Lab 02
Android basic

Software Studio

DataLab, CS, NTHU

2022 spring

Outline

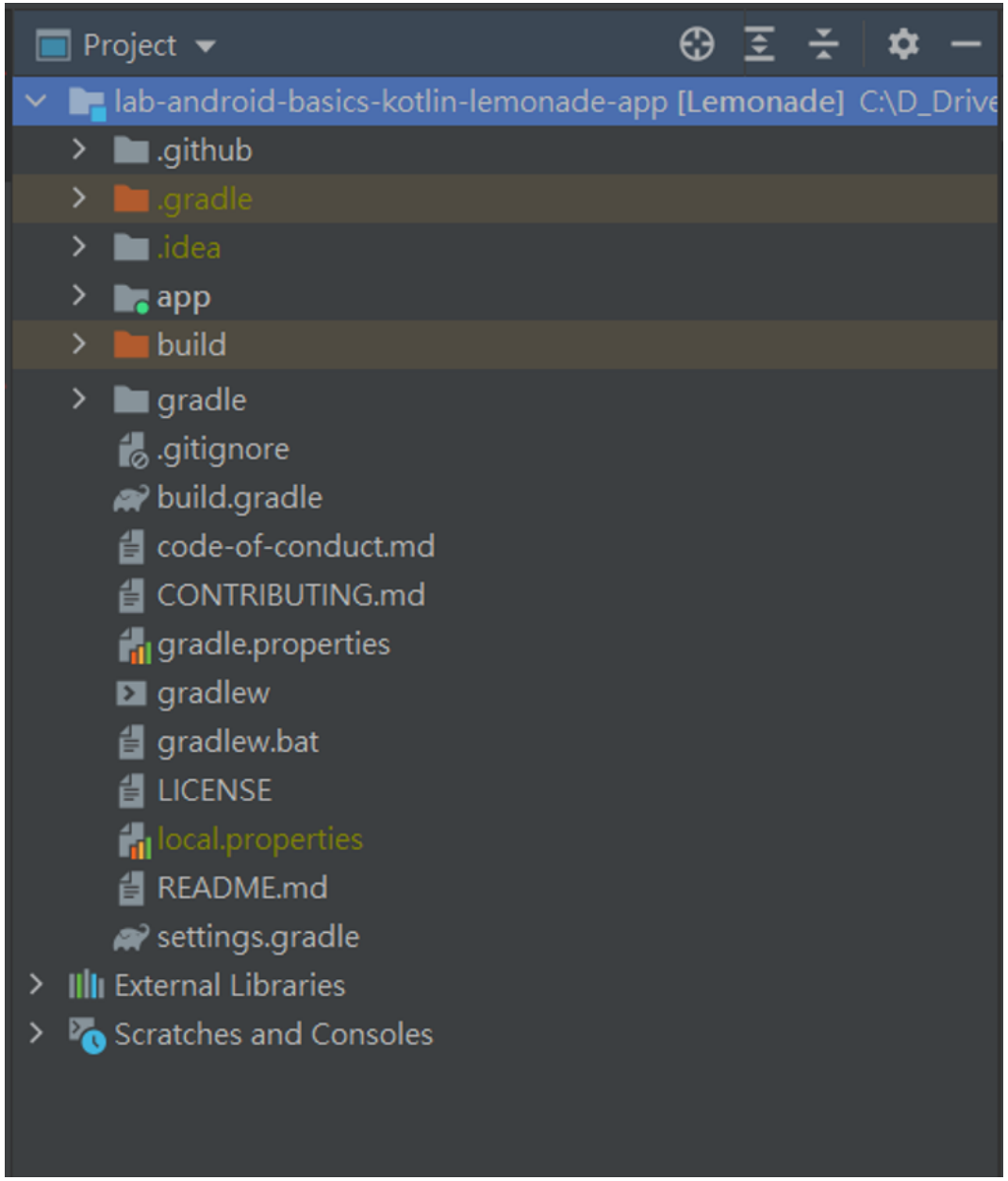
- Introduction to Android
- Folders in Android app
  - Activity
  - User Interface
  - View & View Group
- Some rare cases in test

