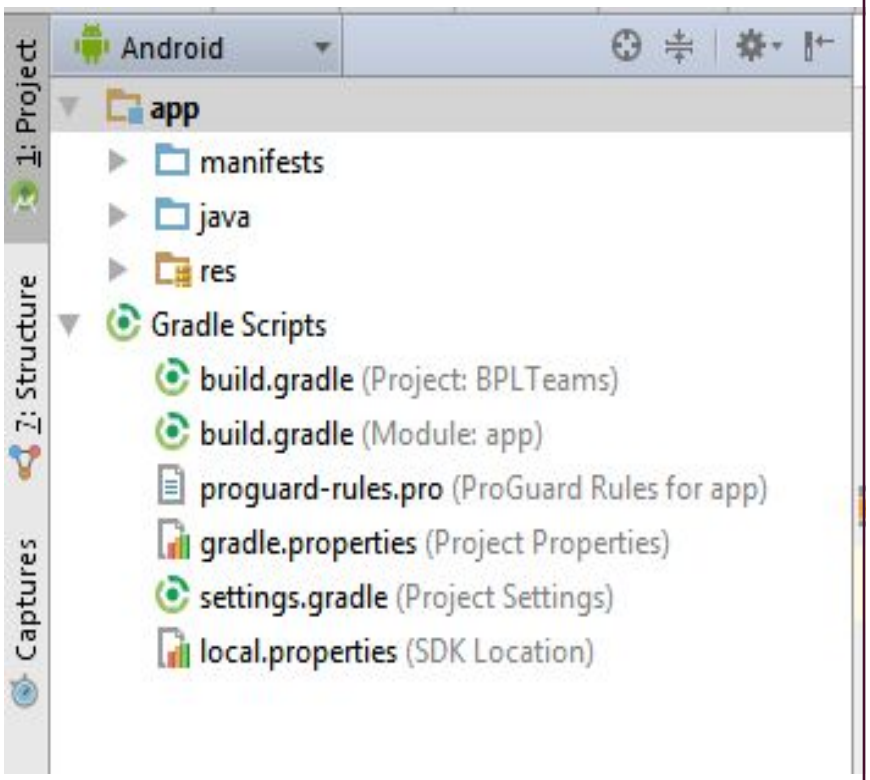
ANDROID DEVELOPMENT TOOLS

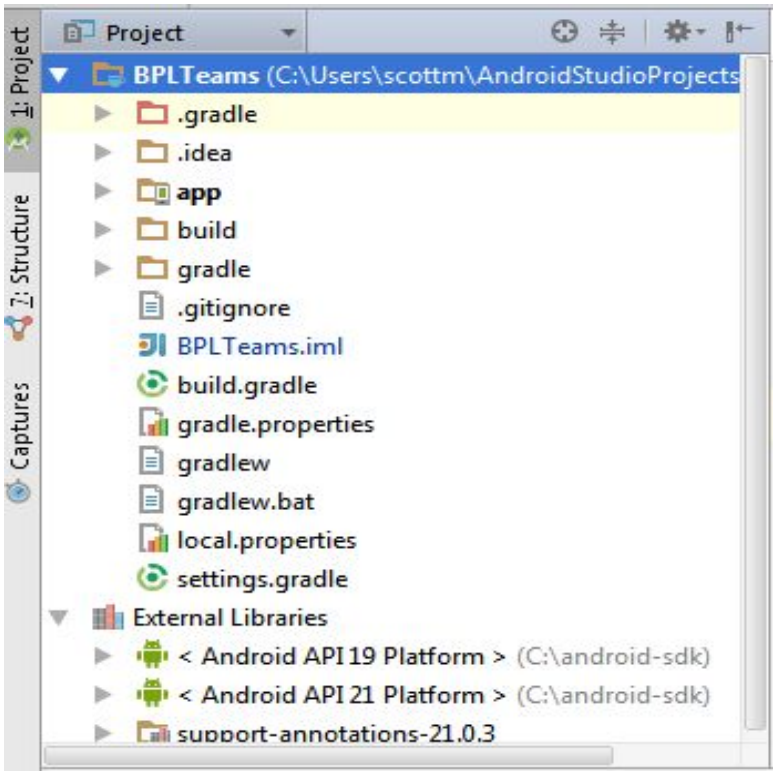
ELEMENTS OF ANDROID PROJECTS

- ***Application Name***
  - seen by users on app chooser, app list, store
- ***Project Name***
  - in IDE, can be different, often directory
- ***Package Name***
  - Java package name, not using default package
- ***Minimum SDK version***
  - how far back of API level do you support, ~16 as of Jan 2017
- ***Compile SDK version***
  - SDK version (PI level) where your app has been complied. it is strongly recommended that you always compile with the latest SDK.
- ***Target SDK version***
