



ANDROID

MOBILE APPLICATIONS PROGRAMMING

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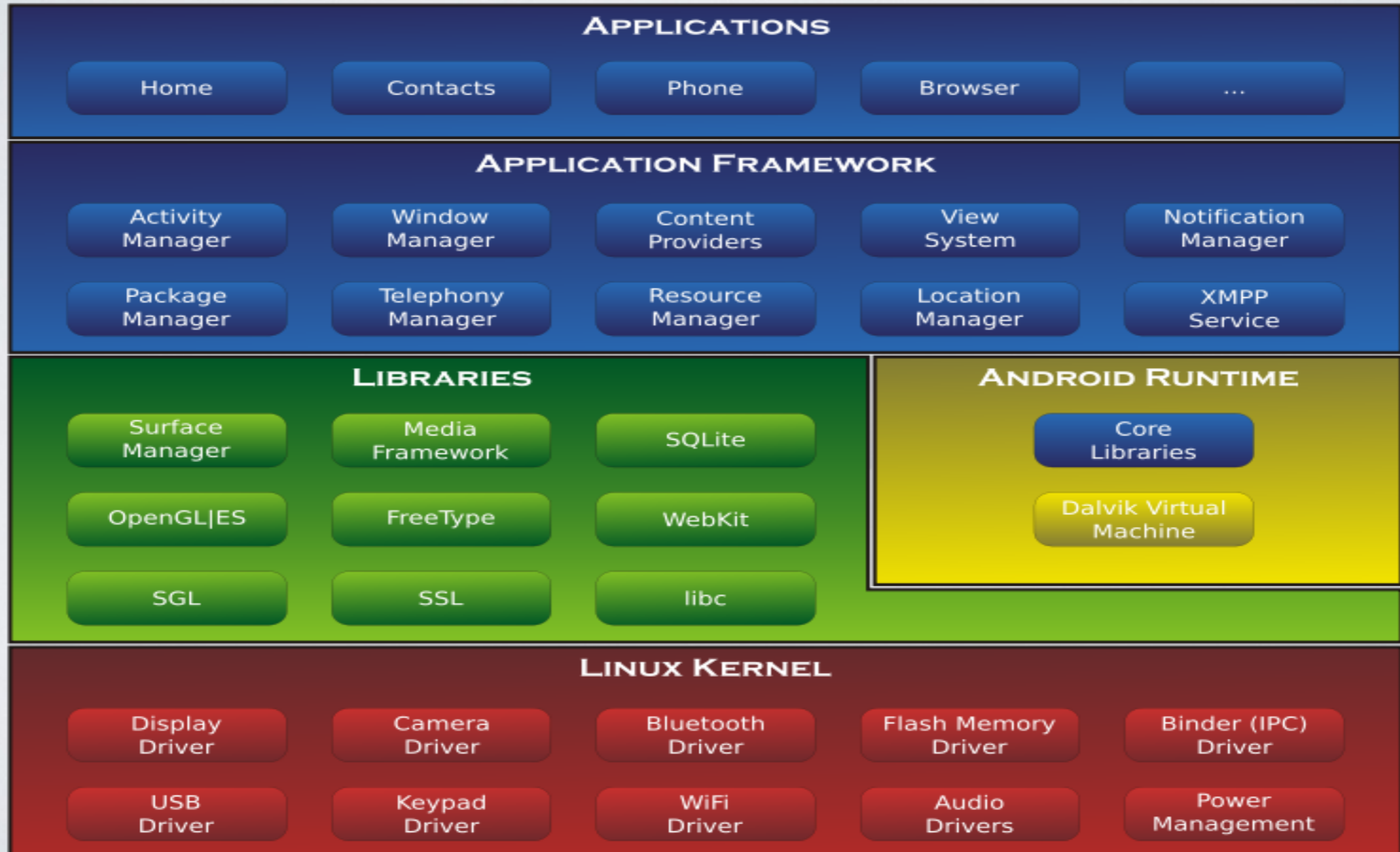
Polsko-Japońska Akademia Techniki Komputerowych

WHAT IS ANDROID?

