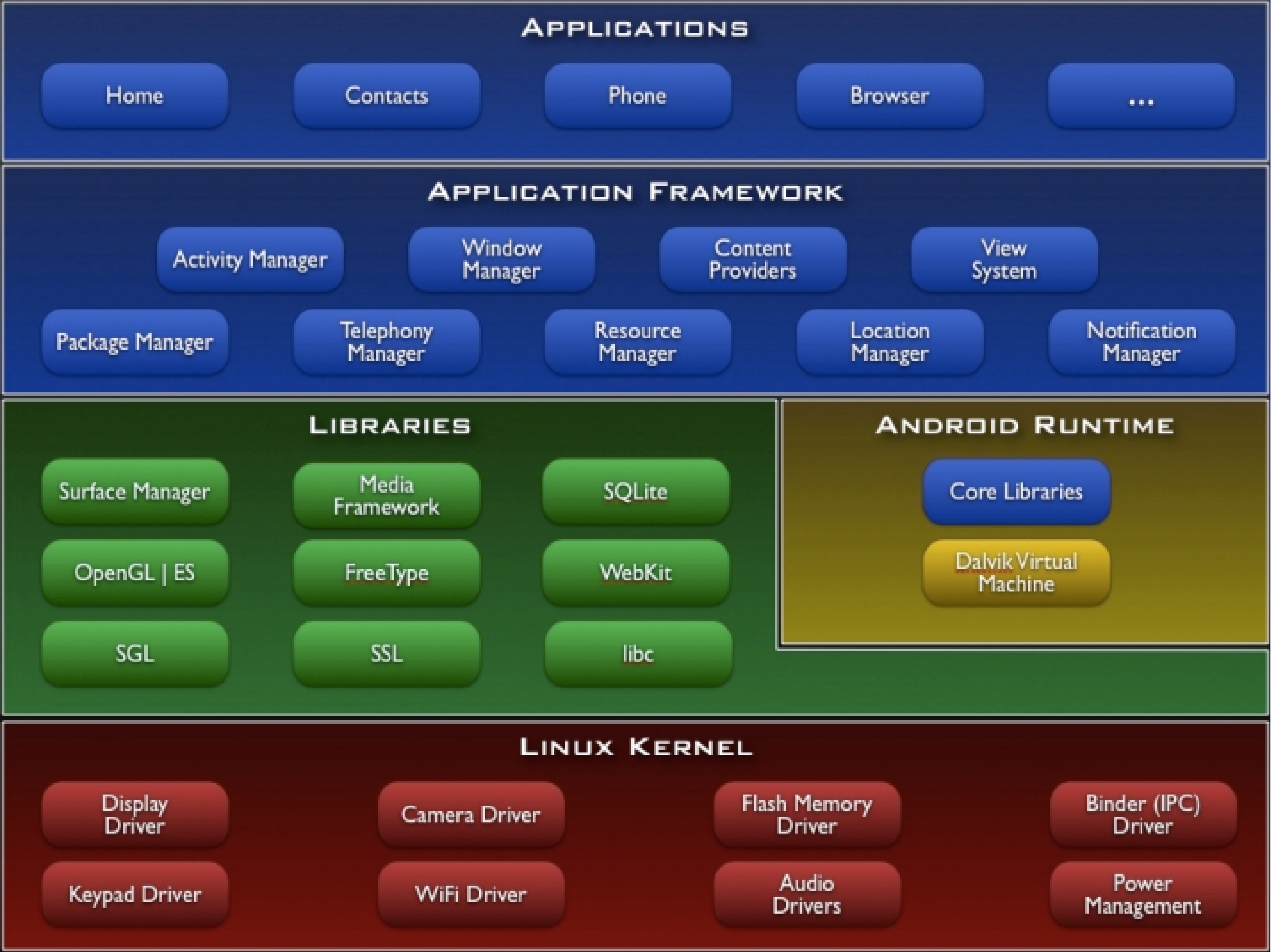
Программирование Android

Введение

06.06.2016



Applications

Home

Contacts

Phone

Browser

...

Application Framework

Activity Manager

Window Manager

Content Providers

View System

Package Manager

Telephony Manager

Resource Manager

Location Manager

Notification Manager

Libraries

Surface Manager

Media Framework

SQLite

OpenGL | ES

FreeType

WebKit

SGL

SSL

libc

Android Runtime

Core Libraries

Dalvik Virtual Machine

Linux Kernel

Display Driver

Camera Driver

Flash Memory Driver

Binder (IPC) Driver

Keypad Driver

WiFi Driver

Audio Drivers

Power Management

The project structure

```
MyProject/
   src/
      MyActivity.java
   res/
      drawable/
         icon.png
      layout/
         main.xml
      values/
         strings.xml
      raw/
   libs/
      ...
   assets/
      ...
   gen/
      R.java
   AndroidManifest.xml
```

