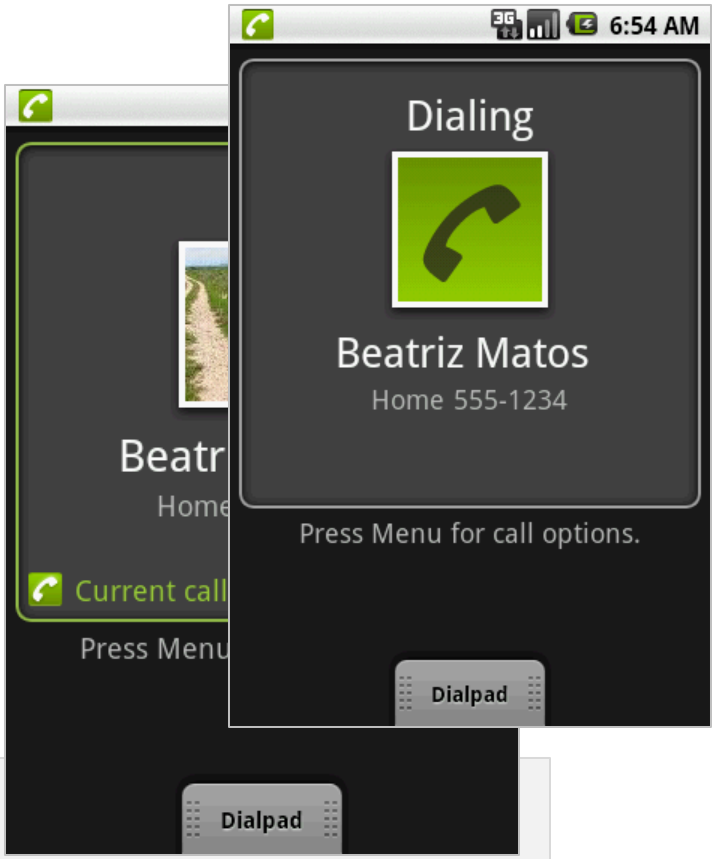
ACTION_TIME_TICK ACTION_TIME_CHANGED ACTION_TIMEZONE_CHANGED ACTION_BOOT_COMPLETED ACTION_PACKAGE_ADDED ACTION_PACKAGE_CHANGED ACTION_PACKAGE_REMOVED ACTION_UID_REMOVED ACTION_BATTERY_CHANGED	

Intents

More Examples: Using Standard Actions

Call Immediately

Modify the *complete* example1 replacing the method 'ClickHandler' with the following code

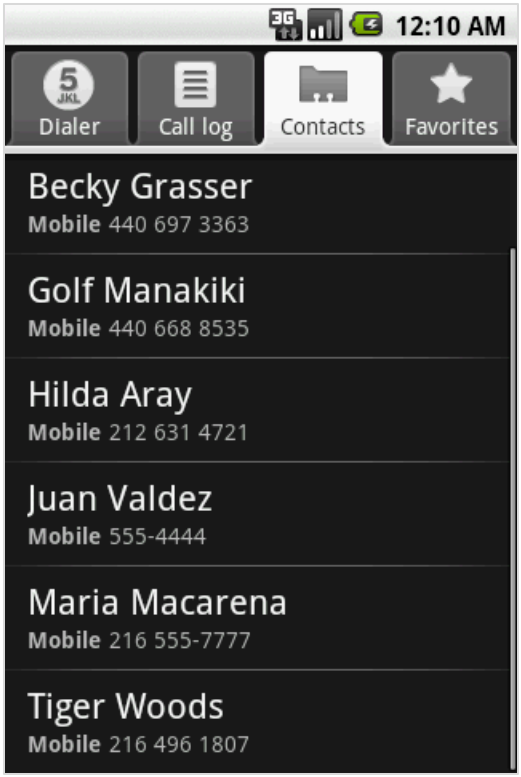



```
String myData = "tel:555-1234";

Intent myActivity2 = new Intent(Intent.ACTION_CALL,
                                Uri.parse(myData));

startActivity(myActivity2);
```

Needs Permission:

```
<uses-permission android:name="android.permission.CALL_PHONE" />
```

Intents



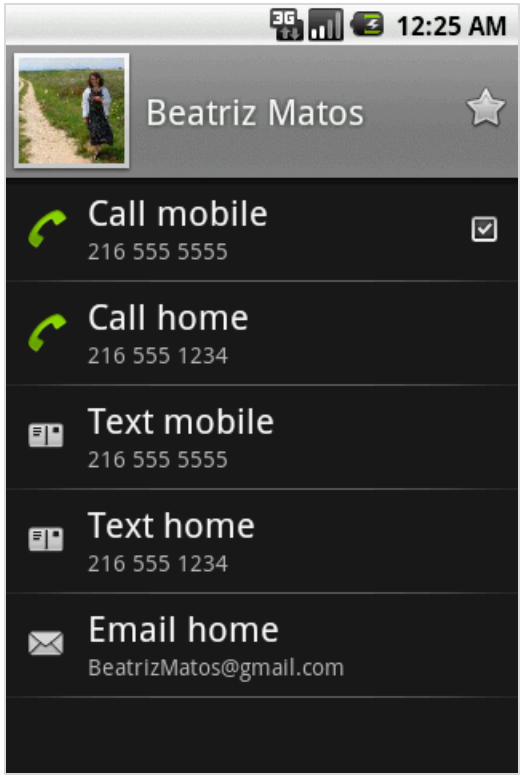
More Examples: Using Standard Actions

Show all your Contacts

Modify the *complete* example1 replacing the method 'ClickHandler' with the following code

```
String myData = "content://contacts/people/";

Intent myActivity2 = new Intent(Intent.ACTION_VIEW,
                                Uri.parse(myData));

startActivity(myActivity2);
```

Intents



More Examples: Using Standard Actions

Show a Particular Contact (ID = 2)

Modify the *complete* example1 replacing the method 'ClickHandler' with the following code

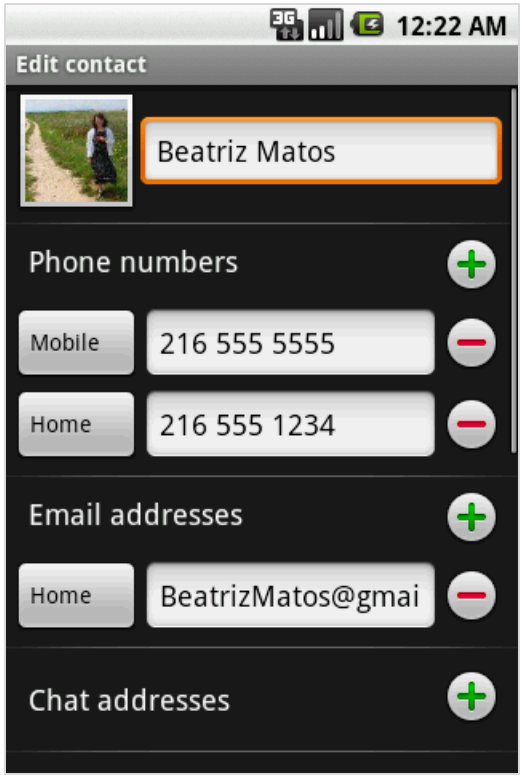
```
String myData = "content://contacts/people/2";

Intent myActivity2 = new Intent(Intent.ACTION_VIEW,
                                Uri.parse(myData));

startActivity(myActivity2);
```

