



instituto
superior de
engenharia
de lisboa



Anatomia de uma app Android

PDM - Programação para Dispositivos Móveis

Paulo Pereira
paulo.pereira@isel.pt

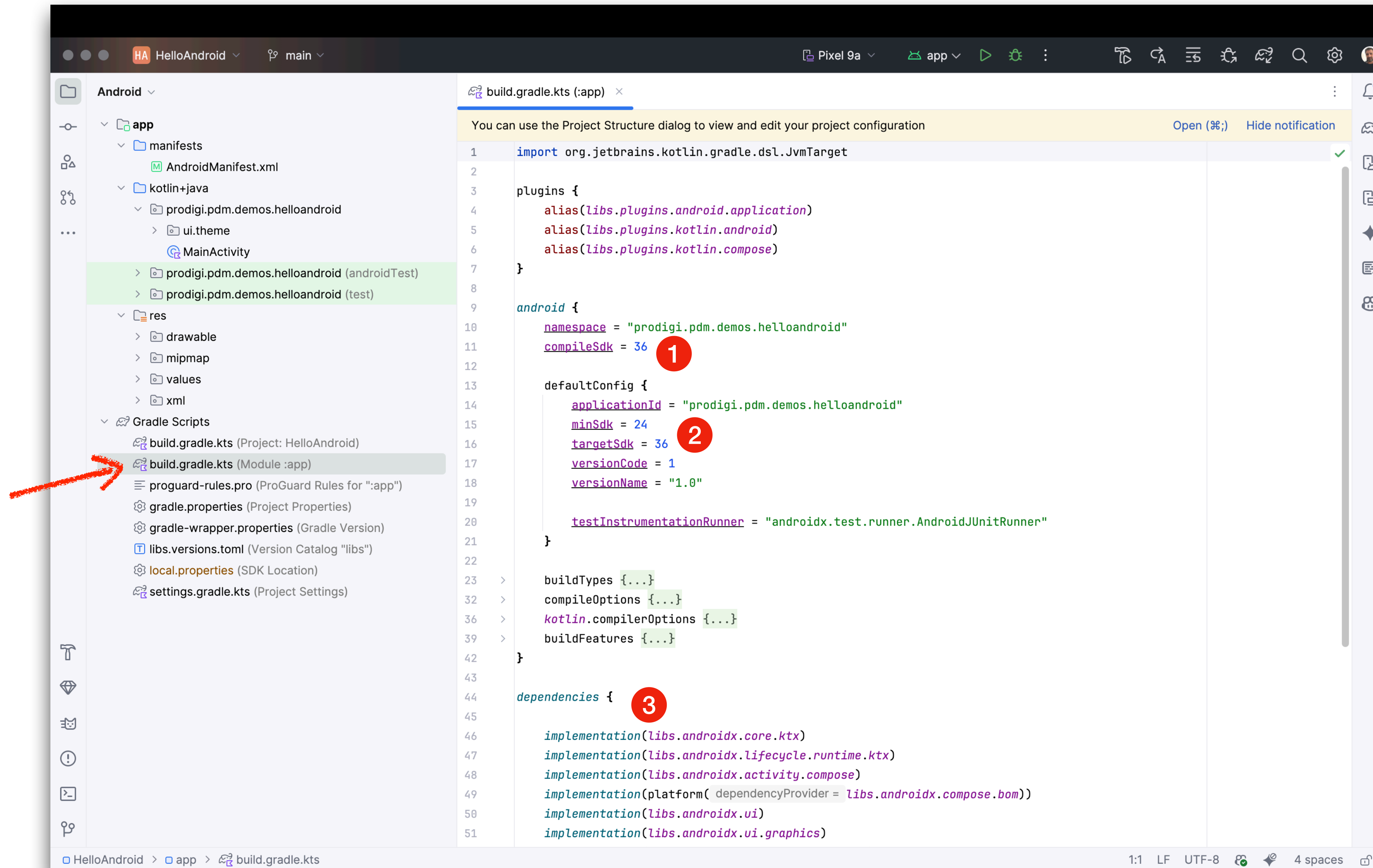
PRO
DIGI

O pacote distribuível

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



Build

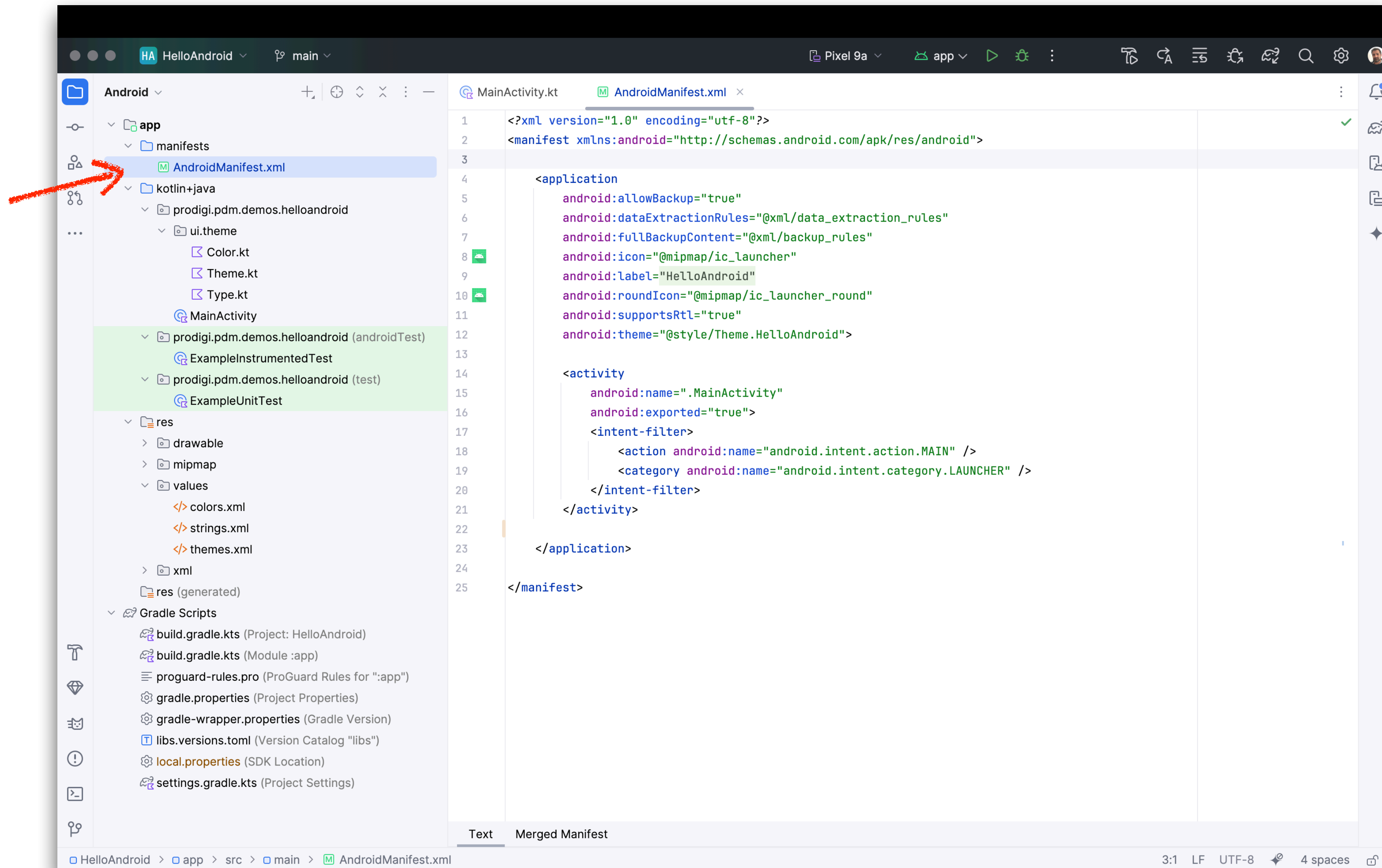


The screenshot displays the Android Studio IDE. On the left, the 'Project' view shows the 'app' module selected, with a red arrow pointing to the 'build.gradle.kts (Module :app)' file. The main editor shows the content of this file, which is a Kotlin Gradle script. The script includes imports, plugin declarations, and configuration blocks for the Android build system. Three red circles with numbers 1, 2, and 3 are placed over the `compileSdk`, `minSdk`, and `dependencies` sections respectively. A yellow notification bar at the top of the editor area states: 'You can use the Project Structure dialog to view and edit your project configuration' with links to 'Open (⌘;)' and 'Hide notification'.

