بِسْمِ اللهِ الرَّحْمٰنِ الرَّحِيْمِ

قَالَ رَبِّ ٱشْرَحْ لِى صَدْرِى وَيَسِّرْ لِىٓ أَمْرِى
وَٱحْلُلْ عُقْدَةً مِّن لِّسَانِى يَفْقَهُوا۟ قَوْلِى

وَقُل رَّبِّ زِدْنِى عِلْمًا

قَالُوا۟ سُبْحَٰنَكَ
لَا عِلْمَ لَنَآ إِلَّا مَا عَلَّمْتَنَآ
إِنَّكَ أَنتَ ٱلْعَلِيمُ ٱلْحَكِيمُ

IDE
First Program

Mobile Computing

LECTURE 04

IDE

First Program

Instructor:

Maulana Haq Nawaz

تصحیح نیت

حضرت محمد صلی اللہ علیہ وسلم نے فرمایا

اِنَّمَا الْاَعْمَالُ بِالنِّـیَّاتِ

ترجمہ

اعمال کا دارومدار نیتوں پر

دُعا

DUA FOR PARENTS
رَّبِّ ارْحَمْهُمَا كَمَا رَبَّيَانِي صَغِيراً
Rabbi irhamhuma kama rabbayanee sagheera
"My Lord, have mercy upon them as they brought me up [when I was] small."
Quran-17:24

- Spent Quality time With parents
- Daily
- Without gadgets
- Make Dua for them
- Ask them for Dua regular base

Little Efforts Daily Will Make You the Greatest

To systematically learn and get excellence in any concept / subject

- روز کا کام روز کریں
- اک مہینے کا کھانا ایک دن میں نہیں کھایا جا سکتا،
ایسے ہی ایک مہینے کا کام ایک دن میں نہیں ہو سکتا

Little Efforts Daily Will Make You the Greatest

Importance of completing tasks on daily basis

Main Reason of Failure in Life

- یہ کام کل کریں گے
- جو کام کبھی بھی ہو سکتا ہے وہ کبھی نہیں ہوتا
- زندگی ایک دن ہے اور وہ ہے آج۔ زندگی میں کل نام کی کوئی چیز نہیں ہے
- جو دن آپ کی زندگی سے چلا گیا اب واپس نہیں آئے گا
- آج کا کام آج ہی ہوسکتا ہے
- جو گز گیا وہ آنا نہیں ، آنے والے دن کا پتہ نہیں ، آج میدان جما ہے تو اینے جوہر دکھاؤ

How to Achieve BIG Goals in Life

Balanced Life is Ideal Life ☺

To achieve BIG Goals in Life

- **Make a Schedule of 24 Hours with a focus on Five main components of Human Life**
  - **Health**
    - **Physical Health**
    - **Mental Health**
    - **Social Health**
  - **Spirituality**
  - **Work**
  - **Family**
  - **Friends**

جو کام کریں دل سے کریں

کام کرنا.

خوشی خوشی کام کرنا.

اللہ کو ساتھ لے کرخوشی خوشی کام کرنا.

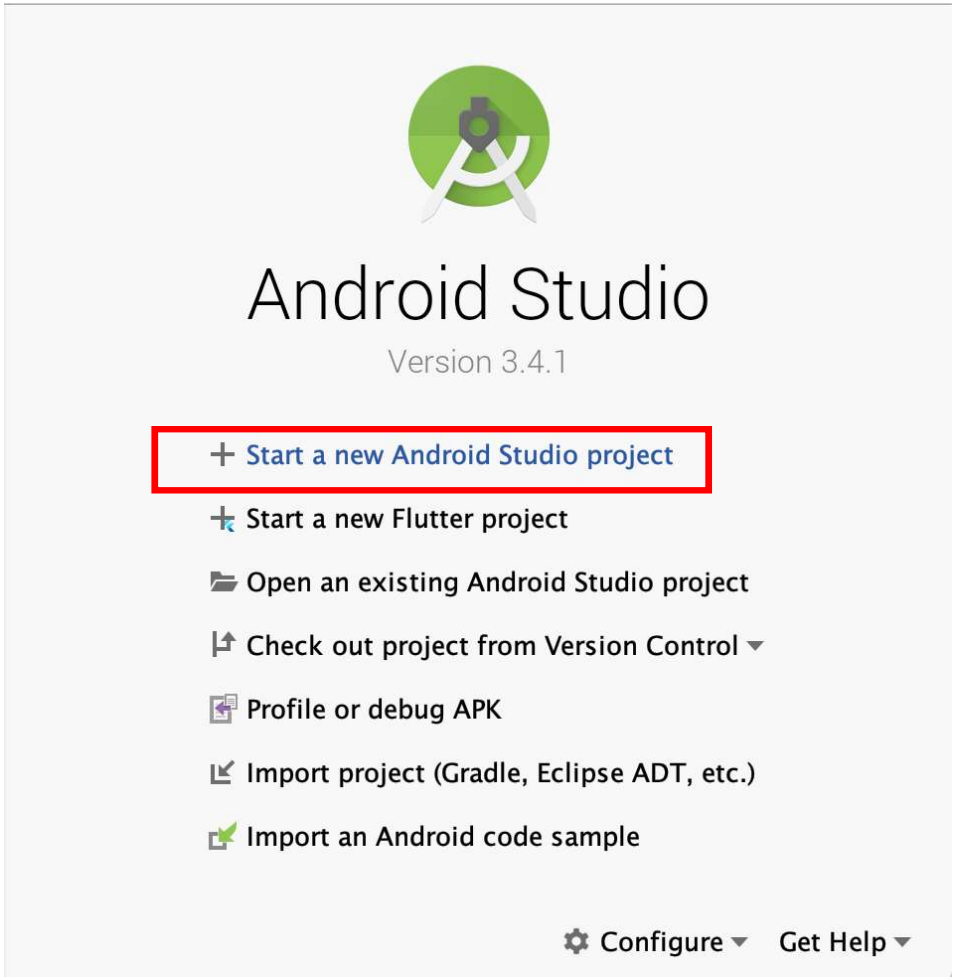
آیت: إِيَّاكَ نَعْبُدُ وإِيَّاكَ نَسْتَعِينُ

ترجمہ: یا اللہ ہم تیری ہی عبادت کرتے ہیں.
اور تجھ ہی سے مد د مانگتے ہیں

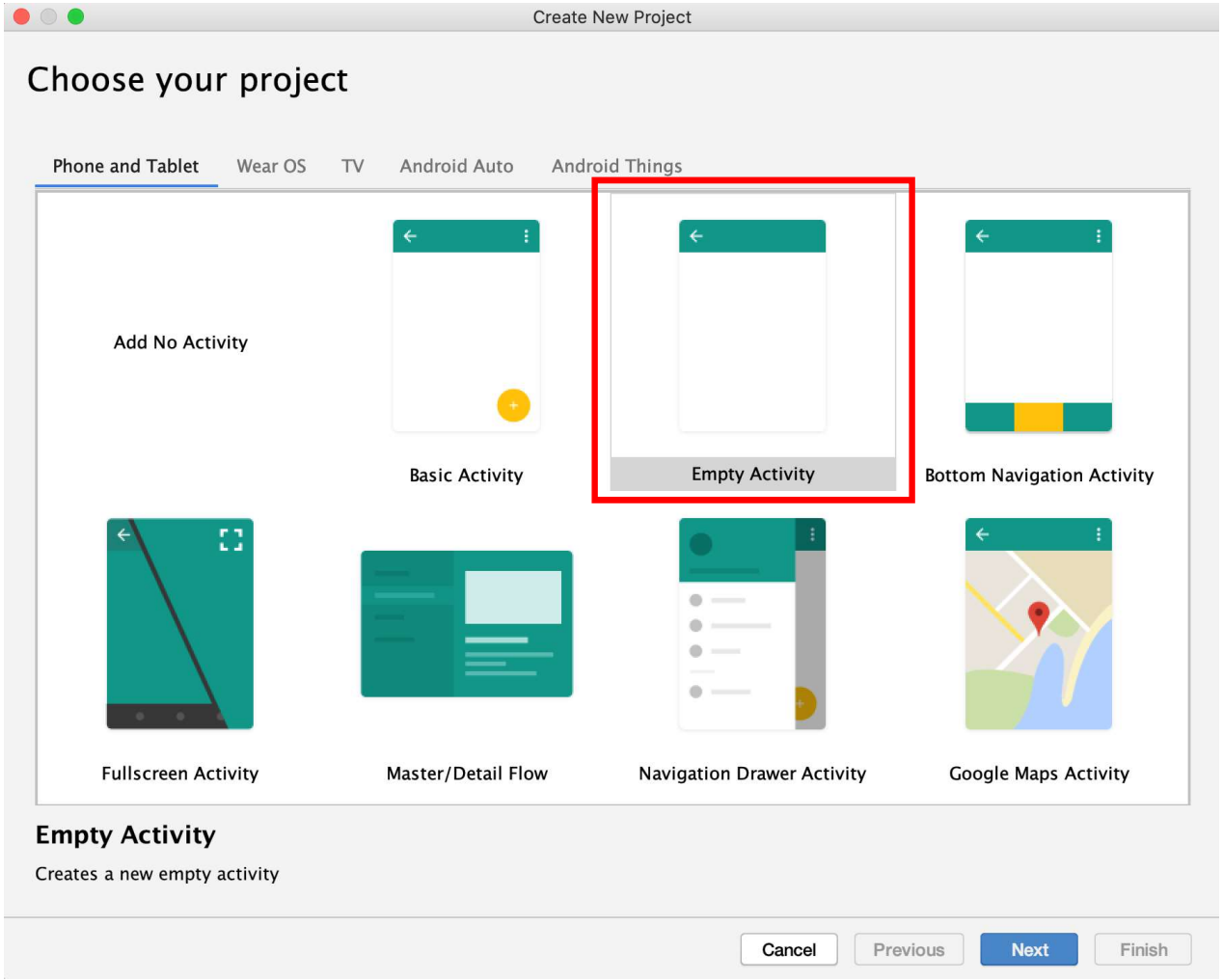
Lecture Outline

1. Revision
2. IDE Introduction
3. Setting of new project in Android Studio
4. Android Studio file system
5. Android virtual device (AVD)
6. USB Debugging
7. Android Profiler
8. Virtual Devices, Real Devices
9. Lay out
10. Stop Complaining! Stop Criticizing! Let’s Start Contributing
11. Lecture Summary

