



instituto
superior de
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de lisboa



Anatomia de uma app Android

PDM - Programação para Dispositivos Móveis

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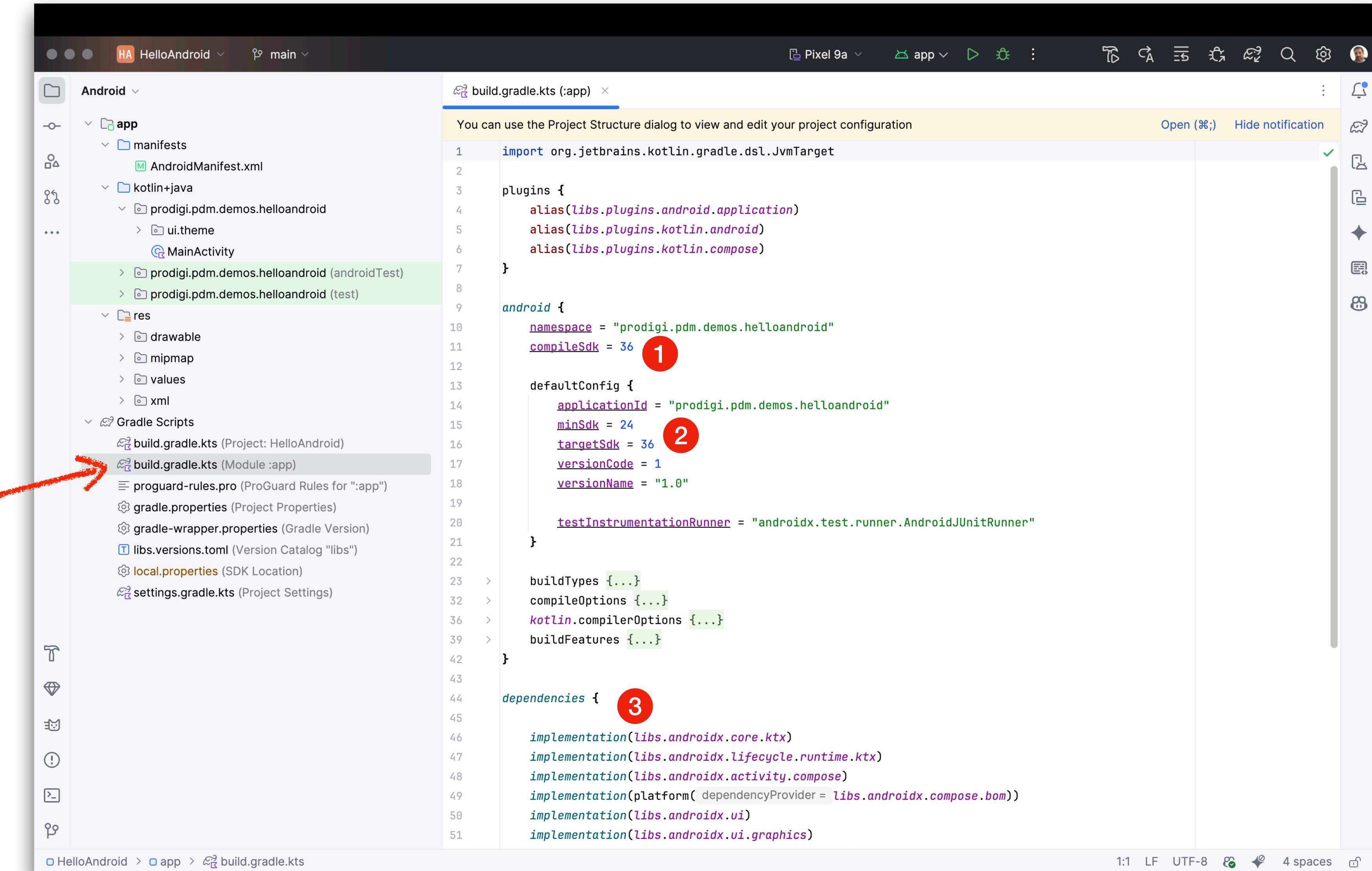


O pacote distribuível

- Build realizado com  **Gradle**
- Empacotamento é feito num ficheiro APK (Android Package) contendo
 - Código compilado (Dalvik VM)
 - Manifest: `AndroidManifest.xml`
 - Recursos da aplicação: texto, imagens, fontes, etc.