- Mobile operating system by Google
- Not only for phones and tablets - TV sets, watches (wearables) and even cars
- Written in Java and C
- Built on Linux kernel



ANDROID PLATFORM ARCHITECTURE



DALVIK VIRTUAL MACHINE

- Virtual Machine for all Android applications
- Optimised to use less space
- Executes Dalvik byte code
- Open Source
- Written in C and Java

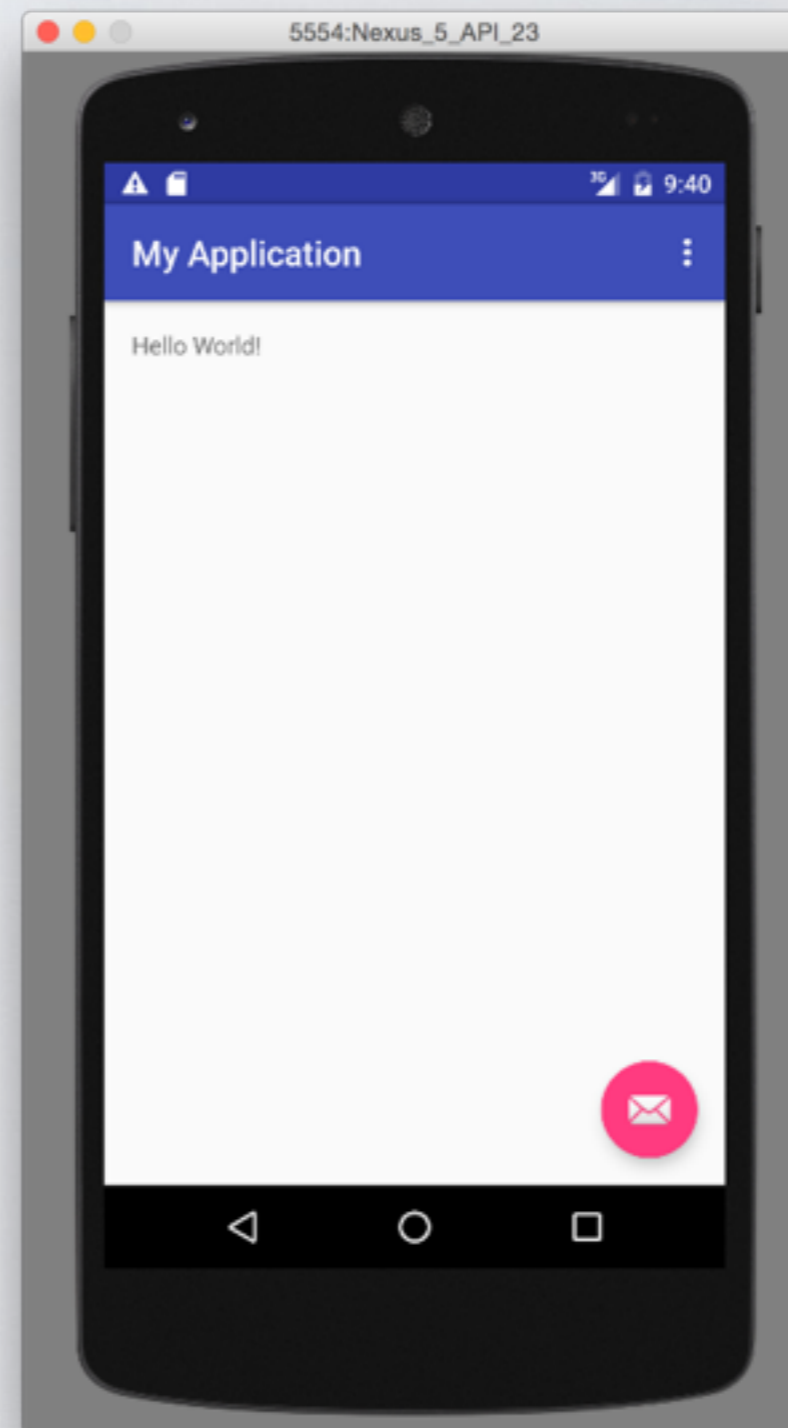


ANDROID VERSIONS

Version	API level	Release	Name
1.0-1.1	1, 2	Sep 2008	none
1,5	3	Apr 2009	Cupcake
1,6	4	Sep 2009	Donut
2.0-2.1	5, 6, 7	Oct 2009	Eclair
2,2	8	May 2010	Froyo
2,3	9, 10	Dec 2010	Gingerbread
3,0	11, 12, 13	Feb 2011	Honeycomb
4,0	14, 15	Oct 2011	Icecream Sandwich
4.1-4.3	16, 17, 18	Jun 2012	Jelly Bean
4,4	19, 20	Sep 2013	Kit Kat
5,0	21	Jun 2014	Lollipop
5,1	22		
5,2	23		

