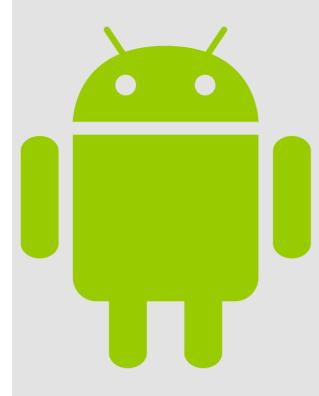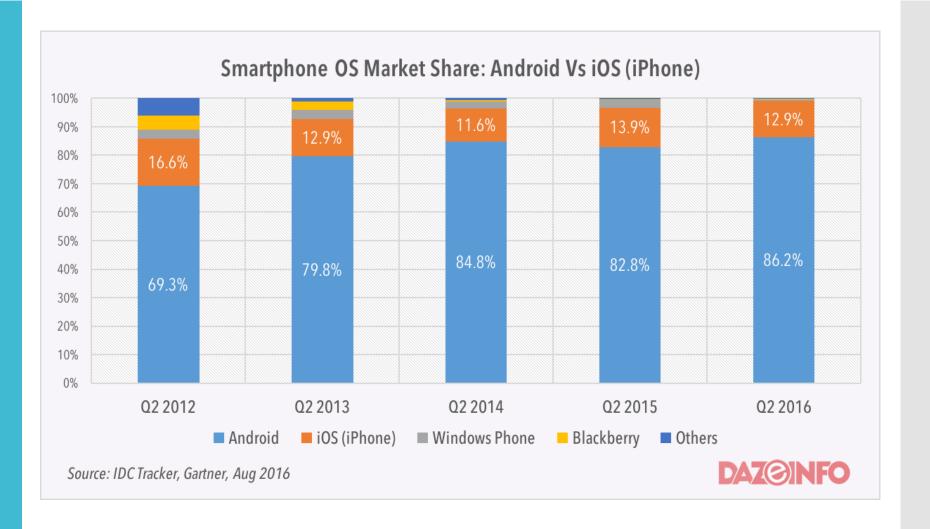# Android

Basics

General Facts
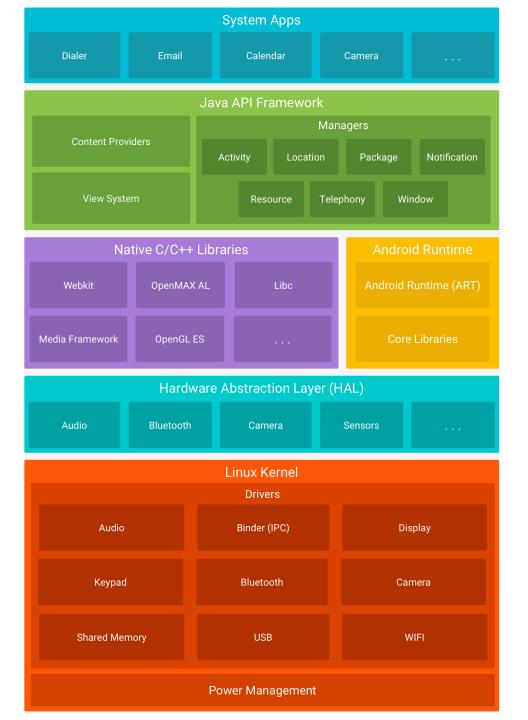
- OS for mobile devices (Smartphones, Tablets, Smartwatches, etc)
- Based on Linux
- Developed by the Open Handset Alliance led by Google

Cupcake
Android 1.5

Donut
Android 1.6

Eclair
Android 2.0/2.1

Froyo
Android 2.2.x

Gingerbread
Android 2.3.x

Honeycomb
Android 3.x

Ice Cream Sandwich
Android 4.0.x

Jelly Bean
Android 4.1.x

KitKat
Android 4.4.x

Lollipop
Android 5.0

Marshmallow
android 6.0

Nougat
android 7.0

Oreo
Android 8.o

General Facts

Smartphone OS Market Share: Android Vs iOS (iPhone)

	Q2 2012	Q2 2013	Q2 2014	Q2 2015	Q2 2016
iOS (iPhone)	16.6%	12.9%	11.6%	13.9%	12.9%
Android	69.3%	79.8%	84.8%	82.8%	86.2%