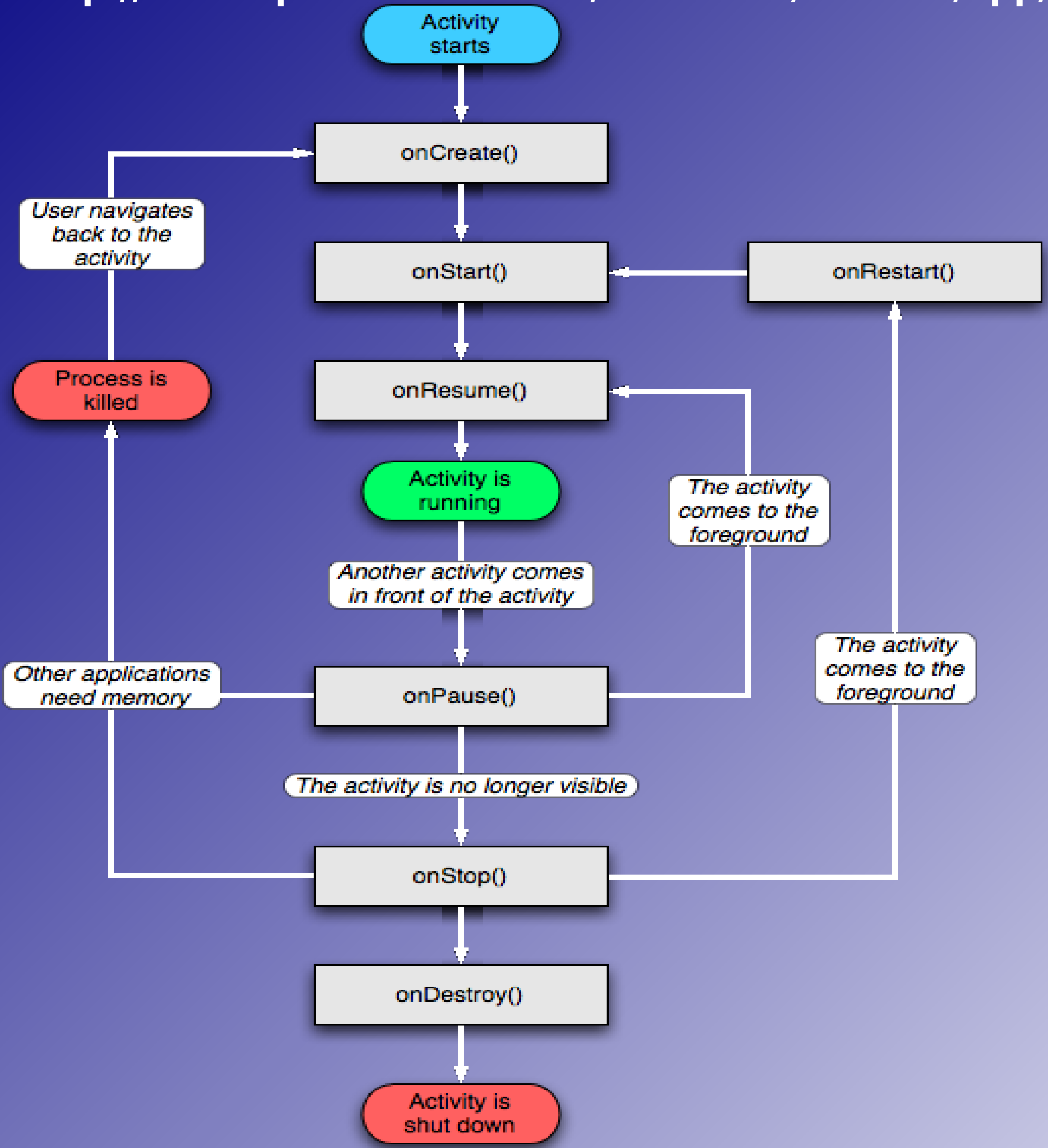
- ✓ src/
- ✓ res/
  - ✓ drawable/
  - ✓ layout/
  - ✓ values/
- ✓ gen/
- ✓ AndroidManifest.xml

Application Fundamentals

- Application Components:
  - Activities
  - Services
  - Broadcast receivers
  - Content providers
- ~ Intent