Build



build.gradle.kts (:app) x

You can use the Project Structure dialog to view and edit your project configuration

Open (⌘;) Hide notification

```
import org.jetbrains.kotlin.gradle.dsl.JvmTarget
plugins {
    alias(libs.plugins.android.application)
    alias(libs.plugins.kotlin.android)
    alias(libs.plugins.kotlin.compose)
}

android {
    namespace = "prodigi.pdm.demos.helloandroid"
    compileSdk = 36 1
    defaultConfig {
        applicationId = "prodigi.pdm.demos.helloandroid"
        minSdk = 24
        targetSdk = 36 2
        versionCode = 1
        versionName = "1.0"
        testInstrumentationRunner = "androidx.test.runner.AndroidJUnitRunner"
    }
    buildTypes {...}
    compileOptions {...}
    kotlin.compilerOptions {...}
    buildFeatures {...}
}

dependencies { 3
    implementation(libs.androidx.core.ktx)
    implementation(libs.androidx.lifecycle.runtime.ktx)
    implementation(libs.androidx.activity.compose)
    implementation(platform(dependencyProvider = libs.androidx.compose.bom))
    implementation(libs.androidx.ui)
    implementation(libs.androidx.ui.graphics)
}
```

1: compileSdk = 36
2: targetSdk = 36
3: dependencies block

Android

app

manifests

AndroidManifest.xml

kotlin+java

prodigi.pdm.demos.helloandroid

ui.theme

MainActivity

prodigi.pdm.demos.helloandroid (androidTest)

prodigi.pdm.demos.helloandroid (test)

res

drawable

mipmap

values

xml

Gradle Scripts

build.gradle.kts (Project: HelloAndroid)

build.gradle.kts (Module :app) →

proguard-rules.pro (ProGuard Rules for ":app")

gradle.properties (Project Properties)

gradle-wrapper.properties (Gradle Version)

libs.versions.toml (Version Catalog "libs")