Legend: ■ Android ■ iOS (iPhone) ■ Windows Phone ■ Blackberry ■ Others

Source: IDC Tracker, Gartner, Aug 2016

DAZEINFO

Platform Architecture

System Apps

| Dialer | Email | Calendar | Camera | . . . |

Java API Framework

Content Providers

Managers

| Activity | Location | Package | Notification |

View System

| Resource | Telephony | Window |

Native C/C++ Libraries

| Webkit | OpenMAX AL | Libc |
| Media Framework | OpenGL ES | . . . |

Android Runtime

Android Runtime (ART)

Core Libraries

Hardware Abstraction Layer (HAL)

| Audio | Bluetooth | Camera | Sensors | . . . |

Linux Kernel

Drivers

Audio	Binder (IPC)	Display
Keypad	Bluetooth	Camera
Shared Memory	USB	WIFI

Power Management

Application Architecture

APK Structure

AndroidManifest.xml
(name, version, access rights, referenced libs)

META-INF/ (signatures)	assets/ (assets)
resources.arsc (compiled resources)	lib/ (native libs)
classes.dex (dalvik bytecode)	res/ (resources)
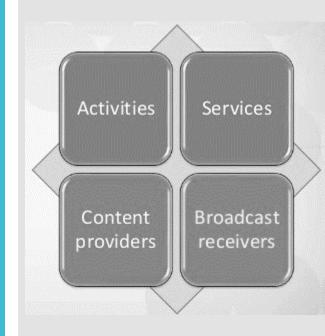
Project in Android Studio

▼ 📁 app
　▶ 📁 manifests
　▶ 📁 java
　▶ 📁 res
▶ ◉ Gradle Scripts
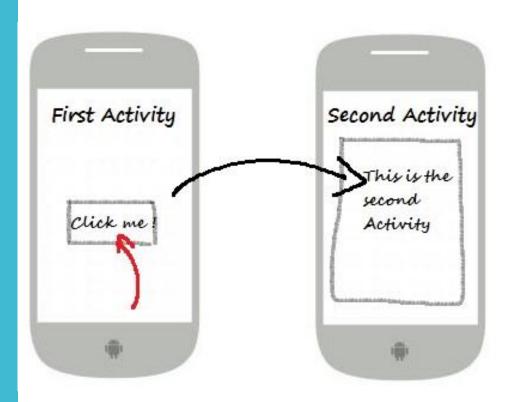
- Android Manifest
- Source Code
- Resources