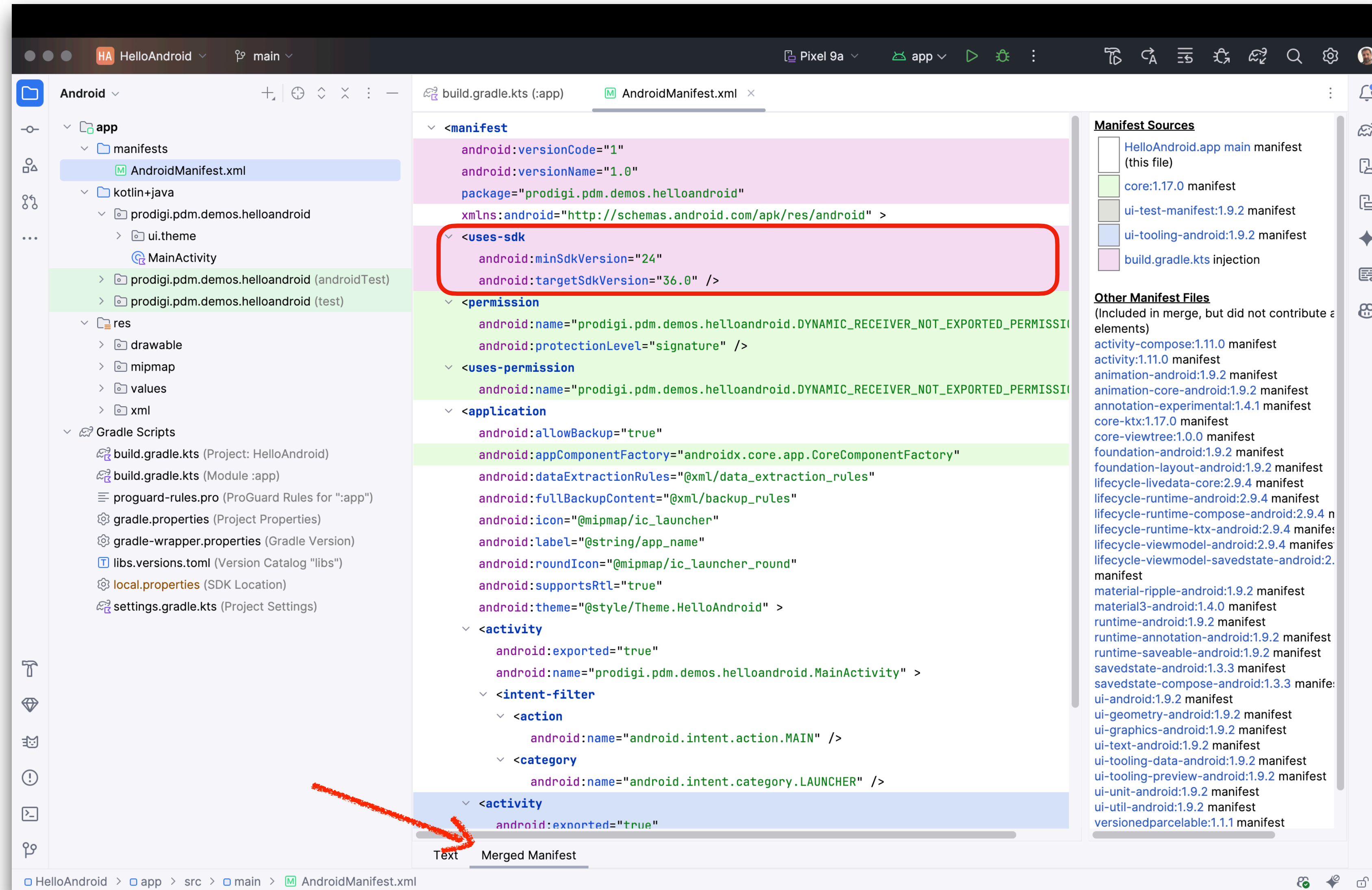
```
1 import org.jetbrains.kotlin.gradle.dsl.JvmTarget
2
3 plugins {
4     alias(libs.plugins.android.application)
5     alias(libs.plugins.kotlin.android)
6     alias(libs.plugins.kotlin.compose)
7 }
8
9 android {
10     namespace = "prodigi.pdm.demos.helloandroid"
11     compileSdk = 36 1
12
13     defaultConfig {
14         applicationId = "prodigi.pdm.demos.helloandroid"
15         minSdk = 24 2
16         targetSdk = 36
17         versionCode = 1
18         versionName = "1.0"
19
20         testInstrumentationRunner = "androidx.test.runner.AndroidJUnitRunner"
21     }
22
23     buildTypes {
24         ...
25     }
26     compileOptions {
27         ...
28     }
29     kotlin.compilerOptions {
30         ...
31     }
32     buildFeatures {
33         ...
34     }
35 }
36
37 dependencies { 3
38     implementation(libs.androidx.core.ktx)
39     implementation(libs.androidx.lifecycle.runtime.ktx)
40     implementation(libs.androidx.activity.compose)
41     implementation(platform(dependencyProvider = libs.androidx.compose.bom))
42     implementation(libs.androidx.ui)
43     implementation(libs.androidx.ui.graphics)
44 }
```