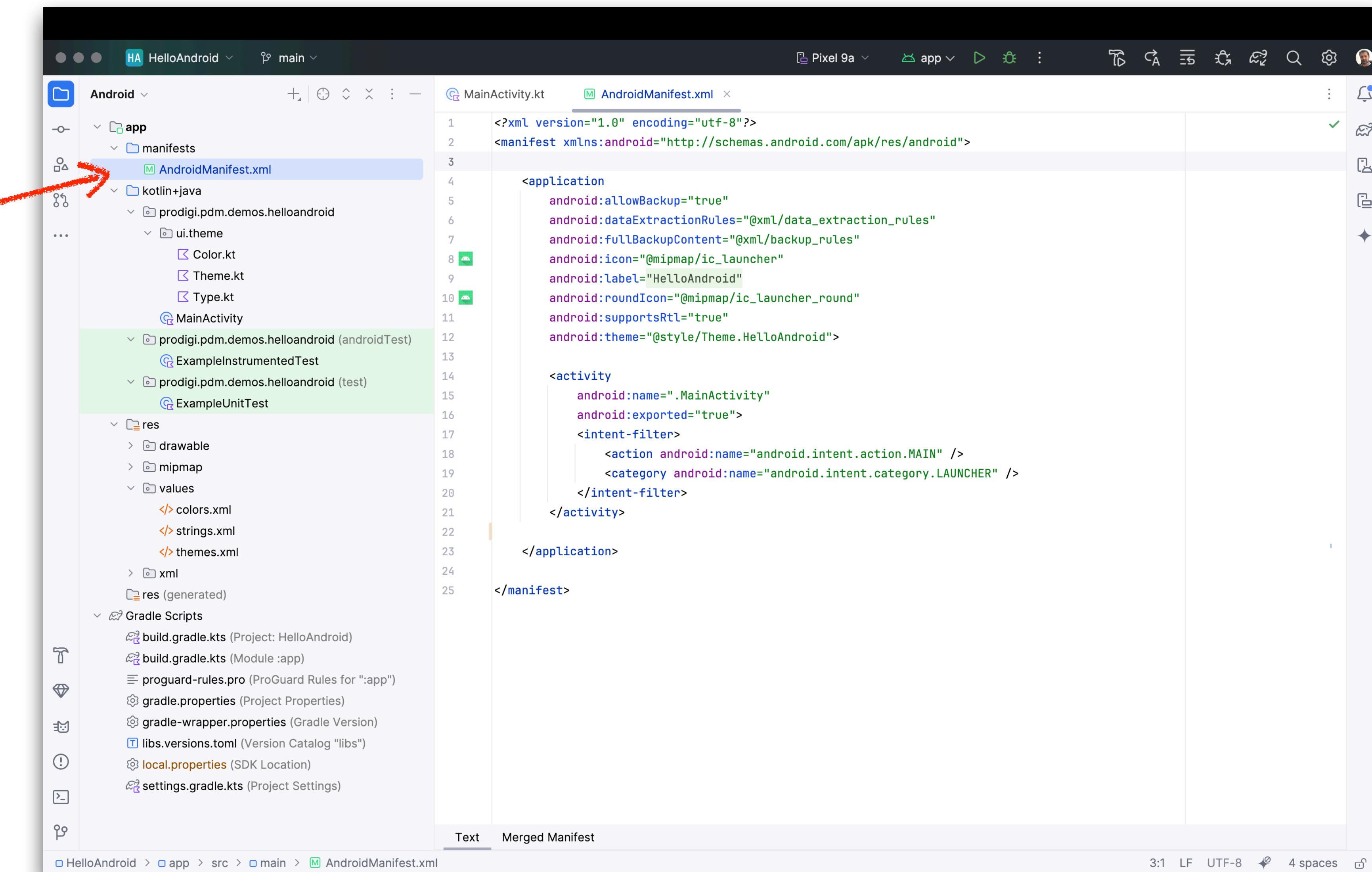
local.properties (SDK Location)

settings.gradle.kts (Project Settings)

1: LF 2: UTF-8 3: 4 spaces



Manifesto [1]



