



ANDROID

Bootcamp

2014

Introduction

Nurul Arif Setiawan



DEVELOPERACADEMY

Agenda

- What is Android
- Android development environment
- Android architecture
- Hello world app
- Android app building blocks

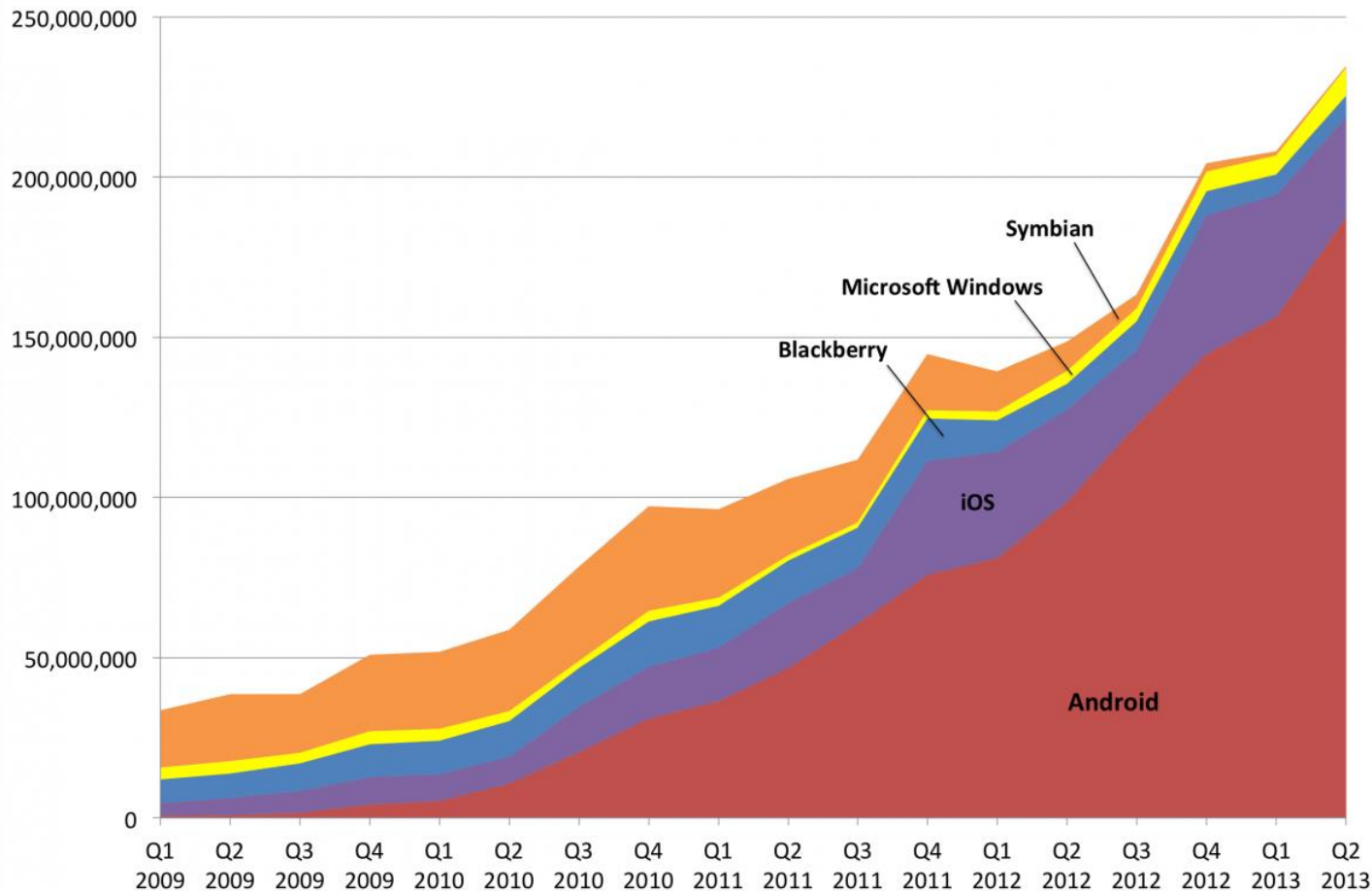
Android Overview

- Operating System based on Linux
- Designed for touch screen mobile devices
- Open source - Android Open Source Project (AOSP)
 - Part of it
 - Maintained by Google

Android

- Android delivers a complete set of software for mobile devices: an operating system, middleware and key mobile applications
- Use Java and support native with C/C++

