Android Components

Introduction to Android Smartphone Programming

University of Freiburg

Matthias Keil
Institute for Computer Science
Faculty of Engineering
University of Freiburg

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Outline

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2 Messages to the User

3 Background Work

4 App Widgets

5 Useful Widgets

6 Summary

- Many ways to store data of the application.
- Android provides support for SQLite databases[3].
- Accessible for every class inside the application.
- No possibility to access from outside of application.
- Use *Cursor* object to loop through data inside the database.
- Easy to display cursor data inside an activity by creating an adapter and binding it to the activity, for example *ListAdapter* for *ListView*.

Data Storage

Example: Creating and filling a table

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- Use method *execSQL* to execute one SQL statement.
- Exceptions: Do not use a *SELECT* statement or one that returns data.

```
try {
  SQLiteDatabase db = openOrCreateDatabase("myDB", MODE_PRIVATE, null);
  db.execSQL("CREATE␣TABLE␣IF␣NOT␣EXISTS␣myTable␣(Driver␣TEXT,Team␣TEXT);");
  db.execSQL("INSERT␣OR␣IGNORE␣INTO␣myTable␣VALUES␣('Glock','Toyota');");
  ...
}
```

Data Storage

Examples

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- Creation of Cursor object to access data from database

```
Cursor SQLiteDatabase.query(boolean distinct,
    String table, String[] columns, String
    selection, String[] selectionArgs, String
    groupBy, String having, String orderBy,
    String limit)
```

- Example

```
Cursor c = db.query(true, "myDB", values, null,
     null, null, null, null, null);
```

Data Storage

Example: Accessing data from a table

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```java
try {
  Cursor c = ...
  c.moveToFirst();
  String driverStr = c.getString(c.getColumnIndexOrThrow("Driver"));
  String teamStr = c.getString(c.getColumnIndexOrThrow("Team"));
  c.moveToNext();
  ...
}
```

- Mostly used to share data between applications[2].
- Many predefined Content Providers available, for example to access phone contacts.
- Provide mechanisms to define data security.
- Access of data through content URI.
  - Example: *people.CONTENT_URI* to access the phone contacts.

Data Storage

Example: Usage of a Content Provider

```java
String[] proj = new String[] {People._ID,
    People.NAME, People.NUMBER};
try {
  Cursor c = managedQuery(People.CONTENT_URI,
      proj, null, null, null);
  if (c == null) return;
  int name = c.getColumnIndexOrThrow(People.
      NAME);
  if (!c.moveToFirst()) return;
  String nameString = c.getString(name);
  ...
}
```

Messages to the User

Status Bar Notifications

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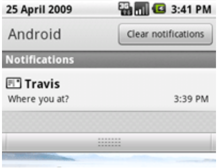
- Can be created using the *Notification* class.
- Adds an icon to the status bar and a message in the notifications window of the system[5].
- Used to notify the user about an event from a background service, not from a visible application.
- Can be selected in the notifications window, which fires a predefined *intent* (message).



25 April 2009 3:41 PM

Android

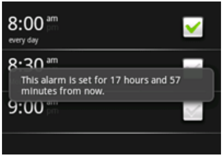
Travis

Where you at? 3:39 PM

Messages to the User

Toast Notifications

- *Toast*: Small message that pops up when shown[6].
- User's current activity remains visible and interactive.
- Fades in and out.
- Does not provide any means for user interaction.
- Used to display short text messages.

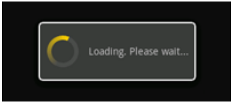


This alarm is set for 17 hours and 57 minutes from now.

Messages to the User

Dialog Notifications

- *Dialog*: Small window that appears in front of current Activity[4].
- Used for notifications or interaction directly related with the application.
- Example usage scenarios:
  - Display of a progress bar till the application is updated.
  - Display a short message the user needs to confirm with *OK* or *Cancel*.



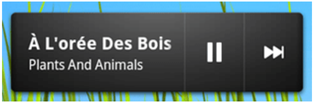
Loading. Please wait...

Background Work: Services

- Used to perform long-running operations in background[7].
- Does not provide a user interface.
- Continues to run even when starting component is not active anymore.
- *Interprocess communication* (IPC) possible for interaction between component and service.
- Used for example for handling network transactions, play music, etc.

App Widgets

- Miniature application view that can be embedded in other application, for example home screen[1].
- Receives periodic updates.
- Example usage: Displaying current song of music player as seen in picture below.


À L'orée Des Bois
Plants And Animals

Useful Widgets

- *DatePicker* can be used to pick a date including year, month and day.
- *TimePicker* enables the user to specify a time in 24 hour or AM/PM mode.

Summary

- Persistent data storage can be archived with *SQLite databases*.
- Data can be shared between different applications using *Content Providers*.
- Messages to the user can be displayed as small text message through a *Toast*, a *Status Bar Notification* from a service or a *Dialog*, if user interaction is required.
- *Services* are used to perform background work.
- *App Widgets* can be placed on the home screen and receive periodic updates.

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