Intents

More Examples: Using Standard Actions

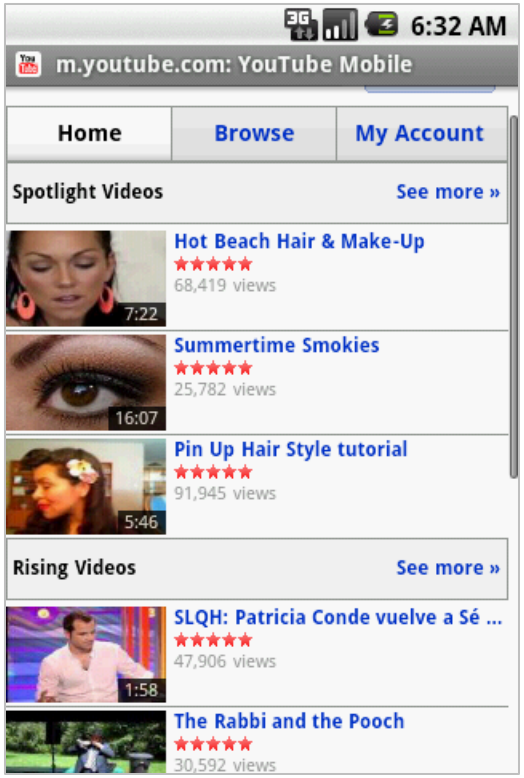
Edit a Particular Contact (ID = 2)

Modify the *complete* example1 replacing the method 'ClickHandler' with the following code




```
String myData = "content://contacts/people/2";

Intent myActivity2 = new Intent(Intent.ACTION_EDIT,
                                Uri.parse(myData));

startActivity(myActivity2);
```

Intents



More Examples: Using Standard Actions

View a Webpage

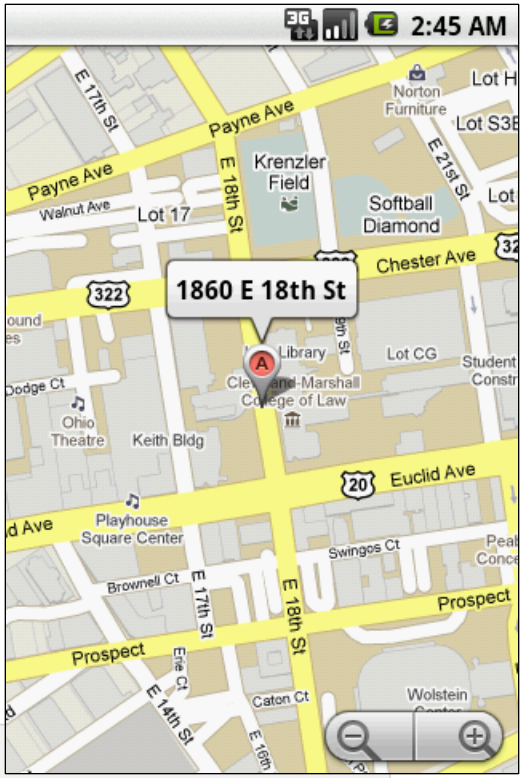
Modify the *complete* example1 replacing the method 'ClickHandler' with the following code

```
String myData = "http://www.youTube.com";

Intent myActivity2 = new Intent(Intent.ACTION_VIEW,
                                Uri.parse(myData));

startActivity(myActivity2);
```

Caution. Add to the Manifest a request to use the Internet:

```
<uses-permission android:name="android.permission.INTERNET" />
```

Intents



More Examples: Using Standard Actions

Geo Mapping an Address

Provide a geoCode expression holding a street address (or place, such as ‘golden gate ca’)
Replace spaces with ‘+’.

```
String geoCode =
       "geo:0,0?q=1860+east+18th+street+cleveland+oh";
Intent intent = new Intent(Intent.ACTION_VIEW,
                           Uri.parse(geoCode));
startActivity(intent);
```

Modify the Manifest adding the following requests:

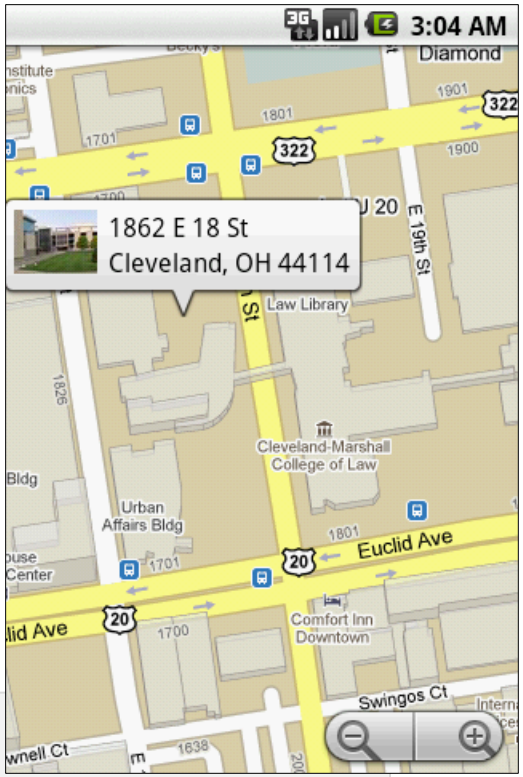
```
<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION" />
<uses-permission android:name="android.permission.INTERNET" />
```

Intents

More Examples: Using Standard Actions

Geo Mapping Coordinates (latitude, longitude)

Provide a geoCode holding latitude and longitude (also an addittional zoom '**?z=xx**' with xx in range 1..23)




```
String geoCode =
        "geo:41.5020952,-81.6789717";
Intent intent = new Intent(Intent.ACTION_VIEW,
                           Uri.parse(geoCode));
startActivity(intent);
```

Modify the Manifest adding the following requests:

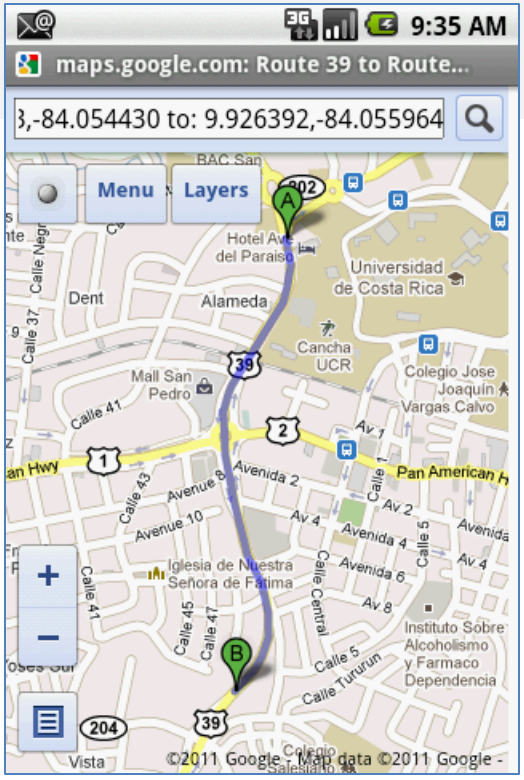
```
<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION" />
<uses-permission android:name="android.permission.INTERNET" />
```

Intents

More Examples

// Getting driving directions: how to go from loaction A to location B?