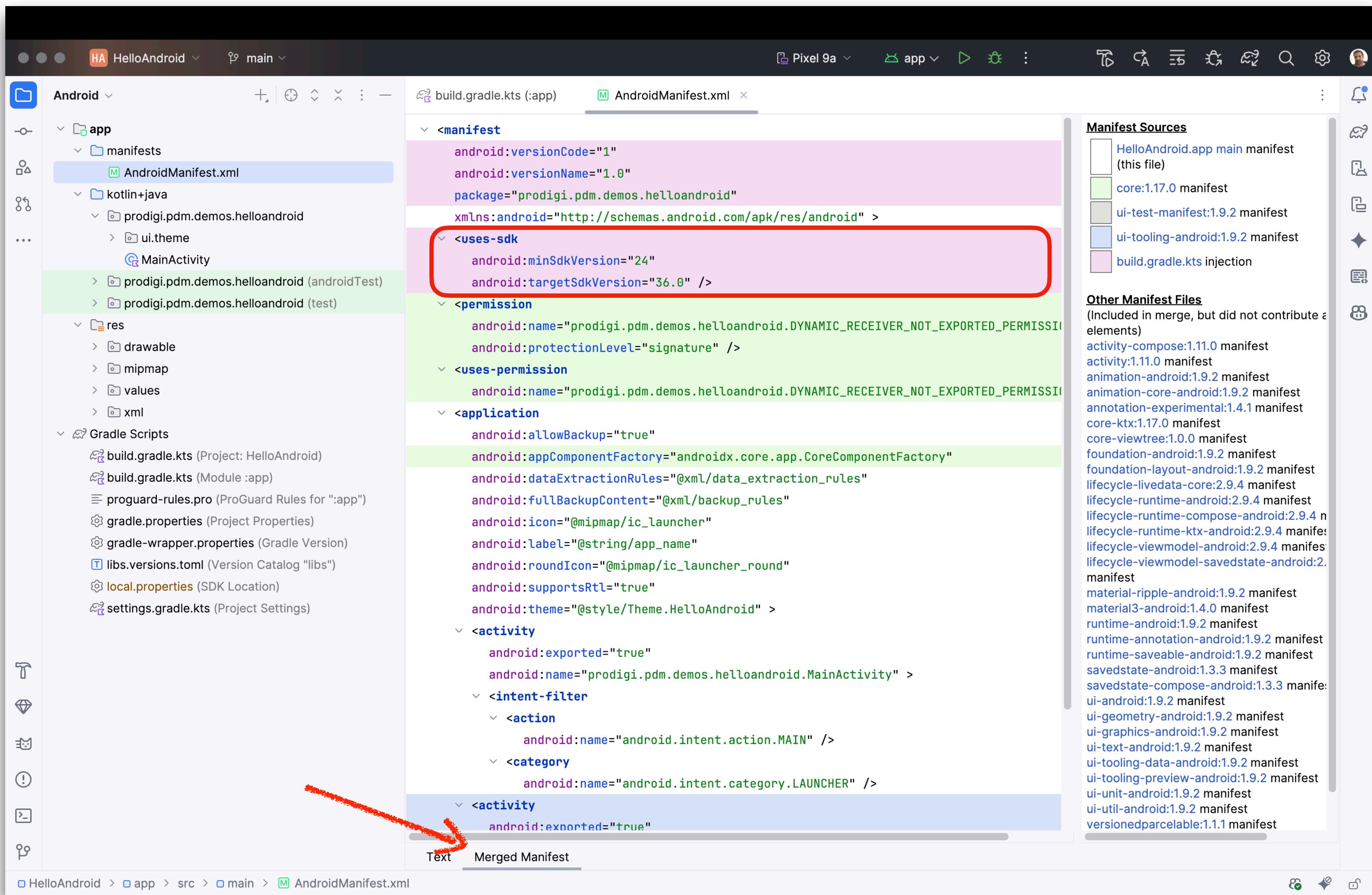
The screenshot shows the Android Studio interface with the project 'HelloAndroid' open. The left sidebar displays the project structure, including the 'app' module with its 'manifests' folder containing the 'AndroidManifest.xml' file, which is highlighted with a red arrow. The main editor window shows the XML code for the manifest:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android">
    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="HelloAndroid"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.HelloAndroid">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```

The bottom of the editor shows the status bar with 'HelloAndroid > app > src > main > AndroidManifest.xml' and '3:1 LF UTF-8 4 spaces'.



Manifesto [2]



AndroidManifest.xml

```
<manifest>
    <manifest>
        <uses-sdk>
            <minSdkVersion>24</minSdkVersion>
            <targetSdkVersion>36.0</targetSdkVersion>
        </uses-sdk>
        <permission>
            <name>prodigi.pdm.demos.helloandroid.DYNAMIC_RECEIVER_NOT_EXPORTED_PERMISSION</name>
            <protectionLevel>signature</protectionLevel>
        </permission>
        <uses-permission>
            <name>prodigi.pdm.demos.helloandroid.DYNAMIC_RECEIVER_NOT_EXPORTED_PERMISSION</name>
        </uses-permission>
        <application>
            <allowBackup>true</allowBackup>
            <componentFactory>androidx.core.app.CoreComponentFactory</componentFactory>
            <dataExtractionRules>@xml/data_extraction_rules</dataExtractionRules>
            <fullBackupContent>@xml/backup_rules</fullBackupContent>
            <icon>@mipmap/ic_launcher</icon>
            <label>@string/app_name</label>
            <roundIcon>@mipmap/ic_launcher_round</roundIcon>
            <supportsRtl>true</supportsRtl>
            <theme>@style/Theme.HelloAndroid</theme>
            <activity>
                <exported>true</exported>
                <name>prodigi.pdm.demos.helloandroid.MainActivity</name>
                <intent-filter>
                    <action>android.intent.action.MAIN</action>
                    <category>android.intent.category.LAUNCHER</category>
                </intent-filter>
                <activity>
                    <exported>true</exported>
                </activity>
            </activity>
        </application>
    </manifest>

