Android User Interface

Android Smartphone Programming

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Outline

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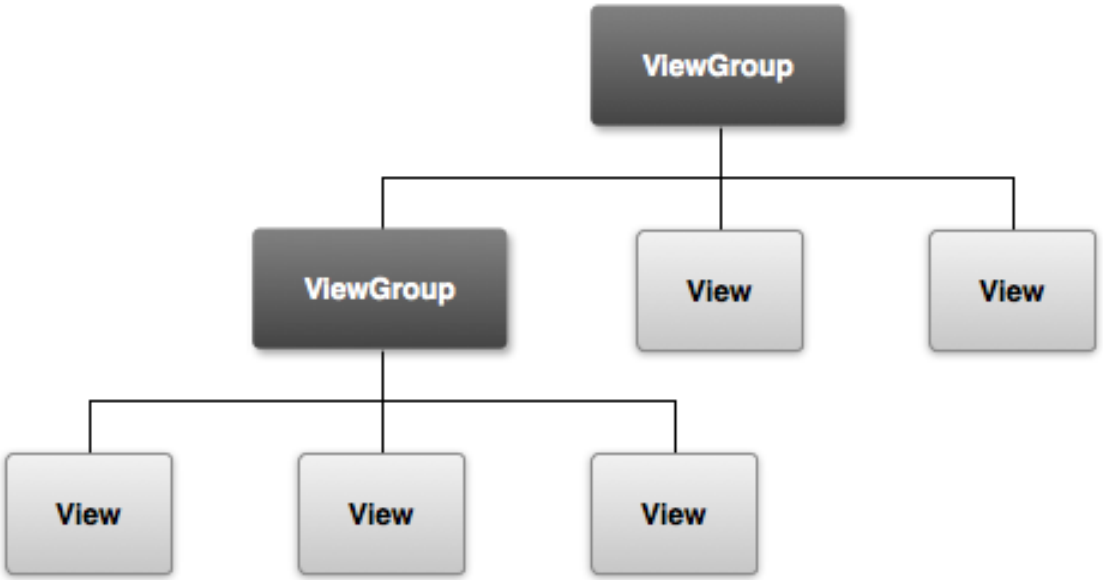
Activity Application component that provides a screen [1].

User interface of an activity is build using View and ViewGroup objects [5].

View Basis unit for user interface, base for subclasses called *widgets*.

ViewGroup Base for subclasses called *layouts*.



Android View Hierarchy containing ViewGroup objects as nodes and View objects as leafs.

- Can be defined in an **XML** layout file [7].
- Similar to HTML layout development.
- Each element is a View or ViewGroup object or a subclass of these.
- ViewGroup objects contain more Views or ViewGroup objects.

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <LinearLayout xmlns:android="http://schemas.
    android.com/apk/res/android"
3     android:layout_width="fill_parent"
4     android:layout_height="fill_parent"
5     android:orientation="vertical" >
6   <TextView android:id="@+id/text"
7     android:layout_width="wrap_content"
8     android:layout_height="wrap_content"
9     android:text="Hello, I am a TextView" />
10  <Button android:id="@+id/button"
11    android:layout_width="wrap_content"
12    android:layout_height="wrap_content"
13    android:text="Hello, I am a Button" />
14 </LinearLayout>
```

- Subclass of View.
- Serves as interaction interface with user.
- Many fully implemented widges available.
  - Examples: *Button*, *Checkbox*, *EditText* and many more.
  - Advanced Example *WebView*: Displays web pages and can use JavaScript [6].
- Own implementation enables full customization of behavior.

- Many ways to intercept events from user interaction.
- Approach for user interface events: Capture events from View objects the user interacts with [2].
- Two ways of implementation:
  - Overwrite existing callback method.
  - Define own event listener.
- Mostly used: Defining event listeners.

```
1 public class MyActivity extends Activity {
2   ...
3   @Override
4   public boolean onKeyDown (int keyCode,
        KeyEvent event) {
5     // Do something.
6   }
7 }
```

```
1 public class MyActivity extends Activity {
2   private OnClickListener myListener = new
        OnClickListener() {
3     public void onClick(View v) {
4       // Do something.
5     }
6   };
7
8   public void onCreate(Bundle state) {
9     ...
10    Button button = (Button)findViewById(R.id.
        myButton);
11    button.setOnClickListener(myListener);
12    ...
13  }
14 }
```

Intent Message to communicate between components. [3].

Can connect components in the same or in different applications.

Starts activities, background processes or notifies broadcast receivers.

Broadcast Receiver Can be registered to receive certain intents.

Example: Intent sent from system indicates incoming call and application stops playing music.

- Intent starts activity by specifying what action should be performed.
- Note: Activity only implicitly given though action.

```
Intent intent = new Intent(Intent.ACTION_DIAL,
    Uri.parse("tel:5905-5635");
startActivity(intent);
```

- Step 1: Create broadcast receiver as a new class.

```
1 public class MyPhoneReceiver extends
      BroadcastReceiver {
2   @Override
3   public void onReceive(Context context, Intent
        intent) {
4     // Do something.
5   }
6 }
```

- Step 2: Extend *AndroidManifest.xml* to register broadcast receiver to intents.

```
<application ... >
  <receiver android:name="MyPhoneReceiver" >
    <intent-filter>
      <action android:name="android.intent.
          action.PHONE_STATE" >
      </action>
    </intent-filter>
  </receiver>
</application>
```

- Done though localization: Switch language according to locale settings of the device [4].
- Helps reaching more users.
- Easy though separation of string resources and application code.
- Refer to string names in code and define strings in resource files.

- Default resources in *res/values/strings.xml* provides all strings used.
- Special language resource files like e.g. *res/values-de/strings.xml* provides adjusted strings.
- If no special resource file exists, default is used.

- In Activity

```
1 tv = new TextView(this);
2 tv.setText(R.string.example);
```

- In *res/values/strings.xml*

```
1 <string name="example">Example</string>
```

- In *res/values-de/strings.xml*

```
1 <string name="example">Beispiel</string>
```

Summary

- User interfaces of activities are build through *View* and *ViewGroup* objects.
- ViewGroup subclasses are *layouts* that group other ViewGroup or View objects.
- View subclasses are *widgets* for user interaction like button, checkbox and so on.
- Enabling user interaction is implemented by *capturing input events*.
- Intents are messages and can be received through broadcast receivers.
- Multi-language support is implemented through *resource files* for strings.

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