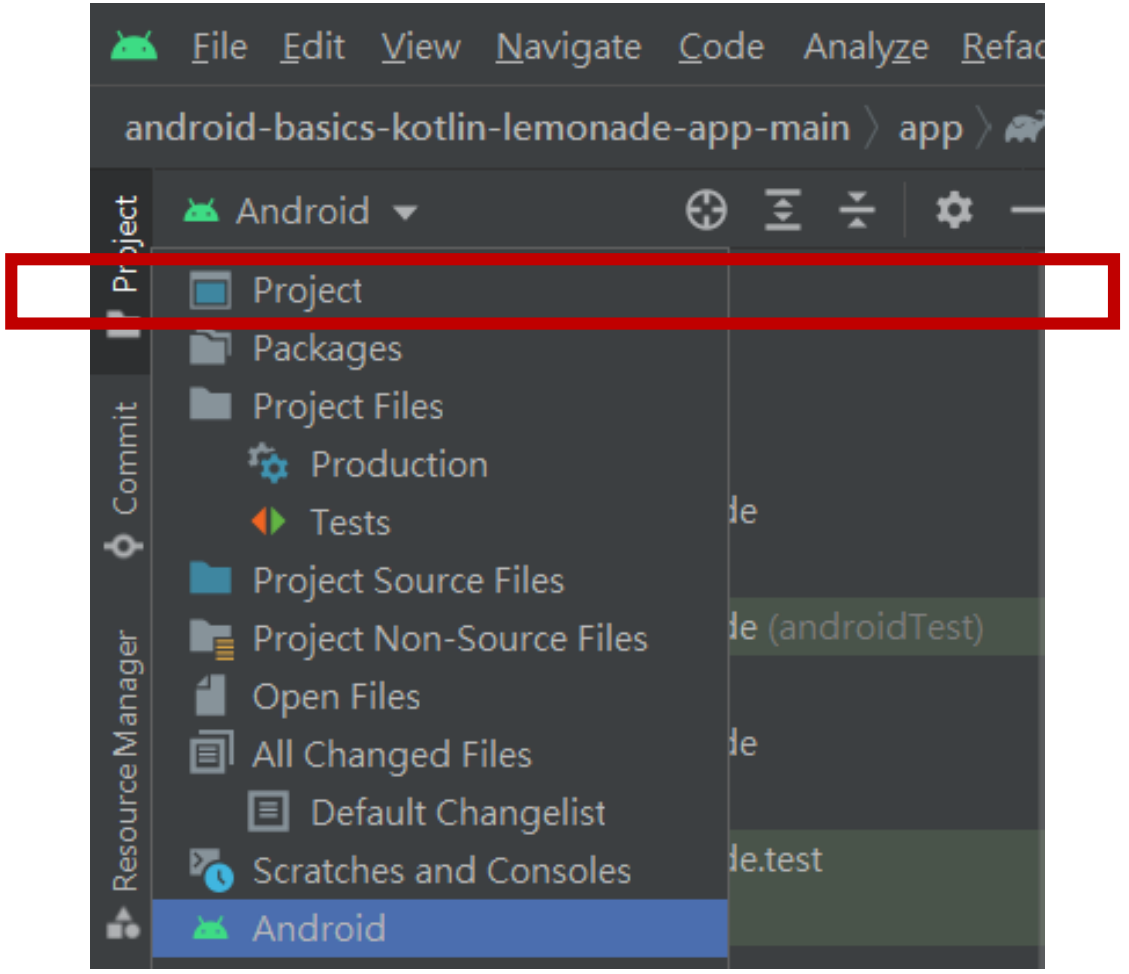
Introduction to Android

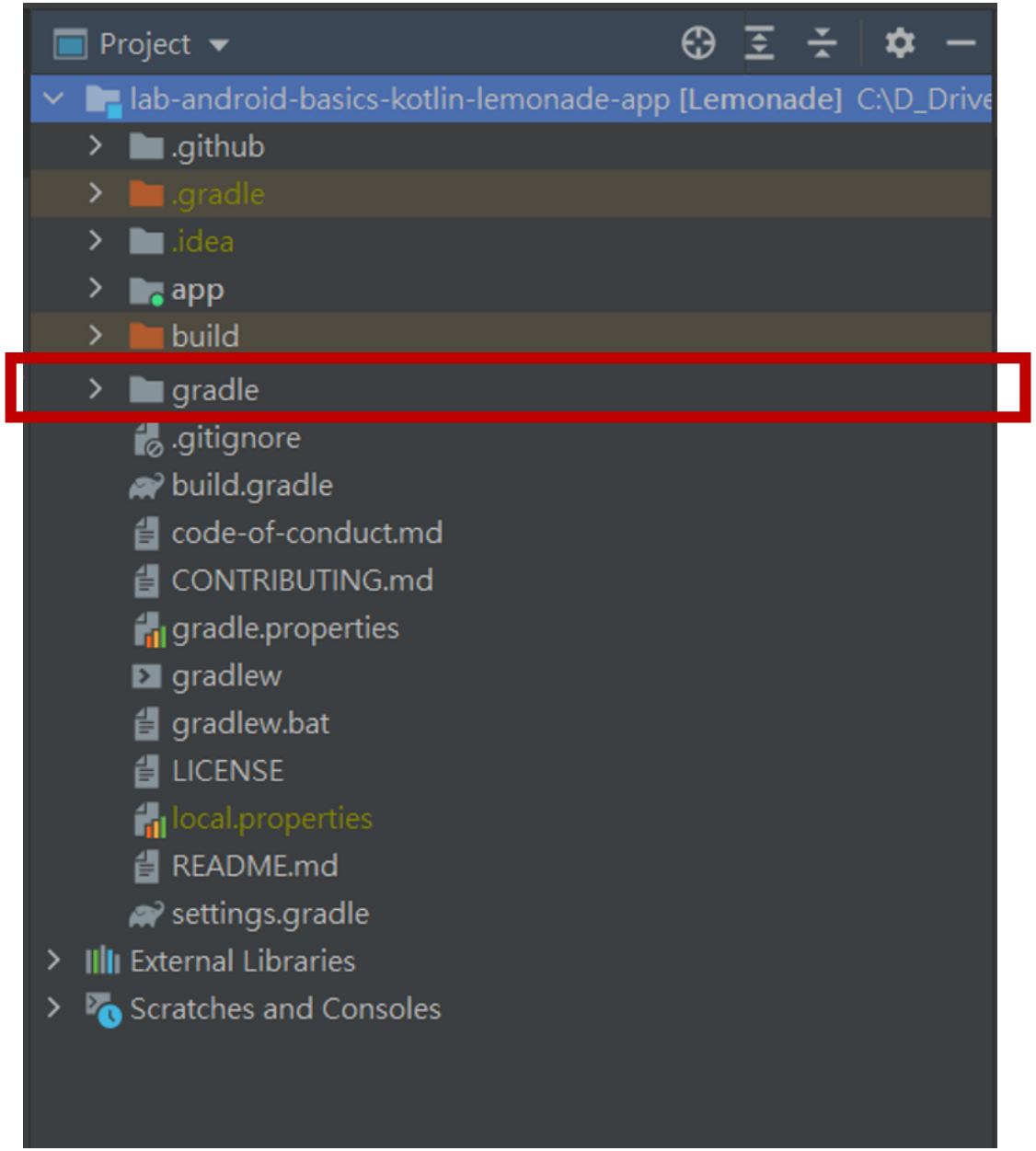
- Android is an *Operating System for mobile devices* developed by Google, which is built upon Linux kernel.