Manifesto (1)



Manifesto [2]



The screenshot displays the Android Studio IDE with the `AndroidManifest.xml` file open. The file is structured as follows:

```
<manifest>  
  android:versionCode="1"  
  android:versionName="1.0"  
  package="prodigi.pdm.demos.helloandroid"  
  xmlns:android="http://schemas.android.com/apk/res/android" >  
    <uses-sdk  
      android:minSdkVersion="24"  
      android:targetSdkVersion="36.0" />  
    <permission  
      android:name="prodigi.pdm.demos.helloandroid.DYNAMIC_RECEIVER_NOT_EXPORTED_PERMISSION"  
      android:protectionLevel="signature" />  
    <uses-permission  
      android:name="prodigi.pdm.demos.helloandroid.DYNAMIC_RECEIVER_NOT_EXPORTED_PERMISSION" />  
    <application  
      android:allowBackup="true"  
      android:appComponentFactory="androidx.core.app.CoreComponentFactory"  
      android:dataExtractionRules="@xml/data_extraction_rules"  
      android:fullBackupContent="@xml/backup_rules"  
      android:icon="@mipmap/ic_launcher"  
      android:label="@string/app_name"  
      android:roundIcon="@mipmap/ic_launcher_round"  
      android:supportRtl="true"  
      android:theme="@style/Theme.HelloAndroid" >  
      <activity  
        android:exported="true"  
        android:name="prodigi.pdm.demos.helloandroid.MainActivity" >  
        <intent-filter>  
          <action  
            android:name="android.intent.action.MAIN" />  
          <category  
            android:name="android.intent.category.LAUNCHER" />  
        </intent-filter>  
      </activity>  
    </application>  
  </manifest>
```

The right sidebar shows the 'Manifest Sources' and 'Other Manifest Files' sections. The 'Manifest Sources' section lists the following sources:

- HelloAndroid.app main manifest (this file)
- core:1.7.0 manifest
- ui-test-manifest:1.9.2 manifest
- ui-tooling-android:1.9.2 manifest
- build.gradle.kts injection

The 'Other Manifest Files' section lists various system and library manifests, including activity-compose, activity, animation, annotation-experimental, core-ktx, core-viewtree, foundation, lifecycle-livedata-core, lifecycle-runtime-android, lifecycle-runtime-compose-android, lifecycle-runtime-ktx-android, lifecycle-viewmodel-android, lifecycle-viewmodel-savedstate-android, material-ripple-android, material3-android, runtime-android, runtime-annotation-android, runtime-saveable-android, savedstate-android, savedstate-compose-android, ui-android, ui-geometry-android, ui-graphics-android, ui-text-android, ui-tooling-data-android, ui-tooling-preview-android, ui-unit-android, ui-util-android, and versionedparcelable.