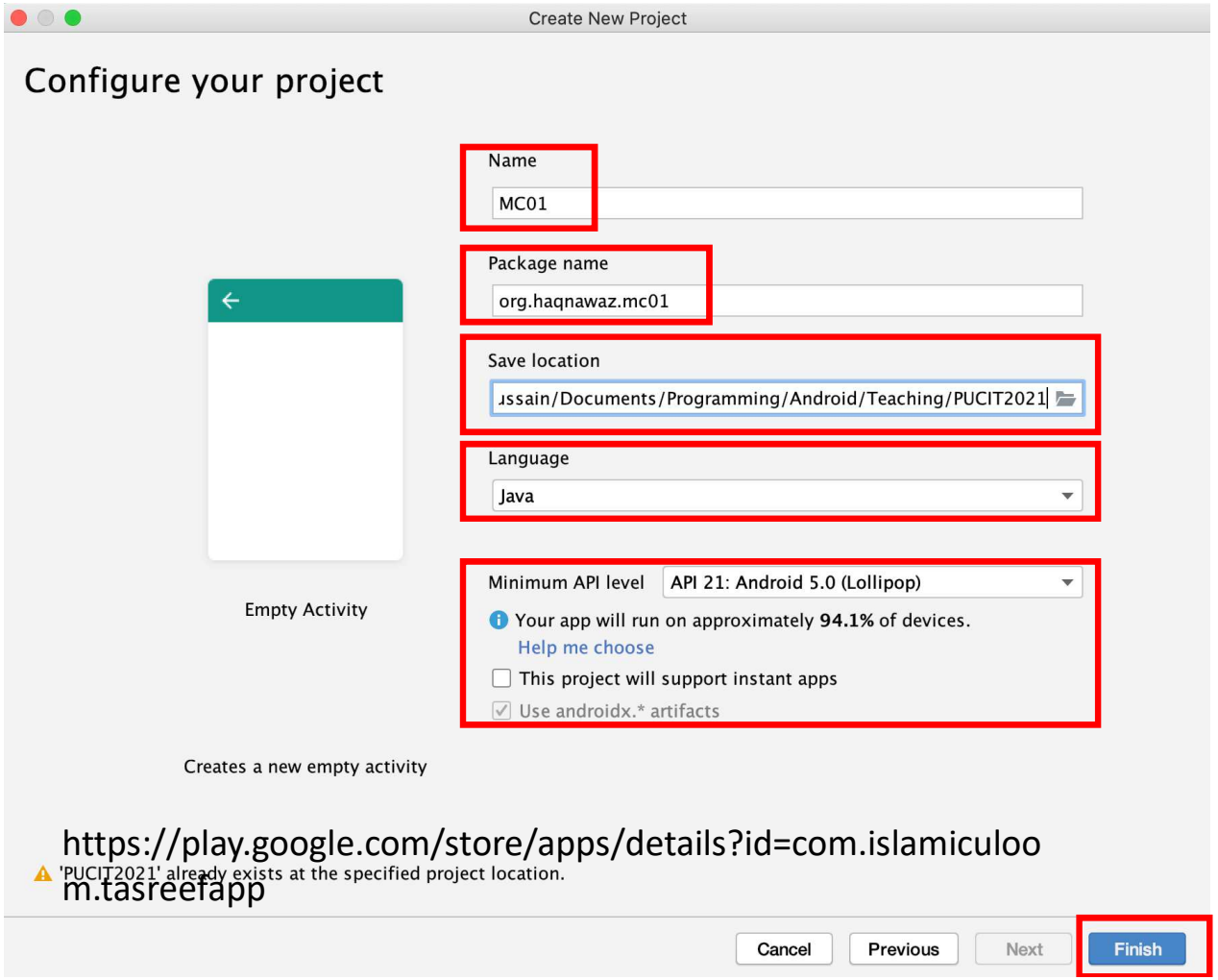
Start a new Project



Chose Project

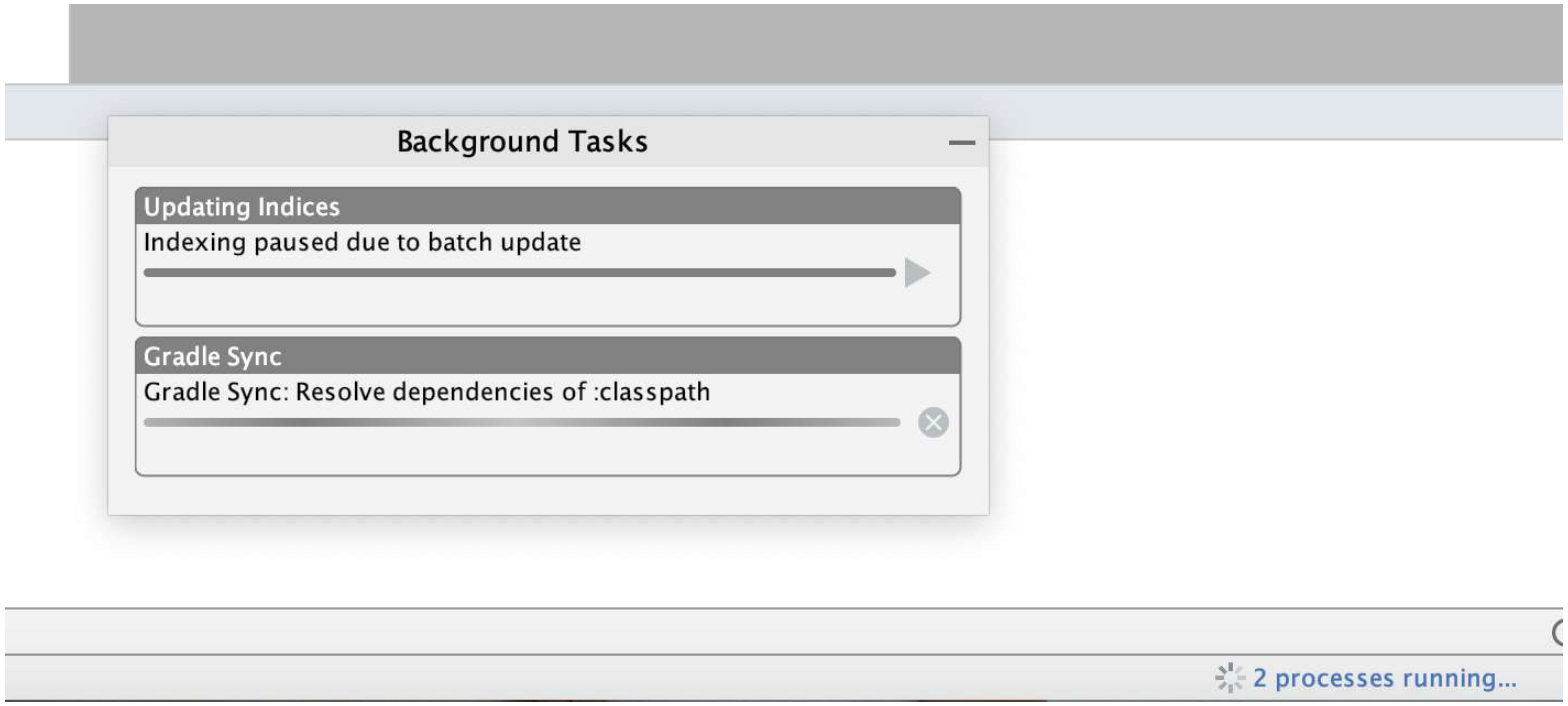


Android Project Configuration

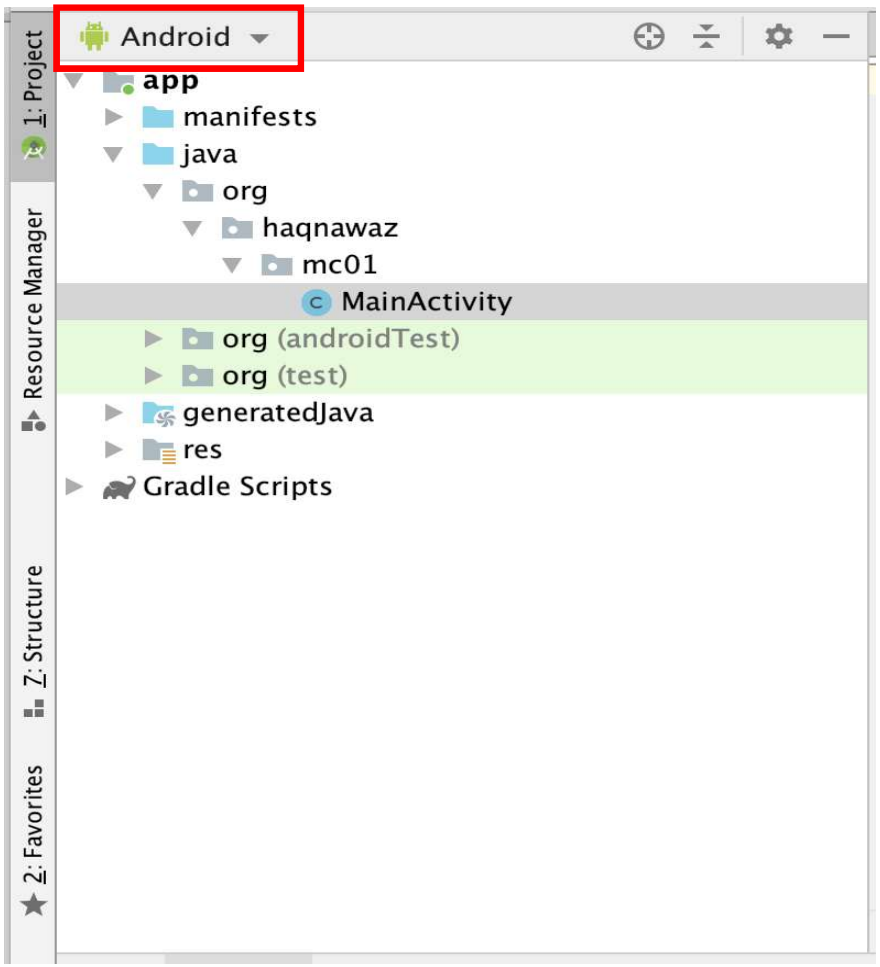


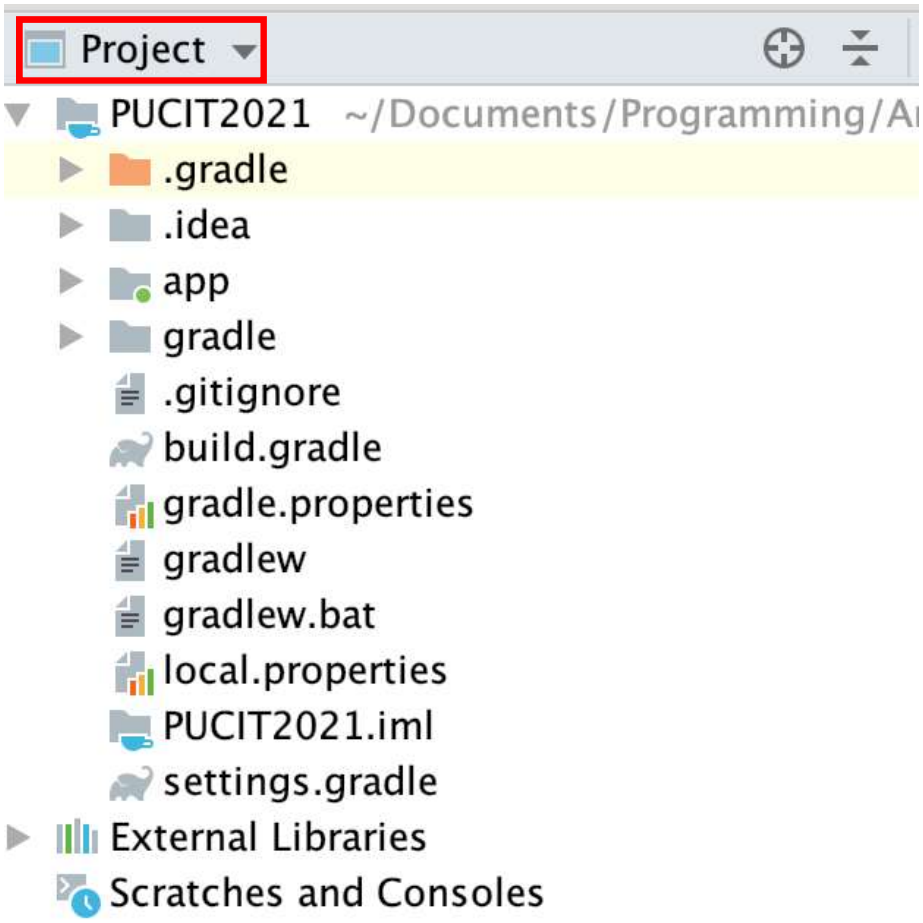
https://play.google.com/store/apps/details?id=com.islamiculoom.tasreefapp