Introduction to Android

Folders In Android App

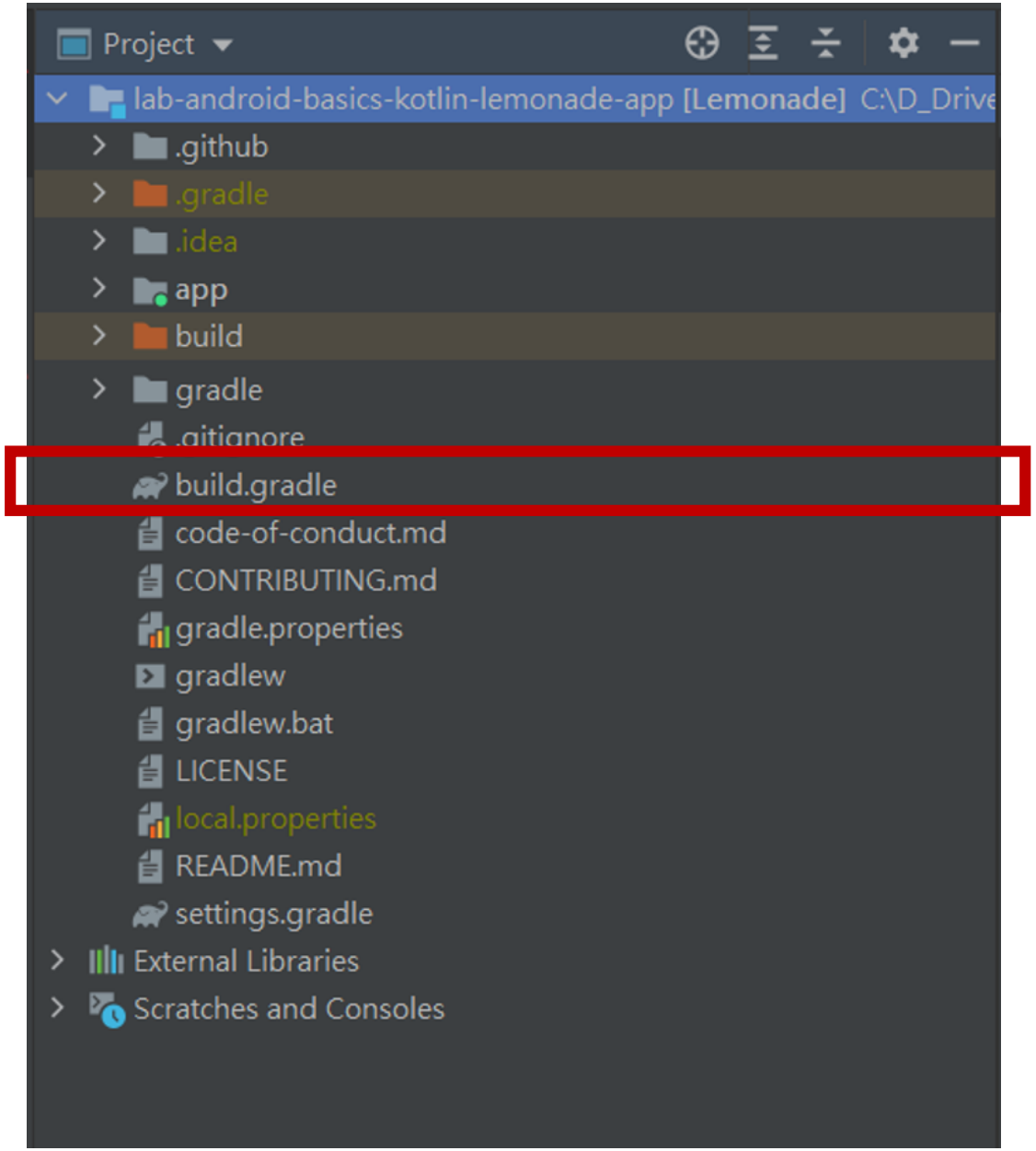






Folders In Android App

1. `gradle` folder
   - What is gradle?
   - Android Studio uses **Gradle**, an **advanced build toolkit**, to automate and manage the build process, while allowing you to define flexible custom build configurations.

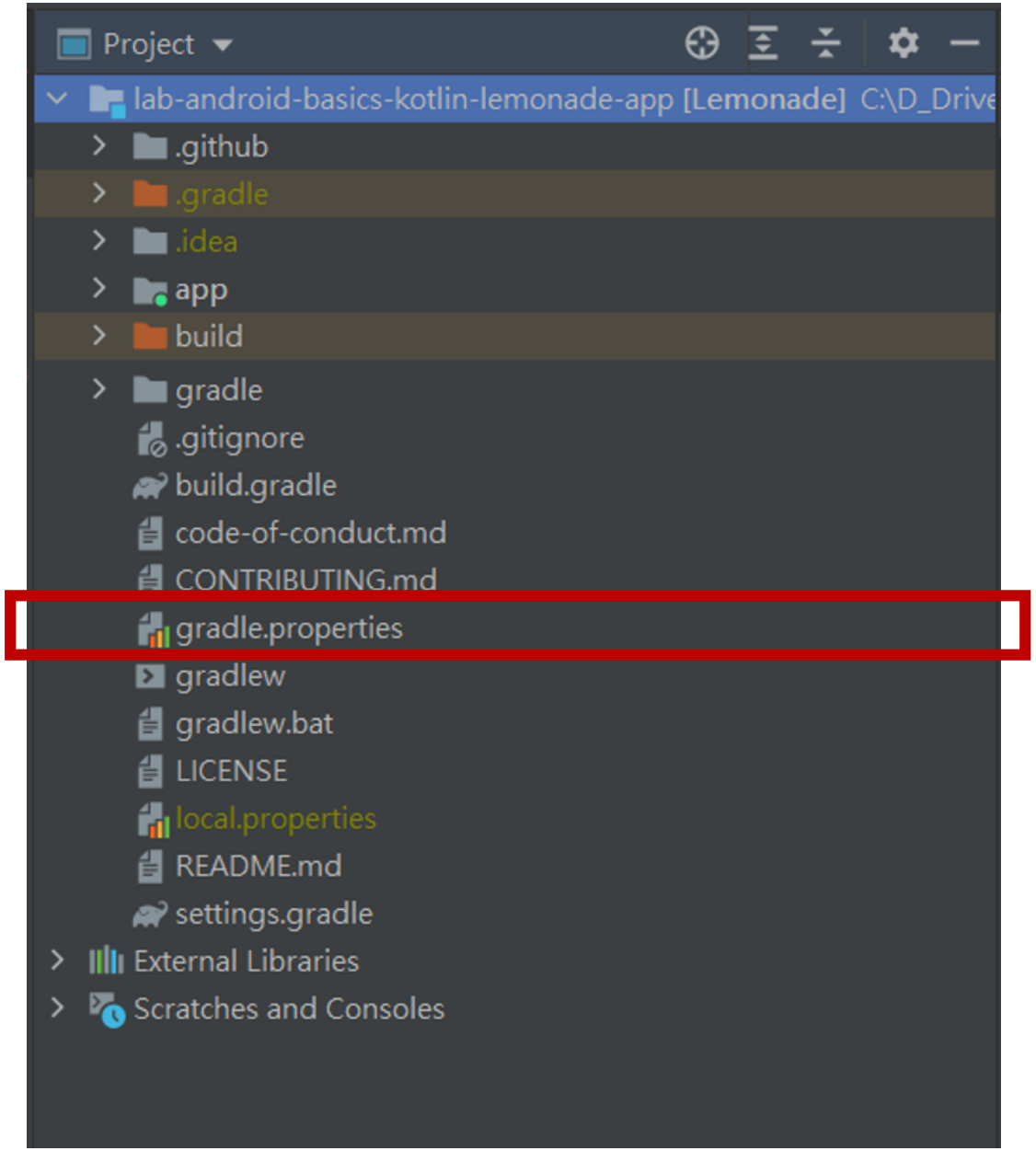


Folders In Android App

2. build.gradle (project level)
   - a Groovy-based DSL (domain specific language) for describing the builds.
   - define our dependencies