Application Components
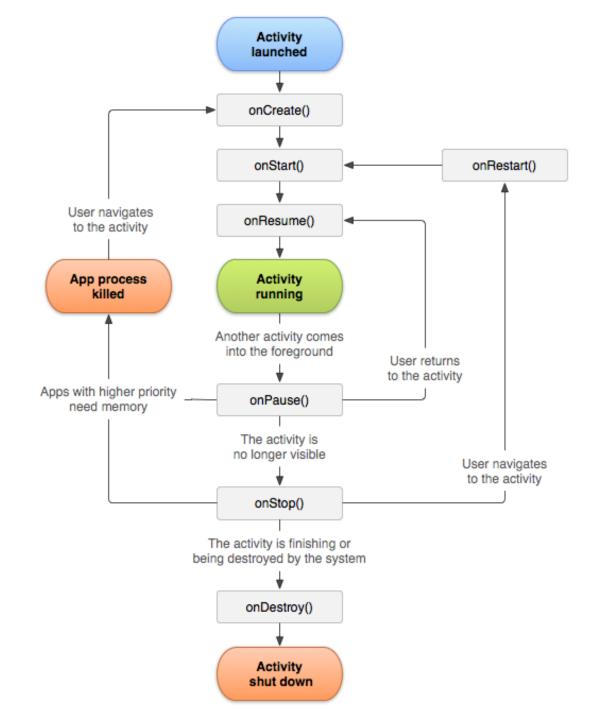
Activity
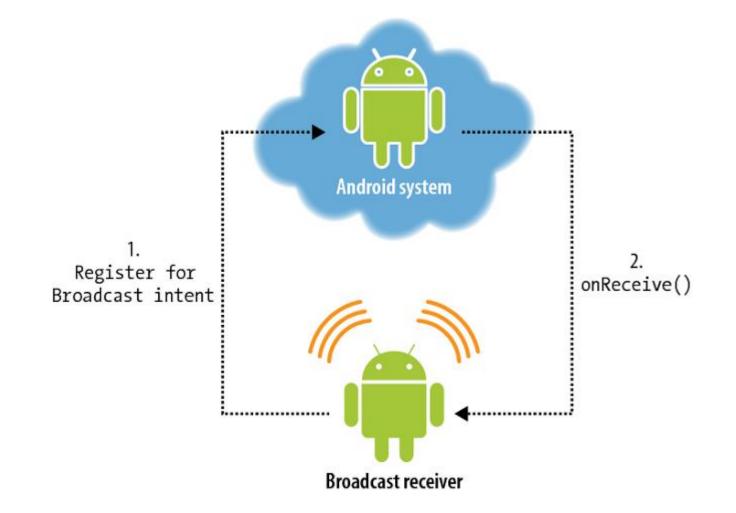
- Represents a single Screen
- An app consists of multiple Activites
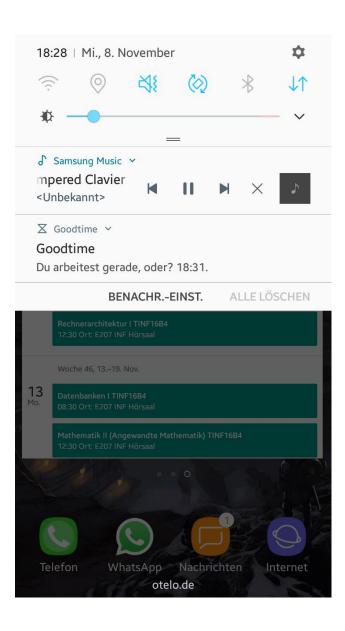- Every activity has a corresponding Layout File

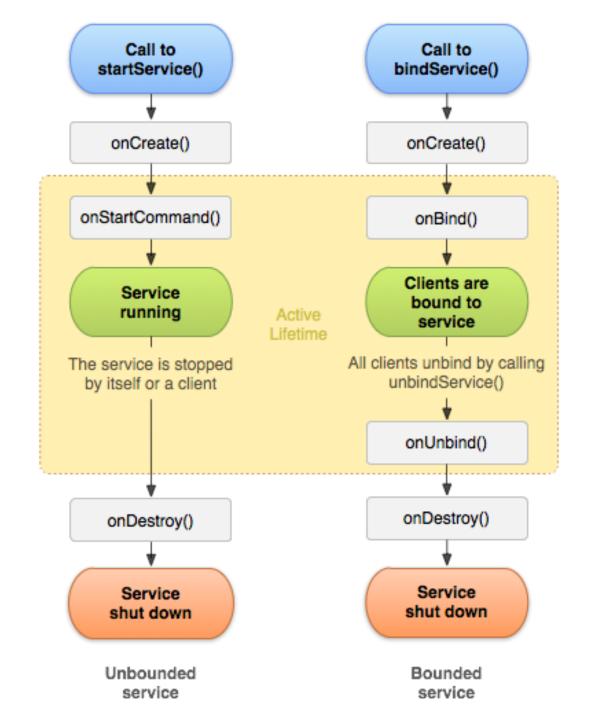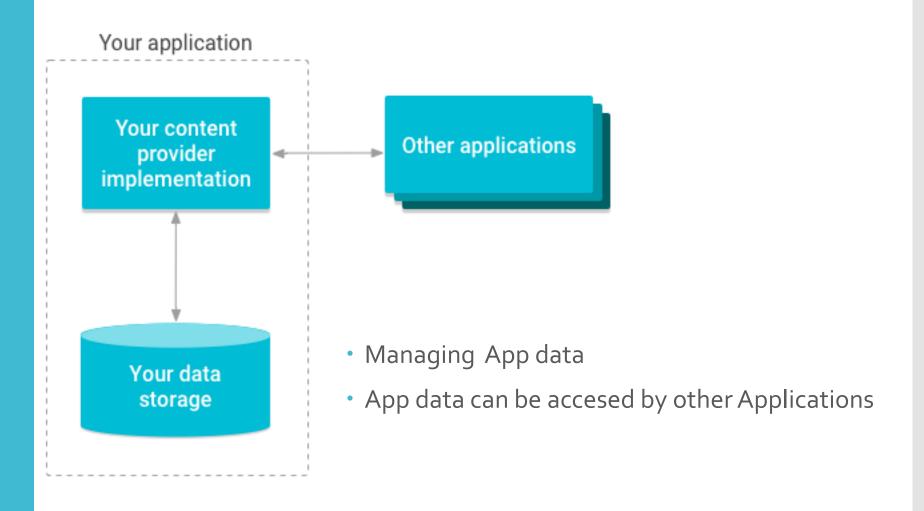# Activity-Lifecycle