Activity

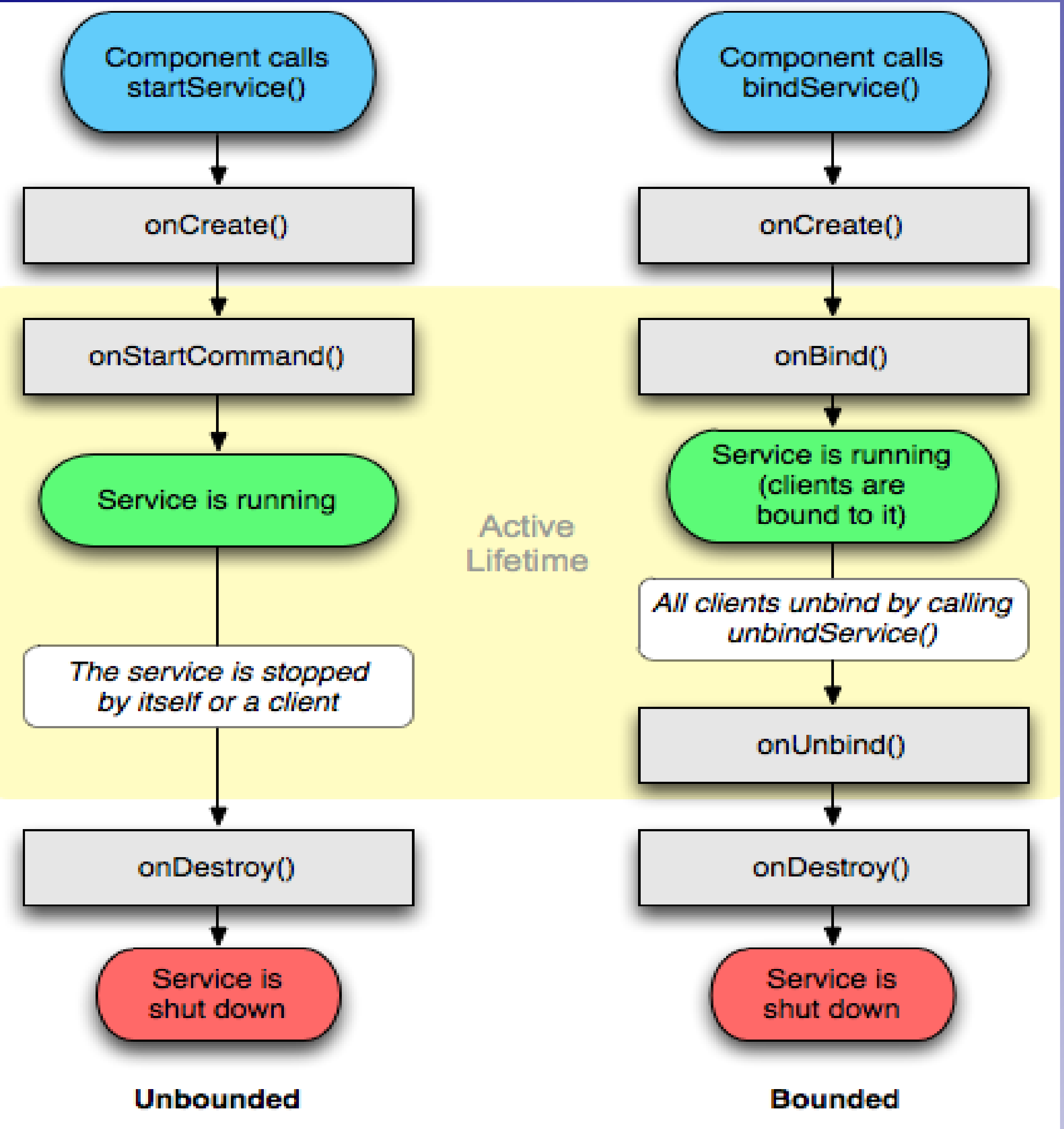
http://developer.android.com/reference/android/app/Activity.html


Activity starts
onCreate()
User navigates back to the activity
onStart()
onRestart()
Process is killed
onResume()
Activity is running
The activity comes to the foreground
Another activity comes in front of the activity
The activity comes to the foreground
Other applications need memory
onPause()
The activity is no longer visible
onStop()
onDestroy()
Activity is shut down

- protected void onCreate(Bundle savedInstanceState);
- protected void onStart();
- protected void onRestart();
- protected void onResume();
- protected void onPause();
- protected void onStop();
- protected void onDestroy();

