CS 696 Mobile Phone Application Development
Fall Semester, 2009
Doc 4 Data
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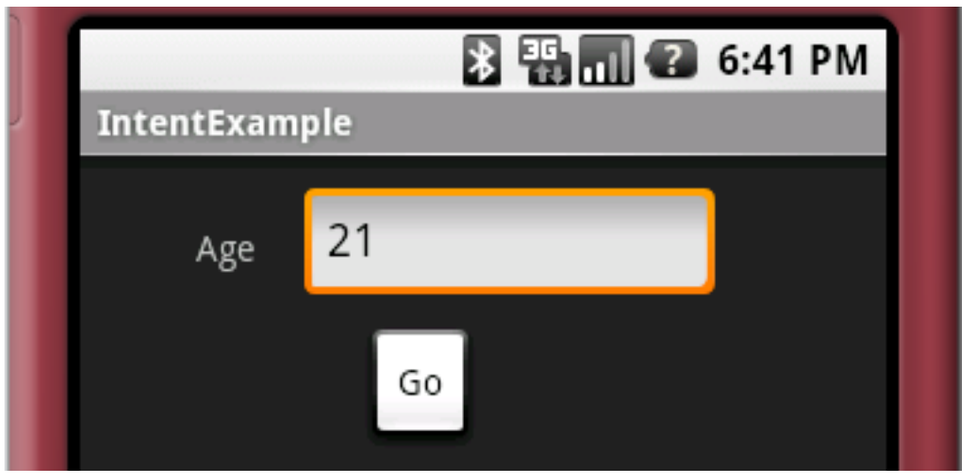
References

Google Android Documentation, http://code.google.com/android/documentation.html

Intent - Passing Data

IntentExample

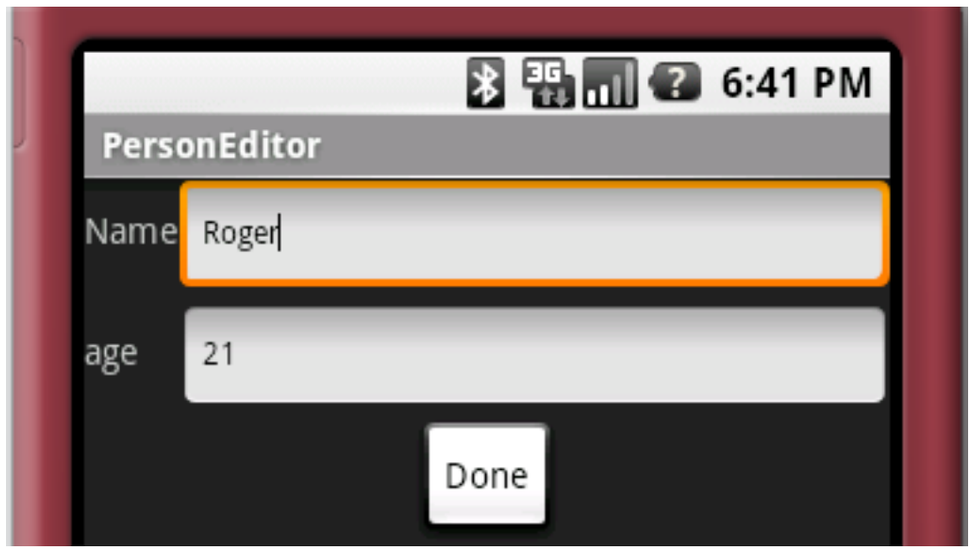


Displays/Edits age

Go button

- Calls PersonEditor
- Passes data
  - Name
  - Age

PersonEditor



Displays/Edits Name and age

Done button

- Returns edited data back
- Age = 0 cancels edit

IntentExample.java

```
public class IntentExample extends Activity implements View.OnClickListener {
	private EditText numberText;
	private static final int INTENT_EXAMPLE_REQUEST = 123;

	public void onCreate(Bundle savedInstanceState) {
		super.onCreate(savedInstanceState);
		setContentView(R.layout.intent);
		Button ok = (Button) findViewById(R.id.go);
		ok.setOnClickListener(this);
		numberText = (EditText) this.findViewById(R.id.number);
		numberText.setText("21");

	}
```


When we want a reply back from an Intent request we supply a request number. The request number is return with the answer. That way it is possible to know where the request originated from.