```

Manifest Sources

- HelloAndroid.app main manifest (this file)
- core:1.17.0 manifest
- ui-test-manifest:1.9.2 manifest
- ui-tooling-android:1.9.2 manifest
- build.gradle.kts injection

Other Manifest Files

- activity-compose:1.11.0 manifest
- activity:1.11.0 manifest
- animation-android:1.9.2 manifest
- animation-core-android:1.9.2 manifest
- annotation-experimental:1.4.1 manifest
- core-ktx:1.17.0 manifest
- core-viewtree:1.0.0 manifest
- foundation-android:1.9.2 manifest
- foundation-layout-android:1.9.2 manifest
- lifecycle-livedata-core:2.9.4 manifest
- lifecycle-runtime-android:2.9.4 manifest
- lifecycle-runtime-compose-android:2.9.4 manifest
- lifecycle-runtime-ktx-android:2.9.4 manifest
- lifecycle-viewmodel-android:2.9.4 manifest
- lifecycle-viewmodel-savedstate-android:2.9.4 manifest
- material-ripple-android:1.9.2 manifest
- material3-android:1.4.0 manifest
- runtime-android:1.9.2 manifest
- runtime-annotation-android:1.9.2 manifest
- runtime-saveable-android:1.9.2 manifest
- savedstate-android:1.3.3 manifest
- savedstate-compose-android:1.3.3 manifest
- ui-android:1.9.2 manifest
- ui-geometry-android:1.9.2 manifest
- ui-graphics-android:1.9.2 manifest
- ui-text-android:1.9.2 manifest
- ui-tooling-data-android:1.9.2 manifest
- ui-tooling-preview-android:1.9.2 manifest
- ui-unit-android:1.9.2 manifest
- ui-util-android:1.9.2 manifest
- versionedparcelable:1.1 manifest