Service

http://developer.android.com/reference/android/app/Service.html

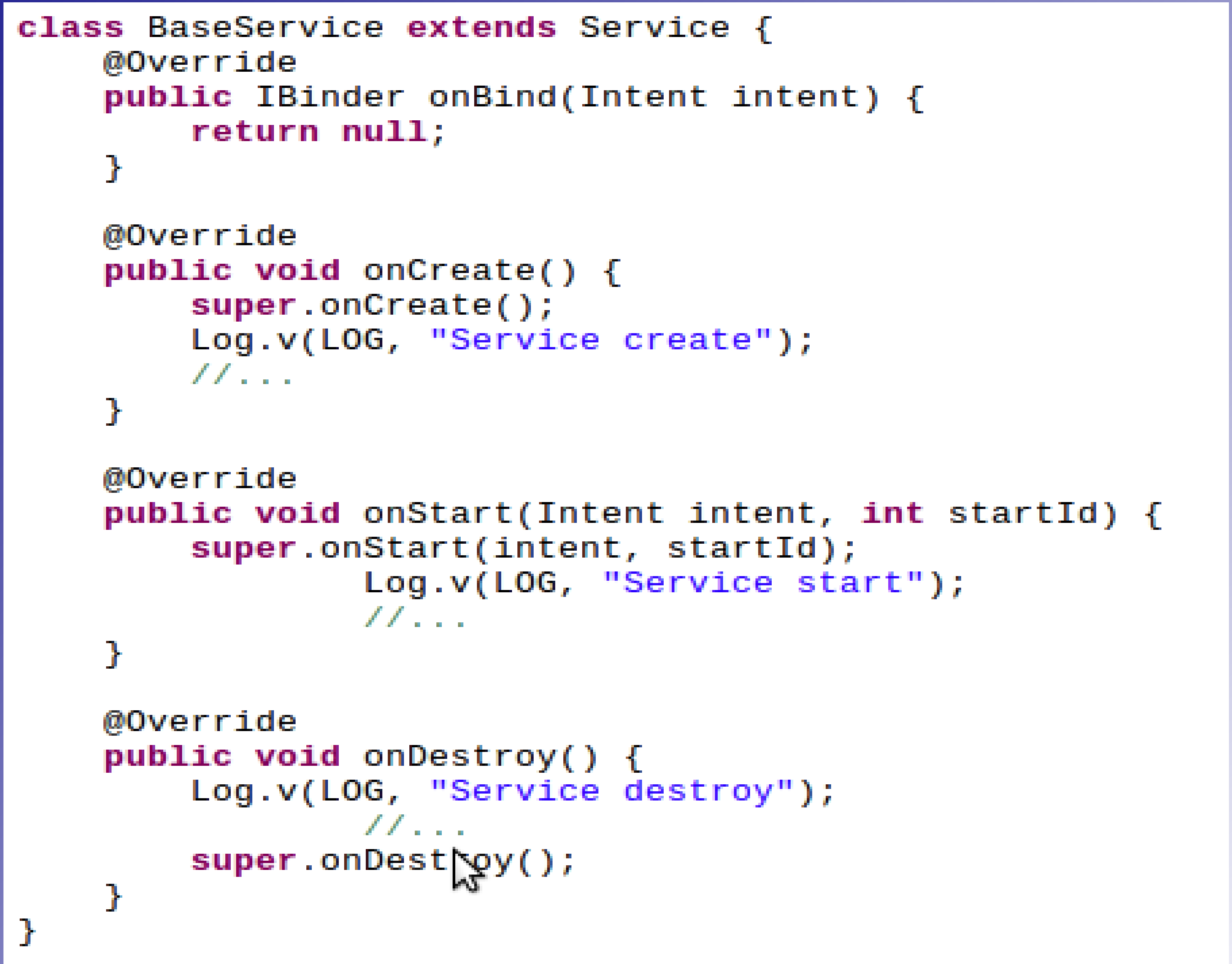


Component calls startService()
onCreate()
onStartCommand()
Service is running
The service is stopped by itself or a client
onDestroy()
Service is shut down
Unbounded
Active Lifetime
Component calls bindService()
onCreate()
onBind()
Service is running (clients are bound to it)
All clients unbind by calling unbindService()
onUnbind()
onDestroy()
Service is shut down
Bounded

- startService(...)
- stopService(...)

- bindService(...)
- unbindService(...)