Global Smartphone Shipments By Platform



Source: Gartner, IDC



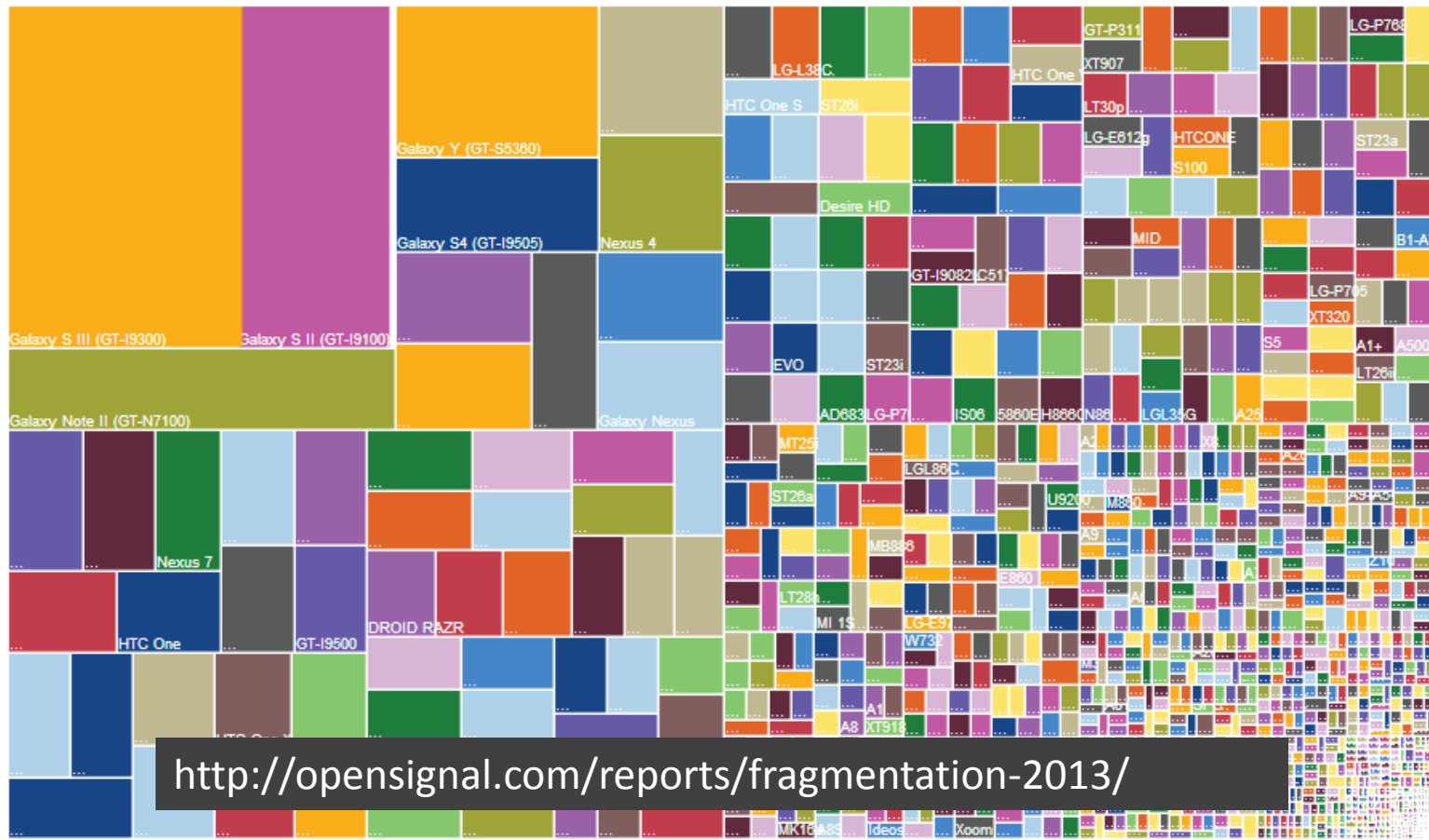
Who runs Android

- Google – AOSP + Google Mobile Services
- Amazon – AOSP + Amazon Services
- Nokia – AOSP + Nokia-Microsoft Services
- Others