Background tasks



Android studio File Structure





Android Menifest files

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="haqnawaz.org.app1">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="App1"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.App1">
        <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>
```

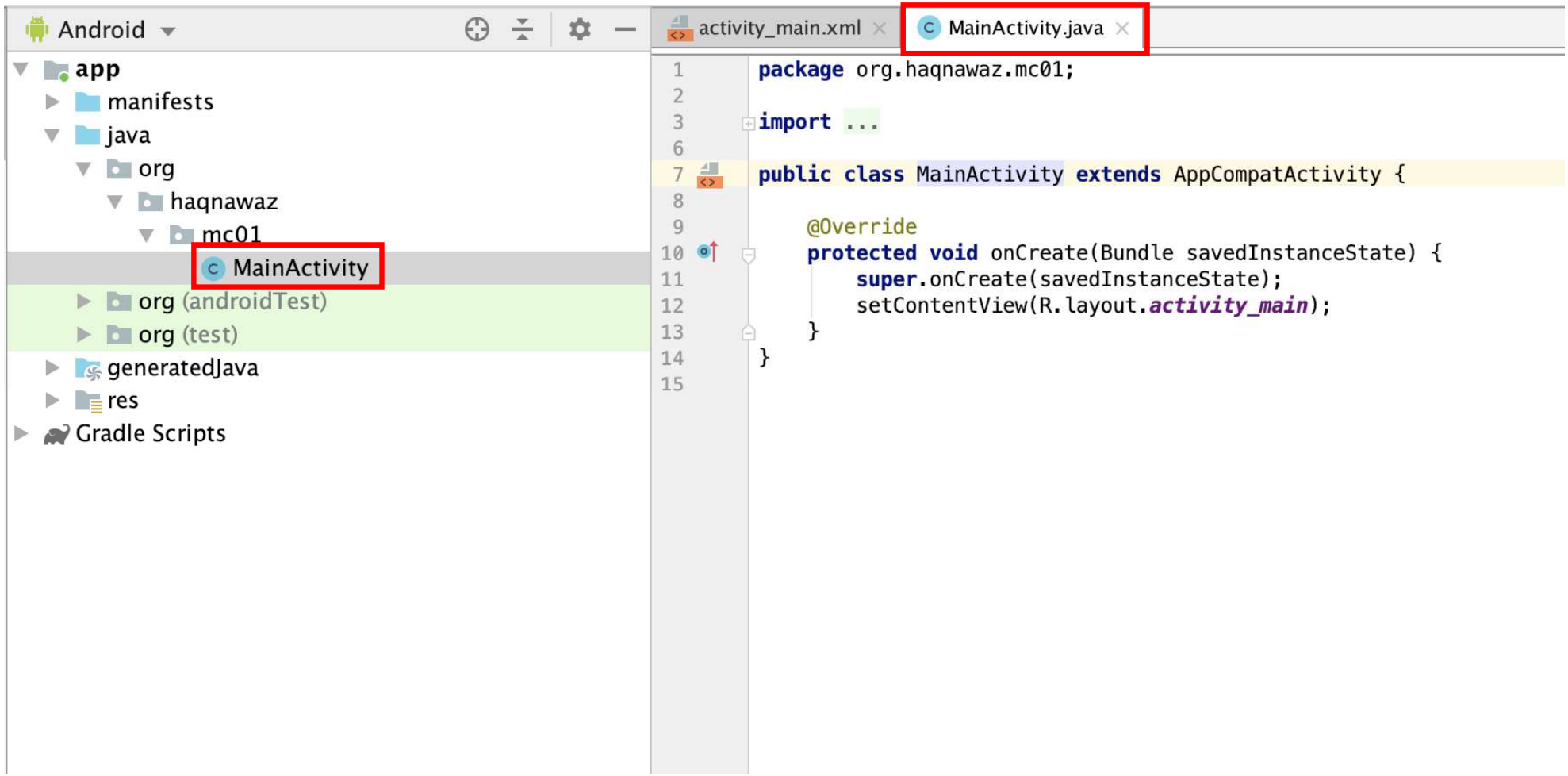
Intent filters

- Intent filters
- App activities, services, and broadcast receivers are activated by intents. An intent is a message defined by an Intent object that describes an action to perform, including the data to be acted upon, the category of component that should perform the action, and other instructions.

- When an app issues an intent to the system, the system locates an app component that can handle the intent based on intent filter declarations in each app's manifest file. The system launches an instance of the matching component and passes the Intent object to that component. If more than one app can handle the intent, then the user can select which app to use.

- An app component can have any number of intent filters (defined with the <intent-filter> element), each one describing a different capability of that component.

Files for Coding



Settings

Appearance & Behavior
- Appearance
- Menus and Toolbars
- System Settings
- File Colors
- Scopes
- Notifications
- Quick Lists
- Path Variables

Keymap

Editor
- General
- Font
- Color Scheme
- Code Style
- Inspections
- File and Code Templates
- File Encodings
- Live Templates
- File Types
- Layout Editor
- Copyright
- Emmet
- Images
- Intentions

Editor › General

Mouse
- [x] Honor "CamelHumps" words settings when selecting on double click
- [x] Change font size (Zoom) with Ctrl+Mouse Wheel
- [x] Enable Drag'n'Drop functionality in editor

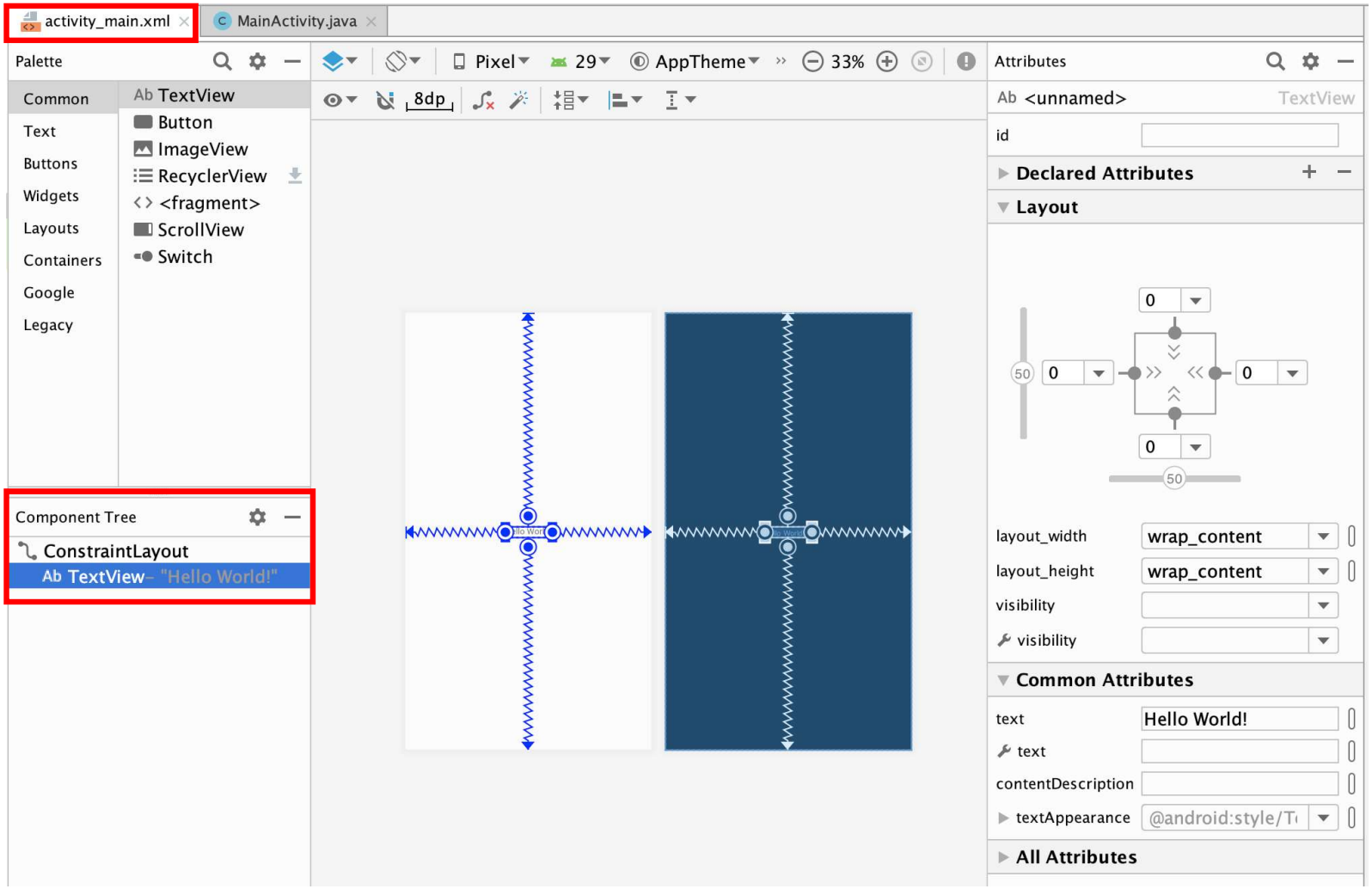
Soft Wraps
- [ ] Soft-wrap files: *.md; *.txt; *.rst; *.adoc
  Use ; to separate patterns, * and ? as wildcards
- [ ] Use original line's indent for wrapped parts — Additional shift: 0
- [x] Show soft wrap indicators for current line only