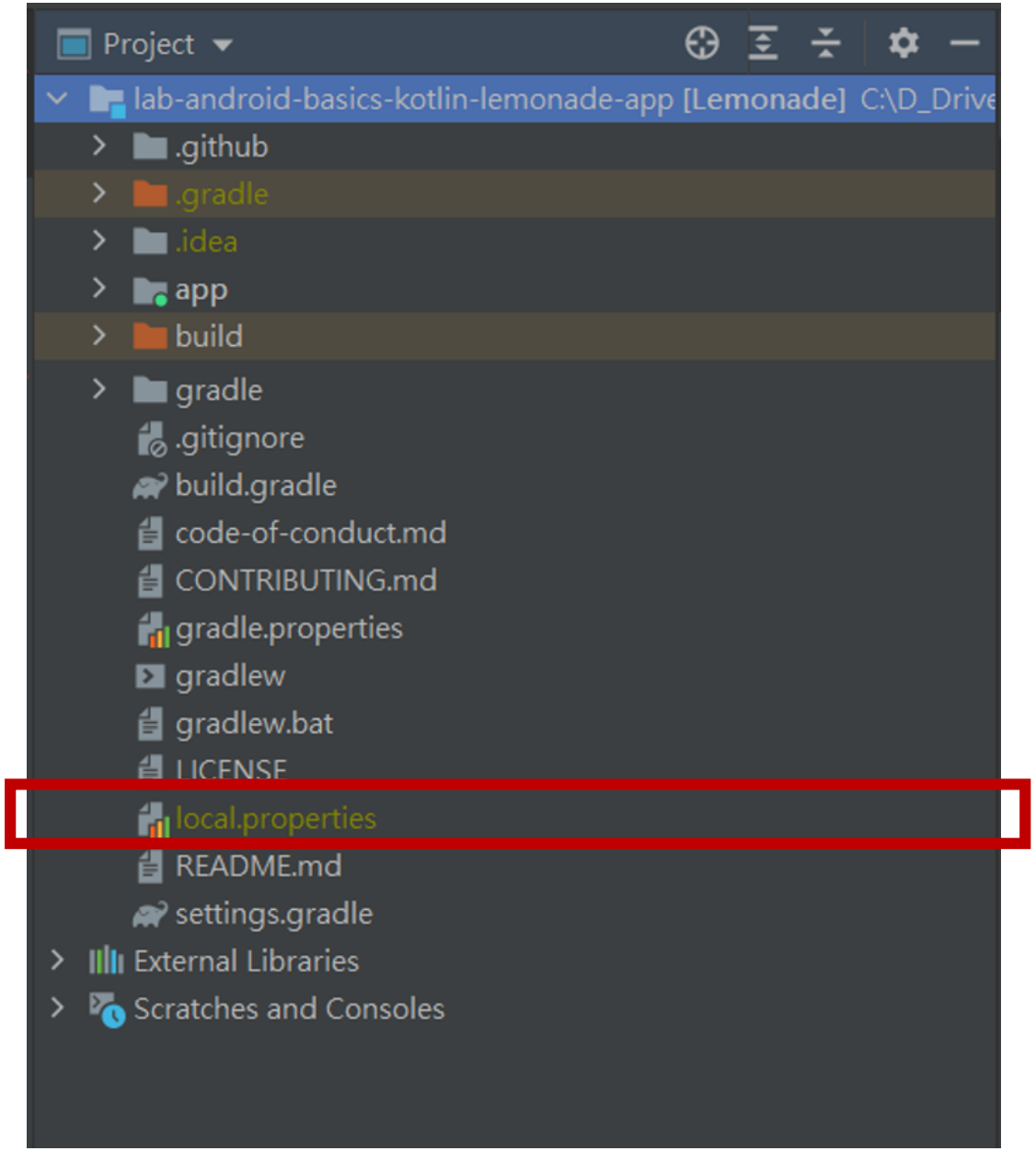
https://search.maven.org/

https://maven.google.com/web/index.html



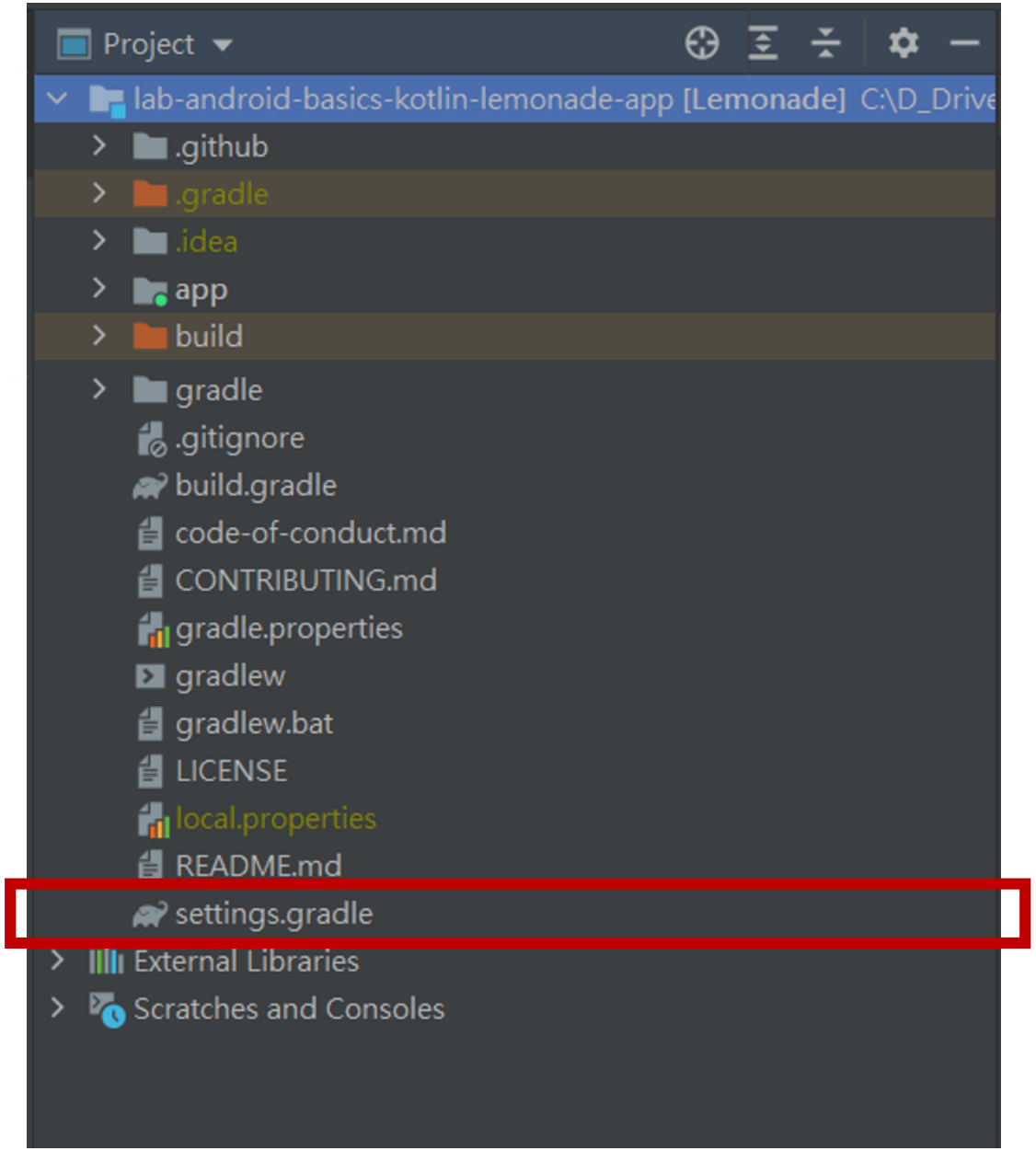
Folders In Android App

3. gradle.properties