  - Level of API you had in mind for app, most recent?
- ***Theme***
  - look and feel of app, color scheme, various built in themes such as Theme, Holo, Material (Design)

ANDROID PROJECTS



Android Project View

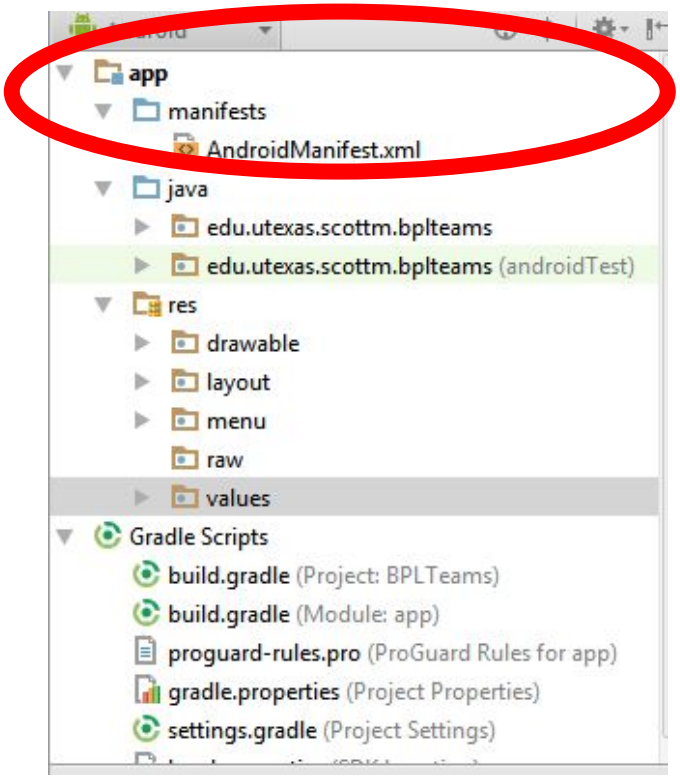


Classic Project View

ANDROID PROJECT COMPONENTS

ANDROID PROJECT COMPONENTS - MANIFESTS

- AndroidManifest.xml
- Like a table of contents for your app
- Main activity
- Explicit and Implicit Intent Filters
- Declare all the parts of your apps:
  - Application package name, activities, services, broadcast receivers, icon, theme
- Request permissions
  - network, location, ...