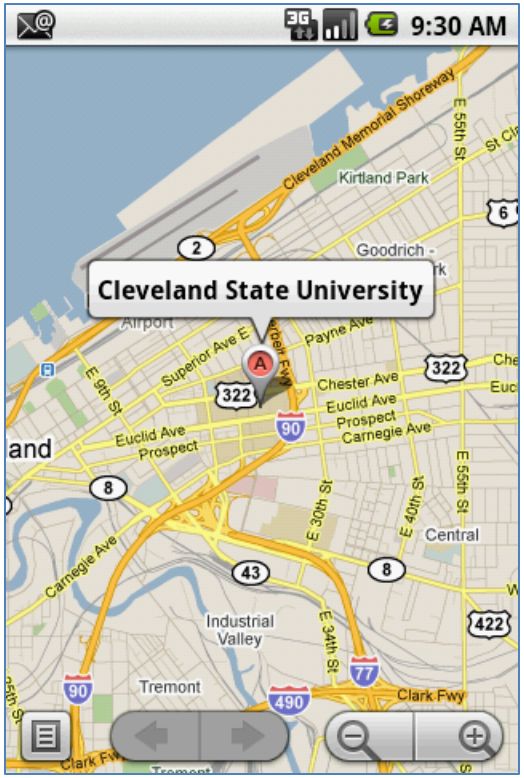
```
Intent intent = new Intent(android.content.Intent.ACTION_VIEW,

Uri.parse("http://maps.google.com/maps?saddr=9.938083,-84.054430&daddr=9.926392,-84.055964"));

startActivity(intent);
```



Intents

More Examples

```
// use a mnemonic  to articulate an address
String thePlace = "Cleveland State University";

Intent intent = new Intent(android.content.Intent.ACTION_VIEW,
                                Uri.parse("geo:0,0?q= (" +  thePlace  + ")"  );
startActivity(intent);
```



Intents

More Examples: Using Standard Actions

Geo Mapping - Google StreetView

geoCode Uri structure:

google.streetview:cbll=***lat,lng***&cbp=1,
yaw,,pitch,zoom&mz=*mapZoom*

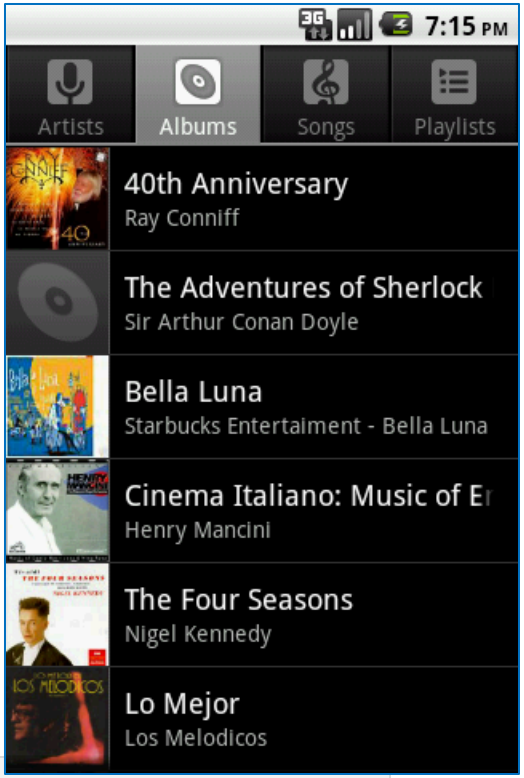
Reference: http://developer.android.com/guide/appendix/g-app-intents.html

```
String geoCode =
      "google.streetview:cbll=41.5020952,-81.6789717&cbp=1,270,,45,1&mz=1";

Intent intent = new Intent(Intent.ACTION_VIEW,
                           Uri.parse(geoCode));
startActivity(intent);
```

Modify the Manifest adding the following requests:

```
<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION" />
<uses-permission android:name="android.permission.INTERNET" />
```

Intents



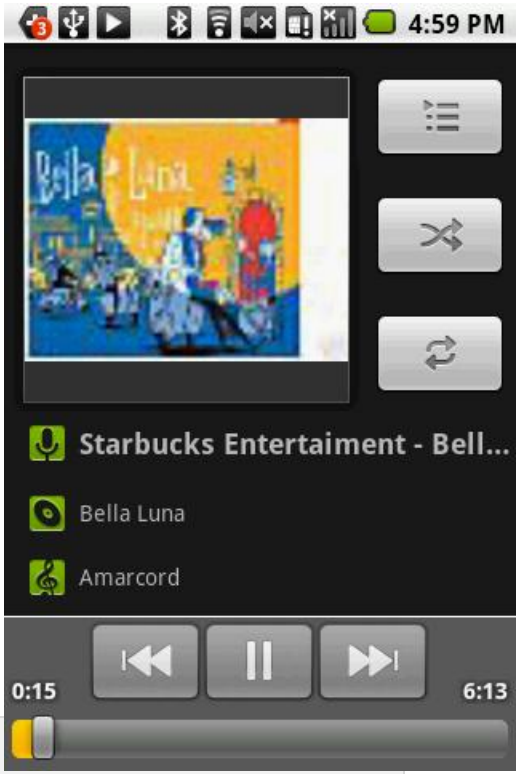
More Examples: Using Standard Actions

Launching the Music Player

Reference: http://developer.android.com/guide/appendix/g-app-intents.html

```
//launch music player

Intent myActivity2 =
       new Intent("android.intent.action.MUSIC_PLAYER");

startActivity(myActivity2);
```

Intents



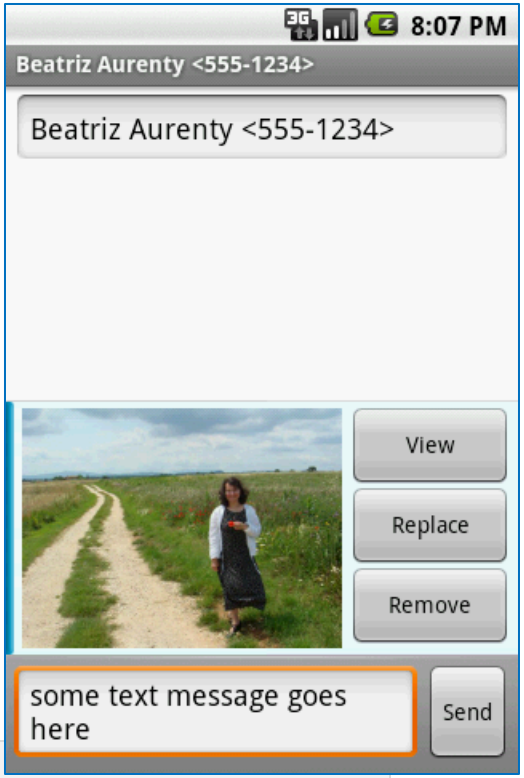
More Examples: Using Standard Actions

Playing a song stored in the SD card

Reference: http://developer.android.com/guide/appendix/g-app-intents.html

```
// play song "amarcord.mp3" saved in the SD
Intent myActivity2 =
        new Intent(android.content.Intent.ACTION_VIEW);

Uri data = Uri.parse("file:///sdcard/amarcord.mp3");
String type = "audio/mp3";

myActivity2.setDataAndType(data, type);

startActivity(myActivity2);
```