Broadcast Receiver

1.
Register for
Broadcast intent

2.
onReceive()

Android system

Broadcast receiver

Services

- Background Task
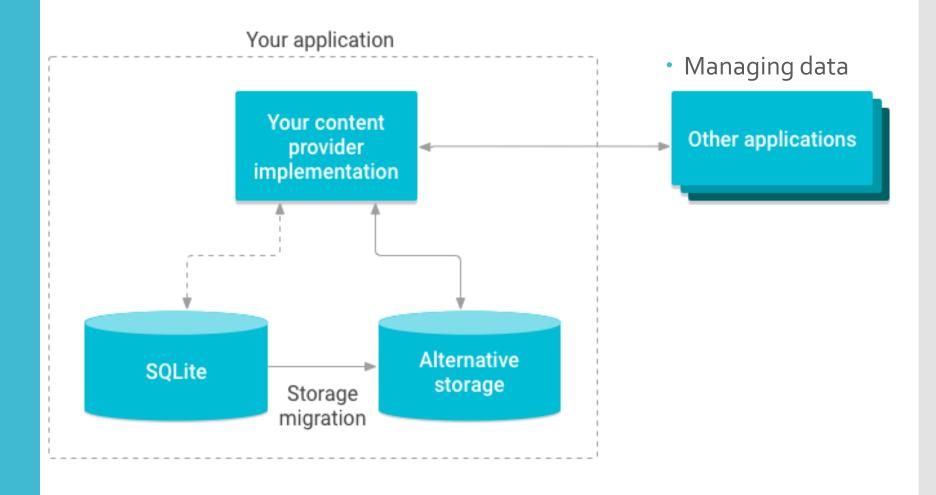- Can be started by from within an App
- Can be bound by an App

Services - Lifecycle

Content Provider

Your application

Your content provider implementation

Other applications

Your data storage

- Managing App data
- App data can be accesed by other Applications

Content Provider

Your application

Your content provider implementation

Other applications

• Managing data

SQLite → Alternative storage

Storage migration

Android Application Anatomy

Android Application Anatomy

Activities

1. Provides User Interface
2. Usually represents a Single Screen
3. Can contain one/more Views
4. Extends the Activity Base class

Services

1. No User Interface
2. Runs in Background
3. Extends the Service Base Class

Application= Set of Android Components

Intent/Broadcast Receiver

1. Receives and Reacts to broadcast Intents
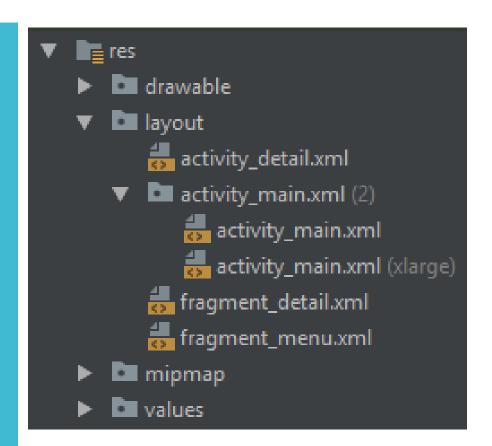2. No UI but can start an Activity
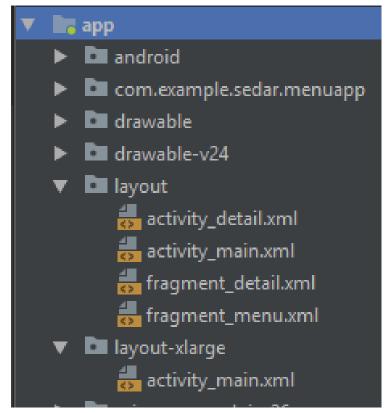3. Extends the BroadcastReceiver Base Class