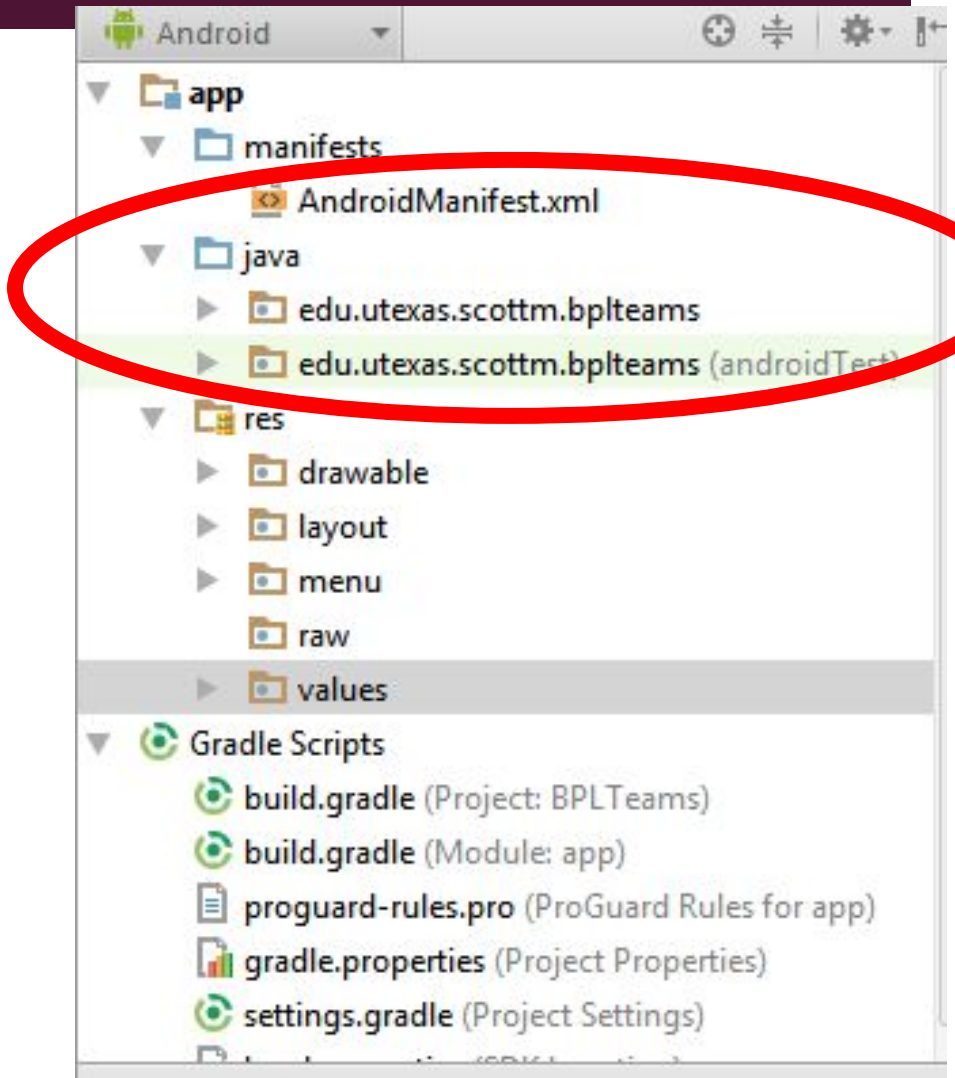
ANDROID MANIFEST - SAMPLE

```
<application
    android:allowBackup="true"
    android:icon="@drawable/ic_launcher"
    android:label="BPL Teams"
    android:theme="@style/AppTheme" >
    <activity
        android:name=".BPL_Activity"
        android:label="BPL Teams" >
        <intent-filter>
            <action android:name="android.intent.action.MAIN" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    </activity>
</application>

</manifest>
```