Virtual Space
- [ ] Allow placement of caret after end of line
- [ ] Allow placement of caret inside tabs
- [ ] Show virtual space at file bottom

Other
- Strip trailing spaces on Save: Modified Lines
  - [x] Always keep trailing spaces on caret line
- [ ] Ensure line feed at file end on Save
- [ ] Show quick documentation on mouse move — Delay (ms): 500
- [x] Highlight modified lines in gutter
  - [x] Different color for lines with whitespace-only modifications

OK | Cancel | Apply

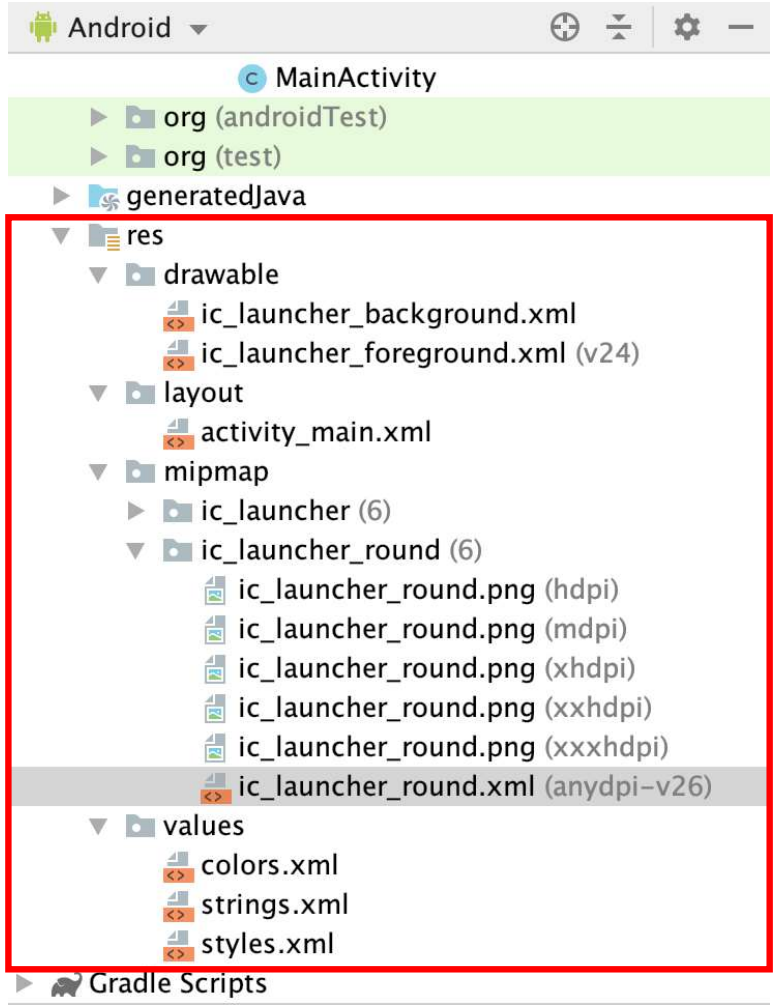
Files for GUI



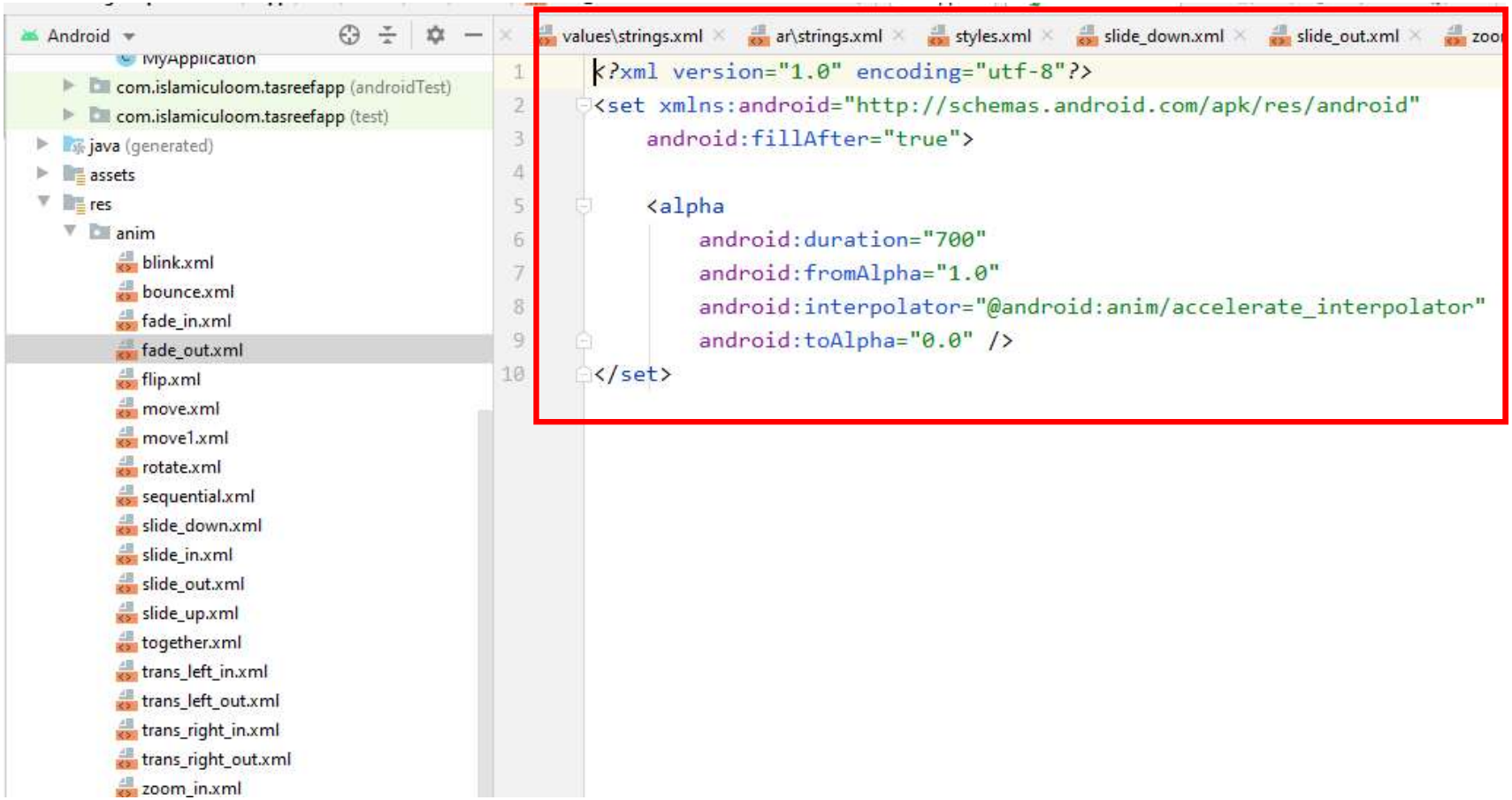
Project Resources

- **Additional files Static contents used by code**
  - **Images**
  - **Layout definitions**
  - **User interface strings**

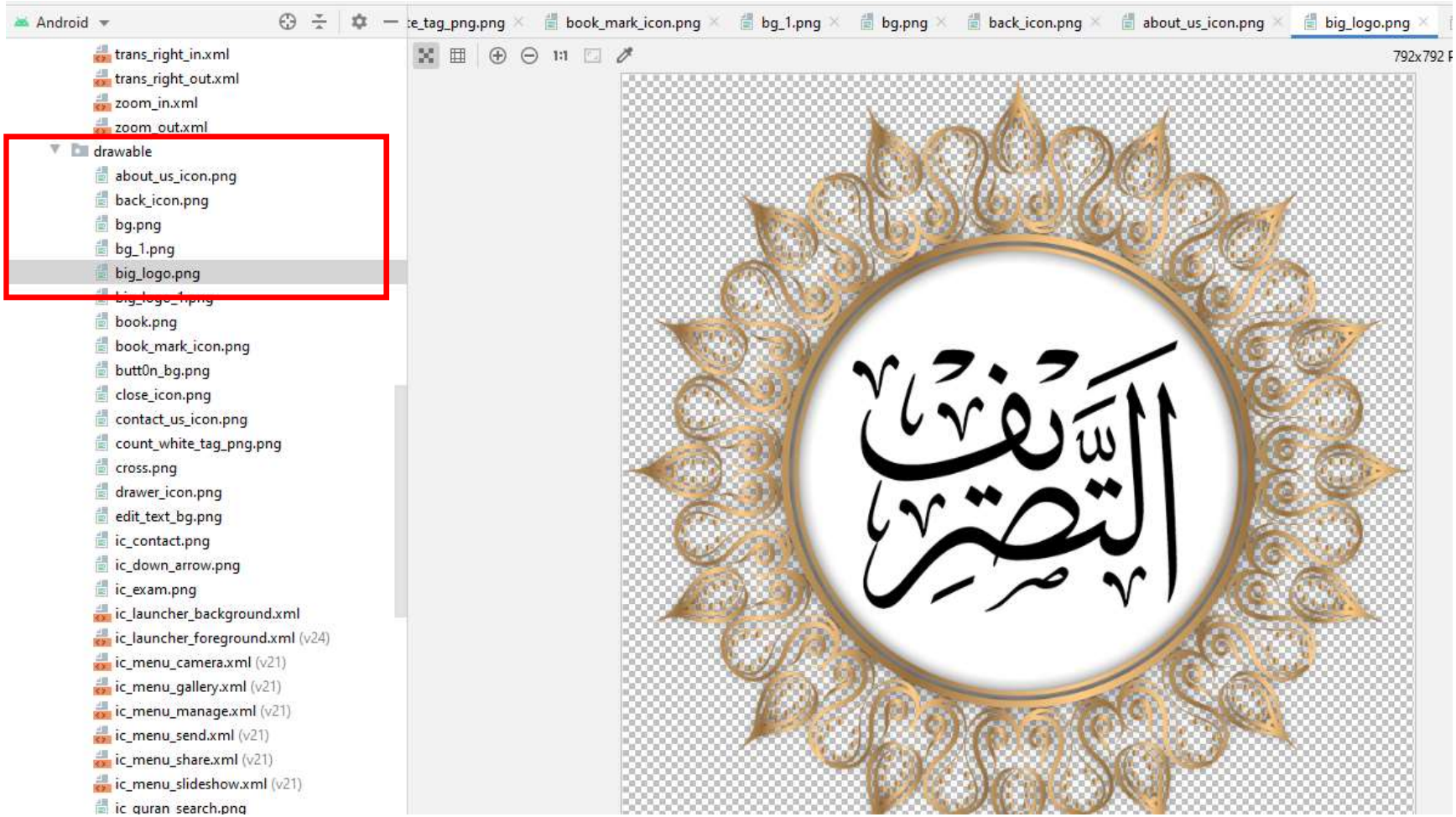
https://developer.android.com/guide/topics/resources/providing-resources



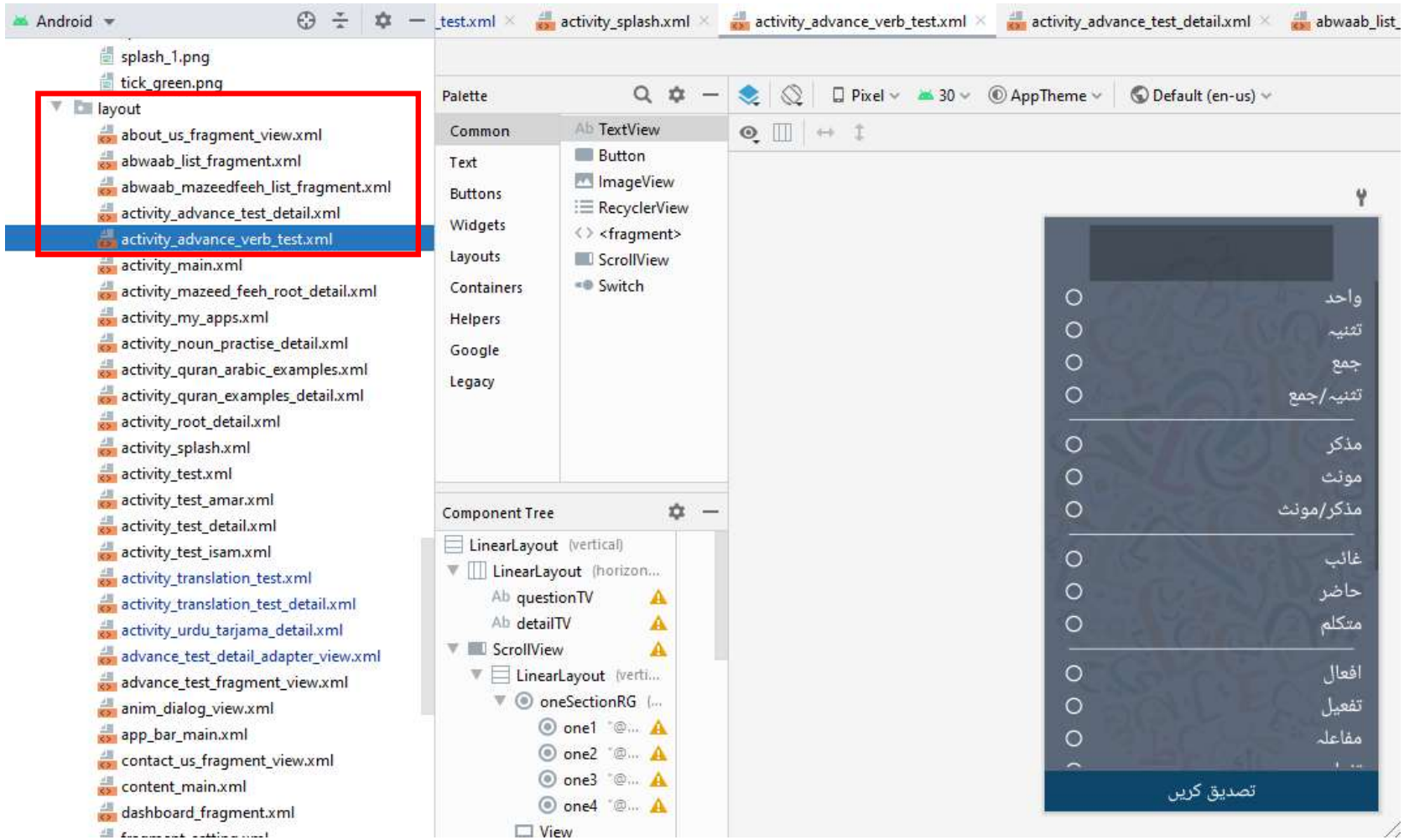
Project Resources



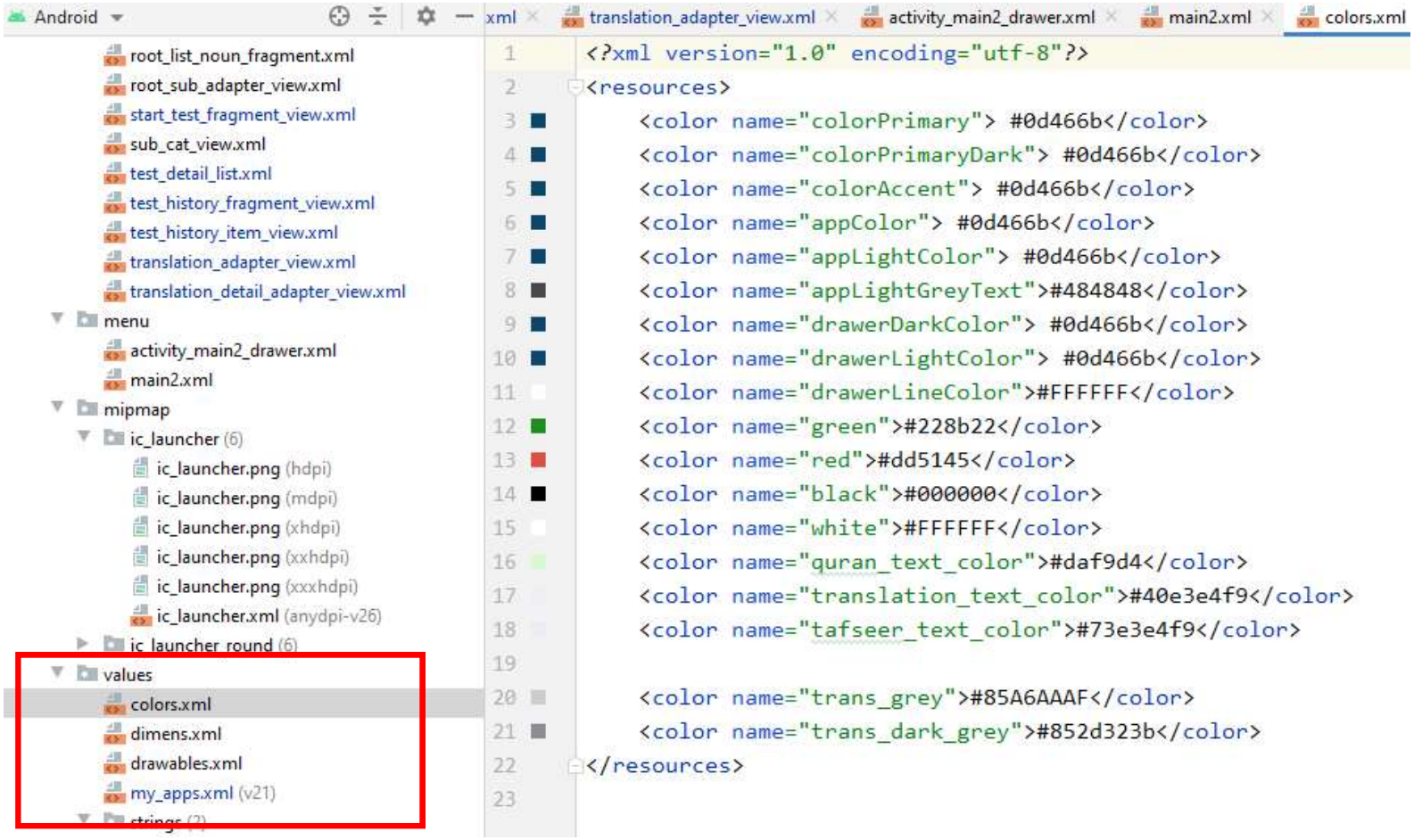
Project Resources



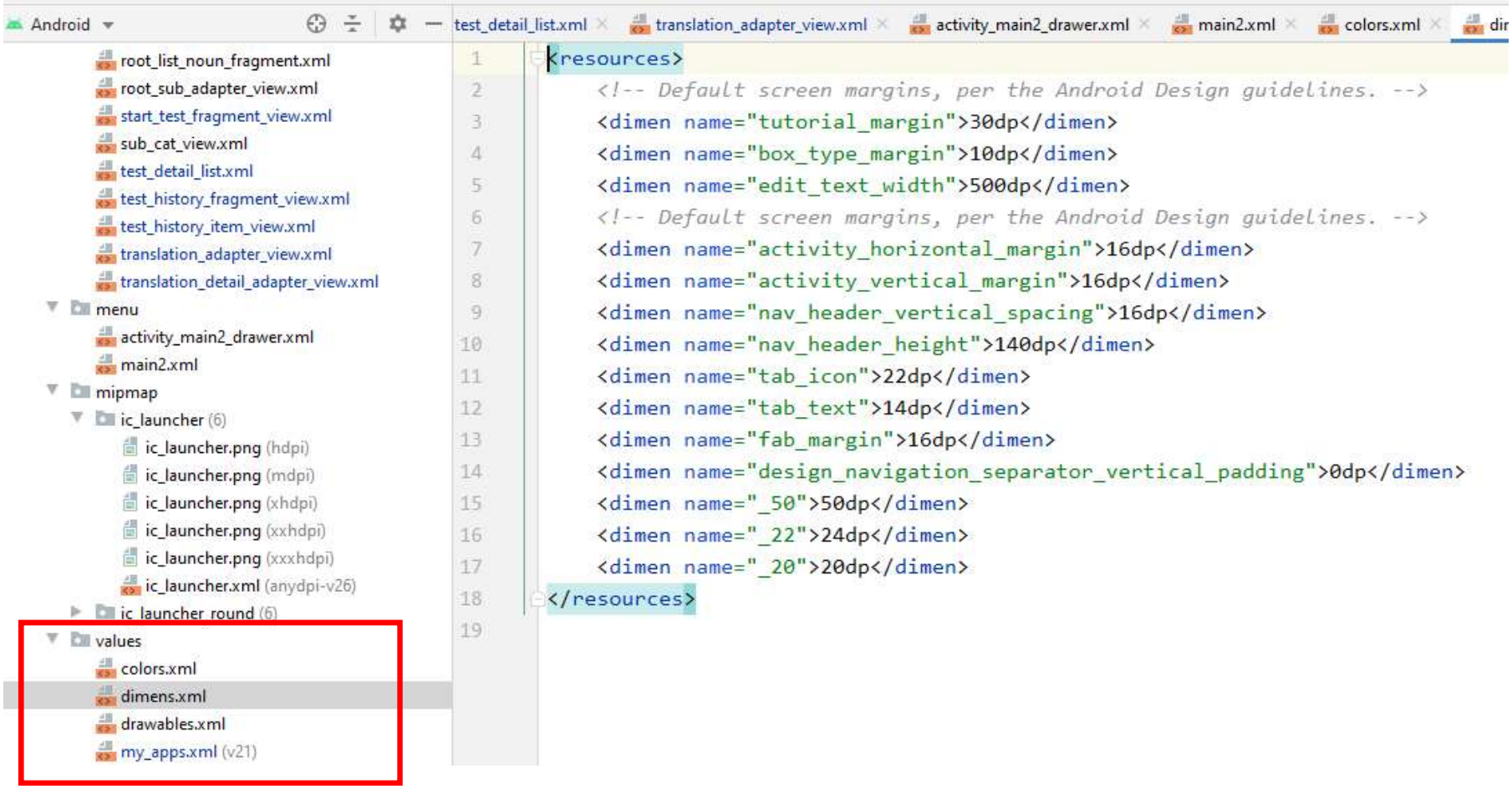
Project Resources



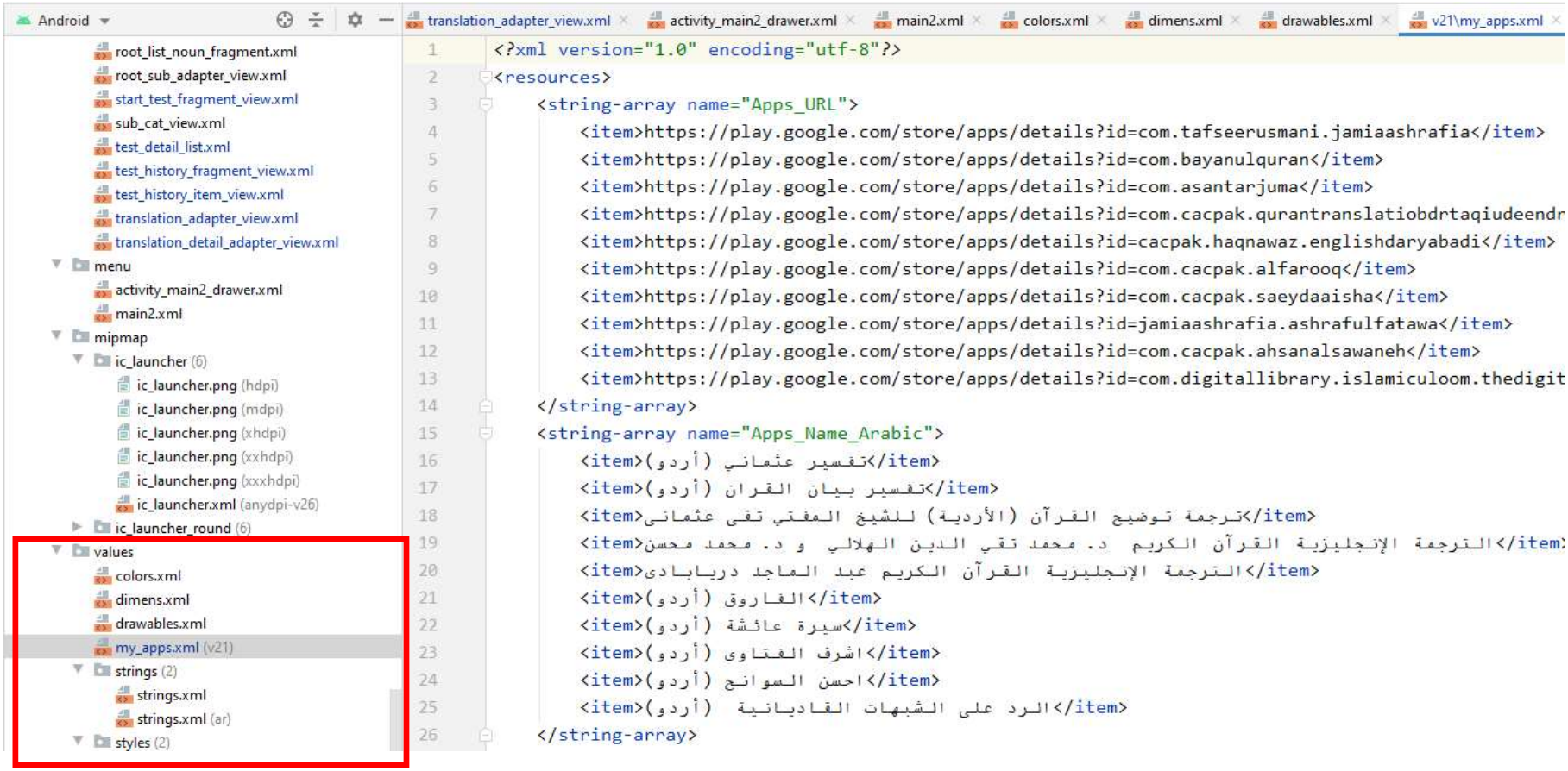
Project Resources



Project Resources



Project Resources



Project Resources

Android

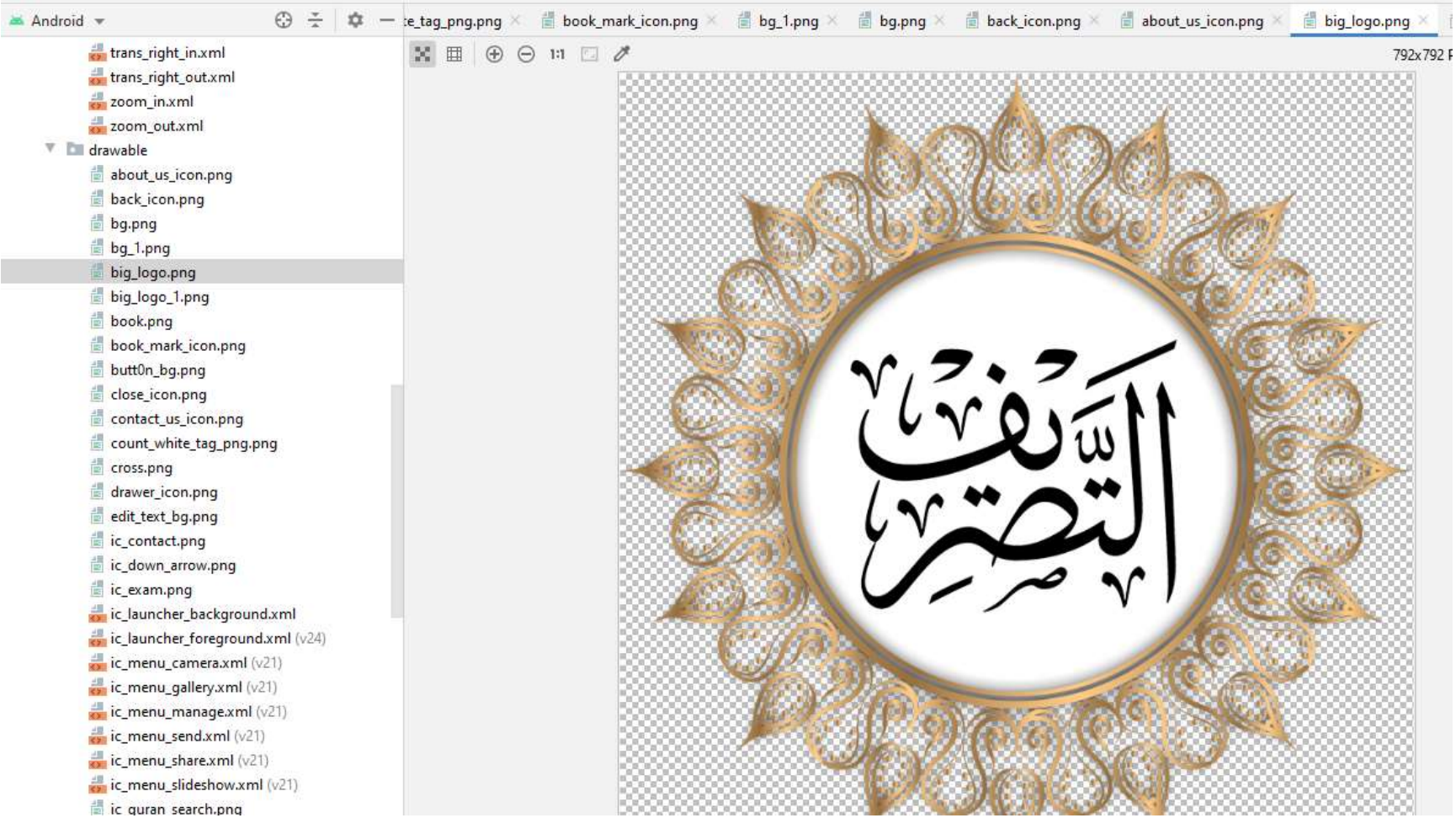
- root_list_noun_fragment.xml
- root_sub_adapter_view.xml
- start_test_fragment_view.xml
- sub_cat_view.xml
- test_detail_list.xml
- test_history_fragment_view.xml
- test_history_item_view.xml
- translation_adapter_view.xml
- translation_detail_adapter_view.xml
- menu
  - activity_main2_drawer.xml
  - main2.xml
- mipmap
  - ic_launcher (6)
    - ic_launcher.png (hdpi)
    - ic_launcher.png (mdpi)
    - ic_launcher.png (xhdpi)
    - ic_launcher.png (xxhdpi)
    - ic_launcher.png (xxxhdpi)
    - ic_launcher.xml (anydpi-v26)
  - ic_launcher_round (6)
- values
  - colors.xml
  - dimens.xml
  - drawables.xml
  - my_apps.xml (v21)
  - strings (2)
    - strings.xml
    - strings.xml (ar)
  - styles (2)
    - styles.xml

ter_view.xml | activity_main2_drawer.xml | main2.xml | colors.xml | dimens.xml | drawables.xml | v21

Edit translations for all locales in the translations editor.