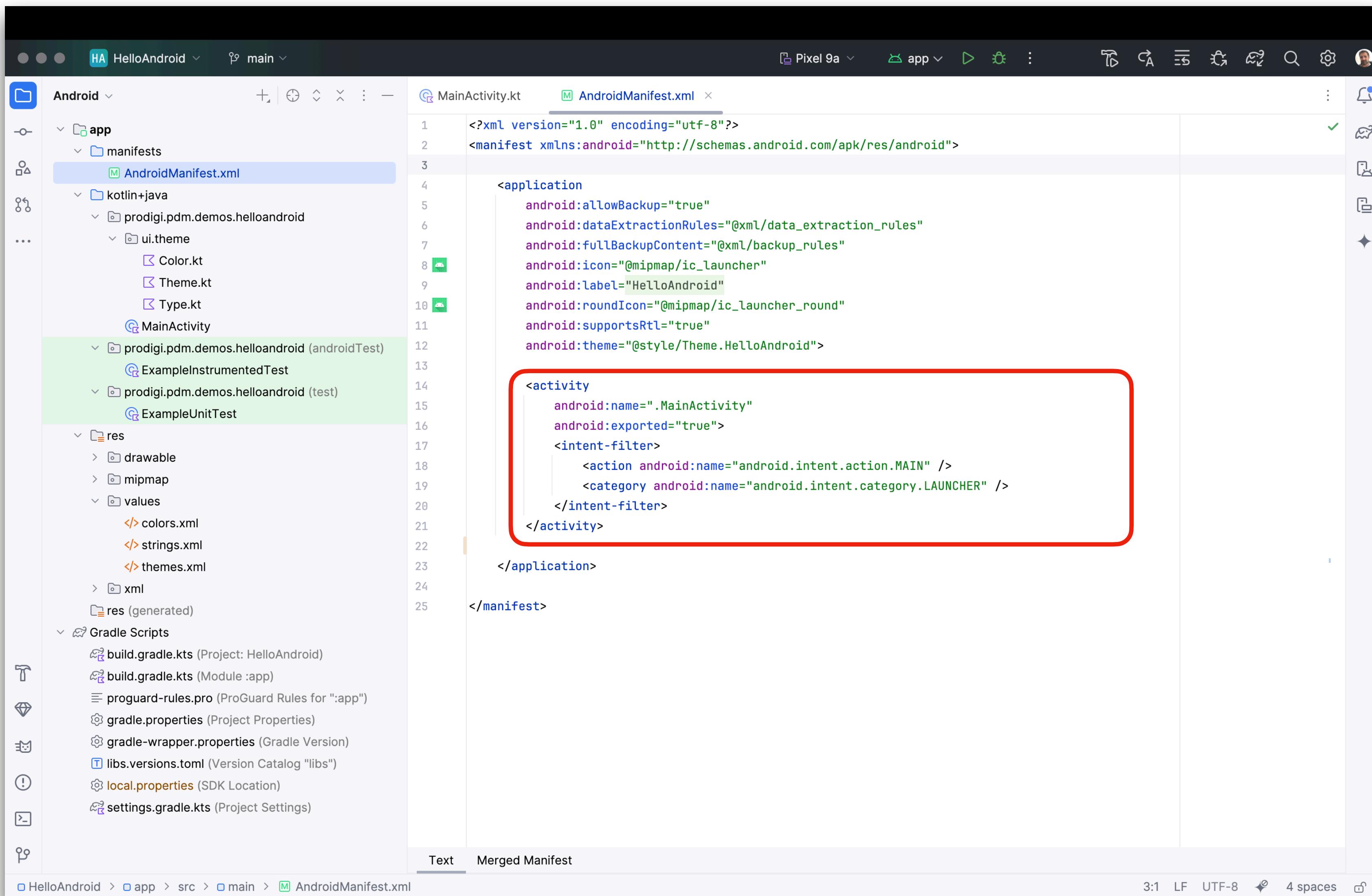


Componentes Android

- Elementos potencialmente acessíveis do exterior (i.e. *entry points*)
 - Activity ←
 - Service
 - Broadcast Receiver
 - Content Provider



Manifesto [3]