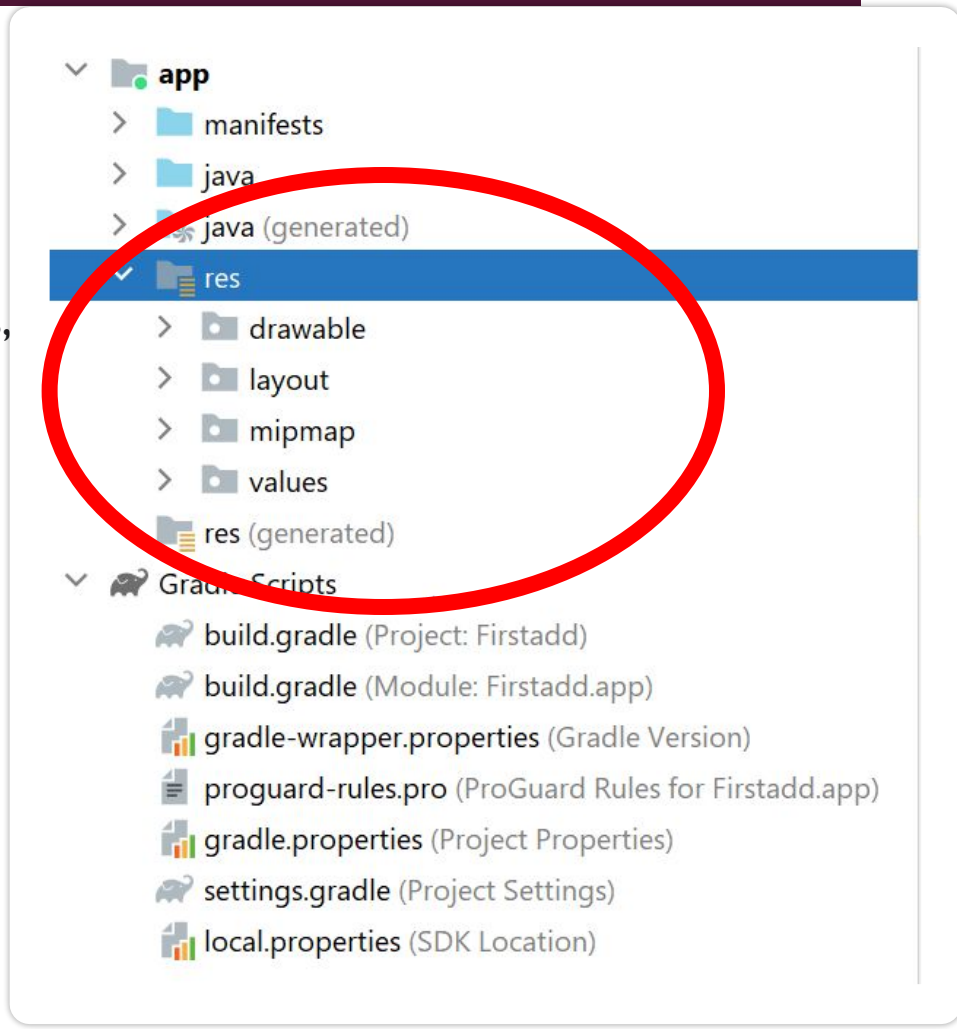
ANDROID PROJECT COMPONENTS - JAVA SOURCE CODE

- Source Code:
- In java directory in Android Project View
- Actually in src directory on system



ANDROID PROJECT COMPONENTS - RESOURCES

- Resources or the res directory
- Resources are the additional files and static content that your code uses, such as bitmaps, layout definitions, user interface strings, animation instructions, and more.
- Packaged up with app
- Plays a large role and has multifaceted use in development of app.

