Android Fundamentals

Java, Gradle and an overview of Android
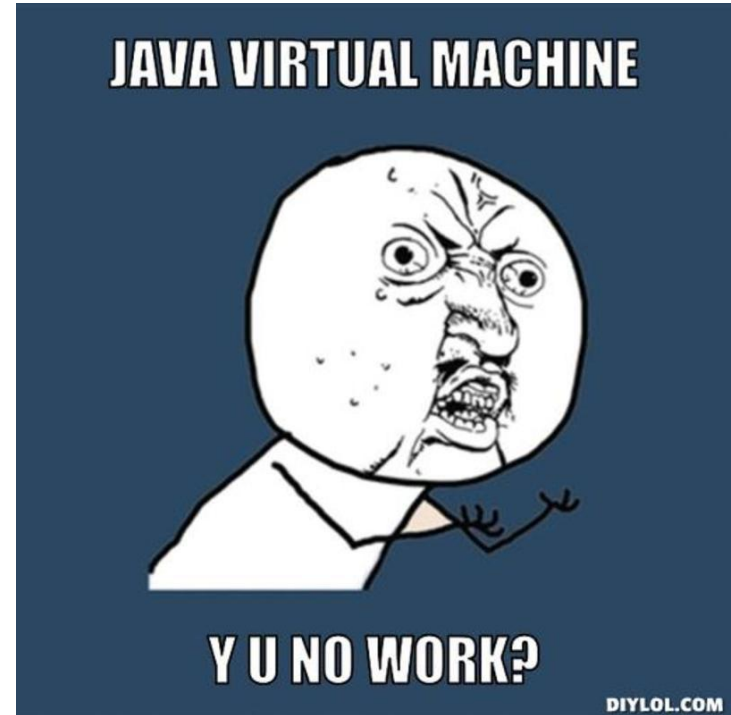
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Overview of Android

➔ Open handset alliance

➔ Android Open Source Platform

➔ Multi-user Linux system

➔ Apps run in sandboxed 'Java' VM

➔ Each app has its own user

➔ Permissions model based on user

➔ Dalvik / Art

➔ Native Code via NDK

Java Virtual Machine

Whilst Android applications are written in Java, they are not executed by the Java virtual machine.

Dalvik and ART

Dalvik (Pre Lollipop)

- Just In Time (JIT) compilation
  - Compiled at runtime

- dexopt > Odex file

- Toleration for post processing errors

- Requires less storage space

- Increased processing requirements

ART (Lollipop)

- Ahead Of Time (AOT) compilation
  - Compiled at install time (kinda)

- dex2oat > ELF file

- Improved garbage collection

- Requires more storage space

- Increased processing performance

Show me the numbers!

- 5.0 Lollipop   3.3   %
- **4.4 KitKat**   **40.9 %**
- **4.1 Jelly Bean**   **42.6 %**
- 4.0 Ice Cream   5.9   %
- 2.3 Gingerbread   6.9   %
- 2.2 Froyo   0.4   %
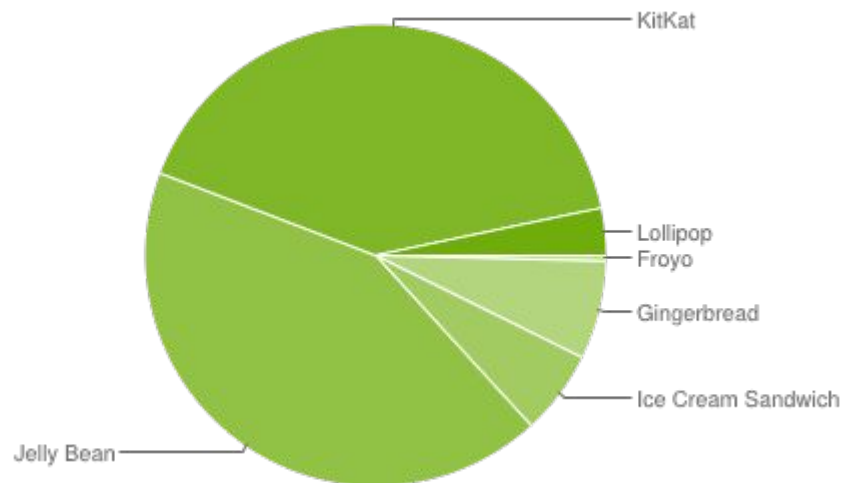
Groovy!