Fragmentation

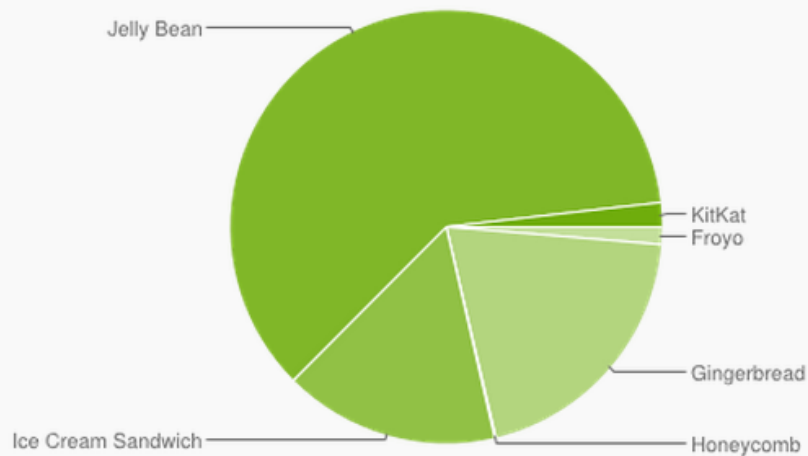
- Lots of device variations
 - Screen size
 - CPU
 - Versions

DEVICE FRAGMENTATION





Version	Codename	API	Distribution
2.2	Froyo	8	1.3%
2.3.3 - 2.3.7	Gingerbread	10	20.0%
3.2	Honeycomb	13	0.1%
4.0.3 - 4.0.4	Ice Cream Sandwich	15	16.1%
4.1.x		16	35.5%
4.2.x		17	16.3%
4.3		18	8.9%
4.4	KitKat	19	1.8%



<http://developer.android.com/about/dashboards/index.html>

	ldpi	mdpi	tvdpi	hdpi	xhdpi	xxhdpi	Total
Small	8.1%						8.1%
Normal	0.1%	13.9%		33.3%	20.2%	11.3%	78.8%
Large	0.8%	4.4%	1.6%	0.6%	0.6%		8.0%
Xlarge	0.1%	4.5%		0.3%	0.2%		5.1%
Total	9.1%	22.8%	1.6%	34.2%	21.0%	11.3%	

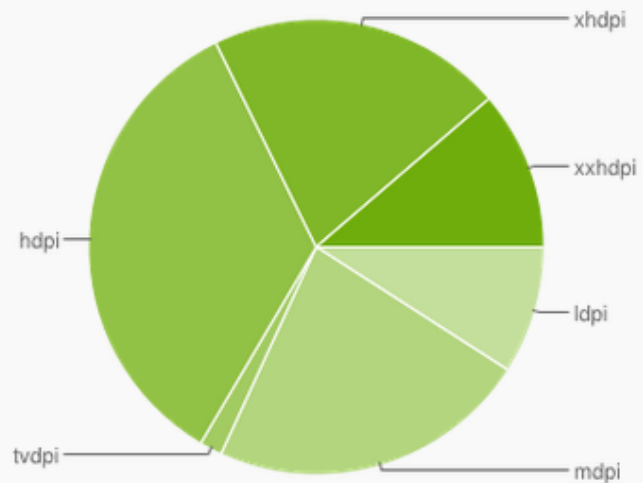
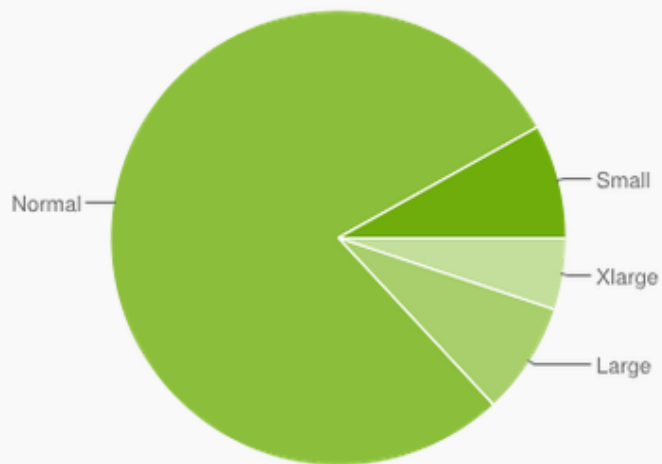


Table 3. Various screen configurations available from emulator skins in the Android SDK (indicated in bold) and other representative resolutions.