Content Provider

1. Makes application data available to other apps
2. Data stored in SQLite database
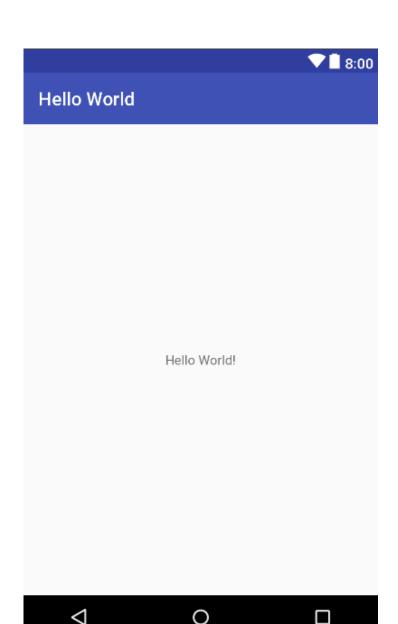3. Extends the ContentProvider Base class

Resources

Resources

- Pictures, Audio Files, Layouts etc. are saved in seperate directories
- Qualifiers are used to offer different versions of the same resource.
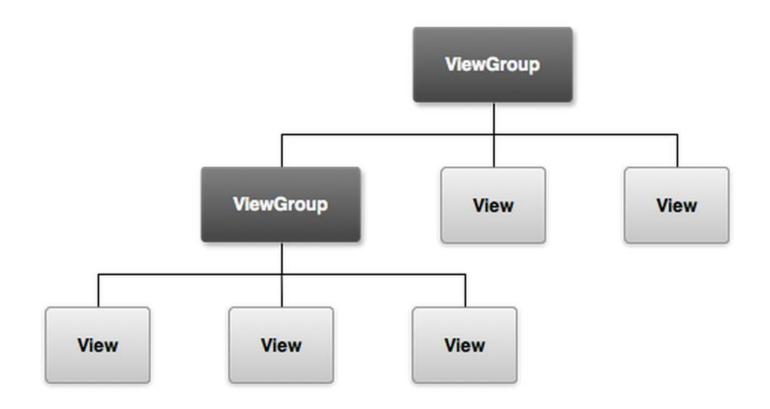- Resources can be identified in the source code by their ID

Layout

```xml
<?xml version="1.0" encoding="utf-8"?>
<android.support.constraint.ConstraintLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="com.example.sedar.helloworld.MainActivity">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello World!"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

</android.support.constraint.ConstraintLayout>
```
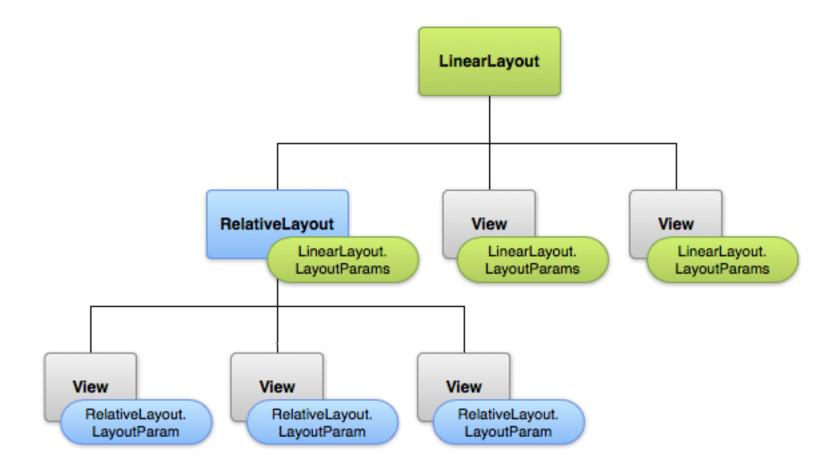
Hello World

Hello World!