IntentExample.Java continued

Sending the data to PersonEditor

```
public void onClick(View v) {
        Intent go;
        go = new Intent();
        go.setAction("android.intent.action.EDIT");
        go.addCategory("person_editor");
        String newAge = numberText.getText().toString();
        go.putExtra("age", newAge);
        go.putExtra("name", "Roger");
        startActivityForResult(go, INTENT_EXAMPLE_REQUEST);
    }
```


The name was sent just to show we can send multiple items. They can be of any base type or serializable. See the putExtra methods in the Intent class.

IntentExample.Java continued

Getting the Results back

```
protected void onActivityResult(int requestCode, int resultCode, Intent data) {
    if (requestCode != INTENT_EXAMPLE_REQUEST) {
        numberText.setText("Not from me");
        return;
    }
    switch (resultCode) {
    case RESULT_OK:
        String editedAge = data.getStringExtra("age");
        numberText.setText(editedAge);
        break;
    case RESULT_CANCELED:
        numberText.setText("Cancelled");
        break;
    }
  }
}
```


When an activity is started after a return from a startActivityForResult request, the method onActivityResult is called. The requestCode is the request code sent in the startActivityForResult method. The result code is the set by the called activity and is RESULT_OK or RESULT_CANCELED by convention. The intent is used to send data back to this activity. RESULT_OK and RESULT_CANCELED are constants defined in the Activity class.

PersonEditor.java

```
public class PersonEditor extends Activity implements View.OnClickListener {
    private EditText ageText;
      private EditText nameText;

      public void onCreate(Bundle savedInstanceState) {
            super.onCreate(savedInstanceState);
            setContentView(R.layout.person_editor);
            Button done = (Button) findViewById(R.id.edit_done);
            done.setOnClickListener(this);
            ageText = (EditText) this.findViewById(R.id.edit_age);
            nameText = (EditText) this.findViewById(R.id.edit_name);
            Bundle personData = getIntent().getExtras();
            String age = personData.getString("age");
            String name = personData.getString("name");
            if ((age != null) && (name != null)) {
                  ageText.setText(age);
                  nameText.setText(name);
            }
}
```


Showing how to access the intent that started the activity and extracting the extras from the intent. If the key-value pair was not set in the intent the value will be returned as null.

PersonEditor.java

Returning the data

```
public void onClick(View v) {
        String newAge = ageText.getText().toString();
        Intent result = getIntent();
        result.putExtra("age", newAge);
        if (newAge.equals("0"))
                setResult(RESULT_CANCELED, result);
        else
                setResult(RESULT_OK, result);
        finish();
}
```


setResult(int, Intent) returns information to the calling activity. The first parameter is the result code passed back in onActivityResult. The intent is the intent passed back in onActivityResult.

AndroidManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
        package="edu.sdsu.cs683.example" android:versionCode="1"
        android:versionName="1.0.0">
        <application android:icon="@drawable/icon" android:label="@string/app_name">
                <activity android:name=".IntentExample" android:label="@string/app_name">
                        <intent-filter>
                                <action android:name="android.intent.action.MAIN" />
                                <category android:name="android.intent.category.LAUNCHER" />
                        </intent-filter>
                </activity>
                <activity android:label="PersonEditor" android:name="PersonEditor">
                    <intent-filter>
                        <action android:name="android.intent.action.EDIT"></action>
                        <category android:name="person_editor"></category>
                        <category android:name="android.intent.category.DEFAULT">
                     </category>
                    </intent-filter>
                </activity>
        </application>
</manifest>
```


The intent filter for the activity must contain all the categories used by the intent to select the activity. It can contain more categories. The example does not work without the default category.

Data Storage

Data Topics

Preferences
Files
SQLite database
Content Providers
Network

Preferences

Key value pairs for program

Key - string

Value
- boolean
- float
- int
- long
- string

getPreferences(int mode)
- For access in activity only

getSharedPreferences(String name,int mode)
- To share preferences with other activities

mode
- 0 = MODE_PRIVATE
- MODE_WORLD_READABLE
- MODE_WORLD_WRITEABLE

Cannot share preferences across applications or threads

Example

```
public class Calc extends Activity {
public static final String PREFS_NAME = "MyPrefsFile";
    protected void onCreate(Bundle state){
       super.onCreate(state);