   - configure project-wide Gradle settings



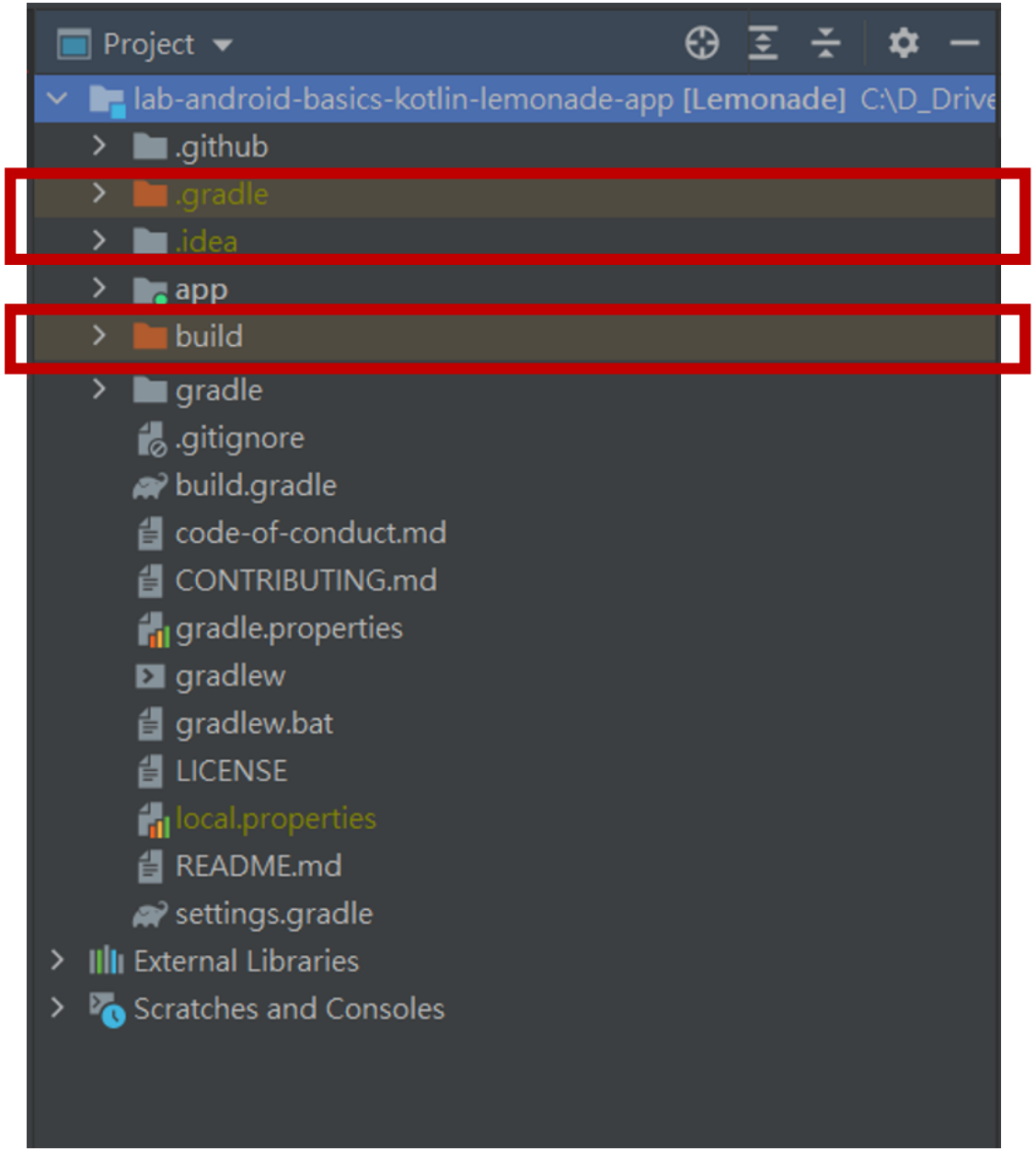
Folders In Android App

4. local.properties
   - Configures local environment properties for the build system, including the following:



Folders In Android App

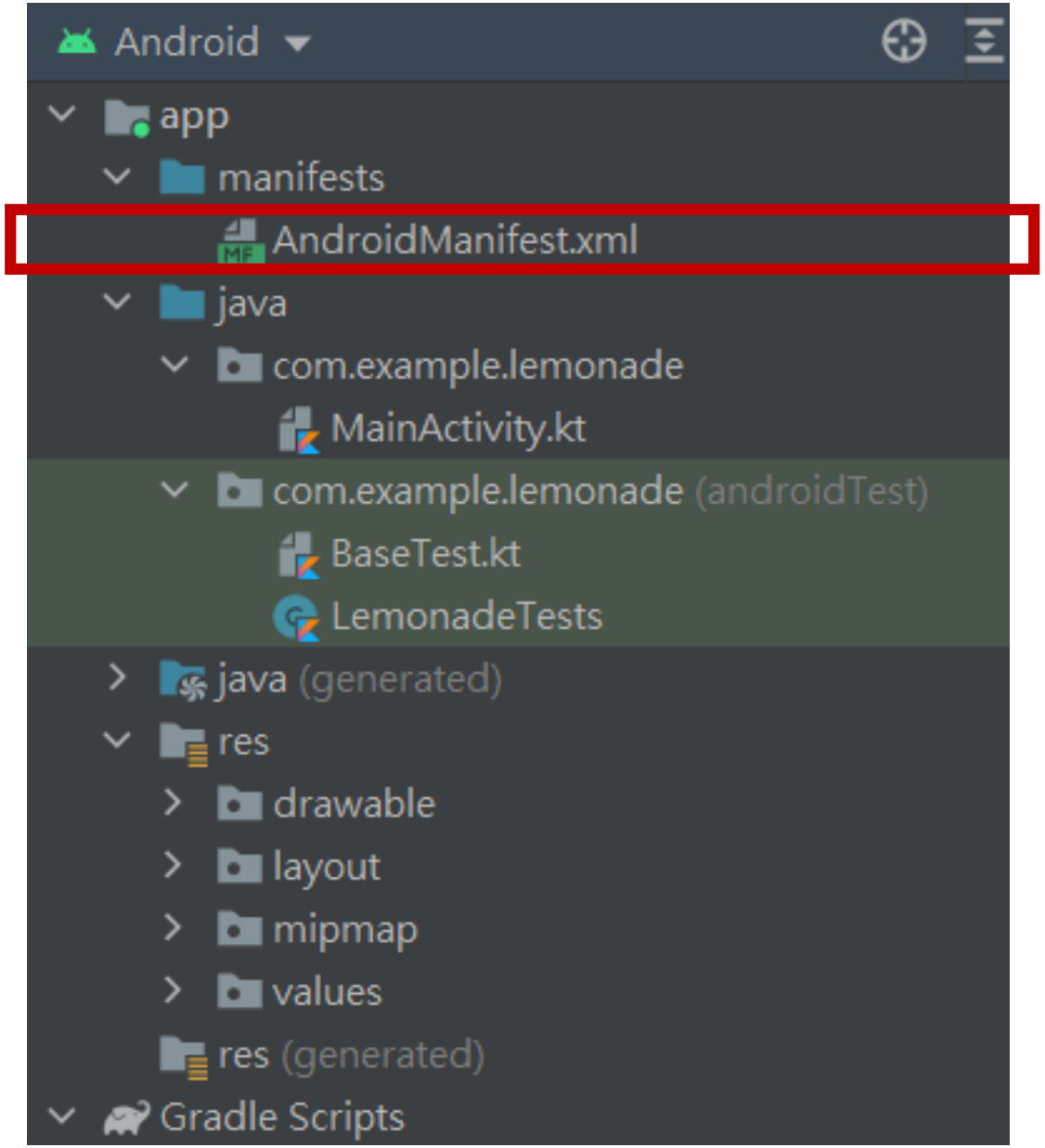
5. settings.gradle
   - defines project-level repository settings
   - tells Gradle which modules it should include when building your app.



Folders In Android App

These files can be ignored because they are generated after compile.

- .gradle
- .idea
- build



Inside `app` folder

1. `manifests` declare:
   - Components of the app including all **activities, services, broadcast receivers, and content providers**.
   - Permissions of accessing the system or other apps.
   - Hardware and software features the app requires.

Manifests

- Activity need to registered in Manifests.
- Contains all the definitions, such as **package name, activities, services, minimum level of the Android API, linked libraries, and permissions** that allow the Android OS to launch and run the application.

Manifests

xmlns: abbreviation of xml namespace

avoid the problem of same element

android: prefix of namespace

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.lemonade">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher_lemonade"
        android:label="@string/a
        android:roundIcon="@mi
        android:supportsRtl="true
        android:theme="@style/T
        <activity android:name="
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

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

</manifest>
```

Prefix:element

```
android:text="@string/lemon_select"
tools:text="@string/lemon_select"
```

Manifests

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.lemonade">  Keep this same as applicationId in build.gradle (module)

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher_lemonade"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_lemonade_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.Lemonade">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

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

</manifest>
```

Manifests

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.lemonade">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher_lemonade"
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        android:supportsRtl="true"
        android:theme="@style/Theme.Lemonade">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

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

</manifest>
```

Due to this

.MainActivity resolved to com.example.lemonade.MainActivity

Manifests

```
<activity android:name=".MainActivity">
    <intent-filter>
        <action android:name="android.intent.action.MAIN" />

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

Intent

Intents are like "glue" that enable different activities from different applications to work together.