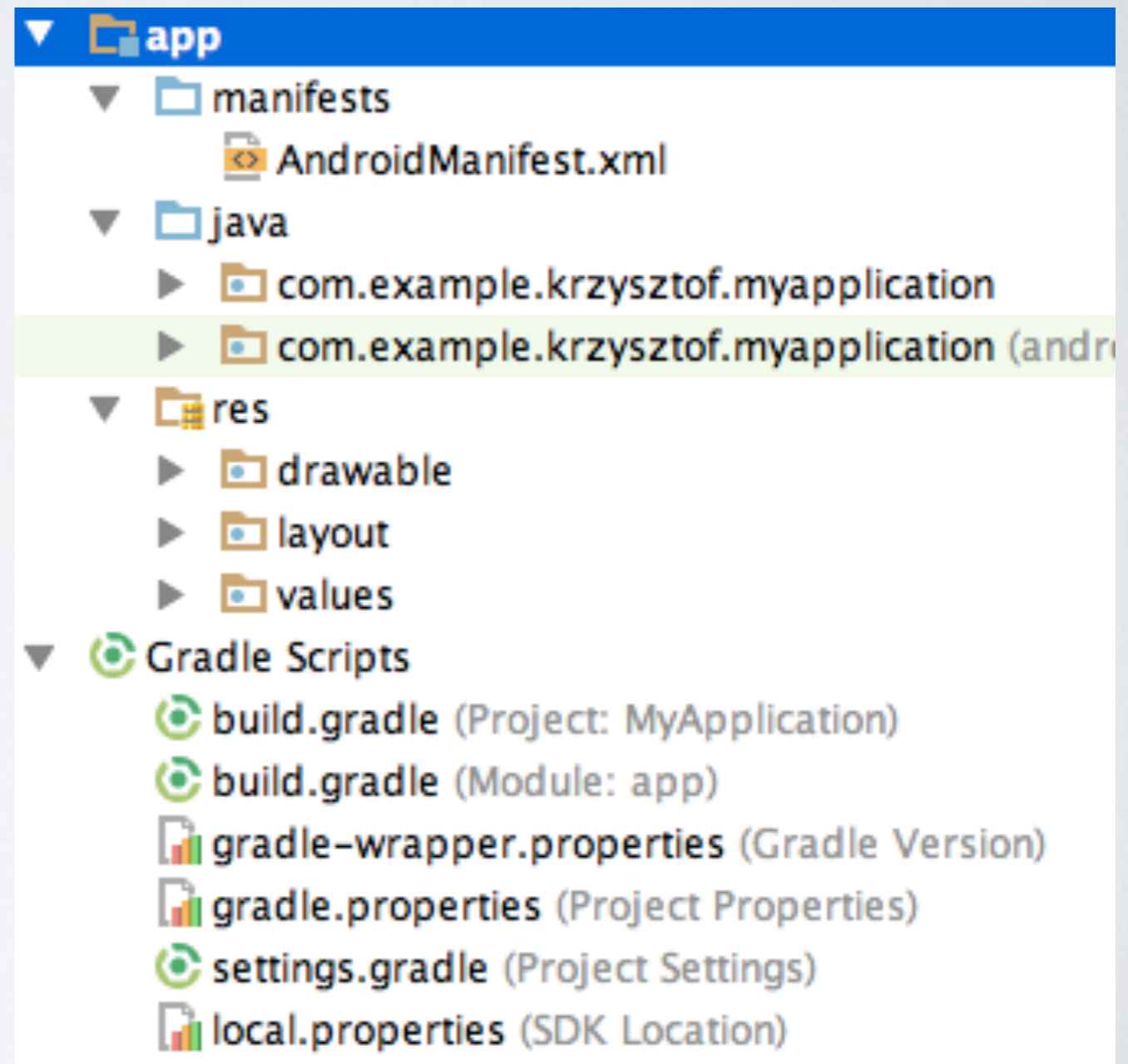
ANDROID EMULATOR

- Delivered with Android SDK
- Various devices types:
 - phones
 - tablets