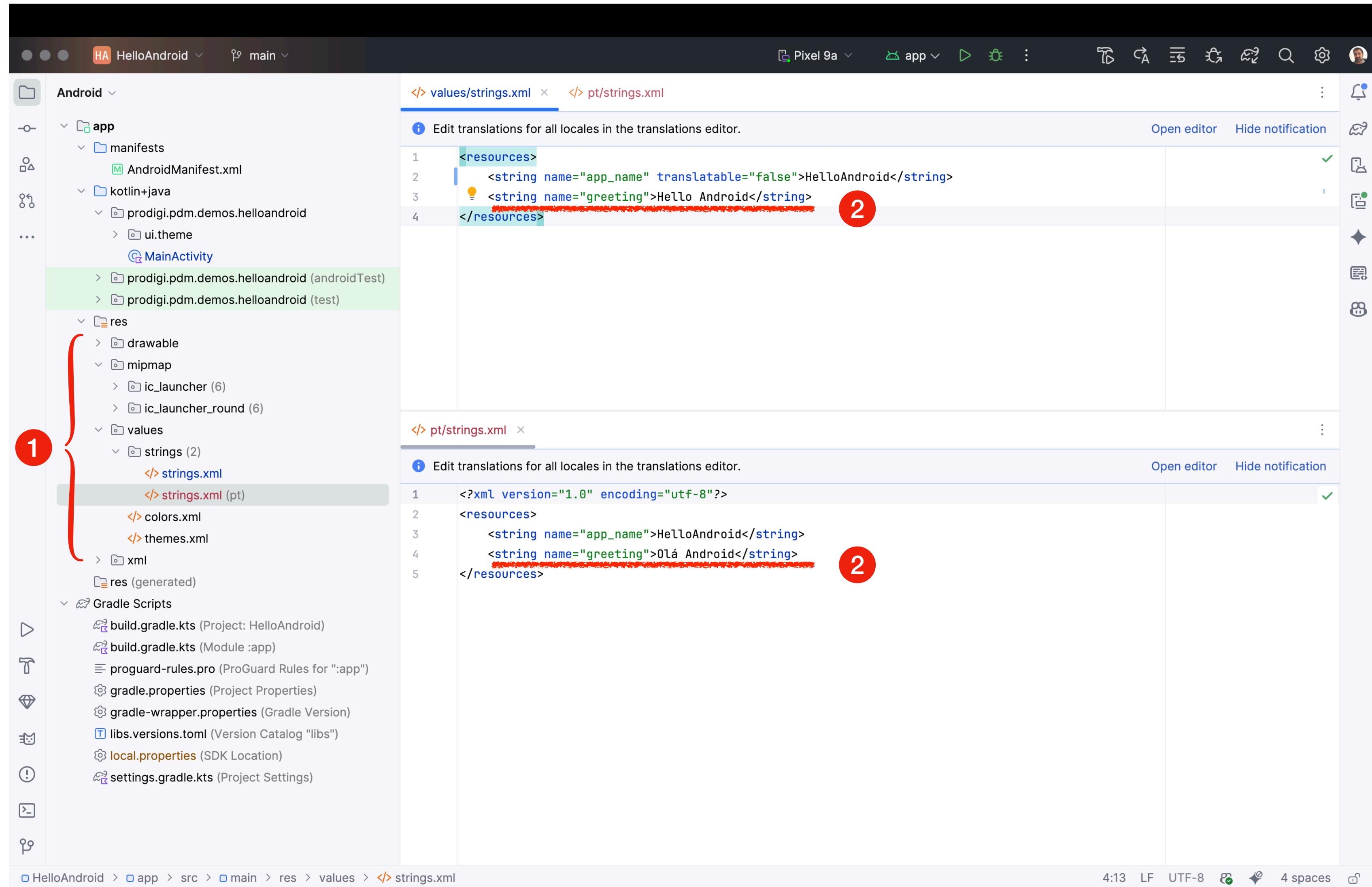


The image shows the Android Studio interface with the project 'HelloAndroid' open. The left sidebar shows the project structure with the 'AndroidManifest.xml' file selected. The main editor shows the XML code for the manifest. A red box highlights the `<activity>` tag, which defines the main activity of the application.

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android">
    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="HelloAndroid"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.HelloAndroid">
        <activity
            android:name=".MainActivity"
            android:exported="true"
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```



Recursos



1

2

2

Pixel 9a app 4:13 LF UTF-8 4 spaces

values/strings.xml x pt/strings.xml

1 Edit translations for all locales in the translations editor. Open editor Hide notification

2

```
<resources>
    <string name="app_name" translatable="false">HelloAndroid</string>
    <string name="greeting">Hello Android</string>
</resources>
```

pt/strings.xml x

1 Edit translations for all locales in the translations editor. Open editor Hide notification

2

```
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <string name="app_name">HelloAndroid</string>
    <string name="greeting">Olá Android</string>
</resources>
```

0 HelloAndroid > app > src > main > res > values > strings.xml



Activity - Primeiro olhar

```
1 class MainActivity : ComponentActivity() {
2     override fun onCreate(savedInstanceState: Bundle?) {
3         super.onCreate(savedInstanceState)
4         enableEdgeToEdge()
5         setContent {
6             HelloAndroidTheme {
7                 Scaffold(modifier = Modifier.fillMaxSize()) { innerPadding ->
8                     Text(
9                         text = stringResource(id = R.string.greeting),
10                        modifier = Modifier.padding(paddingValues = innerPadding)
11                    )
12                }
13            }
14        } // setContent ends
15    } // onCreate ends
16 } // class ends
```



A saber (ou rever)

- **Classes** - <https://kotlinlang.org/docs/classes.html>
- **Interfaces** - <https://kotlinlang.org/docs/interfaces.html>
- **Herança e polimorfismo** - <https://kotlinlang.org/docs/inheritance.html>
- ***Companion objects*** - <https://kotlinlang.org/docs/object-declarations.html>
- **Funções de extensão** - <https://kotlinlang.org/docs/extensions.html>
- **HOFs e lambdas** - <https://kotlinlang.org/docs/lambdas.html>





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