       SharedPreferences settings = getSharedPreferences(PREFS_NAME, 0);
       boolean silent = settings.getBoolean("silentMode", false);
       setSilent(silent);
    }

    protected void onStop(){
       super.onStop();
       SharedPreferences settings = getSharedPreferences(PREFS_NAME, 0);
       SharedPreferences.Editor editor = settings.edit();
       editor.putBoolean("silentMode", mSilentMode);
       editor.commit();
    }
}
```


Example from http://code.google.com/android/devel/data/preferences.html. See http://developer.android.com/reference/android/app/Activity.html for an example of using getSharedPreferences()

Files

Application can write/read files on phone

Cannot directly read files written by other application

Write a file

FileOutputStream openFileOutput(String name, int mode)

Creates file if it does not exist

mode

0 = MODE_PRIVATE

MODE_APPEND

MODE_WORLD_READABLE

MODE_WORLD_WRITEABLE

FileInputStream openFileInput(String name)

name can not contain path seperators

Static files

You can package static files with your application

Place file in res/raw/<mydatafile>

Generates resource id in R

Read file using

Resources.openRawResource (R.raw.mydatafile)

File Example

Saves data in local file

Uses local preference to store data

FileExample Structure

```
public class FileExamples extends Activity implements View.OnClickListener {

    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
        Button update = (Button) findViewById(R.id.update);
        update.setOnClickListener(this);
        restoreData();
    }

    public void onClick(View v) {
        saveData();
    }
```

Getting Data from Files/Preference

```
private void restoreData() {
        String fileContents = readFile();
        EditText fileText = (EditText) this.findViewById(R.id.file);
        fileText.setText(fileContents);

        EditText preferenceText = (EditText) this
                        .findViewById(R.id.localPreference);
        SharedPreferences settings = getPreferences(MODE_PRIVATE);
        preferenceText.setText(settings.getString("setting", "No value"));
}
```

Read file

```
private String readFile() {
        String fileContents;
        try {
                InputStream file = new BufferedInputStream(
                        openFileInput("dataFile"));
                byte[] data = new byte[file.available()];
                file.read(data, 0, file.available());
                fileContents = new String(data);
                file.close();
        } catch (Exception noFile) {
                fileContents = "empty";
        }
        return fileContents;
}
```

Storing the Data

```
private void saveData() {
        EditText fileText = (EditText) this.findViewById(R.id.file);
        String fileContents = fileText.getText().toString();
        writeFile(fileContents);
        EditText preferenceText = (EditText) this
                        .findViewById(R.id.localPreference);
        String preferenceContents = preferenceText.getText().toString();
        SharedPreferences settings = getPreferences(MODE_PRIVATE);
        SharedPreferences.Editor editor = settings.edit();
        editor.putString("setting", preferenceContents);
        editor.commit();
}
```

Writing a File

```
private void writeFile(String fileContents) {
        try {
            OutputStream file = new BufferedOutputStream(openFileOutput(
                    "dataFile", MODE_PRIVATE));
            file.write(fileContents.getBytes());
            file.close();
        } catch (Exception noFile) {
        }
    }
}
```

Database

Database

SQLite

- Embedded SQL database engine
- Free
- Source is in public domain
- Transactions
- File format is cross-platform

http://www.sqlite.org/index.html

Key Android Database Classes

android.database.sqlite.SQLiteOpenHelper

- Database creation
- Version management
- Database access

android.database.sqlite.SQLiteDatabase

- Create, delete, execute SQL commands

android.database.Cursor

- Read-write access to the result set

SQLiteOpenHelper

synchronized void close()

Close any open database object.

synchronized SQLiteDatabase getReadableDatabase()

Create and/or open a database.

synchronized SQLiteDatabase getWritableDatabase()

Create and/or open a database that will be used for reading and writing.

abstract void onCreate(SQLiteDatabase db)

Called when the database is created for the first time.

void onOpen(SQLiteDatabase db)

Called when the database has been opened.

abstract void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion)

Called when the database needs to be upgraded.

Android Databases

Accessable to all classes in an application

Can't access directly databases from other applications

Database errors are logged

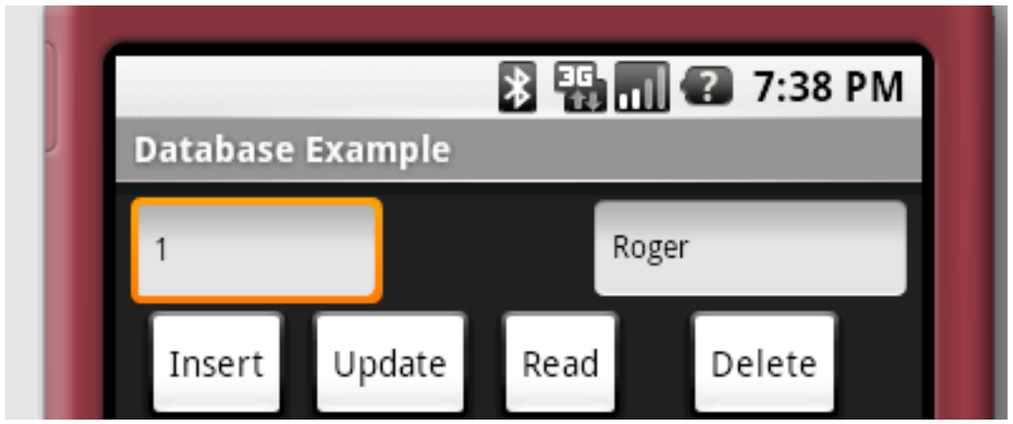
Can connect to database on phone from shell

http://code.google.com/android/reference/adb.html#sqlite

Example

Show

- Creating database
- Inserts
- Update
- Delete
- Query



DatabaseHelper