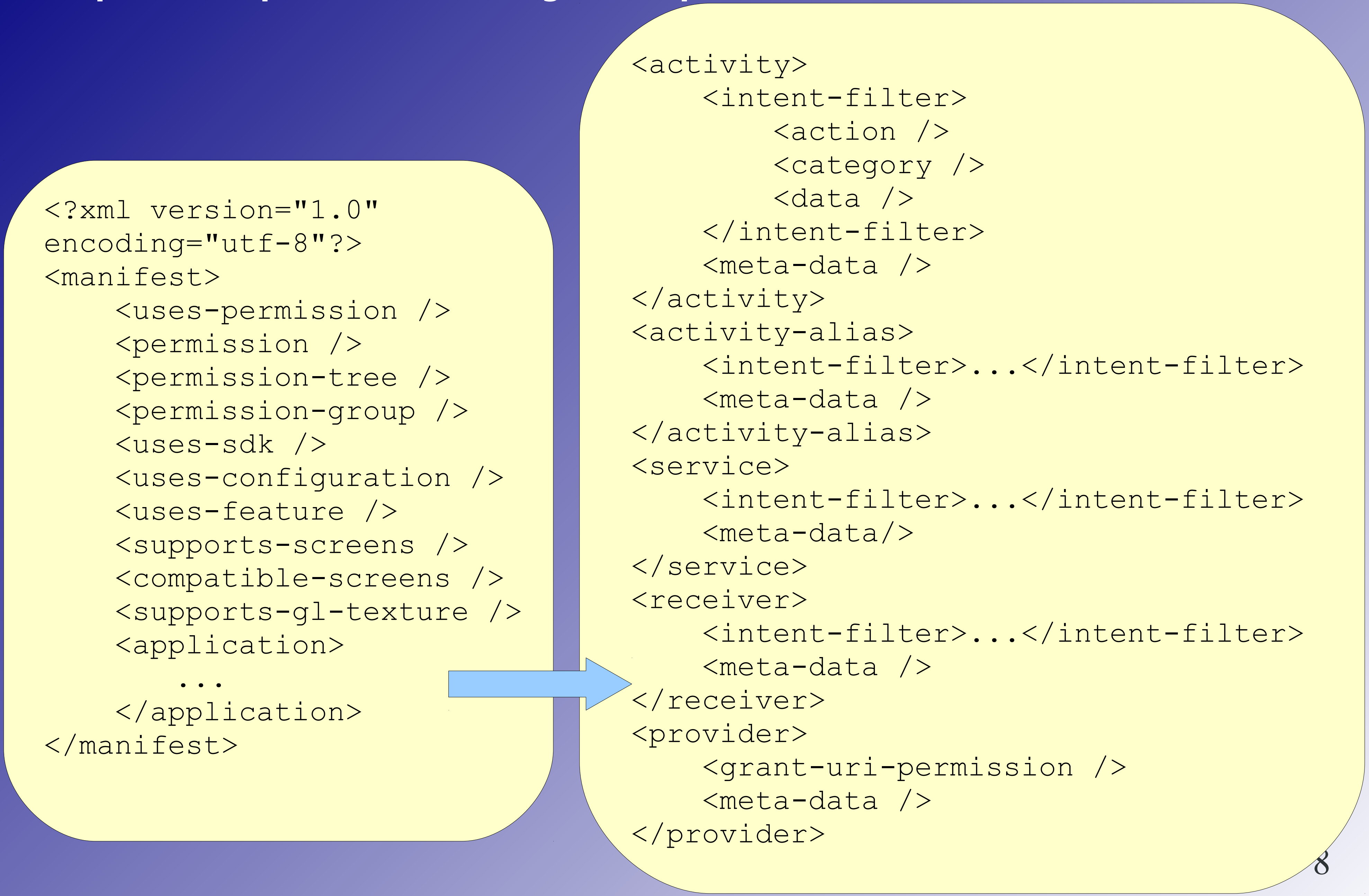
Service Implementation example



```
class BaseService extends Service {
    @Override
    public IBinder onBind(Intent intent) {
        return null;
    }

    @Override
    public void onCreate() {
        super.onCreate();
        Log.v(LOG, "Service create");
        //...
    }

    @Override
    public void onStart(Intent intent, int startId) {
        super.onStart(intent, startId);
                Log.v(LOG, "Service start");
                //...
    }

    @Override
    public void onDestroy() {
        Log.v(LOG, "Service destroy");
                //...
        super.onDestroy();
    }
}
```

AndroidManifest.xml

http://developer.android.com/guide/topics/manifest/manifest-intro.html



```
<?xml version="1.0"
encoding="utf-8"?>
<manifest>
    <uses-permission />
    <permission />
    <permission-tree />
    <permission-group />
    <uses-sdk />
    <uses-configuration />
    <uses-feature />
    <supports-screens />
    <compatible-screens />
    <supports-gl-texture />
    <application>
        ...
    </application>
</manifest>
```

```
<activity>
    <intent-filter>
        <action />
        <category />
        <data />
    </intent-filter>
    <meta-data />
</activity>
<activity-alias>
    <intent-filter>...</intent-filter>
    <meta-data />
</activity-alias>
<service>
    <intent-filter>...</intent-filter>
    <meta-data/>
</service>
<receiver>
    <intent-filter>...</intent-filter>
    <meta-data />
</receiver>
<provider>
    <grant-uri-permission />
    <meta-data />
</provider>
```

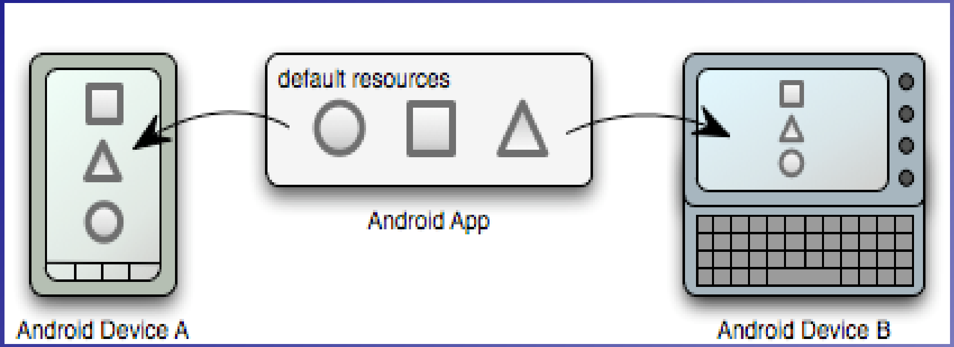
Application Resourses

```
MyProject/
   src/
      MyActivity.java
   res/
      drawable/
         icon.png
      layout/
         main.xml
      values/
         strings.xml
      raw/
   gen/
      R.java
```