"Groovy is a powerful, optionally typed and dynamic language… for the Java platform"

Gradle

- Build variants
- Dependencies
- Manifest entries
- Signing
- ProGuard
- Testing
- Extensible!

"Gradle is an advanced build toolkit that manages dependencies and allows you to define custom build logic"

build.gradle

```
apply plugin: 'com.android.application'

android {
    compileSdkVersion 20
    buildToolsVersion "20.0.0"

    defaultConfig {
        applicationId "com.blacklane.android"
        minSdkVersion 13
        targetSdkVersion 20
        versionCode 1
        versionName "1.0"
    }

    buildTypes {
        release {
            minifyEnabled false
        }
        debug {
            debuggable true
        }
    }
}

dependencies {
    compile fileTree(dir: 'libs', include: ['*.jar'])
    compile 'com.android.support:appcompat-v7:20.0.0'
}
```

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```

What version of the Android SDK should this project be built with?

```
    buildTypes {
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        }
    }

    dependencies {
        compile fileTree(dir: 'libs', include: ['*.jar'])
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```

```
    buildTypes {
        release {
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        }
        debug {
            debuggable true
        }
```

What's the minimum level of Android device I can deploy to?

```
    dependencies {
        compile fileTree(dir: 'libs', include: ['*.jar'])
        compile 'com.android.support:appcompat-v7:20.0.0'
    }
```

build.gradle

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```
buildTypes {
    release {
        minifyEnabled false
    }
     debug {
        debuggable true
    }
  }
}
```

Automatically compiled dependencies, yay!

```
dependencies {
    compile fileTree(dir: 'libs', include: ['*.jar'])
    compile 'com.android.support:appcompat-v7:20.0.0'
}
```

Gradle Wrapper

./gradlew

Just clone and go!

Project Structure
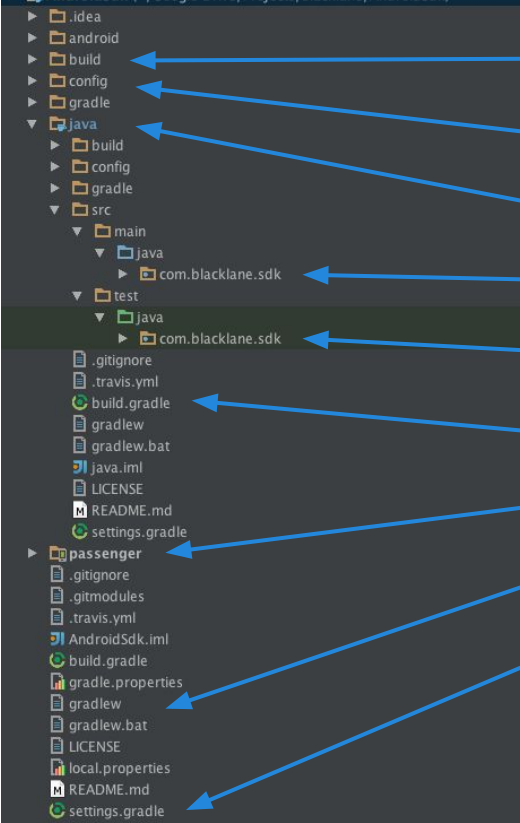
Build files, dex cache, lint cache, apk's

Build tool configurations, checkstyle etc.