• Android offers XML vocabulary to write layouts

• Layouts are built by View and Viewgroup Objects

Layout

Layout

Fragments and Intents

Fragments

Tablet

Selecting an item updates Fragment B

Activity A contains
Fragment A and Fragment B

Handset

Selecting an item starts Activity B

Activity A contains
Fragment A

Activity B contains
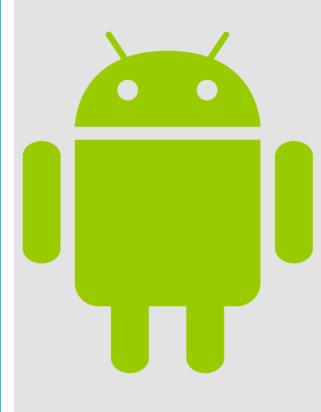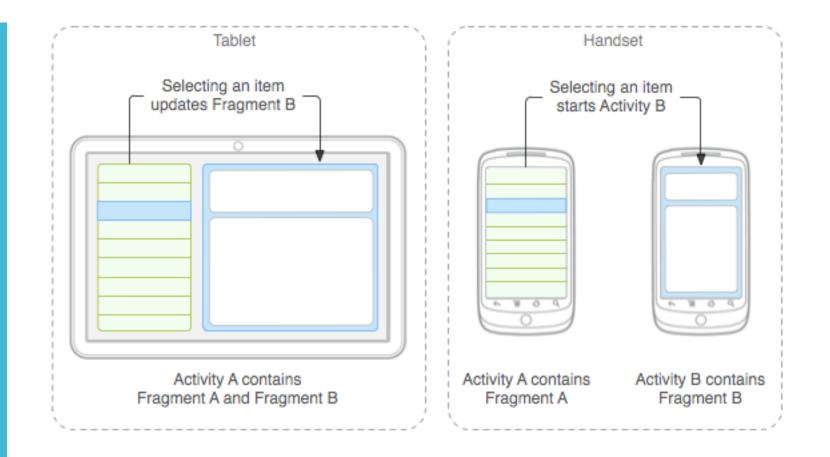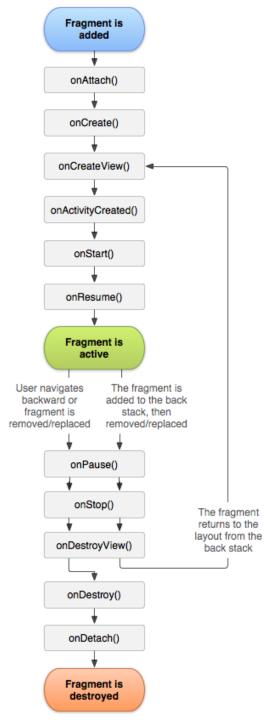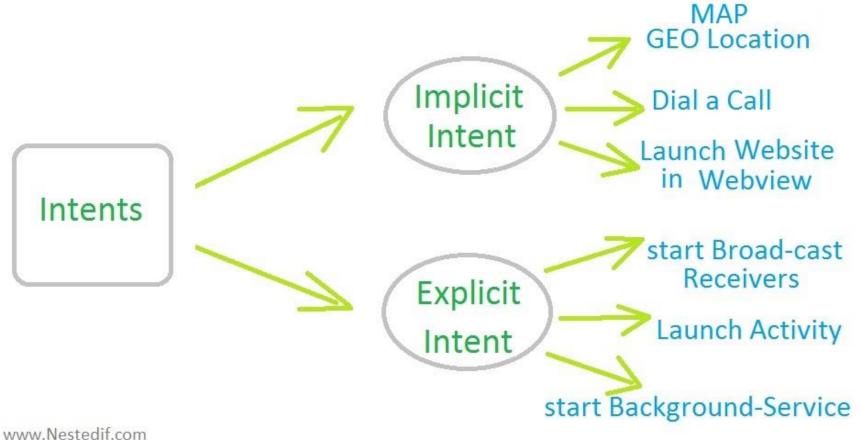Fragment B