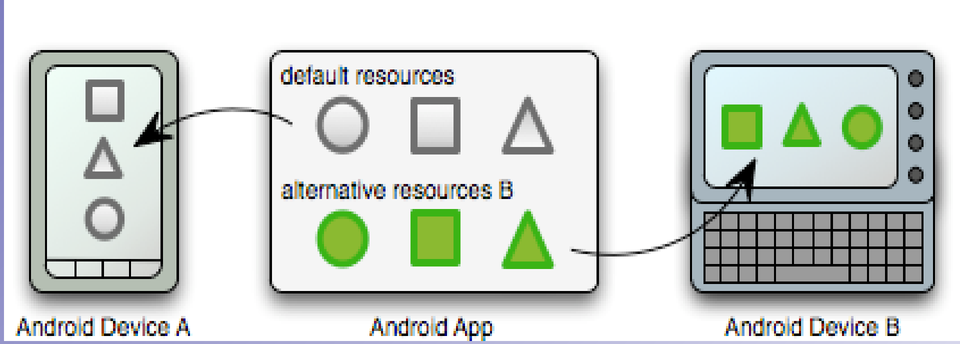
res/

- anim/
- color/
- **drawable/**
- **layout/**
- menu/
- **values/**
- xml/
- raw

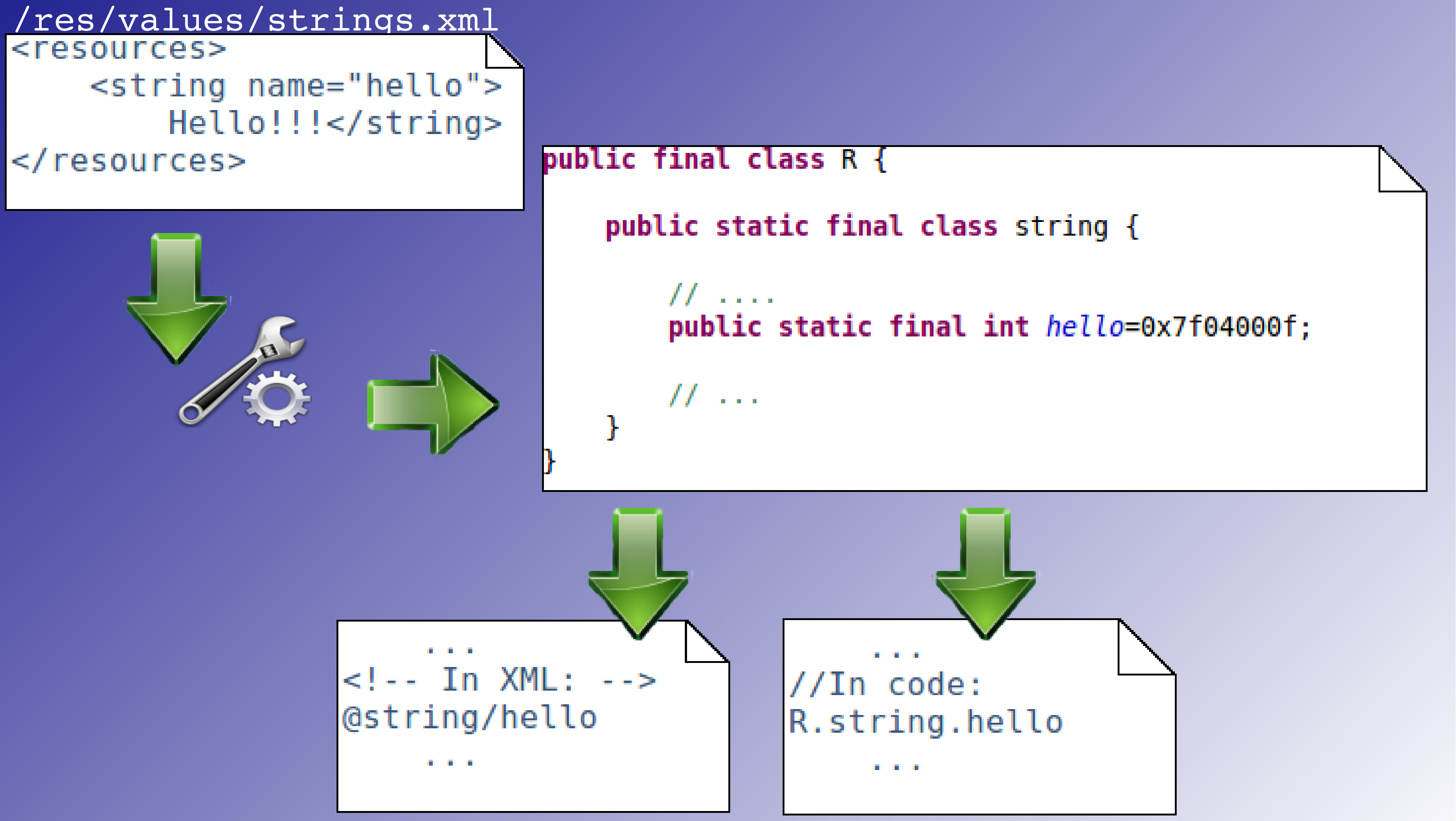
Application Resources



```
res/
    drawable/
        icon.png
        background.png
    drawable-hdpi/
        icon.png
        background.png
```