	Low density (120), <i>ldpi</i>	Medium density (160), <i>mdpi</i>	High density (240), <i>hdpi</i>	Extra high density (320), <i>xhdpi</i>
<i>Small screen</i>	QVGA (240x320)		480x640	
<i>Normal screen</i>	WQVGA400 (240x400) WQVGA432 (240x432)	HVGA (320x480)	WVGA800 (480x800) WVGA854 (480x854) 600x1024	640x960
<i>Large screen</i>	WVGA800** (480x800) WVGA854** (480x854)	WVGA800* (480x800) WVGA854* (480x854) 600x1024		
<i>Extra Large screen</i>	1024x600	WXGA (1280x800)[†] 1024x768 1280x768	1536x1152 1920x1152 1920x1200	2048x1536 2560x1536 2560x1600

http://developer.android.com/guide/practices/screens_support.html

Hello World

Android Developer Tools

- Download and install ADT
- Set environment variable
- Install Android SDK
- Create Android Virtual Devices (AVDs)

Hello world app

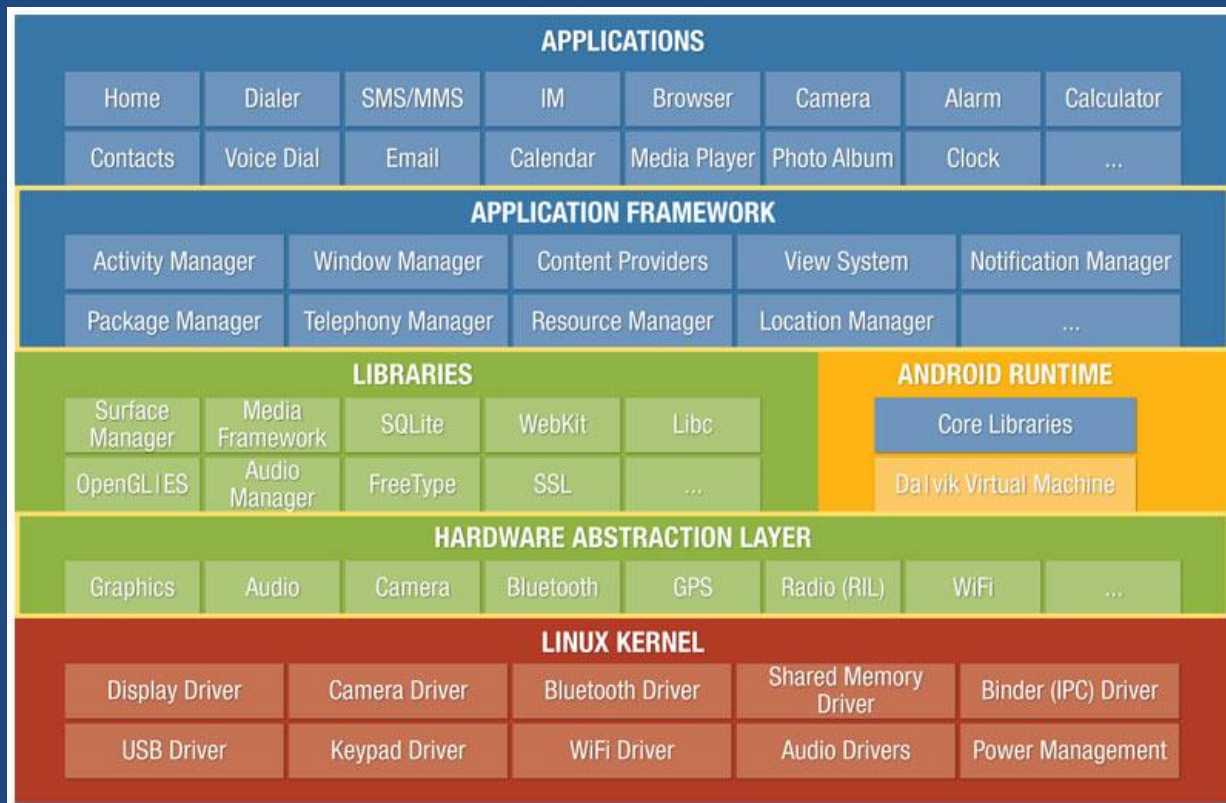
- Create new Android project
- Run it to Emulator or Device
- Explore Android architecture, runtime and package
- Explore Android project components
 - Manifest, Activity, Layout and View, Resources