- Represents a portion of a user Interface in Activities
- Modular component which has its own lifecycle
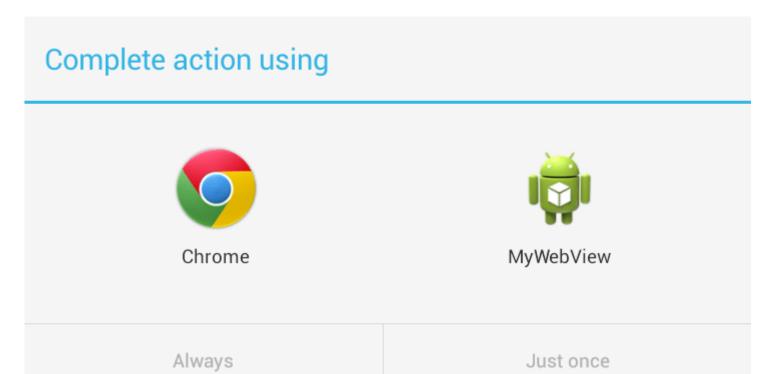- Can be added and removed while the Activity is running

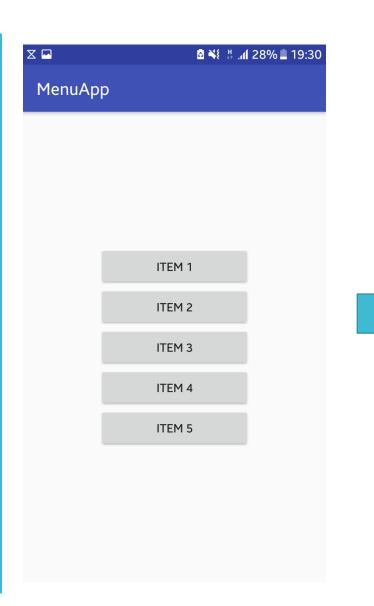# Fragments
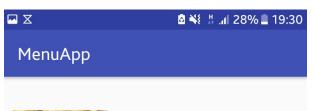
Intents

www.Nestedif.com

- Messaging object for requesting an Action from another App Component
- Two types of Intents: Implicit and Explicit

Implicit Intent

Explicit Intent

Android Manifest

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.sedar.menuapp">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="MenuApp"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <activity android:name=".DetailActivity"></activity>
    </application>