Manifests

```
<activity android:name=".MainActivity">
    <intent-filter>
        <action android:name="android.intent.action.MAIN" />

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

Intent

declares an intention to do something, such as launching an activity, broadcasting a message, starting a service, display a web page, dialing or answering a phone call.

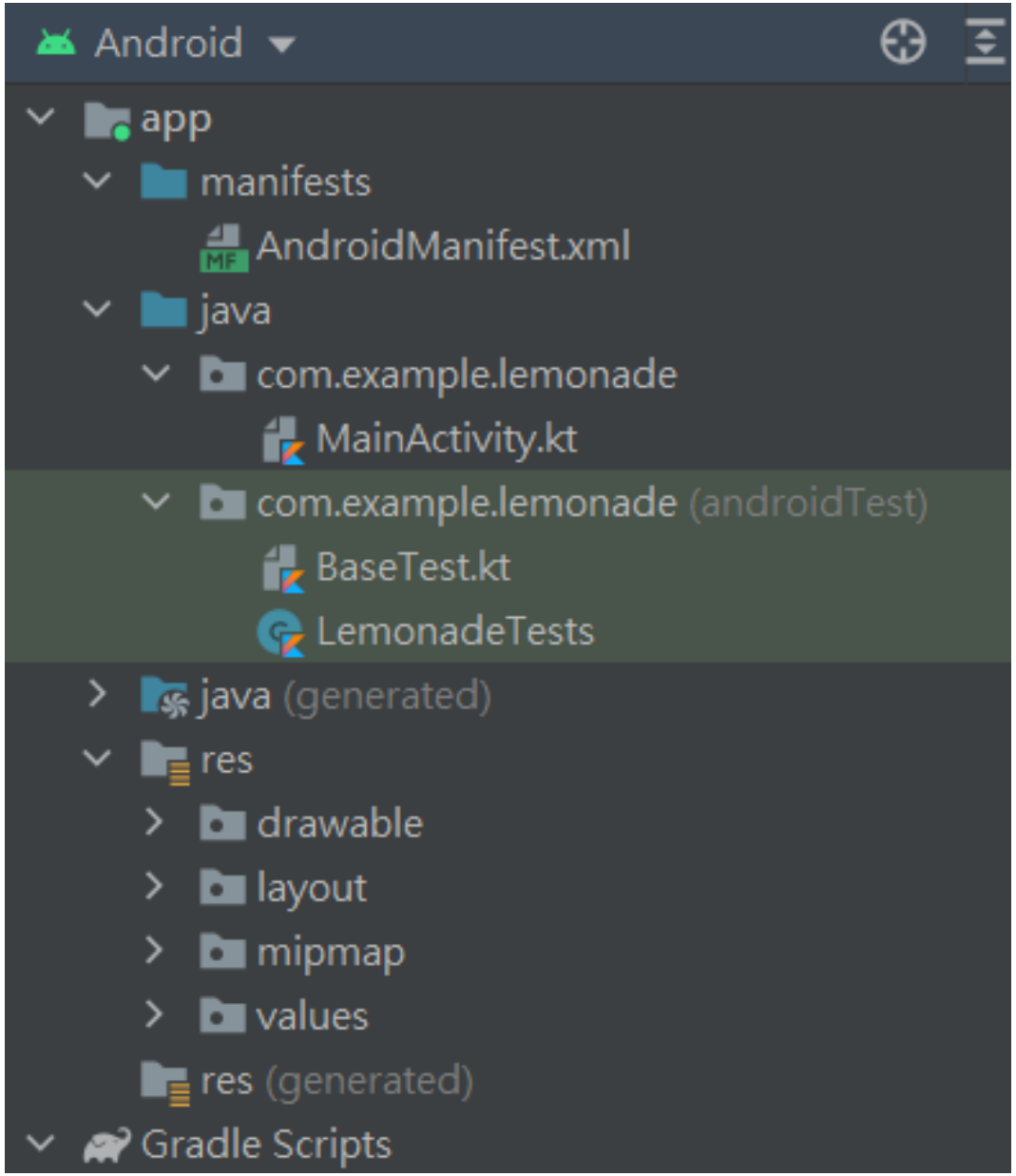
Manifests

```
<activity android:name=".MainActivity">
    <intent-filter>
        <action android:name="android.intent.action.MAIN" />

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

For more information

https://developer.android.com/guide/topics/manifest/manifest-intro



Inside `app` folder

2. Java (where we work)
   - Java & Kotlin file
   - androidTest: UI test
3. res
   - Images
   - Layouts
   - Strings
   - Icon

Activity

- An Android application could have one or more Activity.
- onCreate() is a call-back method, which is called back by the Android system when the activity is launched.

User Interface

- There are two ways to create User Interface (UI) on Android:
  1. Write Java&Kotlin codes.
  2. Layout via XML descriptions and let the system generates the Java code for you.

User Interface

Write Java codes.

```
public class MainActivity extends ..... {

   // REPLACE the ENTIRE onCreate() method as follows:
   @Override
   protected void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      TextView textView = new TextView(this);   // Construct a TextView UI component
      textView.setText("Hello, from my Java code!"); // Set the text message for TextView
      setContentView(textView);  // this Activity sets its content to the TextView
   }

   // Do not touch the rest of the codes, if any

}
```