Accessing Resources



/res/values/strings.xml

```
<resources>
    <string name="hello">
        Hello!!!</string>
</resources>
```

```
public final class R {

    public static final class string {

        // ....
        public static final int hello=0x7f04000f;

        // ...
    }
}
```

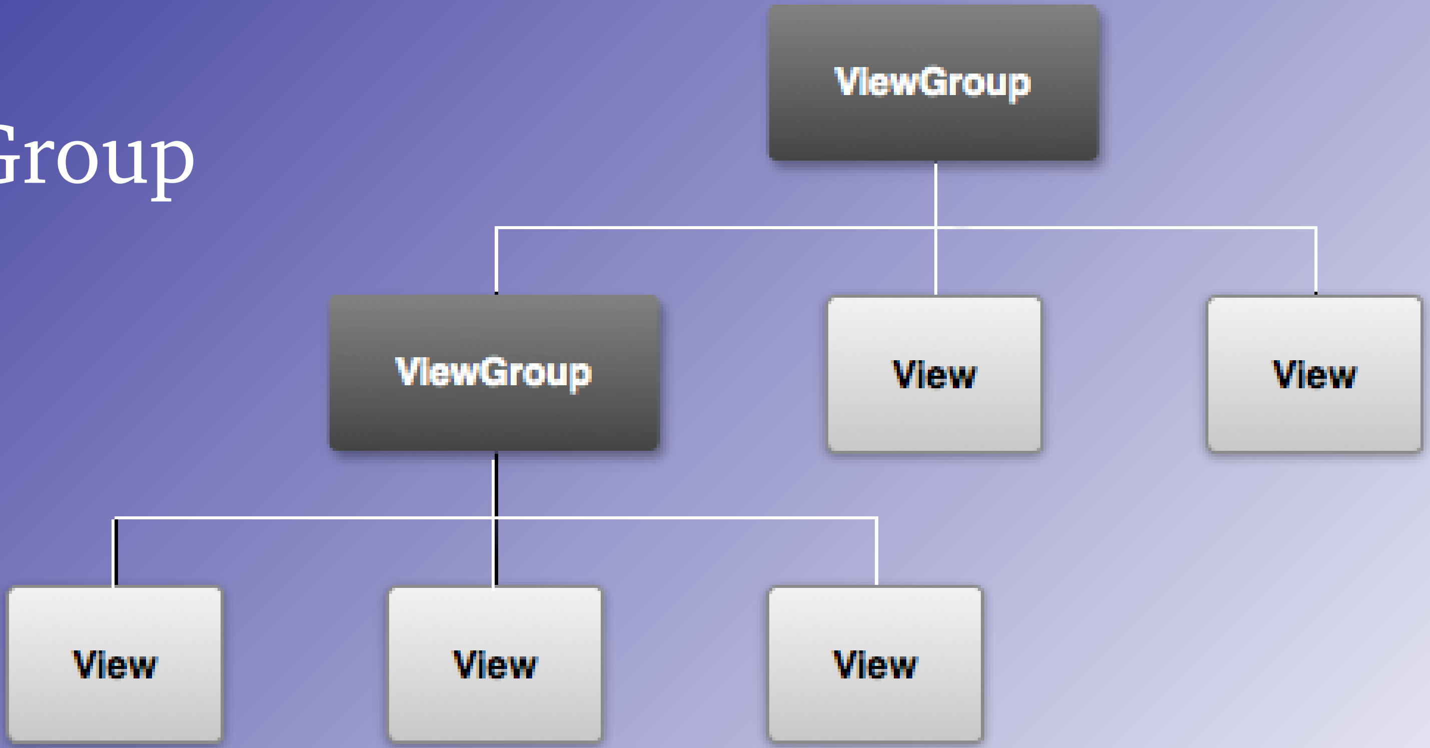
```
    ...
<!-- In XML: -->
@string/hello
    ...
```

```
    ...
//In code:
R.string.hello
    ...
```