Intents



More Examples: Using Standard Actions

Sending MMS

Add picture #1 from SD to MMS

Reference: http://developer.android.com/guide/appendix/g-app-intents.html

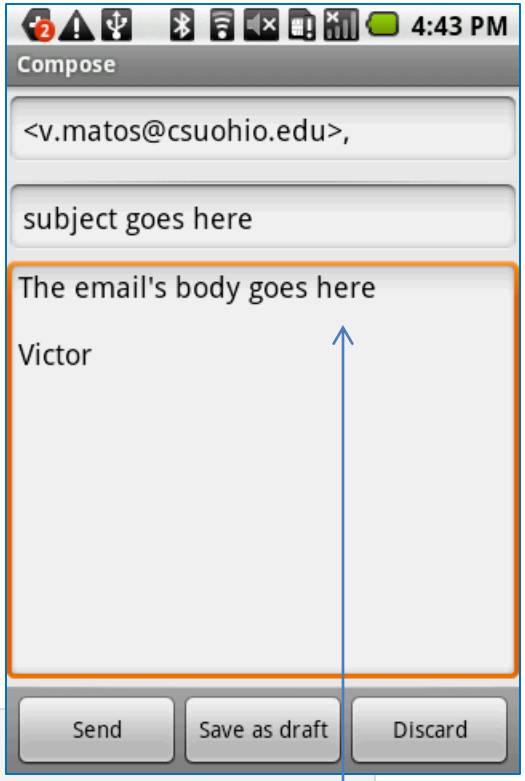
```
//send mms attach picture #1 to it

Uri uri = Uri.parse("content://media/external/images/media/1");

myActivity2 = new Intent(Intent.ACTION_SEND);

myActivity2.putExtra("address", "555-1234");
myActivity2.putExtra("sms_body", "some text message goes here");
myActivity2.putExtra(Intent.EXTRA_STREAM, uri);
myActivity2.setType("image/png");

startActivity(myActivity2);
```

Intents

More Examples: Using Standard Actions

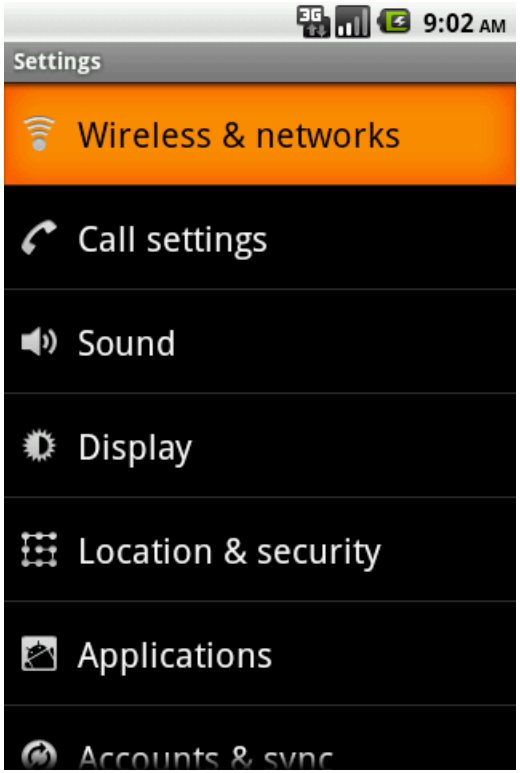
Sending Email

Reference: http://developer.android.com/guide/appendix/g-app-intents.html




```
// send email
Uri uri = Uri.parse("mailto:v.matos@csuohio.edu");
Intent myActivity2 = new Intent(Intent.ACTION_SENDTO, uri);

// you may skip the next two pieces [subject/text]
myActivity2.putExtra(Intent.EXTRA_SUBJECT,
                     "subject goes here");
myActivity2.putExtra(Intent.EXTRA_TEXT,
                     "The email's body goes here");

startActivity(myActivity2);
```

Intents



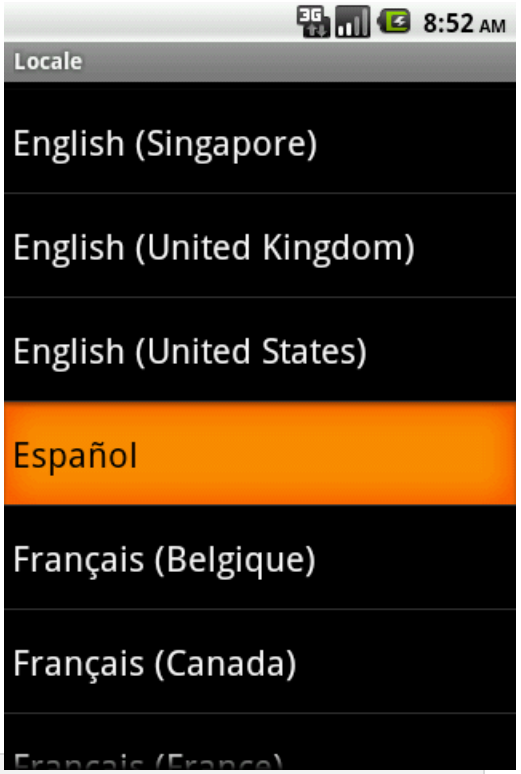
More Examples: Using Standard Actions

Setting System

Reference: http://developer.android.com/reference/android/provider/Settings.html

```
Intent intent = new Intent(
            android.provider.Settings.ACTION_SETTINGS);

startActivity(intent);
```

Intents



More Examples: Using Standard Actions

Setting System Locale: Language & Keyboard

Reference: http://developer.android.com/reference/android/provider/Settings.html

```
Intent intent = new Intent(
                android.provider.Settings.ACTION_LOCALE_SETTINGS);
startActivity(intent);
```

Intents

Starting Activities and Getting Results

The **startActivity(Intent)** method is used to start a new activity, which will be placed at the top of the activity stack.

Sometimes you want to get a result back from the called sub-activity when it ends.

For example, you may start an activity that let the user pick a person from a list of contacts; when it ends, it returns the person that was selected.

Intents

Starting Activities and Getting Results

In order to get results back from the called activity we use the method

startActivityForResult (Intent, requestCodeID)

Where the second (*requestCodeID*) parameter identifies the call.

The result sent by the sub-activity could be picked up through the asynchronous method

onActivityResult (requestCodeID, resultCode, Intent)

Intents

Starting Activities and Getting Results

- Before an activity exits, it can call **setResult (resultCode)** to return a termination signal back to its parent.

- Always supply a result code, which can be the standard results **Activity.RESULT_CANCELED, Activity.RESULT_OK**, or any custom values.