</manifest>
```
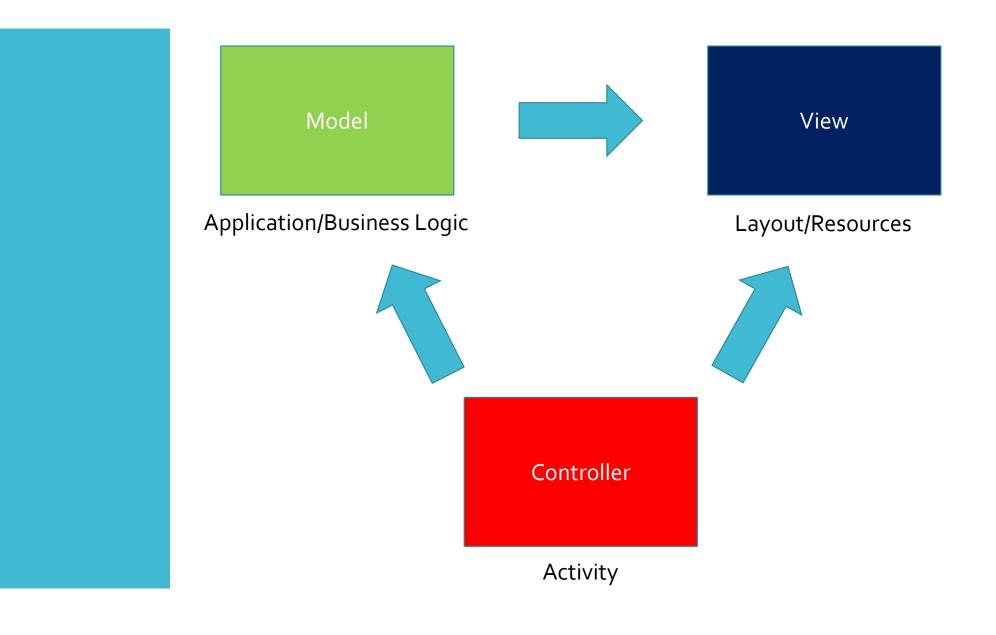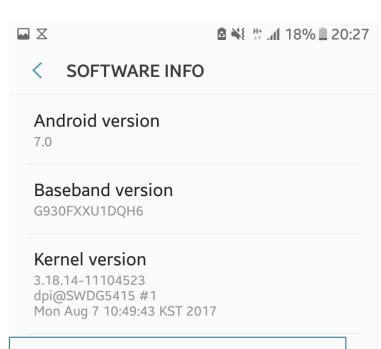
- Declares components of an App
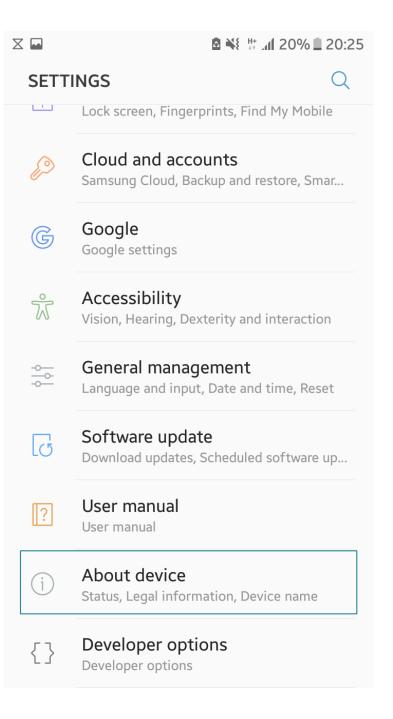
Activating Debugging

Activating - Developer Mode

Lock screen, Fingerprints, Find My Mobile

Cloud and accounts
Samsung Cloud, Backup and restore, Smar...

Google
Google settings

Accessibility
Vision, Hearing, Dexterity and interaction

General management
Language and input, Date and time, Reset

Software update
Download updates, Scheduled software up...

User manual
User manual

About device
Status, Legal information, Device name

Developer options
Developer options

Not available.

Status
View the SIM card status, device IMEI, and other information.

Legal information

Device name
Samsung Galaxy S7

Model number
SM-G930F

Software info
View the currently installed Android version, baseband version, kernel version, build number, etc.

Battery info
View your device's battery status, remaining power, and other information.

LOOKING FOR SOMETHING ELSE?

RESET

Activating - Developer Mode
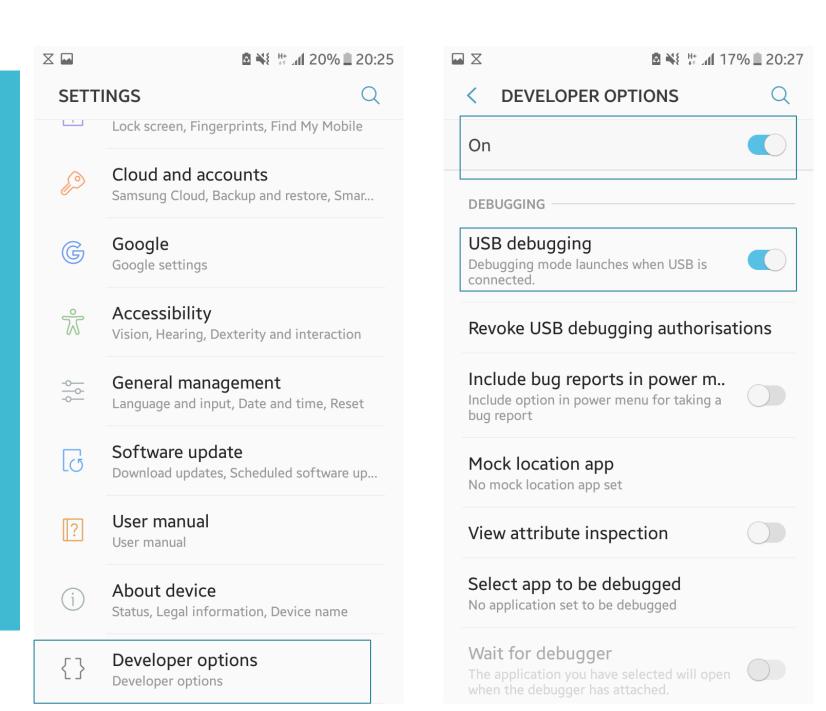
Press 5 times

Activating - Debugging

Helpful Links

https://androiddevsguide.blogspot.de/2017/03/first-off-i-want-to-tell-people-what.html

https://www.tutorialspoint.com/android/

https://developer.android.com/index.html