Hands on

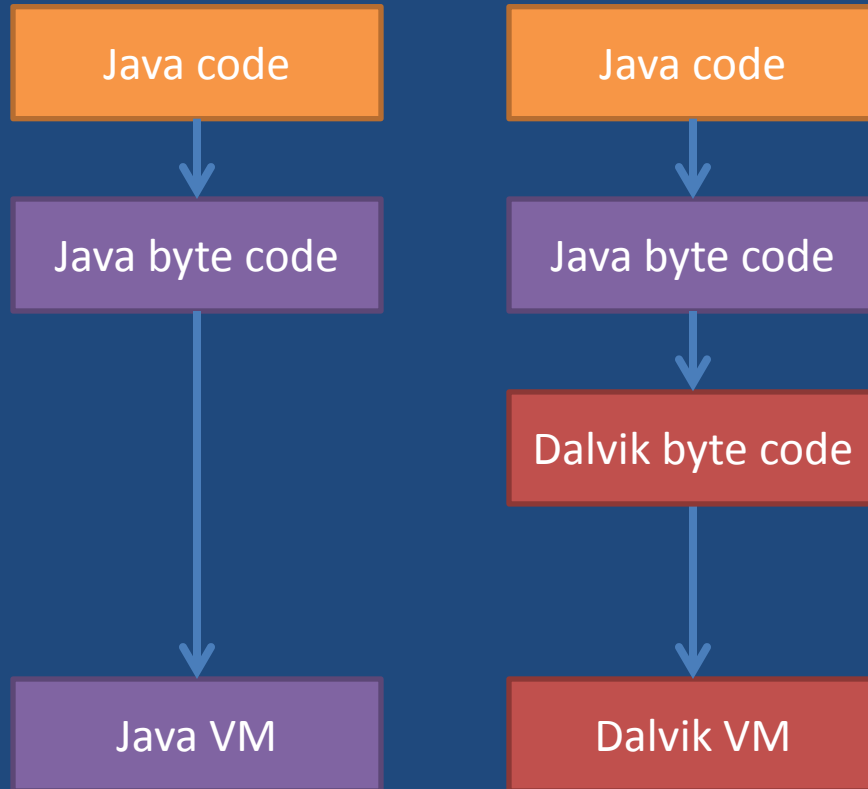
- Hello World



Android Architecture



Android Java VM aka Dalvik

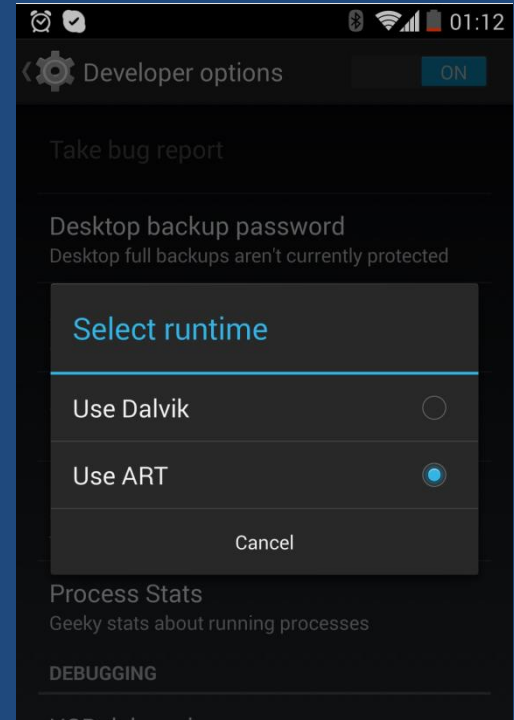


Sandbox

- Each process has its own user ID and VM
- Isolation from other apps
- One app can access other app through permission

Android Runtime (ART) VM

- Introduced in 4.4
- Experimental
- AOT (Ahead of Time) compilation
 - Dalvik use JIT (Just in Time)



Application APK

- Application package file
 - Executable (dex)
 - Resources
 - Manifest
 - Signature