- All of this information can be capture back on the parent's

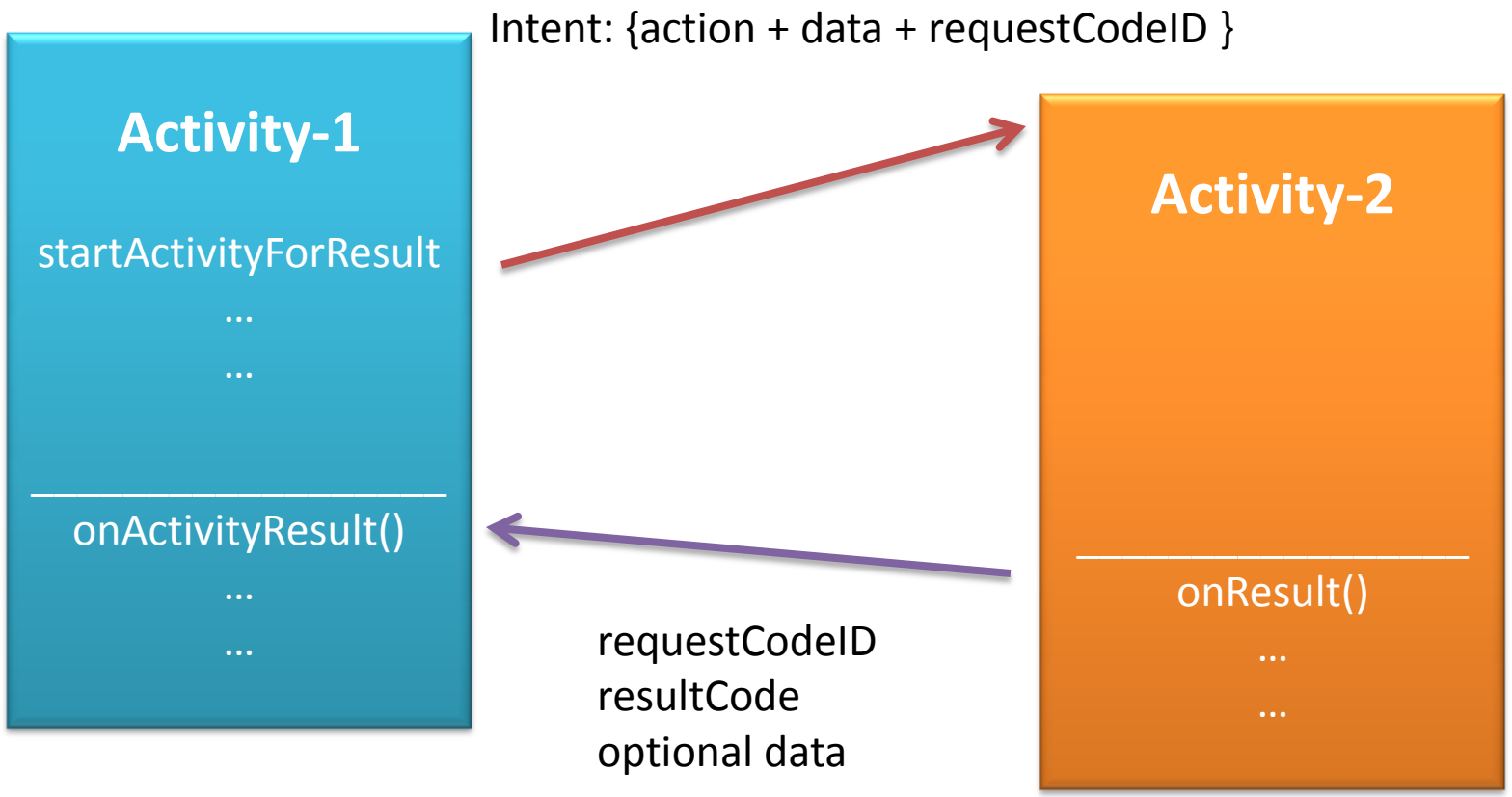
```
onActivityResult (int requestCodeID, int resultCode, Intent data)
```

along with the integer identifier it originally supplied.

- If a child activity fails for any reason (such as crashing), the parent activity will receive a result with the code **RESULT_CANCELED**.