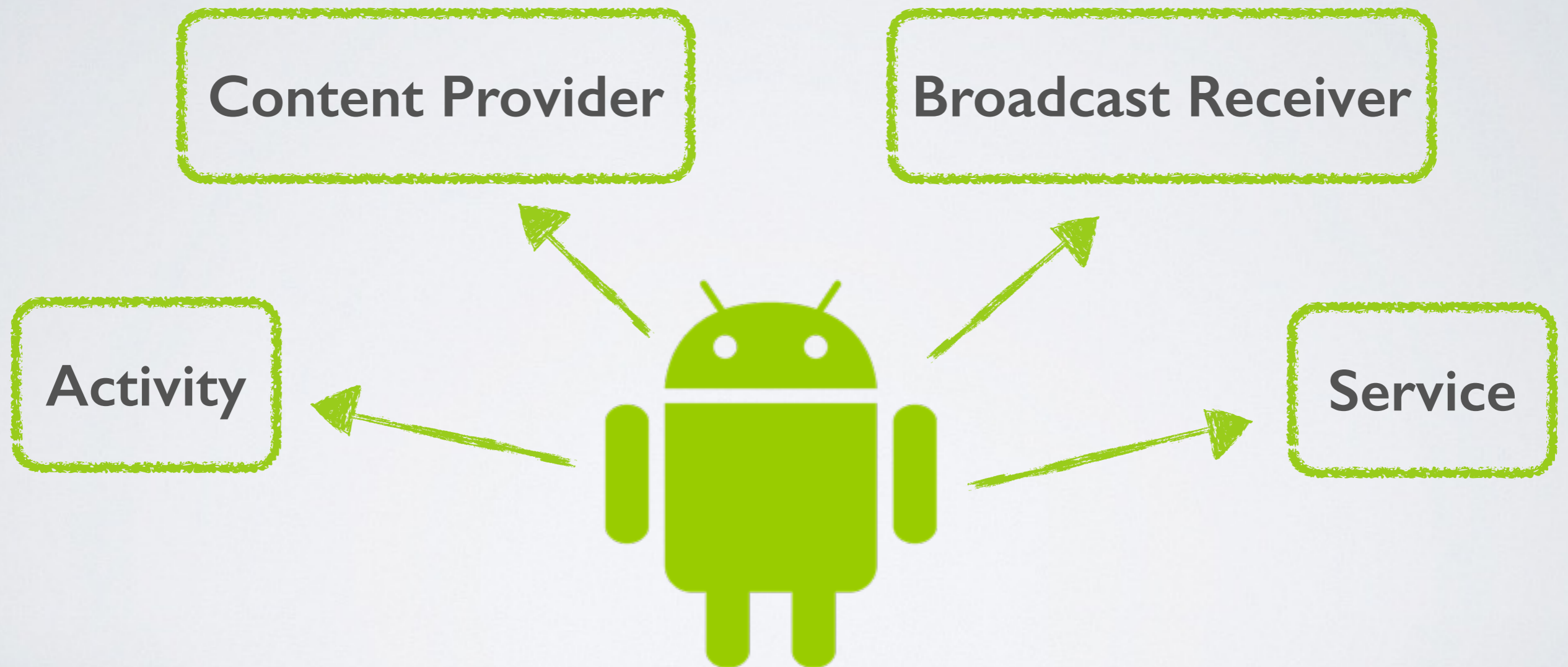


ANDROID PROJECT STRUCTURE

- Gradle as a build tool
- build.gradle hierarchy
- Application manifest (AndroidManifest.xml)