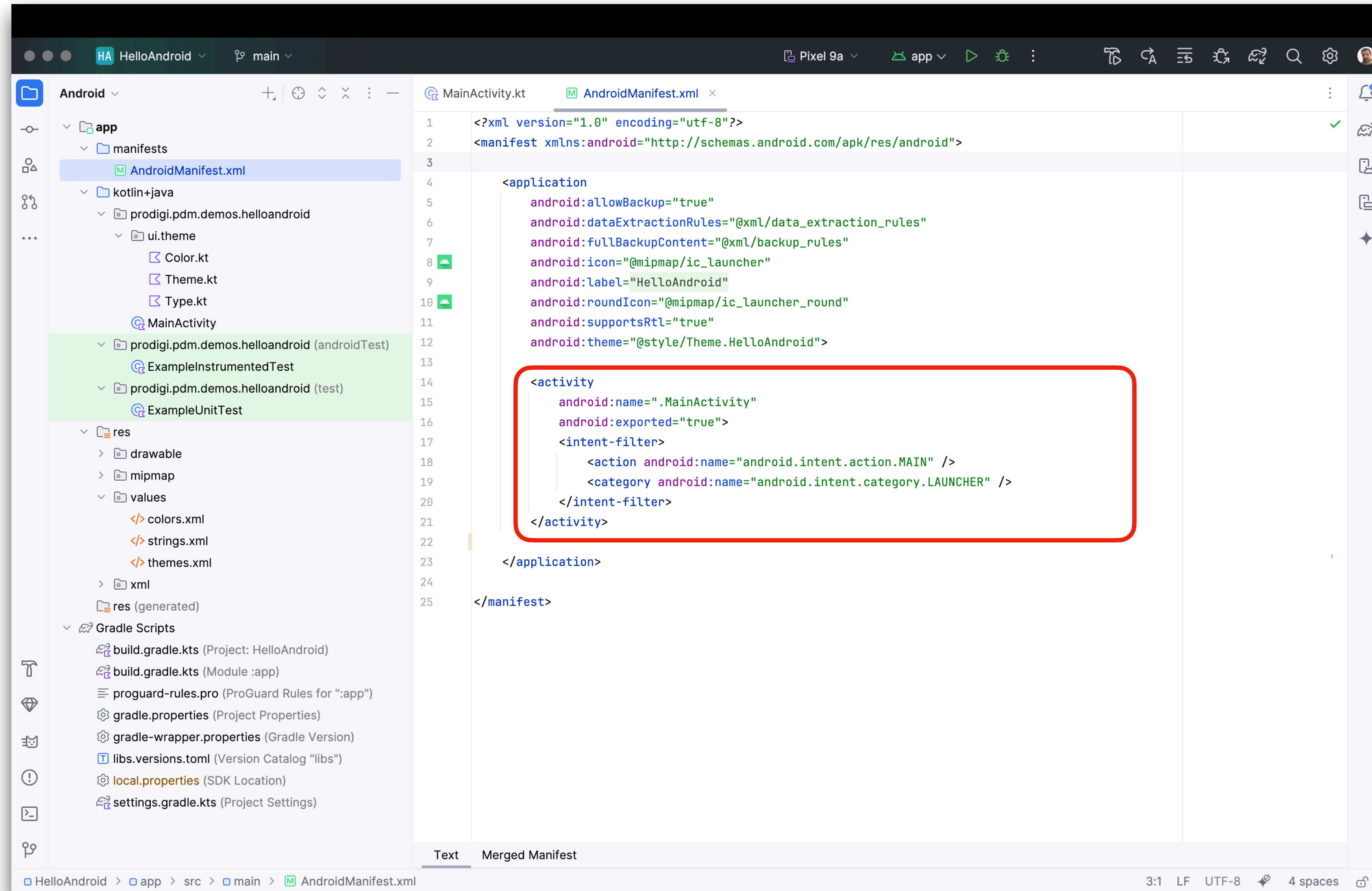


Componentes Android

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



Manifesto (3)



Recursos

The screenshot displays the Android Studio IDE. On the left, the 'Project' view shows the file structure of the 'HelloAndroid' project. A red bracket labeled '1' highlights the 'res' directory, specifically the 'values' folder and its 'strings.xml' files. The main editor area shows two open files: 'values/strings.xml' and 'pt/strings.xml'. Both files are in the 'translations editor' view. The 'values/strings.xml' file contains the following XML code:

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

A red circle labeled '2' points to the 'greeting' string. The 'pt/strings.xml' file contains the following XML code:

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

A red circle labeled '2' points to the 'greeting' string in the Portuguese file. The bottom status bar shows the current file path: 'HelloAndroid > app > src > main > res > values > strings.xml'.



Activity - Primeiro olhar

```
1 class MainActivity : ComponentActivity() {  
    override fun onCreate(savedInstanceState: Bundle?) {  
        super.onCreate(savedInstanceState)  
        enableEdgeToEdge()  
2        setContent {  
            HelloAndroidTheme {  
                Scaffold(modifier = Modifier.fillMaxSize()) { innerPadding ->  
3                    Text(  
4                        text = stringResource(id = R.string.greeting),  
                        modifier = Modifier.padding(paddingValues = innerPadding)  
                    )  
                }  
            }  
        } // setContent ends  
    } // onCreate ends  
} // 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>





instituto
superior de
engenharia
de lisboa



POLITÉCNICO
DE LISBOA
POLYTECHNIC
UNIVERSITY OF LISBON

Anatomia de uma app Android

PDM - Programação para Dispositivos Móveis

Paulo Pereira
paulo.pereira@isel.pt

PRO
DIGI