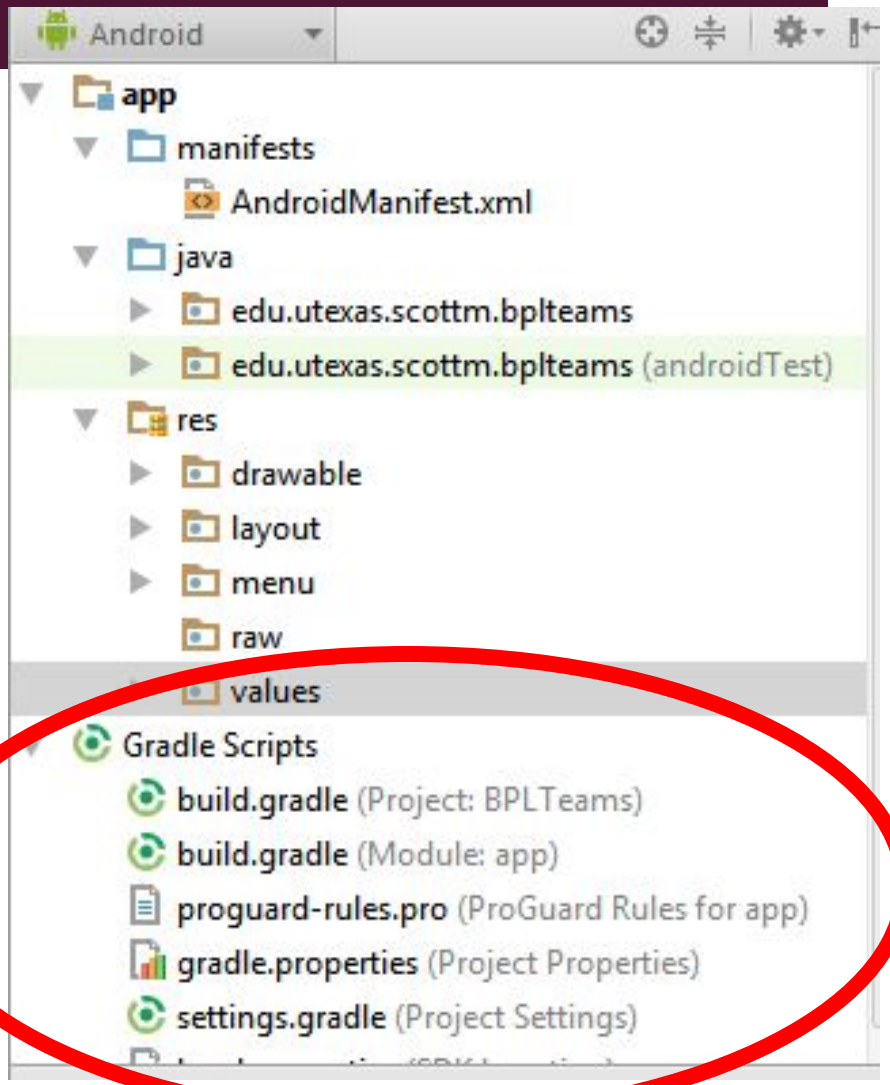


RESOURCE DIRECTORIES

- **res/drawable** for graphic images such as png, jpeg
- **res/layout** for xml files that define the layout of user interfaces inside the app
- **res/menu** for xml based menu specifications
- **res/values** for lists of strings, dimensions, colors, lists of data
- **res/raw** for other kinds of files such as audio clips, video clips, csv files, raw text
- **res/xml** for other general purpose xml files
- **res/mipmap** for drawable files for different launcher icon densities.

GRADLE

- Every Android project needs a gradle for generating an APK from the *.java* and *.xml* files in the project
- APK or Android Package or Android Package Kit
- APK files allow you to install apps on your Android phone. (JAR)
- Two types
  - Top level build.gradle: Top level Configurations
  - Module-level build.gradle: Dependencies and SDK version.



SAMPLE BUILD.GRADLE FILE - PROJECT

```
// Top-level build file where you can add
// configuration options common to all sub-projects/modules.

buildscript {
    repositories {
        jcenter()
    }
    dependencies {
        classpath 'com.android.tools.build:gradle:1.0.0'

        // NOTE: Do not place your application dependencies
        // in the individual module build.gradle files
    }
}

allprojects {
    repositories {
        jcenter()
    }
}
```

SAMPLE BUILD.GRADLE FILE - MODULE / APP

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

android {
    compileSdkVersion 21
    buildToolsVersion "19.1.0"

    defaultConfig {
        applicationId "edu.utexas.scottm.bplteams"
        minSdkVersion 15
        targetSdkVersion 21
        versionCode 1
        versionName "1.0"
    }
    buildTypes {
        release {
            minifyEnabled false
            proguardFiles getDefaultProguardFile('proguard-android.txt'), 'proguard-r
        }
    }
}
```

EMULATORS

ANDROID EMULATOR OR ANDROID VIRTUAL DEVICE (AVD)

- Emulator is useful for testing apps but is not a substitute of a real device
- Emulators are called **Android Virtual Devices** (AVDs)
- Android SDK and AVD Manager allows you to create AVDs that target any Android API level
- AVD have configurable resolutions, RAM, SD cards, skins, and other hardware

ANDROID RUNTIME: DALVIK VM

- Subset of Java developed by Google
- JVM vs DVM ?
- Optimized for mobile devices (better memory management, battery utilization, etc.)
- Dalvik executes .dex files that are compiled from .class files
- Introduces new libraries
- Does not support some Java libraries like AWT, Swing

PRODUCING AN ANDROID APP