```xml
<resources>
    <string name="app_name">التصريف</string>
    <string name="navigation_drawer_open">Open navigation drawer</string>
    <string name="navigation_drawer_close">Close navigation drawer</string>
    <string name="surah">Surah</string>
    <string name="parah">Parah</string>
    <string name="book_mark">Book Mark</string>
    <string name="search">Search</string>
    <string name="settings">Settings</string>
    <string name="about_us">About Us</string>
    <string name="contact_us">Contact Us</string>
    <string name="read_quran">Read Quran</string>
    <string name="all">ALL</string>
    <string name="title_activity_main2">Main2Activity</string>
    <string name="nav_header_title">Android Studio</string>
    <string name="nav_header_subtitle">android.studio@android.com</string>
    <string name="nav_header_desc">Navigation header</string>
    <string name="action_settings">Settings</string>
    <string name="wahid">واحد</string>
    <string name="tasnea">تثنيه</string>
    <string name="jamma">جمع</string>
    <string name="tasneeaWaJamma">تثنيه/جمع</string>
    <string name="muzakar">مذكر</string>
    <string name="monass">مونث</string>
    <string name="muzakarWaMunas">مذكر/مونث</string>
    <string name="gaib">غائب</string>
```

Project Resources



Accessing Resources

- **Additional files Static contents used by code**
  - **Once you provide a resource in your application, you can apply it by referencing its resource ID. All resource IDs are defined in your project's R class, which the aapt tool automatically generates.**
  - **In code**
    - **Using a static integer from a sub-class of your R class, such as: R.string.hello**
  - **In XML**
    - **Using a special XML syntax that also corresponds to the resource ID defined in your R class, such as @string/hello**

AAPT2 (Android Asset Packaging Tool) is a build tool that Android Studio and Android Gradle Plugin use to compile and package your app's resources. AAPT2 parses, indexes, and compiles the resources into a binary format that is optimized for the Android platform
https://developer.android.com/studio/command-line/aapt2
https://developer.android.com/guide/topics/resources/providing-resources

سفر میں مشکلیں آئیں تو جرأت اور بڑھتی ہے

کوئی جب راستہ روکے تو ہمت اور بڑھتی ہے

بجھانے کو ہوا کے ساتھ گر بارش بھی آ جائے

چراغ بے حقیقت کی حقیقت اور بڑھتی ہے

مری کمزوریوں پر جب کوئی تنقید کرتا ہے

وہ دشمن کیوں نہ ہو اس سے محبت اور بڑھتی ہے

ضرورت میں عزیزوں کی اگر کچھ کام آ جاؤ

رقم بھی ڈوب جاتی ہے عداوت اور بڑھتی ہے

اگر بکنے پہ آ جاؤ تو گھٹ جاتے ہیں دام اکثر

نہ بکنے کا ارادہ ہو تو قیمت اور بڑھتی ہے

Joke Time

دو پٹھان ایک حادثے میں مر گئے.

فرشتہ آیا دونوں سے پوچھا کون ھو

بولے مسلمان.

ایک سے پُوچھا نام کیا ہے

بولا: اخلاص خان.

فرشتے نے کہا سورۃ اخلاص سناؤ. اس نے جلدی سے

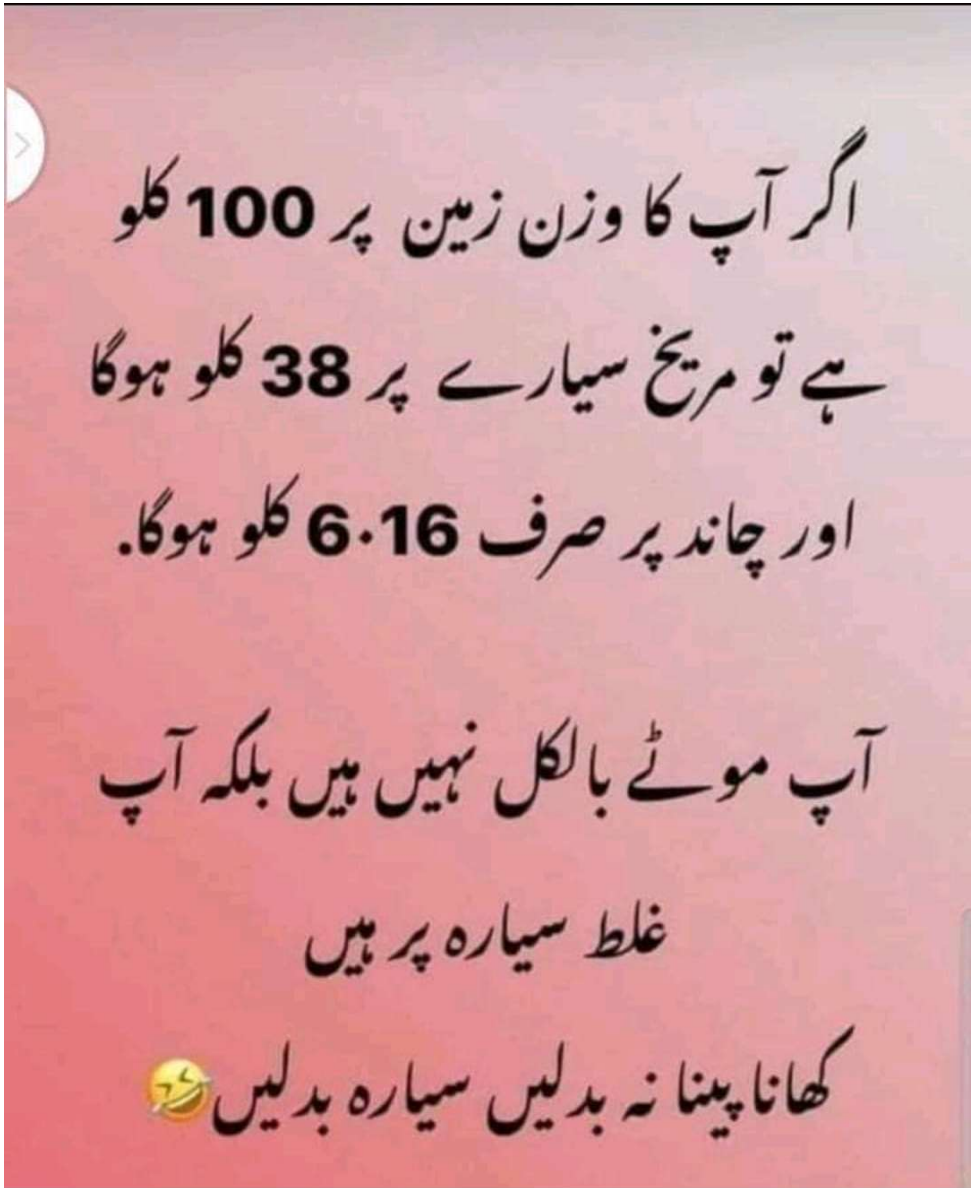
سنادی. اور بچ گیا.

فرشتے نے دوسرے سے پوچھا وہ پریشان ہو گیا اور

بولا

نام تو یاسین خان ہے مگر پیار سے کوثر کوثر کہتے ھیں

Joke Time


اگر آپ کا وزن زمین پر 100 کلو
ہے تو مریخ سیارے پر 38 کلو ہوگا
اور چاند پر صرف 6.16 کلو ہوگا.
آپ موٹے بالکل نہیں ہیں بلکہ آپ
غلط سیارہ پر ہیں
کھانا پینا نہ بدلیں سیارہ بدلیں

Gradle

- Gradle is an open-source build automation tool focused on flexibility and performance. Gradle build scripts are written using a Groovy or Kotlin DSL Domain-Specific Languages

- Highly customizable — Gradle is modeled in a way that is customizable and extensible in the most fundamental ways.

- Fast — Gradle completes tasks quickly by reusing outputs from previous executions, processing only inputs that changed, and executing tasks in parallel.

- Powerful — Gradle is the official build tool for Android, and comes with support for many popular languages and technologies.

Gradle

- **Why Gradle Required** Every Android project needs a Gradle for generating an apk from the .java and .xml files in the project. Simply put, a gradle takes all the source files (java and XML) and applies appropriate tools, e.g., converts the java files into dex files and compresses all of them into a single file known as apk that is actually used. There are two types of build.gradle scripts
- **Top-level build.gradle:** It is located in the root project directory and its main function is to define the build configurations that will be applied to all the modules in the project.
- **Module-level build.gradle:** Located in the project/module directory of the project this Gradle script is where all the dependencies are defined and where the SDK versions are declared. This script has many functions in the project which include additional build types and override settings in the main/app manifest or top-level build.gradle file.

build.gradle (Project)

Android

- app
  - manifests
  - java
    - org
      - haqnawaz
        - mc01
          - MainActivity
    - org (androidTest)
    - org (test)
  - generatedJava
  - res
- Gradle Scripts
  - build.gradle (Project: PUCIT2021)
  - build.gradle (Module: app)
  - gradle-wrapper.properties (Gradle Version)
  - proguard-rules.pro (ProGuard Rules for app)
  - gradle.properties (Project Properties)
  - settings.gradle (Project Settings)
  - local.properties (SDK Location)

activity_main.xml | PUCIT2021 | MainActivity.java

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

buildscript {
    repositories {
        google()
        jcenter()

    }
    dependencies {
        classpath 'com.android.tools.build:gradle:3.4.1'

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

allprojects {
    repositories {
        google()
        jcenter()

    }
}

task clean(type: Delete) {
    delete rootProject.buildDir
}
```