```
public class DatabaseHelper extends SQLiteOpenHelper {
    private static final String DATABASE_NAME = "name.db";
   private static final int DATABASE_VERSION = 1;

   public DatabaseHelper(Context context) {
          super(context, DATABASE_NAME, null, DATABASE_VERSION);
     }

     public void onCreate(SQLiteDatabase nameDb) {
          nameDb.execSQL("CREATE TABLE " + "NAMES" + " ("
            + "_ID" + " INTEGER PRIMARY KEY,"
            + "NAME" + " TEXT"
            + ");");
          nameDb.execSQL("INSERT INTO NAMES ( name) VALUES ('Roger' );");
     }

     public void onUpgrade(SQLiteDatabase arg0, int oldVersion, int newVersion) {
     }
}
```

DatabaseExample.java - Main Class

```
public class DatabaseExample extends Activity implements View.OnClickListener {
    private EditText databaseIdText;
    private EditText nameText;
    private DatabaseHelper namesHelper;

    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
        int[] buttonIds = { R.id.delete, R.id.read, R.id.insert, R.id.update };
        for (int id : buttonIds) {
            Button button = (Button) findViewById(id);
            button.setOnClickListener(this);
        }
        databaseIdText = (EditText) this.findViewById(R.id.databaseId);
        nameText = (EditText) this.findViewById(R.id.name);
        namesHelper = (new DatabaseHelper(this));
        displayDatabaseRecord(1);
}
```

DatabaseExample.java

```
private void displayDatabaseRecord(int id) {
        displayDatabaseRecord(String.valueOf(id));
    }

    private void displayDatabaseRecord(String id) {
        SQLiteDatabase nameDb = namesHelper.getWritableDatabase();
        Cursor result = nameDb.rawQuery("select * from NAMES where _ID = ?",
                new String[] { id });
        int rowCount = result.getCount();
        if (rowCount > 0) {
            result.moveToFirst();
            databaseIdText.setText(String.valueOf(result.getInt(0)));
            nameText.setText(result.getString(1));
        }
    }
```

DatabaseExample.java

```
private String getName() {
	return nameText.getText().toString();
}

private String getId() {
	return databaseIdText.getText().toString();
}
```

DatabaseExample.java

```
public void onClick(View clicked) {
    SQLiteDatabase db = namesHelper.getWritableDatabase();
    switch (clicked.getId()) {
    case R.id.read:
        displayDatabaseRecord(getId());
        break;
    case R.id.delete:
        db.delete("NAMES", "_ID = ?", new String[] { getId() });
        break;
```

onClick

```
case R.id.insert:
        ContentValues newName = new ContentValues(1);
        newName.put("NAME", getName());
        db.insert("NAMES", null, newName);
        break;
case R.id.update:
        ContentValues updateName = new ContentValues(1);
        updateName.put("NAME", getName());
        db.update("NAMES", updateName, "_ID = ?", new String[] { getId() });
        break;
    }
  }

}
```