Intents

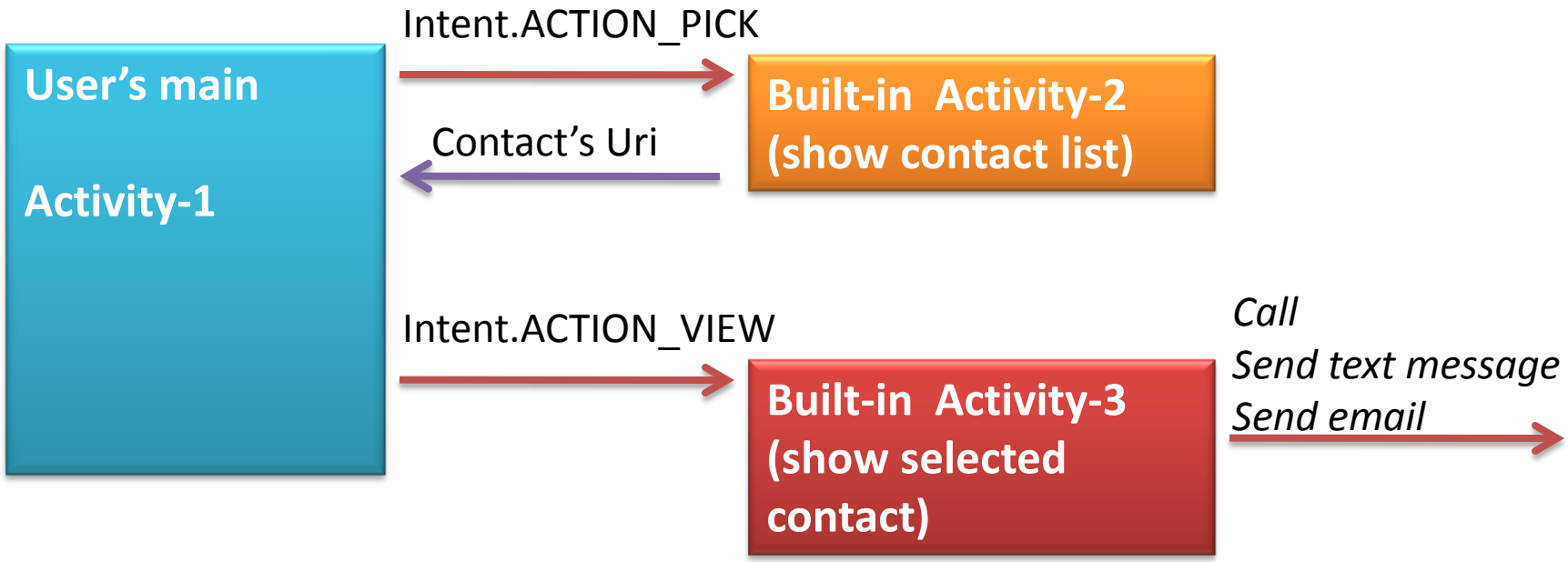
Starting Activities and Getting Results



Intents

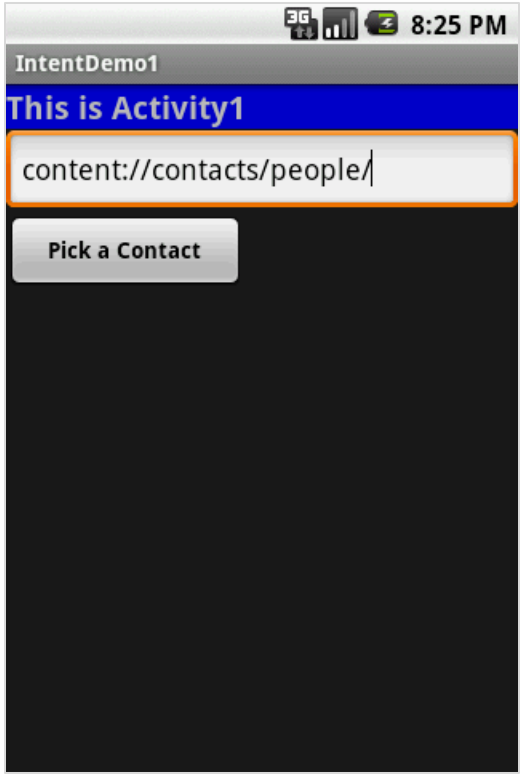
Example2. Let's play golf - Call for a tee-time.

1. Show all contacts and pick a particular one (*Intent.ACTION_PICK*).
2. For a successful interaction the main-activity accepts the returned URI identifying the person we want to call (*content://contacts/people/n*).
3. 'Nicely' show the selected contact's entry allowing calling, texting, emailing actions (Intent.ACTION_VIEW).

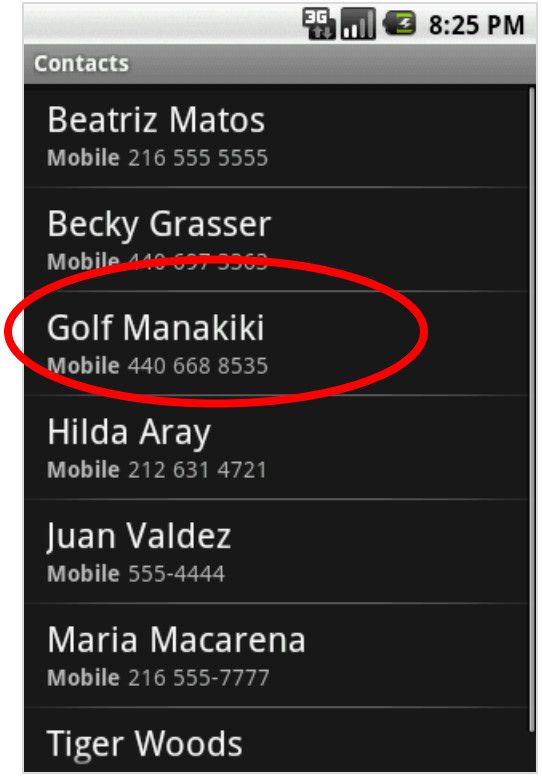


Intents

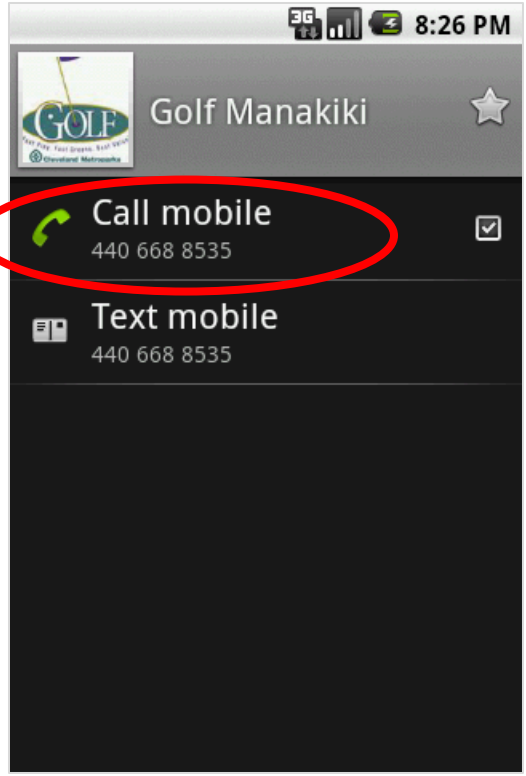
Example2. Let's play golf - *Call for a tee-time*.



Main Activity



Intent.ACTION_PICK

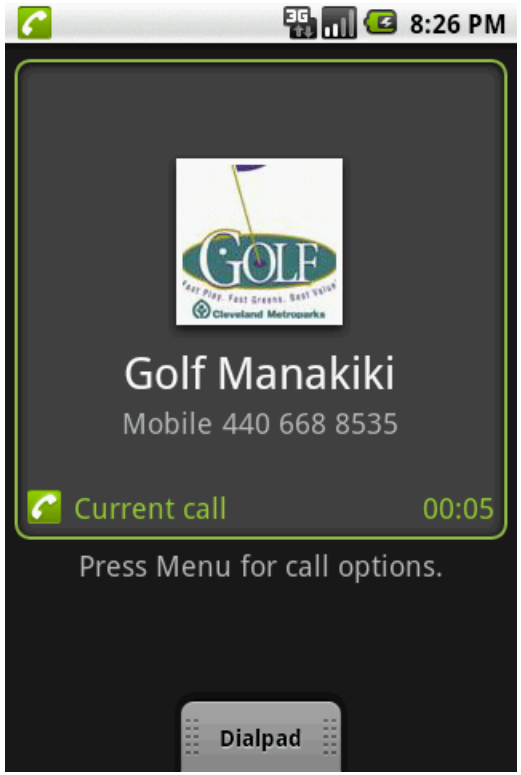


Intent.ACTION_VIEW

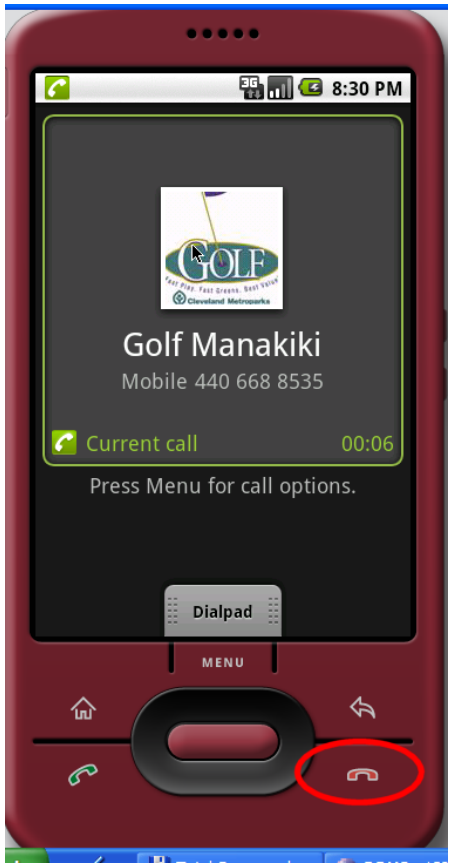
Cont.