Java project module
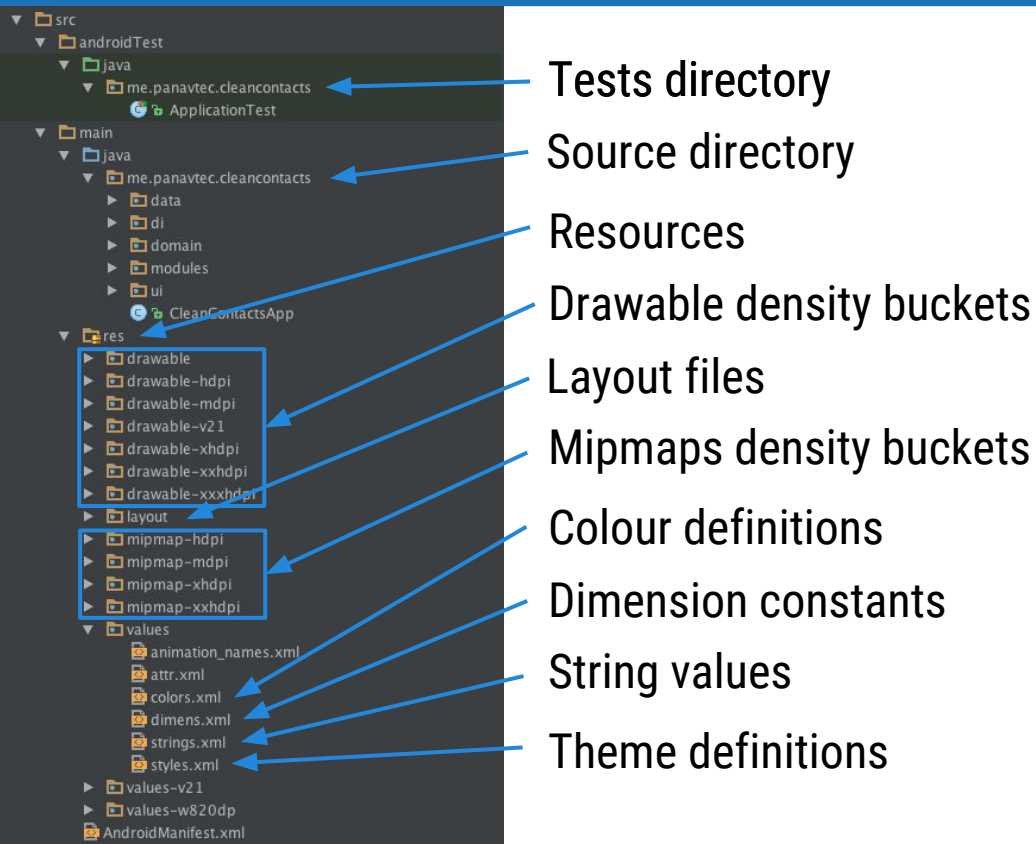
Source files

Tests directory

Gradle build file

Android project module

Gradle wrapper executables

Gradle settings (project constants, etc)

Gradle builds are hierarchical!

Module Structure

- src
  - androidTest
    - java
      - me.panavtec.cleancontacts ← Tests directory
        - ApplicationTest
  - main
    - java
      - me.panavtec.cleancontacts ← Source directory
        - data
        - di
        - domain
        - modules
        - ui
        - CleanContactsApp
    - res ← Resources
      - drawable ← Drawable density buckets
      - drawable-hdpi
      - drawable-mdpi
      - drawable-v21
      - drawable-xhdpi
      - drawable-xxhdpi
      - drawable-xxxhdpi
      - layout ← Layout files
      - mipmap-hdpi ← Mipmaps density buckets
      - mipmap-mdpi
      - mipmap-xhdpi
      - mipmap-xxhdpi
      - values
        - animation_names.xml
        - attr.xml
        - colors.xml ← Colour definitions
        - dimens.xml ← Dimension constants
        - strings.xml ← String values
        - styles.xml ← Theme definitions
      - values-v21
      - values-w820dp
    - AndroidManifest.xml

Application Components

Activities

An activity represents a single screen with a user interface.

Services

A service is a component that runs in the background to perform long running operations or to perform work for remote processes.

Content Provider

A content provider manages a shared set of application data.

Broadcast Receiver

A broadcast receiver is a component that responds to system wide broadcast announcements.

Android Resources

- Images
  - Drawables
  - Mipmaps
- XML
  - Animations
  - Layouts
  - Menus
  - Values
  - Xml

More details available here!

http://developer.android.com/guide/topics/resources/providing-resources.html

Fin.

NOT SURE IF TECH TALK

OR GETTING US TO COMMENT ON ANDROID PULL REQUESTS

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