APPLICATION COMPONENTS



ACTIVITY

- Single screen
- Independent
- Stack of executions
- Lifecycle



SERVICE



- Work in background
- No user interface
- Used for long operations

CONTENT PROVIDER

- Managing the data between applications
- Read / write operations



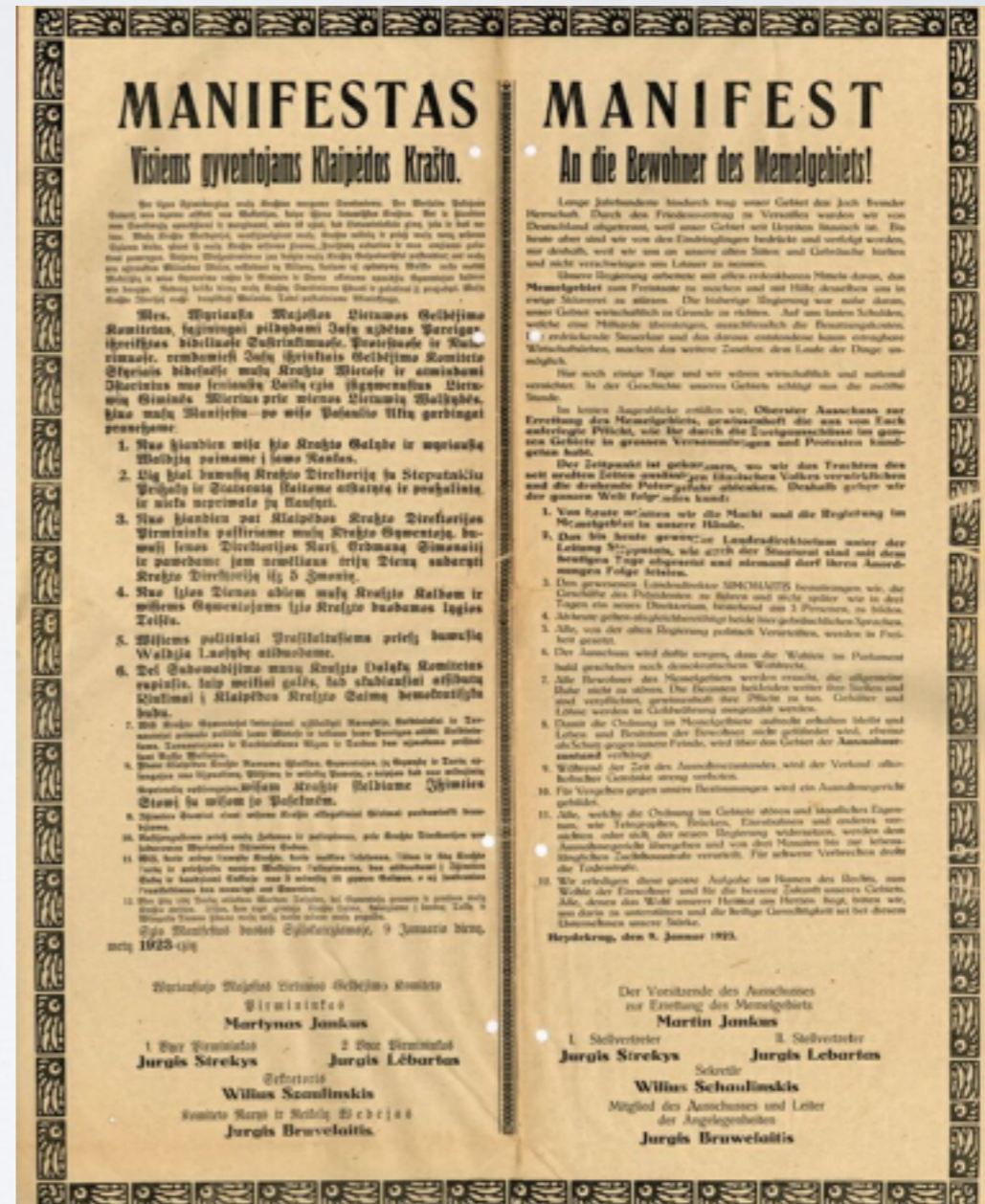
BROADCAST RECEIVER



- System signals
- Applications signals
- Examples
 - low battery level (system)
 - download finished (app)