Intents

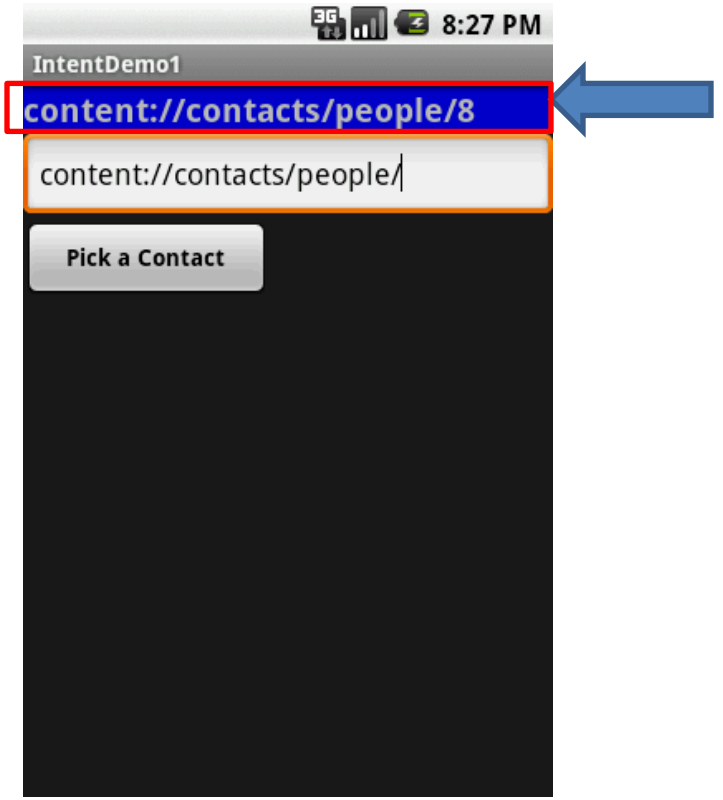
Example2 (cont.) Let's play golf - *Call for a tee-time*



Place the call



Terminate the call



Selected contact's URI

Intents

Example2. *Calling a sub-activity, receiving results.*

```
//IntentDemo2_Intent: making a phone call
//receiving results from a sub-activity
package cis493.intents;
import android.app.Activity;
import android.content.Intent;
import android.net.Uri;
import android.os.Bundle;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.*;

public class IntentDemo2 extends Activity {
    TextView label1;
    EditText text1;
    Button   btnCallActivity2;
```

Intents

Example2. *Calling a sub-activity, receiving results.*

```
@Override
   public void onCreate(Bundle savedInstanceState) {
   super.onCreate(savedInstanceState);
   try {
            setContentView(R.layout.main);
            label1 = (TextView)findViewById(R.id.label1);
            text1 = (EditText)findViewById(R.id.text1);

            btnCallActivity2 = (Button)findViewById(R.id.btnPickContact);
            btnCallActivity2.setOnClickListener(new ClickHandler());
   }
   catch (Exception e) {
             Toast.makeText(getBaseContext(),
             e.getMessage(), Toast.LENGTH_LONG).show();
   }
 }//onCreate
```

Intents

Example2. *Calling a sub-activity, receiving results.*

```
private class ClickHandler implements OnClickListener {
    @Override
    public void onClick(View v) {
        try {
             // myData refer to: content://contacts/people/
             String myData = text1.getText().toString();

             //you may also try ACTION_VIEW instead
             Intent myActivity2 = new Intent(Intent.ACTION_PICK,
                                      Uri.parse(myData));
            // start myActivity2.
            // Tell it that our requestCodeID (or nickname) is 222
            startActivityForResult(myActivity2, 222);

            // Toast.makeText(getApplicationContext(),
            //                "I can't wait for you", 1).show();
        }
        catch (Exception e) {
            label1.setText(e.getMessage());
    }
    }//onClick
  }//ClickHandler
```

Intents

Example2. *Calling a sub-activity, receiving results.*

```
@Override
protected void onActivityResult(int requestCode,
                                int resultCode,
                                Intent data) {
    super.onActivityResult(requestCode, resultCode, data);
    try {
        // use requestCode to find out who is talking back to us
        switch (requestCode){
            case (222): {
                // 222 is our friendly contact-picker activity
                if (resultCode == Activity.RESULT_OK) {
                    String selectedContact = data.getDataString();
                    // it will return an URI that looks like:
                    // content://contacts/people/n
                    // where n is the selected contacts' ID
                    label1.setText(selectedContact.toString());

                    //show a 'nice' screen with the selected contact
                    Intent myAct3 = new Intent (Intent.ACTION_VIEW,
                                                Uri.parse(selectedContact));
                    startActivity(myAct3);
                }
```

Listener

Intents

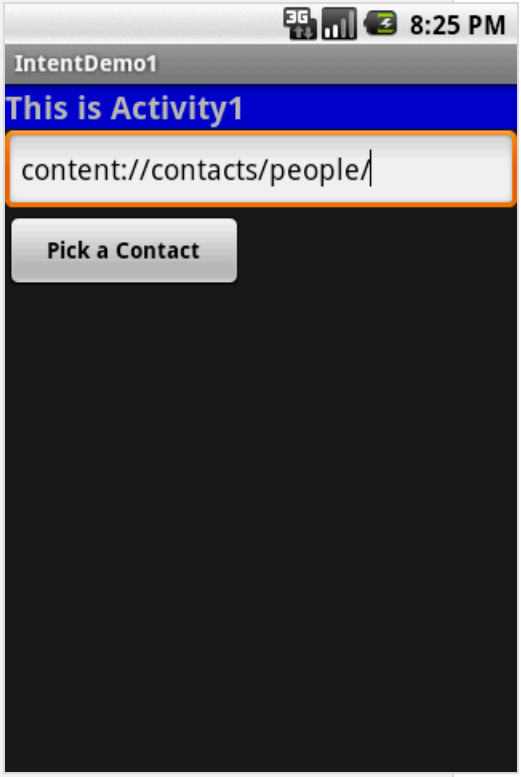
Example2. *Calling a sub-activity, receiving results.*

```
                    else {
                         //user pressed the BACK button
                         label1.setText("Selection CANCELLED "
                                        + requestCode + " " + resultCode);
                         }
                         break;
                    }
               }//switch
          }
          catch (Exception e) {
               Toast.makeText(getBaseContext(), e.getMessage(),
                              Toast.LENGTH_LONG).show();
          }
     }// onActivityResult

}//IntentDemo2
```

Intents

Example2. *Calling a sub-activity, receiving results.*

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent" >
     <TextView
          android:id="@+id/label1"
          android:layout_width="fill_parent"
          android:layout_height="wrap_content"
          android:background="#ff0000cc"
          android:text="This is Activity1"
          android:textStyle="bold"
          android:textSize="20sp"/>
     <EditText
          android:id="@+id/text1"
          android:layout_width="fill_parent"
          android:layout_height="54px"
          android:text="content://contacts/people/"
          android:textSize="18sp"  />
     <Button
          android:id="@+id/btnPickContact"
          android:layout_width="149px"
          android:layout_height="wrap_content"
          android:text="Pick a Contact"
          android:textStyle="bold" />
</LinearLayout>
```



Intents

Example3. Showing Pictures and Video - Calling a sub-activity, receiving results.