build.gradle (module app)

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

android {
    compileSdkVersion 29
    buildToolsVersion "29.0.0"
    defaultConfig {
        applicationId "org.haqnawaz.mc01"
        minSdkVersion 21
        targetSdkVersion 29
        versionCode 1
        versionName "1.0"
        testInstrumentationRunner "androidx.test.runner.AndroidJUnitRunner"
    }
    buildTypes {
        release {
            minifyEnabled false
            proguardFiles getDefaultProguardFile('proguard-android-optimize.txt'), 'proguard-rules.pro'
        }
    }
}

dependencies {
    implementation fileTree(dir: 'libs', include: ['*.jar'])
    implementation 'androidx.appcompat:appcompat:1.2.0'
    implementation 'androidx.constraintlayout:constraintlayout:2.0.1'
    testImplementation 'junit:junit:4.12'
    androidTestImplementation 'androidx.test:runner:1.3.0'
    androidTestImplementation 'androidx.test.espresso:espresso-core:3.3.0'
}
```

TODO

Android

- app
  - manifests
    - AndroidManifest.xml
  - java
    - org
      - haqnawaz
        - mc01
          - MainActivity
    - org (androidTest)
    - org (test)
  - generatedJava
  - res

AndroidManifest.xml | MainActivity.java

```
1   package org.haqnawaz.mc01;
2
3   import ...
6
7   public class MainActivity extends AppCompatActivity {
8
9       @Override
10      protected void onCreate(Bundle savedInstanceState) {
11          super.onCreate(savedInstanceState);
12          setContentView(R.layout.activity_main);
13
14          //TODO: Have to implement the reverse indexing
15
```

MainActivity › onCreate()

TODO: Project | Current File | Scope Based

- Found 1 TODO item in 1 file
  - org.haqnawaz.mc01 1 item
    - MainActivity.java 1 item
      - (14, 11) //TODO: Have to implement the reverse indexing

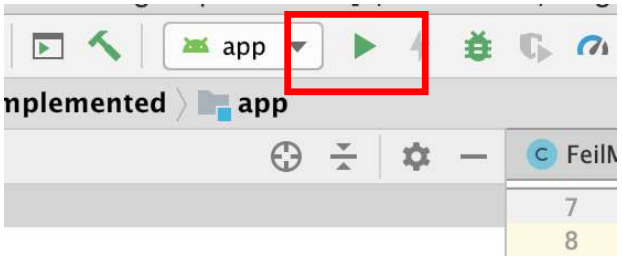
Terminal

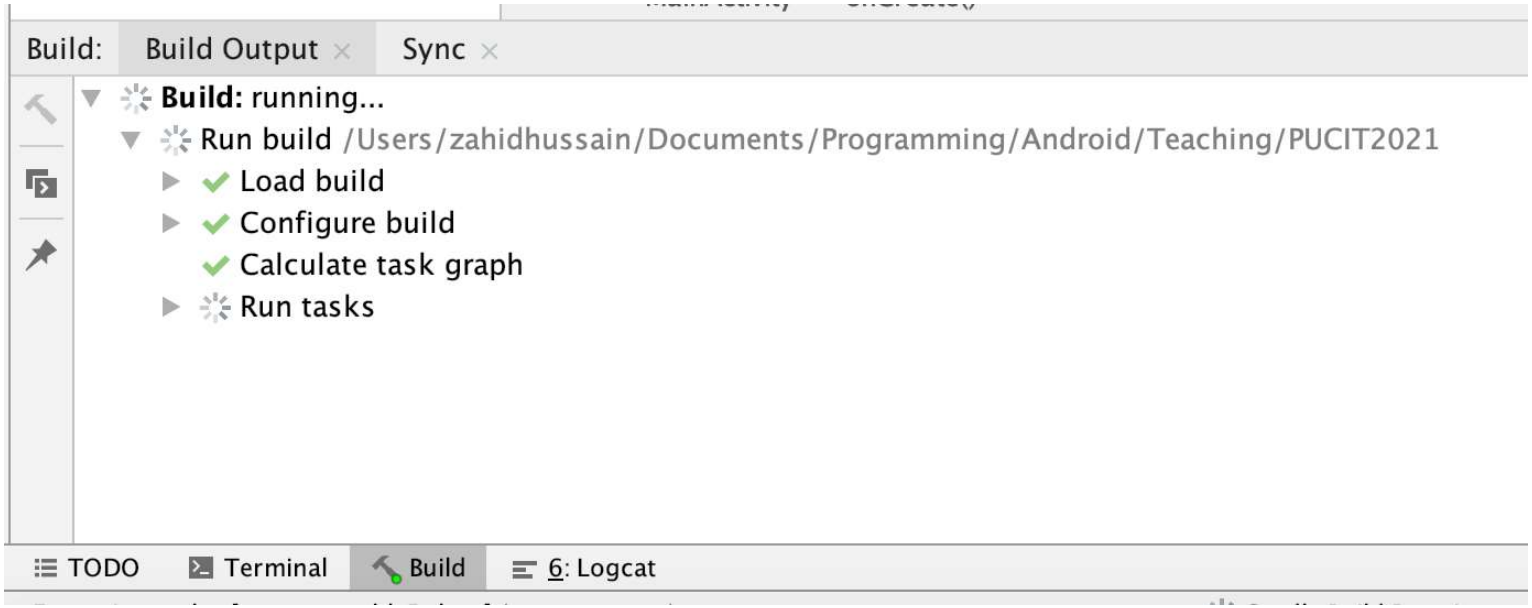
Terminal: Local