ANDROID MANIFEST

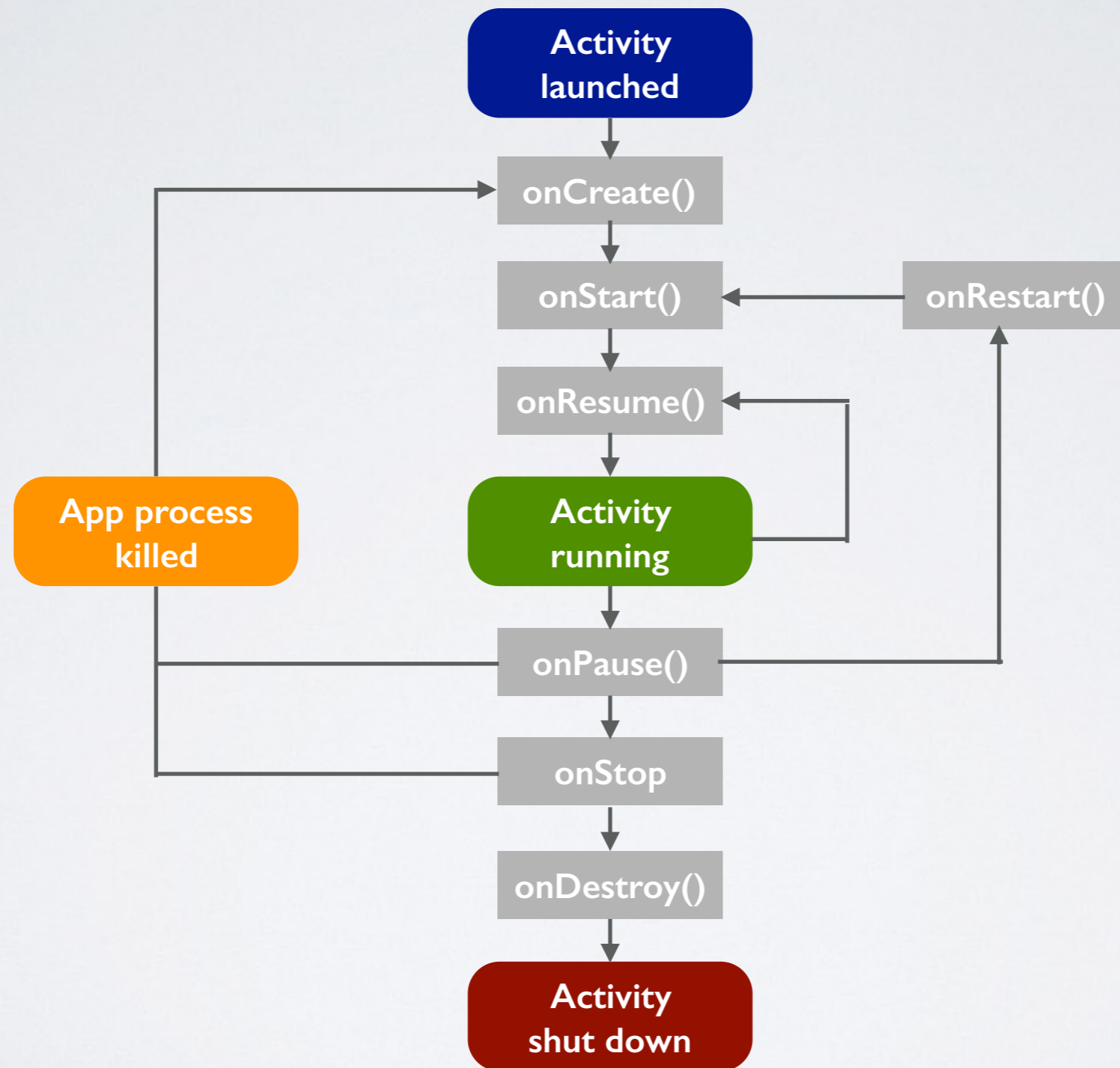
- AndroidManifest.xml
- application name and package
- components
- permissions
- settings (minimal sdk version etc.)



ANDROID MANIFEST STRUCTURE

```
<manifest>  
  <uses-permission />  
  <permission />  
  <uses-sdk />  
  <uses-configuration />  
  <supports-screens />  
  <compatible-screens />  
  <application>  
    <activity>  
      ...  
    </activity>  
    <service>  
      ...  
    </service>  
  </application>  
</manifest>
```

ACTIVITY LIFECYCLE



INTENT



- Intent is used for
 - communication between components
 - starting Activity / Service
 - sending a Broadcast