```
private void showSoundTracks() {

  Intent myIntent = new Intent();
  myIntent.setType("video/*, images/*");
  myIntent.setAction(Intent.ACTION_GET_CONTENT);
  startActivityForResult(myIntent, 0);

}//showSoundTracks


@Override
protected void onActivityResult(int requestCode, int resultCode, Intent intent) {
  super.onActivityResult(requestCode, resultCode, intent);

  if ((requestCode == 0) && (resultCode == Activity.RESULT_OK)) {

      String selectedImage = intent.getDataString();

      Toast.makeText(this, selectedImage, 1).show();

      // show a 'nice' screen with the selected image
      Intent myAct3 = new Intent(Intent.ACTION_VIEW, Uri.parse(selectedImage));
      startActivity(myAct3);
  }
}//onActivityResult
```

All videos and all still images

Intents

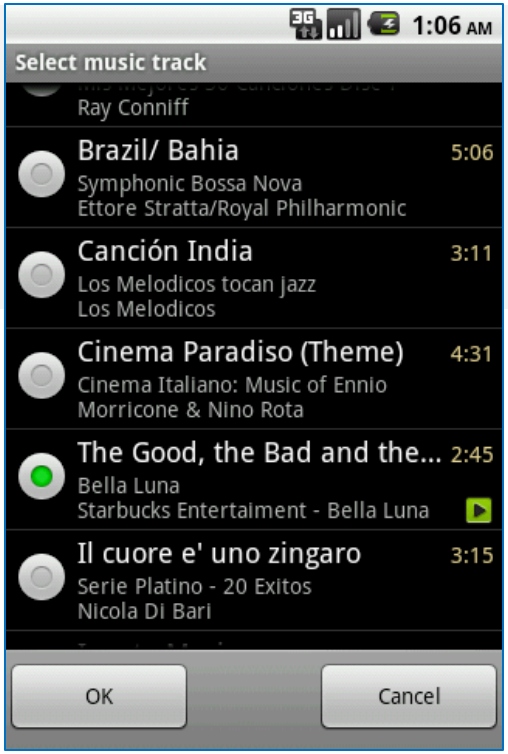
Example3. Showing Pictures and Video - Calling a sub-activity, receiving results.

Intents

Example4. Showing/Playing Sound Tracks - Calling a sub-activity, receiving results.

```
private void showSoundTracks() {
   Intent myIntent = new Intent();
   myIntent.setType("audio/mp3");
   myIntent.setAction(Intent.ACTION_GET_CONTENT);
   startActivityForResult(myIntent, 0);
}//showSoundTracks
```

The returned string value is similar to the following "content://media/external/audio/media/14" ACTION_VIEW on that Uri would produce a result similar to the image on the right



Intents

Questions ?

Intents

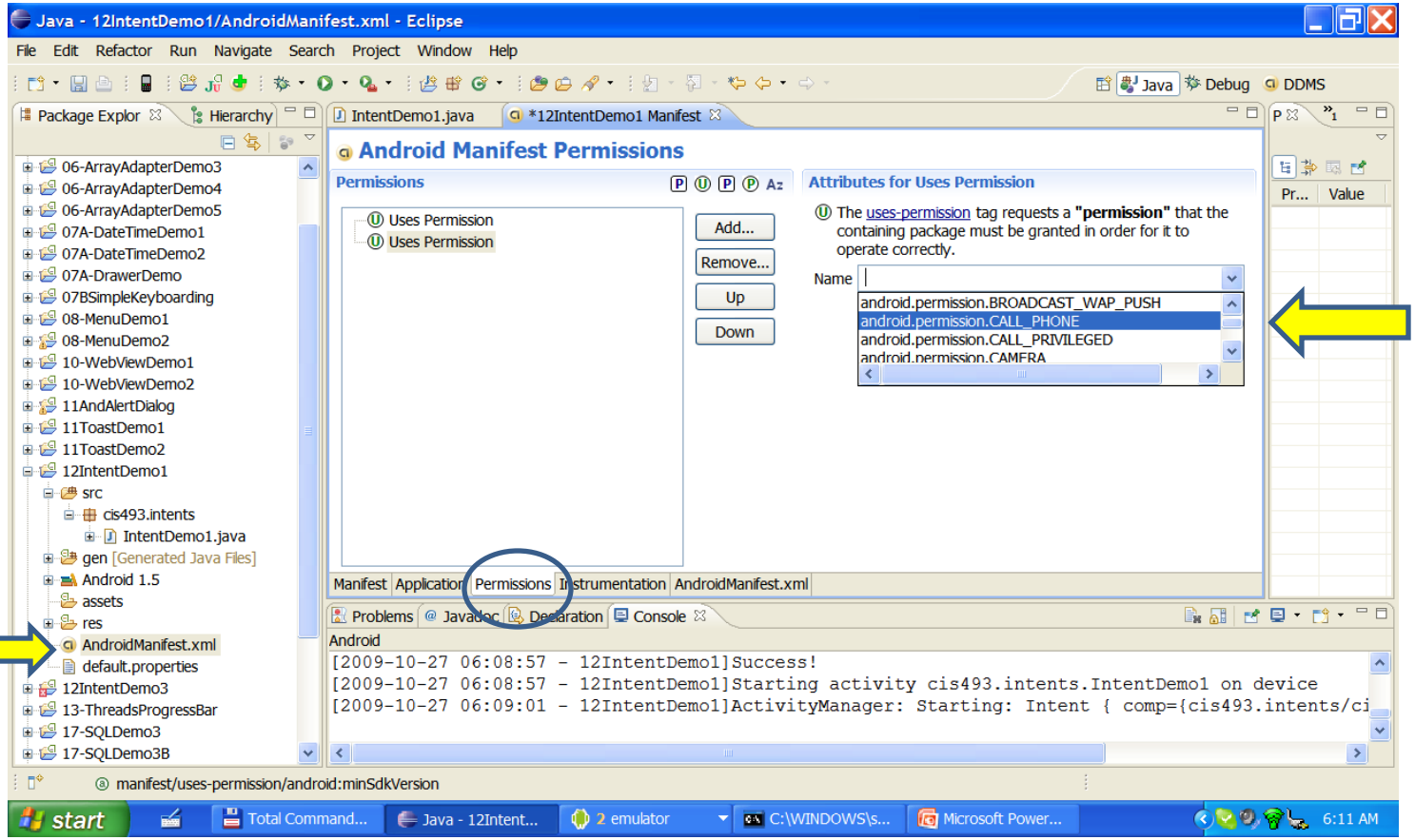
Built-in Standard Broadcast Actions

List of standard actions that Intents can use for receiving broadcasts (usually through *registerReceiver(BroadcastReceiver, IntentFilter)* or a *<receiver>* tag in a manifest).

ACTION_TIME_TICK ACTION_TIME_CHANGED ACTION_TIMEZONE_CHANGED ACTION_BOOT_COMPLETED ACTION_PACKAGE_ADDED ACTION_PACKAGE_CHANGED ACTION_PACKAGE_REMOVED ACTION_UID_REMOVED ACTION_BATTERY_CHANGED	

Intents

Appendix: Getting Permissions



Becomes:

```
<uses-permission android:name="android.permission.CALL_PHONE"></uses-permission>
```