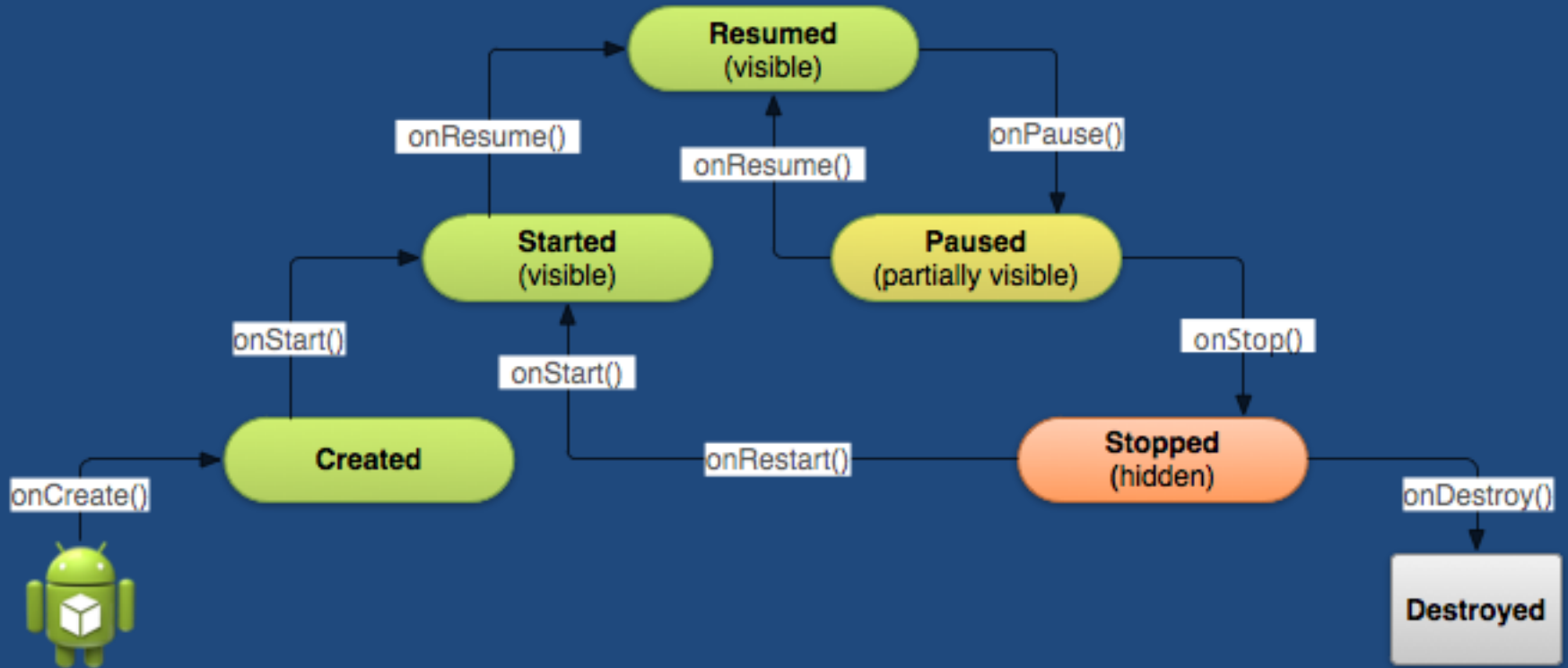
Manifest

- The manifest file glues everything together.
- It explain
 - what the application consists of
 - what all its main building blocks are
 - what permissions it requires and uses

Activity

- An activity represents a single screen with a user interface
- An application typically has multiple activities
- Manage by `ActivityManager`
 - One activity at a time.