User Interface

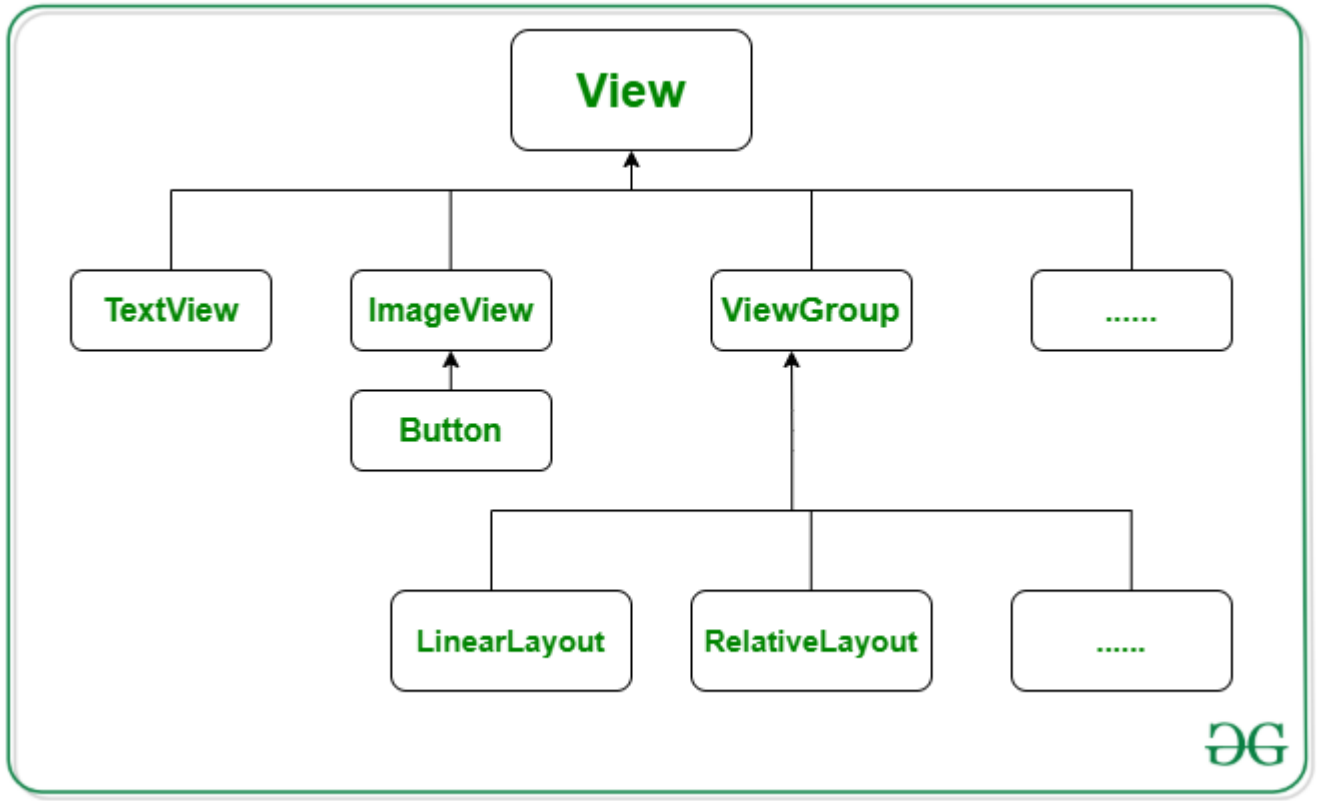
Layout via XML descriptions

```
class MainActivity : AppCompatActivity() {

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
    }
}
```

View & View Group

- A View is a UI component (or widget, or control).



View & View Group

- A View is a UI component (or widget, or control).
- Android provides many ready-to-use Views such as TextView, EditText, Button, RadioButton, etc, in package android.widget.

View & View Group

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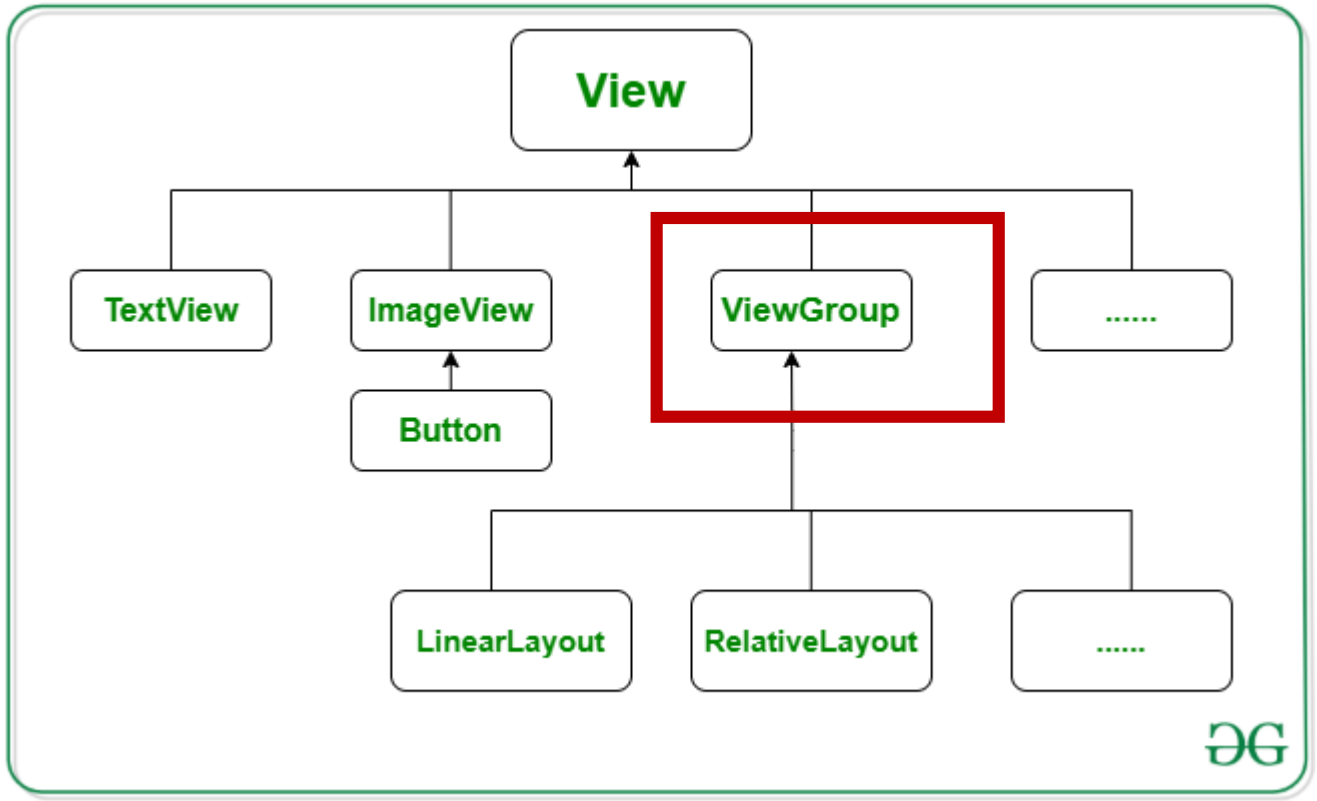

View & View Group

- A ViewGroup is an invisible **container** used to layout the View components.
- Android provides many ready-to-use ViewGroups such as LinearLayout, RelativeLayout, TableLayout and GridLayout in package android.widget.

Some rare cases in test

- androidx.test.espresso.PerfromException:Error

Some concerns

- Don’t worry about it.

keyboard shortcut

- Alt + Enter: Project quick fix
- Ctrl + O: override members
- Ctrl + Alt + L: Reformat code
- Ctrl + P: Show parameters for selected method
- Double Shift: Search everywhere