```
(base) haqnawaz@Zahids-MBP PUCIT2021 % ls
PUCIT2021.iml           build.gradle            gradle.properties       gradlew.bat             settings.gradle
app                     gradle                  gradlew                 local.properties
(base) haqnawaz@Zahids-MBP PUCIT2021 %
```

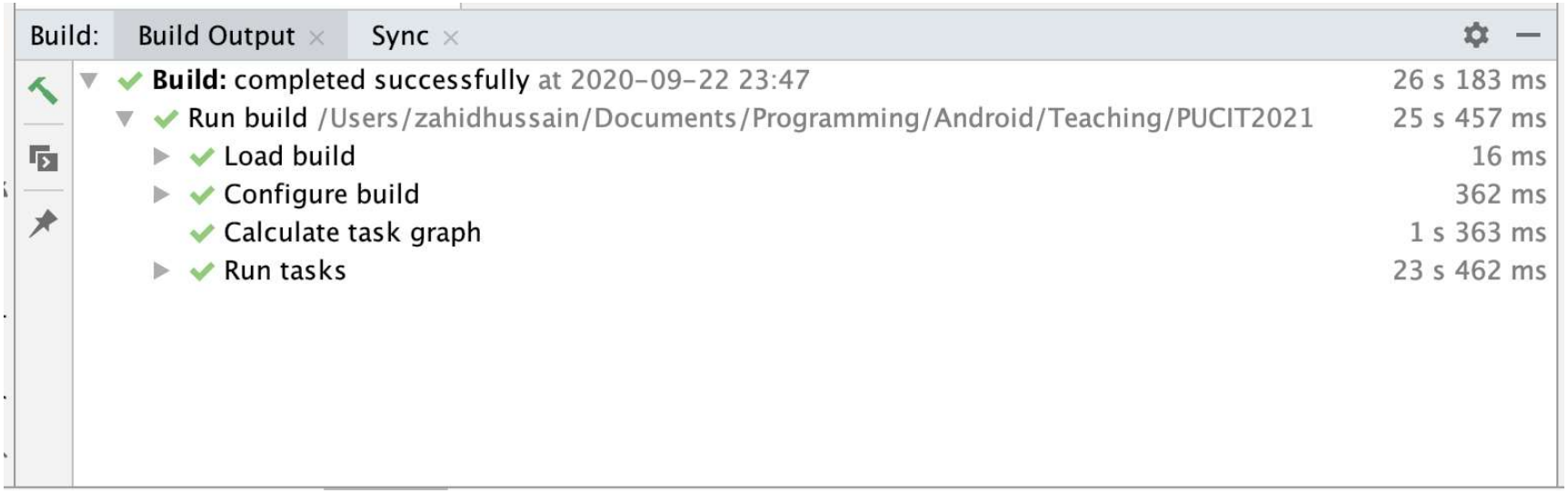
TODO | Terminal | Build | 6: Logcat

Project build

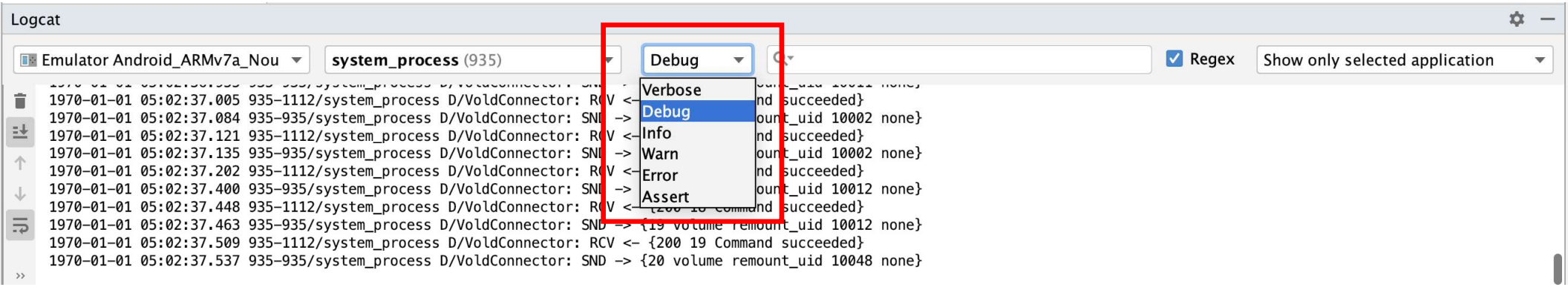




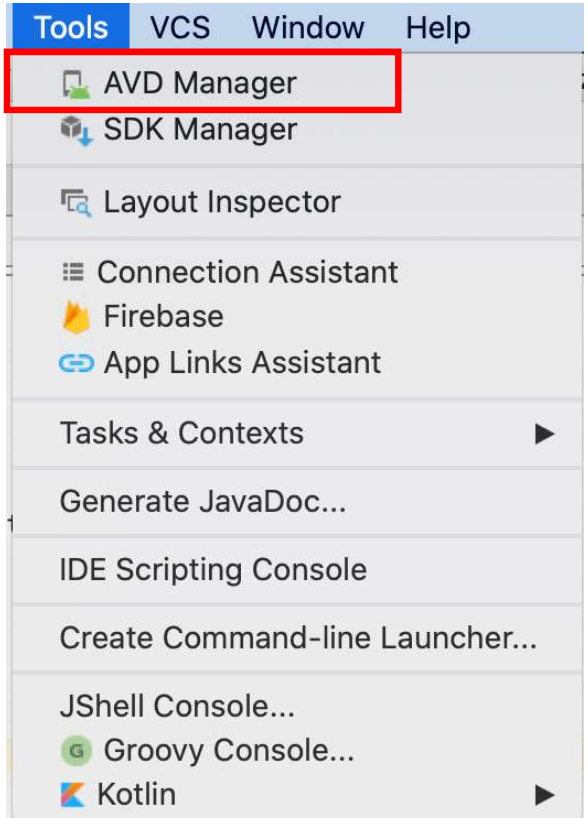
Project build

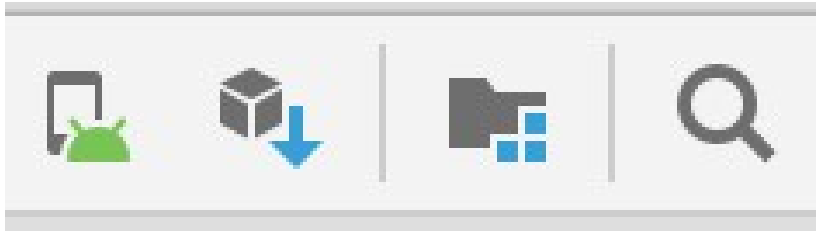


Project LogCat



AVD Manager


Tools
VCS
Window
Help
AVD Manager
SDK Manager
Layout Inspector
Connection Assistant
Firebase
App Links Assistant
Tasks & Contexts
Generate JavaDoc...
IDE Scripting Console
Create Command-line Launcher...
JShell Console...
Groovy Console...
Kotlin



available Virtual Devices

Android Virtual Device Manager

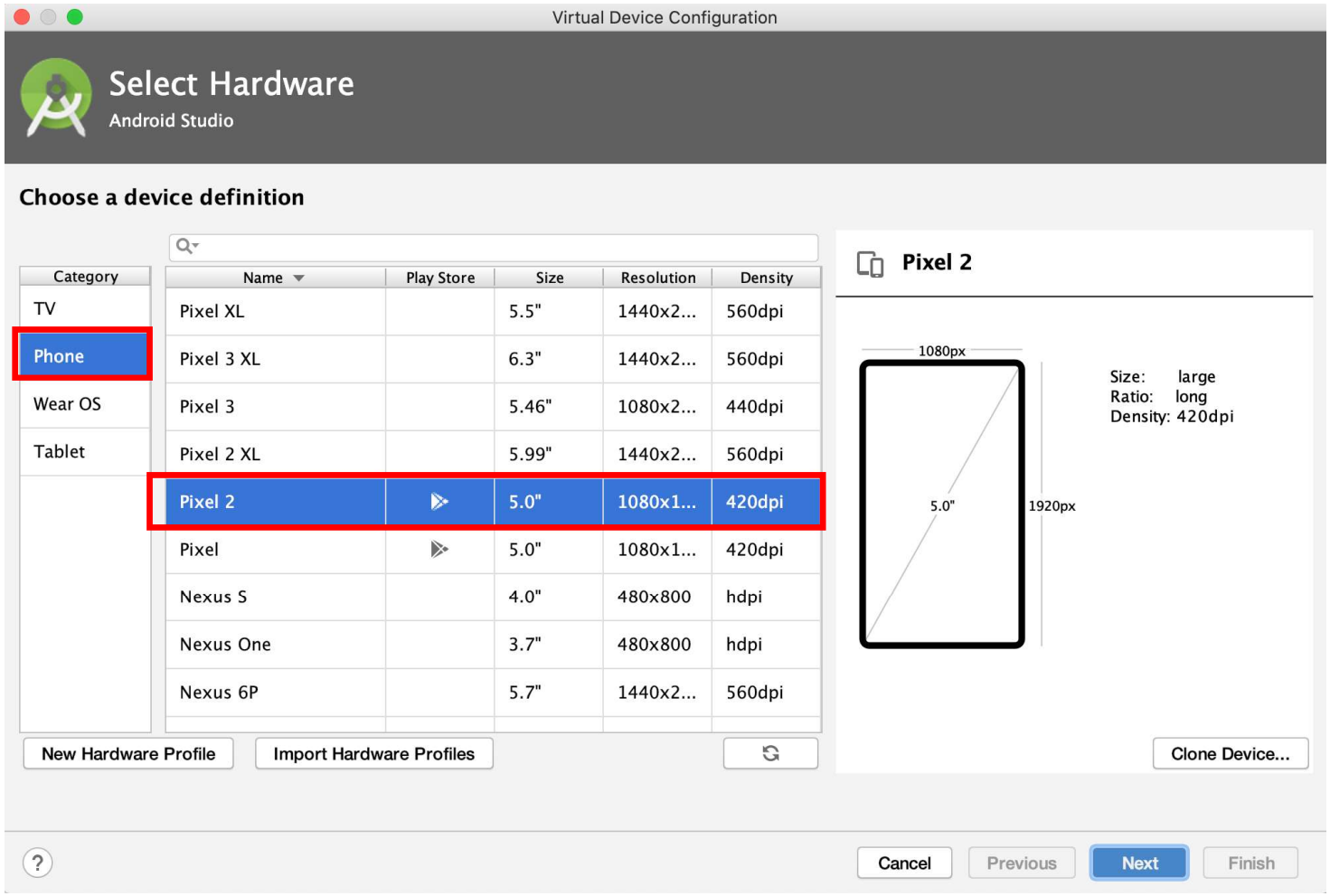
Your Virtual Devices

Android Studio

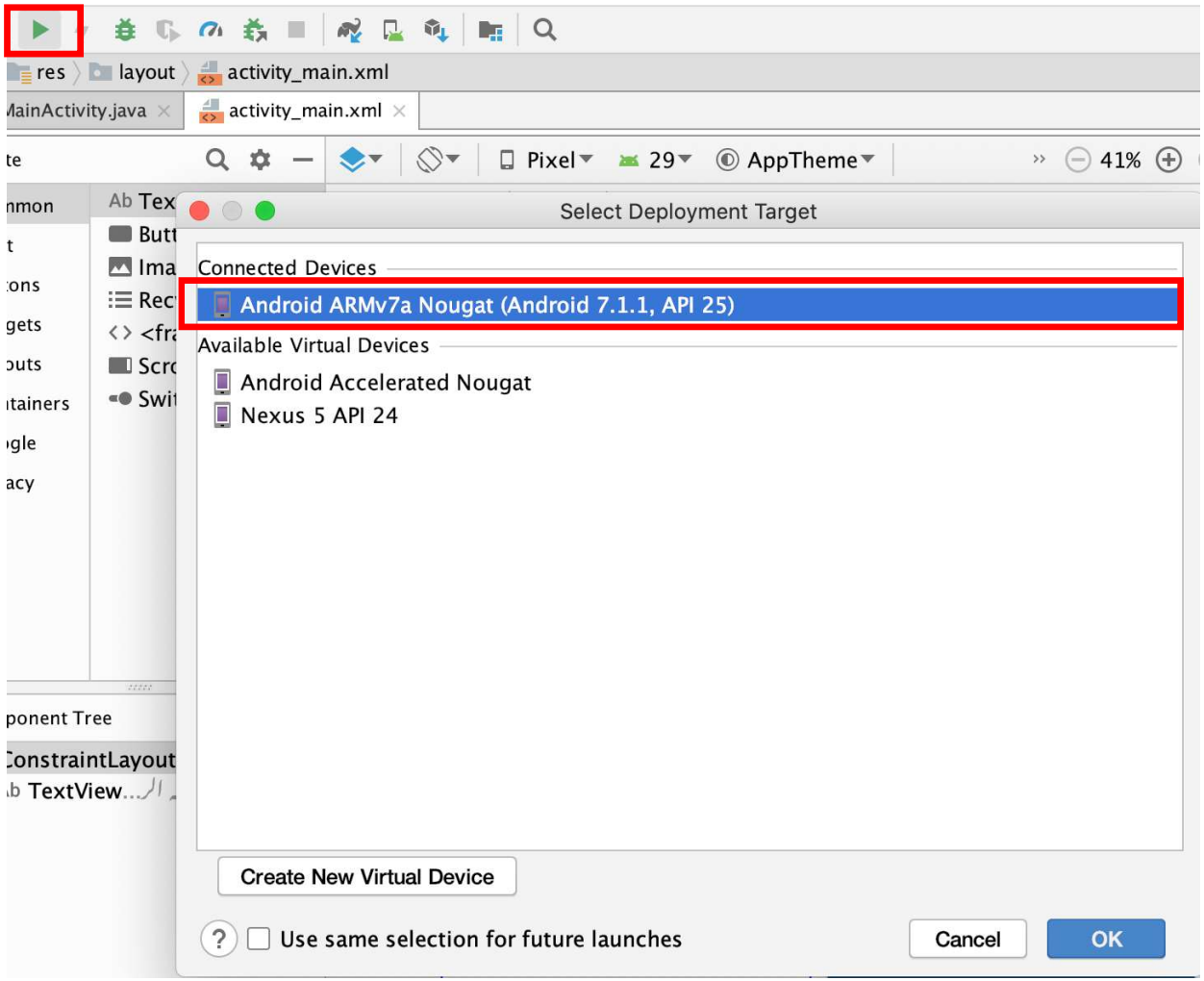
Type	Name	Play Store	Resolution	API	Target	CPU/ABI	Size on Disk	Actions
	Android Accelerated No...		Unknown Resolution	25	Android 7.1.1 (Google A...	x86...	2.1 GB	
	Nexus 5 API 24		1080 × 1920: xxhdpi	24	Android 7.0 (Google Play)	x86	4.2 GB	