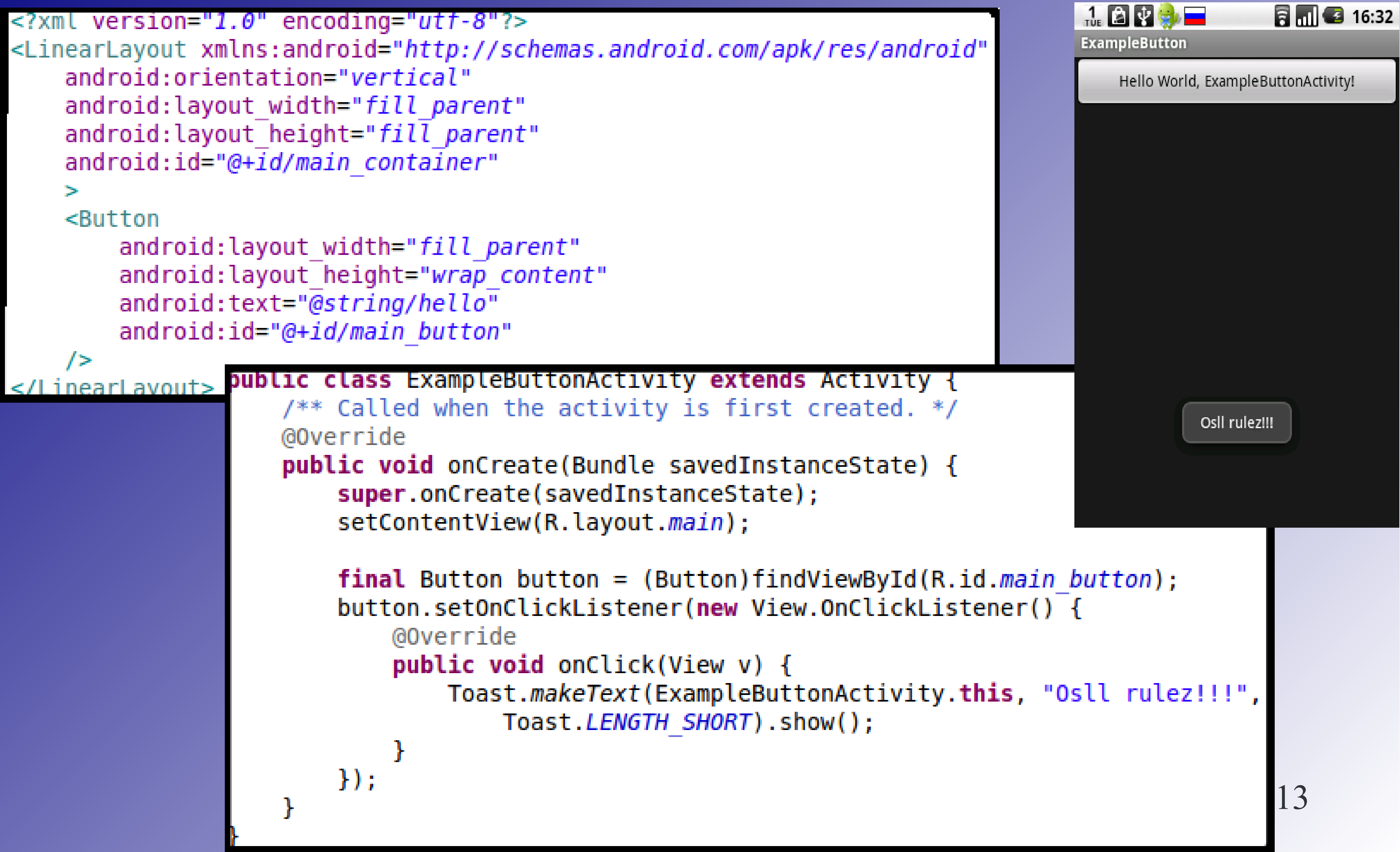
User Interface

- Runtime (programmatically)
- Xml layout file (ex: res/layout/main.xml)

- ViewGroup
- View



Example layout file



```xml
<?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"
    android:id="@+id/main_container"
    >
    <Button
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text="@string/hello"
        android:id="@+id/main_button"
    />
</LinearLayout>
```

```java
public class ExampleButtonActivity extends Activity {
    /** Called when the activity is first created. */
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);

        final Button button = (Button)findViewById(R.id.main_button);
        button.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Toast.makeText(ExampleButtonActivity.this, "Osll rulez!!!",
                    Toast.LENGTH_SHORT).show();
            }
        });
    }
}
```

ExampleButton

Osll rulez!!!

Practice

- http://startandroid.ru
- https://developer.android.com/training/index.html
- https://developer.android.com/guide/index.html
- https://developer.android.com/samples/index.html