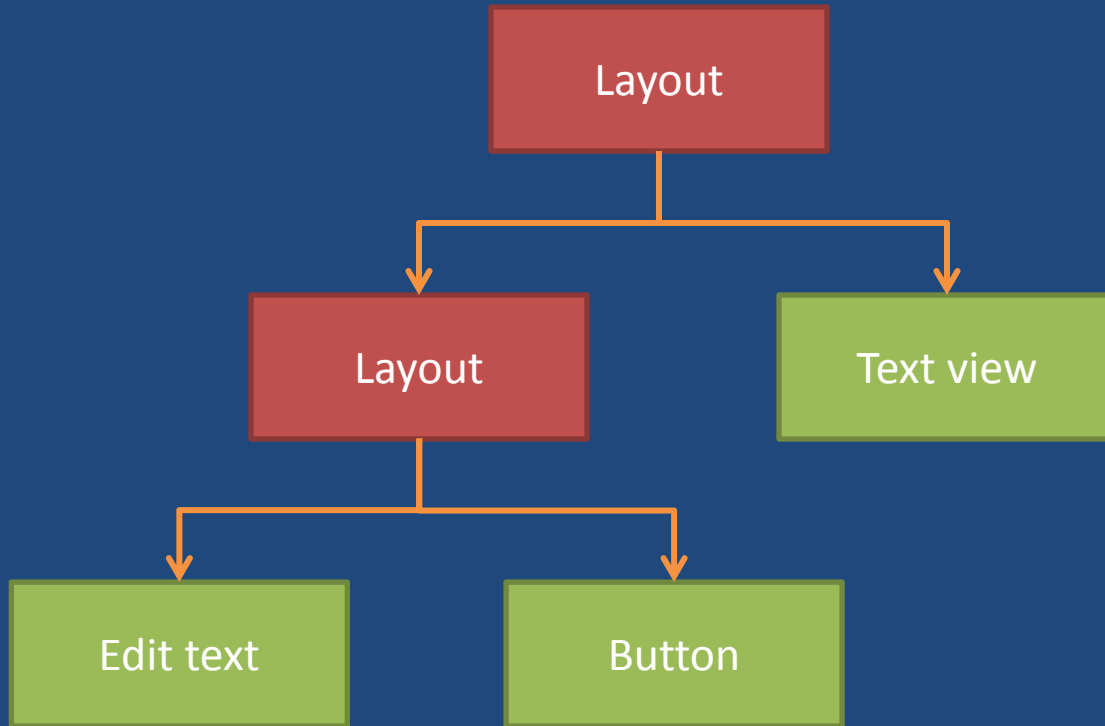
Activity Lifecycle



Layout and View

- Everything you see, such as a button, label, or text box, is a view.
- Layout or ViewGroup organize views, such as grouping together a button and label or a group of these elements.

Layout and View



Resources

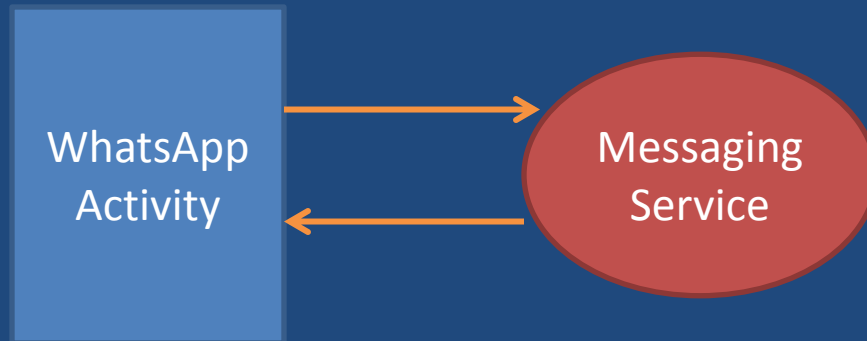
- Strings
- Images
- Layout XML

Application Building Block

- Activity
- Service
- Content Provider
- Broadcast Receiver

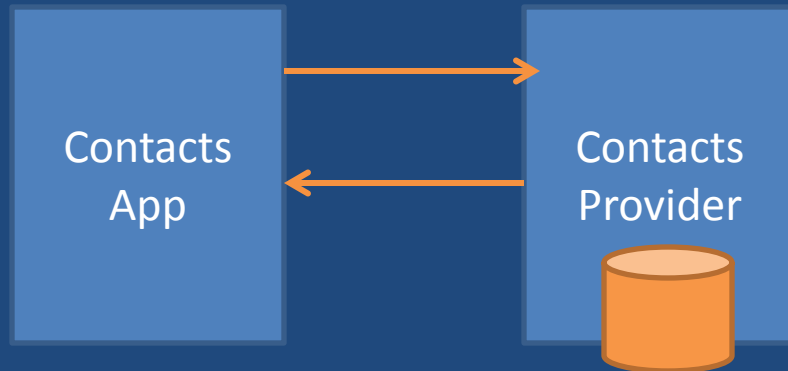
Service

- Runs in the background to perform long-running operations
- Does not provide a user interface.
- Example: Messaging service in WhatsApp



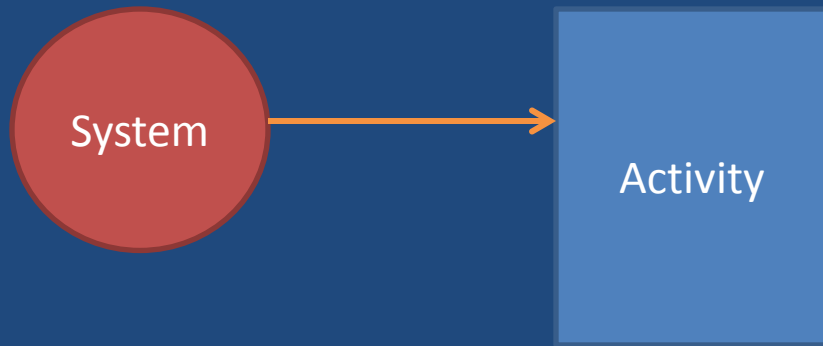
Content Provider

- Manages a shared set of app data.
- Through the content provider, other apps can query or even modify the data (given permission)
- Example : Contacts, Calendar