INTENT USAGE EXAMPLES

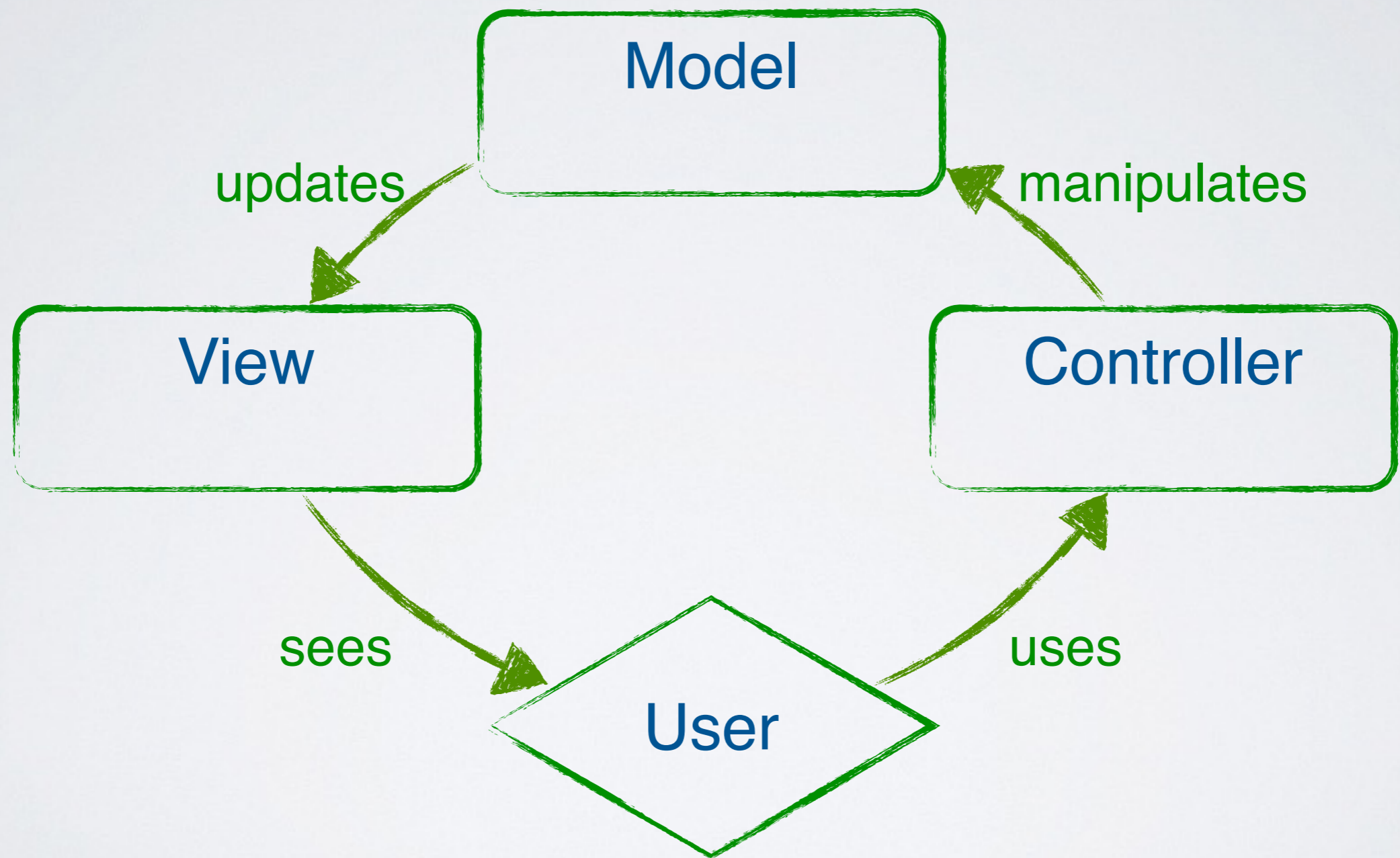
```
// Starting a new activity
```

```
Intent intent = new Intent(this, SignInActivity.class);  
startActivity(intent);
```

```
// Starting an app for sending email
```

```
Intent intent = new Intent(Intent.ACTION_SEND);  
intent.putExtra(Intent.EXTRA_EMAIL, recipientArray);  
startActivity(intent);
```

MODEL-VIEW-CONTROLLER



EVENTS

- Event Driven Programming
- Examples of events in Android:
 - `onClick()`
 - `onTouch()`
 - `onMenuItemClick()`

IMAGES SOURCES

- <http://developer.android.com/guide/index.html>
- <http://www.blog.outrankthem.co.uk/what-is-android>
- <https://www.fayerwayer.com/2010/10/google-pide-que-se-anule-la-demanda-de-oracle-contra-android/>
- <http://www.visindavefur.is/svar.php?id=62743>
- <http://wikiblinks.com/awesome-android-facts-tips-tricks-secrets/>
- <http://www.tivix.com/blog/perfect-resource-image-size-dpi-for-any-android-de/>
- <http://health.gov/paguidelines/>
- <http://inlandprinting.net>
- <http://www.digitalsignageconnection.com/content-provider-bluefox-launches-content-digital-screens-poll>
- <https://indolinkenglish.wordpress.com/2012/04/04/govt-may-clear-fdi-cap-in-broadcasting-services/>
- https://commons.wikimedia.org/wiki/File:Manifest_of_the_Supreme_Committee_for_the_Salvation_of_Lithuania_Minor.jpg