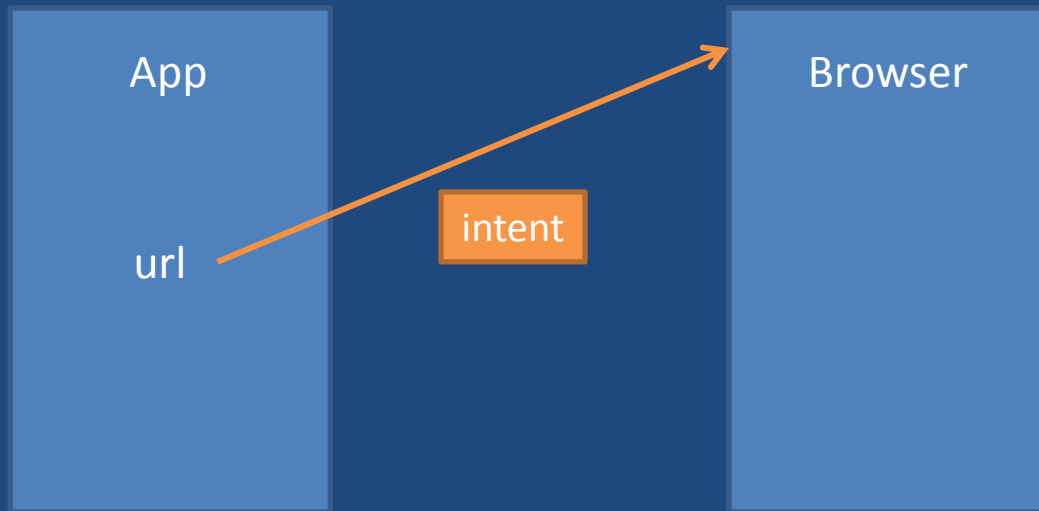
Broadcast Receiver

- Responds to system-wide broadcast announcements.
- Example: a broadcast announcing that the screen has turned off, the battery is low, or a picture was captured.



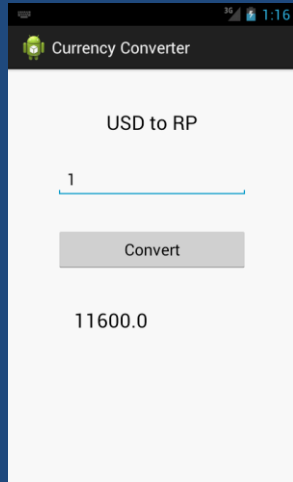
Intent

- Messaging object you can use to request an action from another app component.

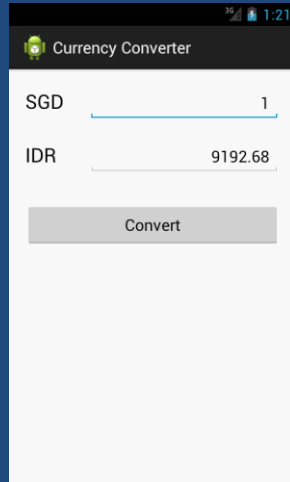


First App – Currency Converter

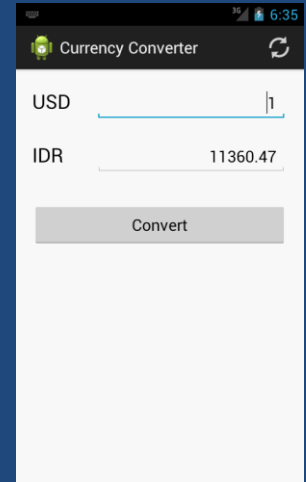
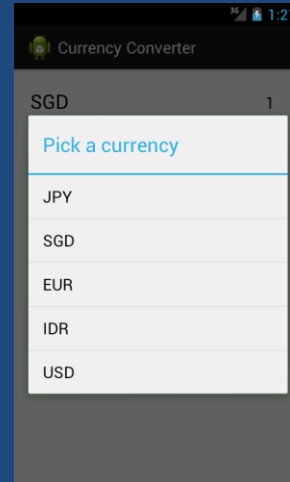
Currency Converter App



simple



List of currencies



Network data
Data Storage

Steps

- Create new Android project
- Modify layout
 - Add button, text view and edit text
- Modify Activity to handle event and give response
- Working app

Let's Start