	Android ARMv7a Nougat		Unknown Resolution	25	Android 7.1.1 (Google A...	arm	1.7 GB	

? + Create Virtual Device...

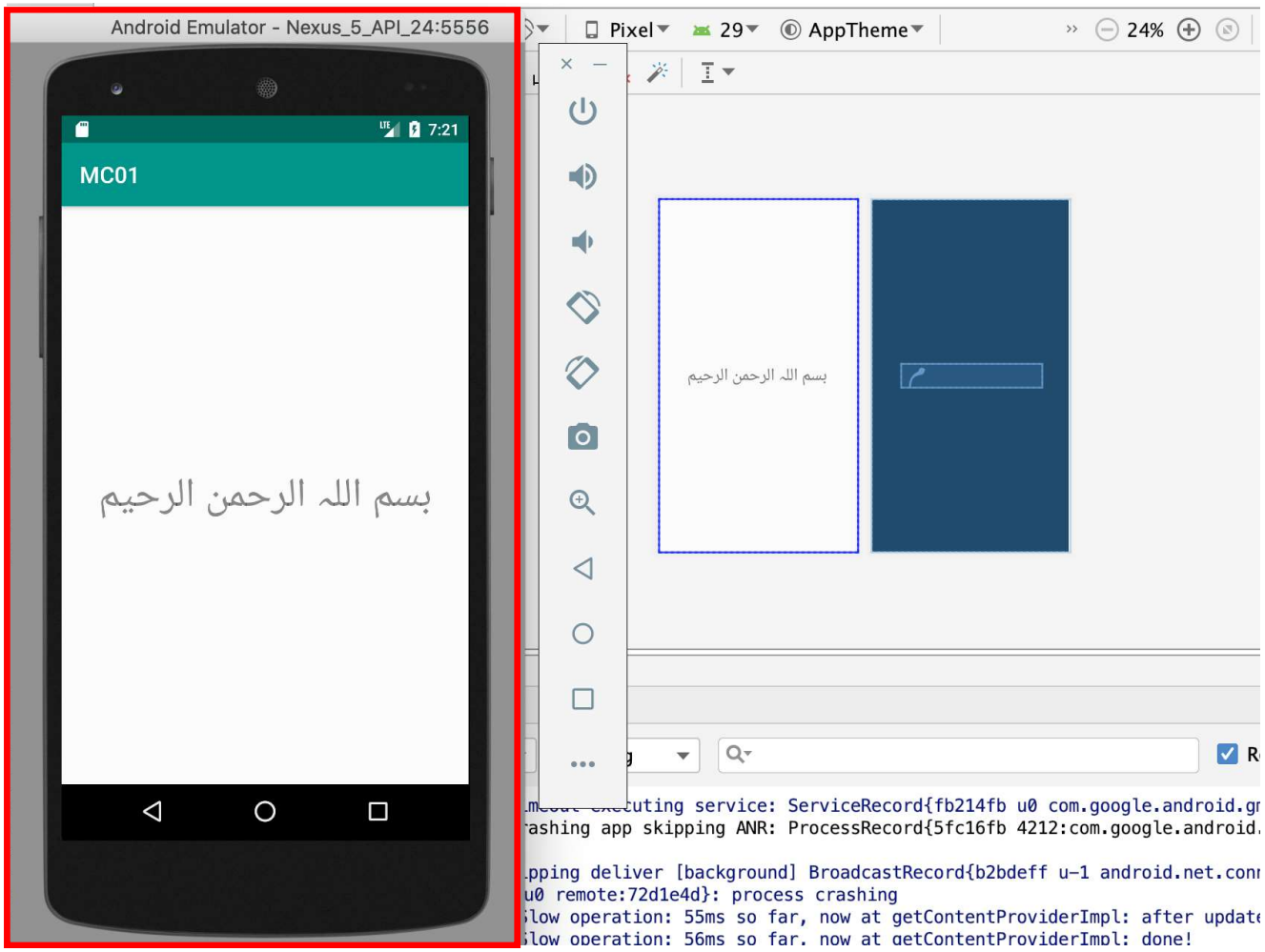
create Virtual Device



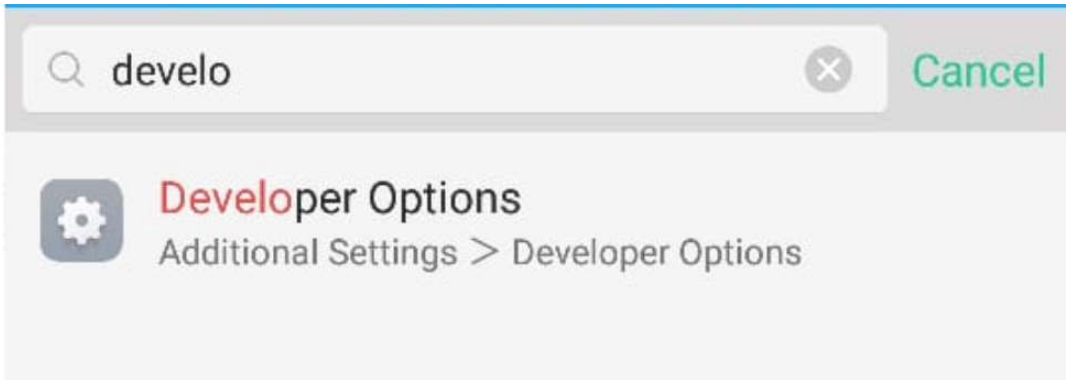
Run on Virtual Device

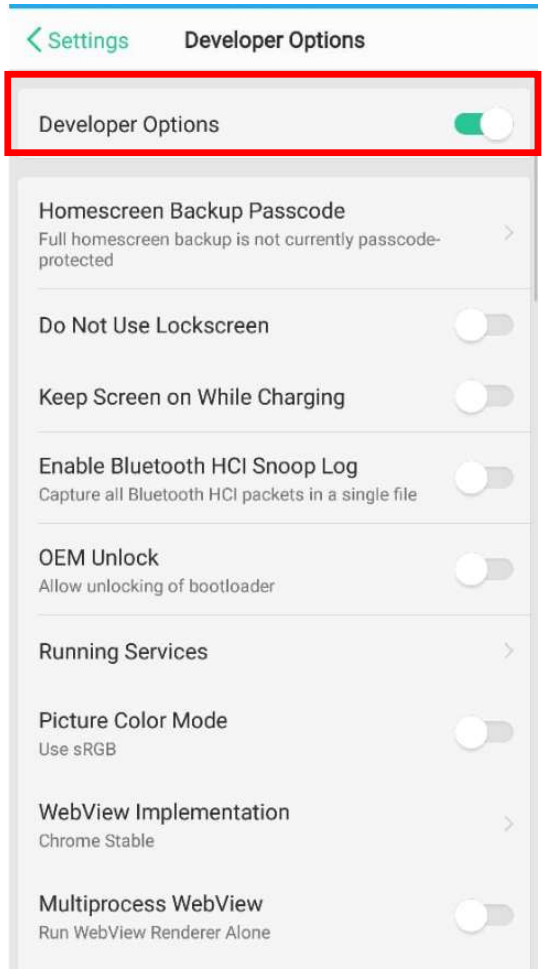


App launched

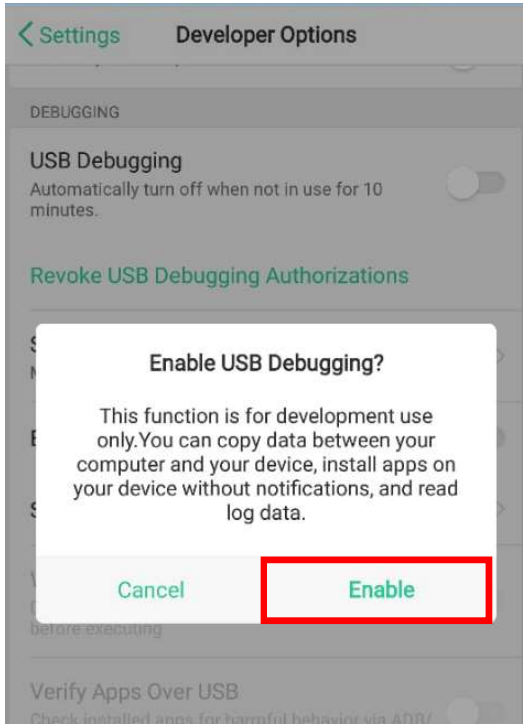


Setting for real Device

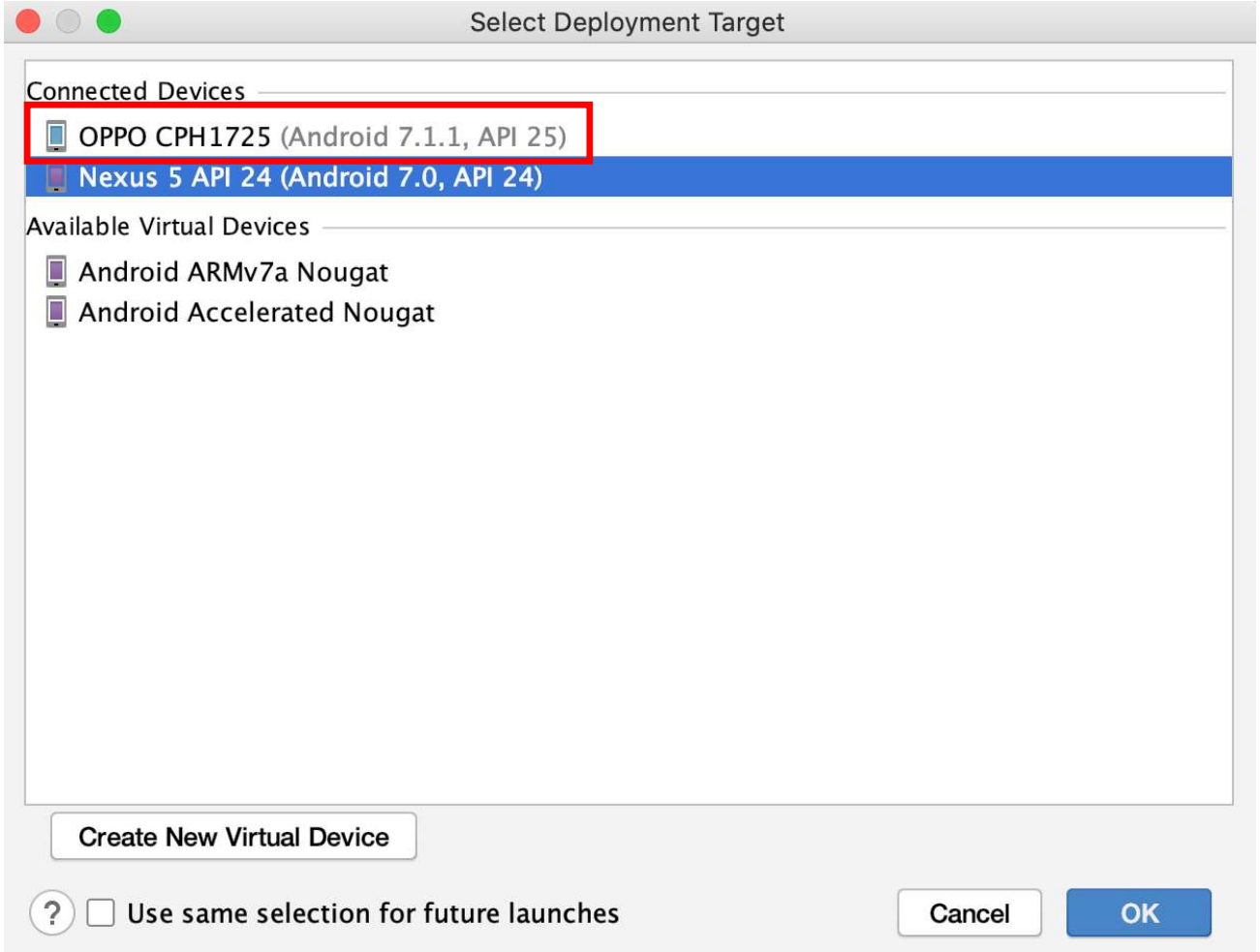




Enable USB Debugging

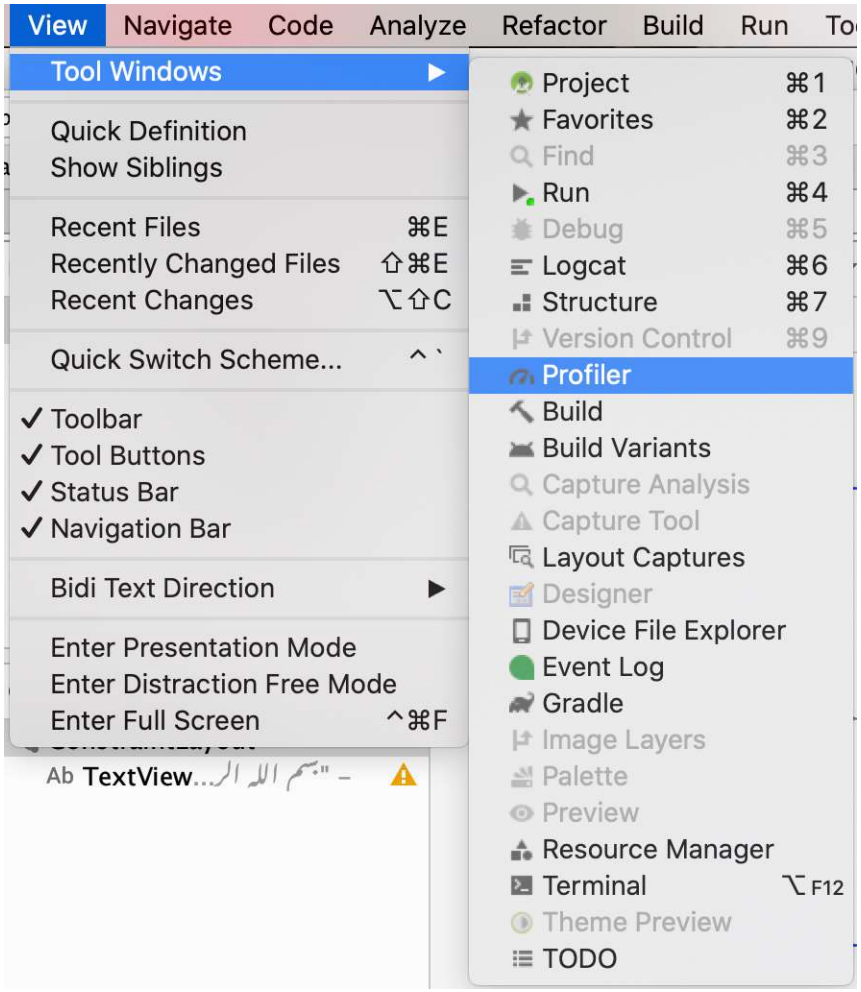


Choose Selected Device

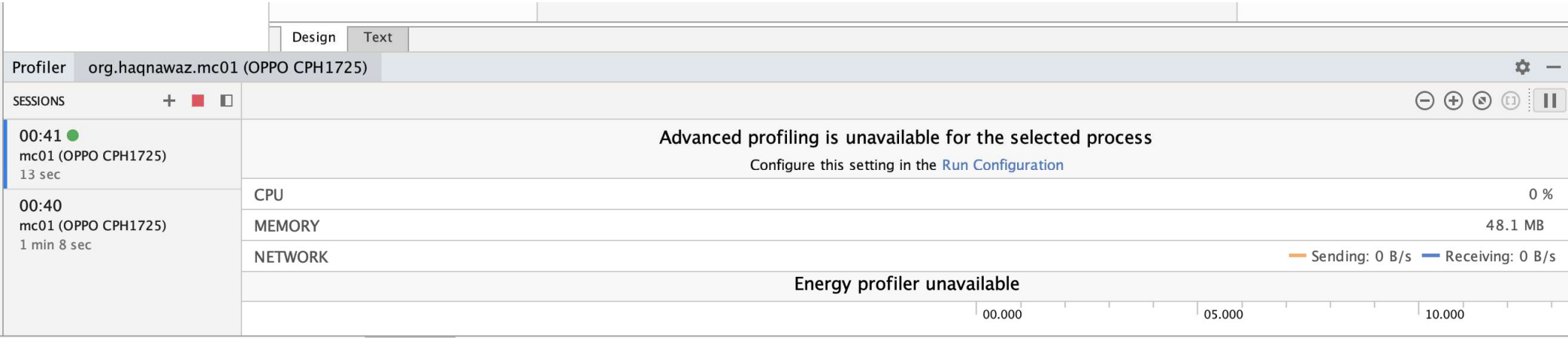


Running on real Device

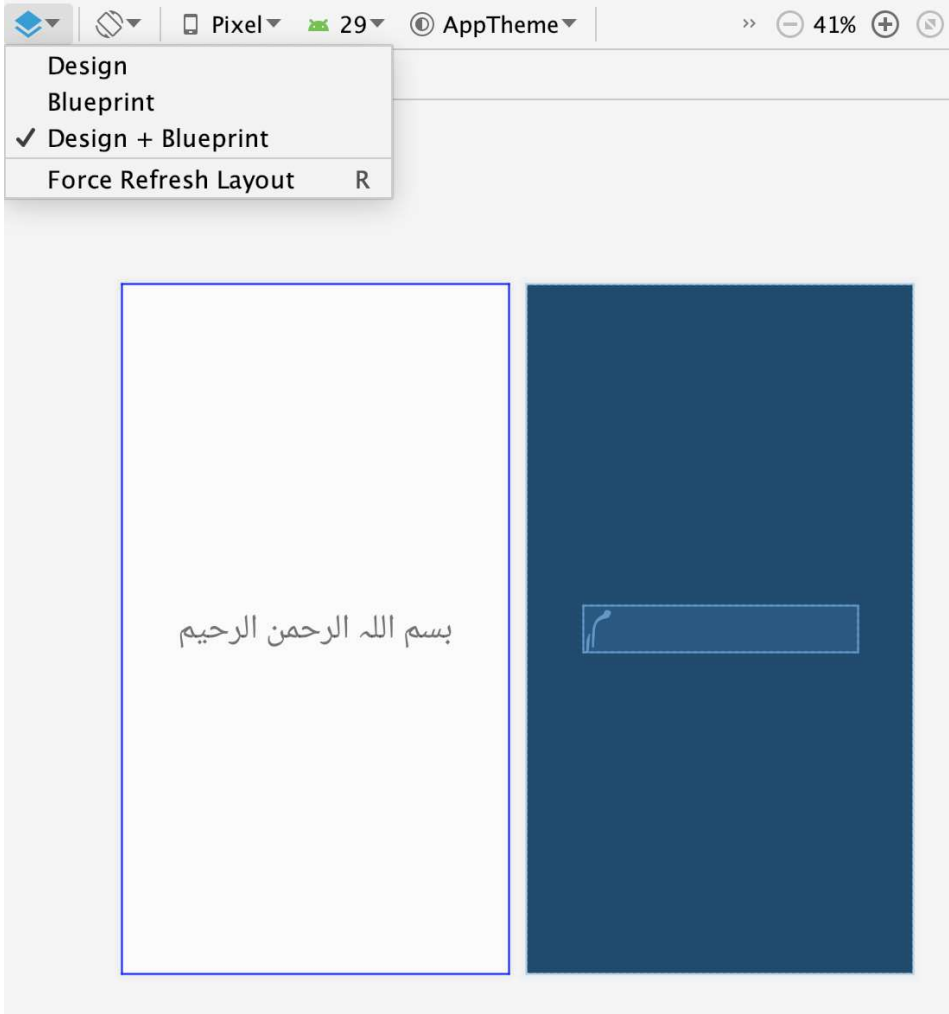
Android Profiler



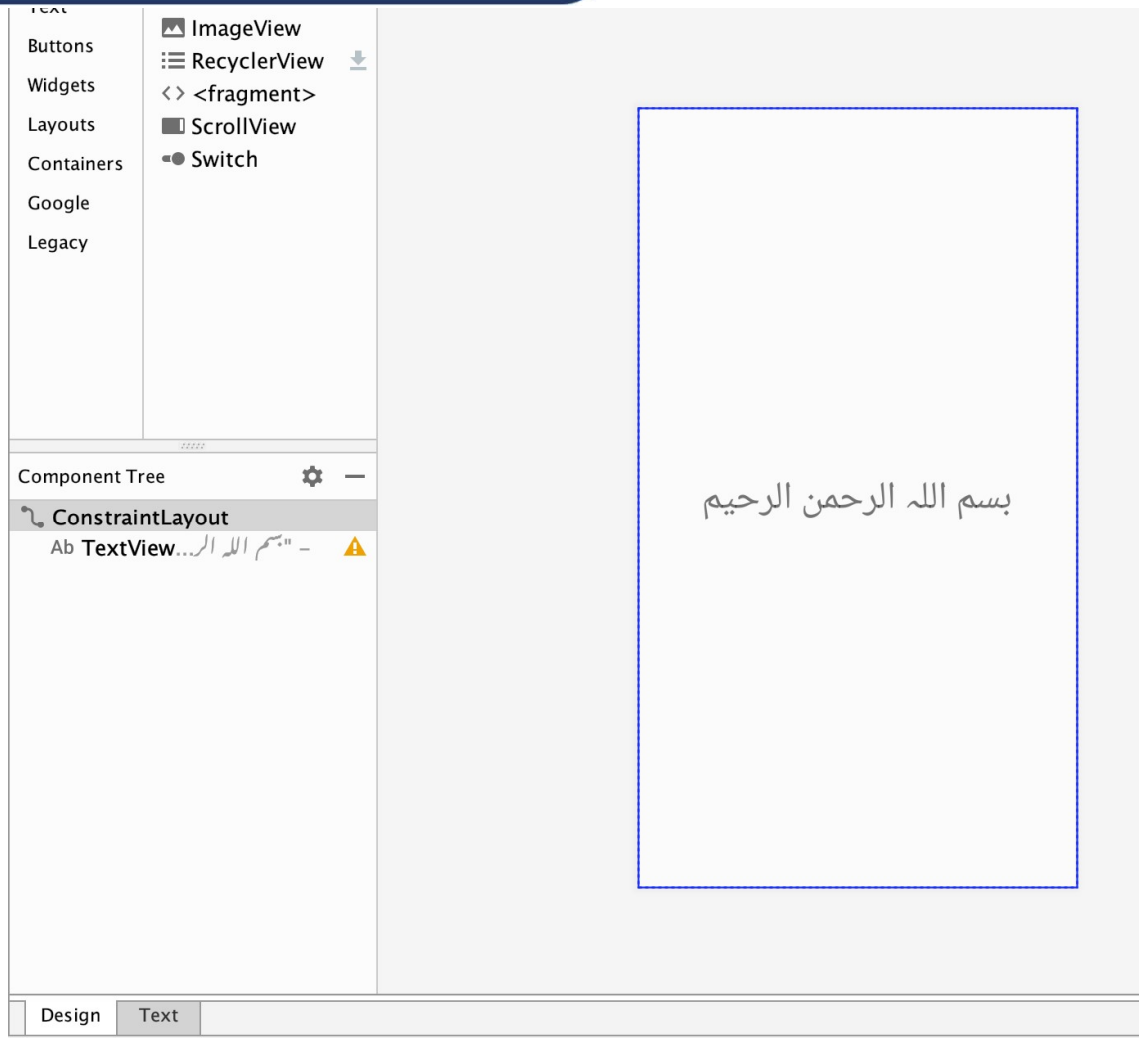
Running on real Device



Design and Blueprint



XML Design view



XML Text view

PUCIT2021 > app > src > main > res > layout > activity_main.xml

MainActivity.java | activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="بسم الله الرحمن الرحيم"
        android:textSize="36sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

</androidx.constraintlayout.widget.ConstraintLayout>
```

Design | Text

XML Text view

XML Anatomy

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
```

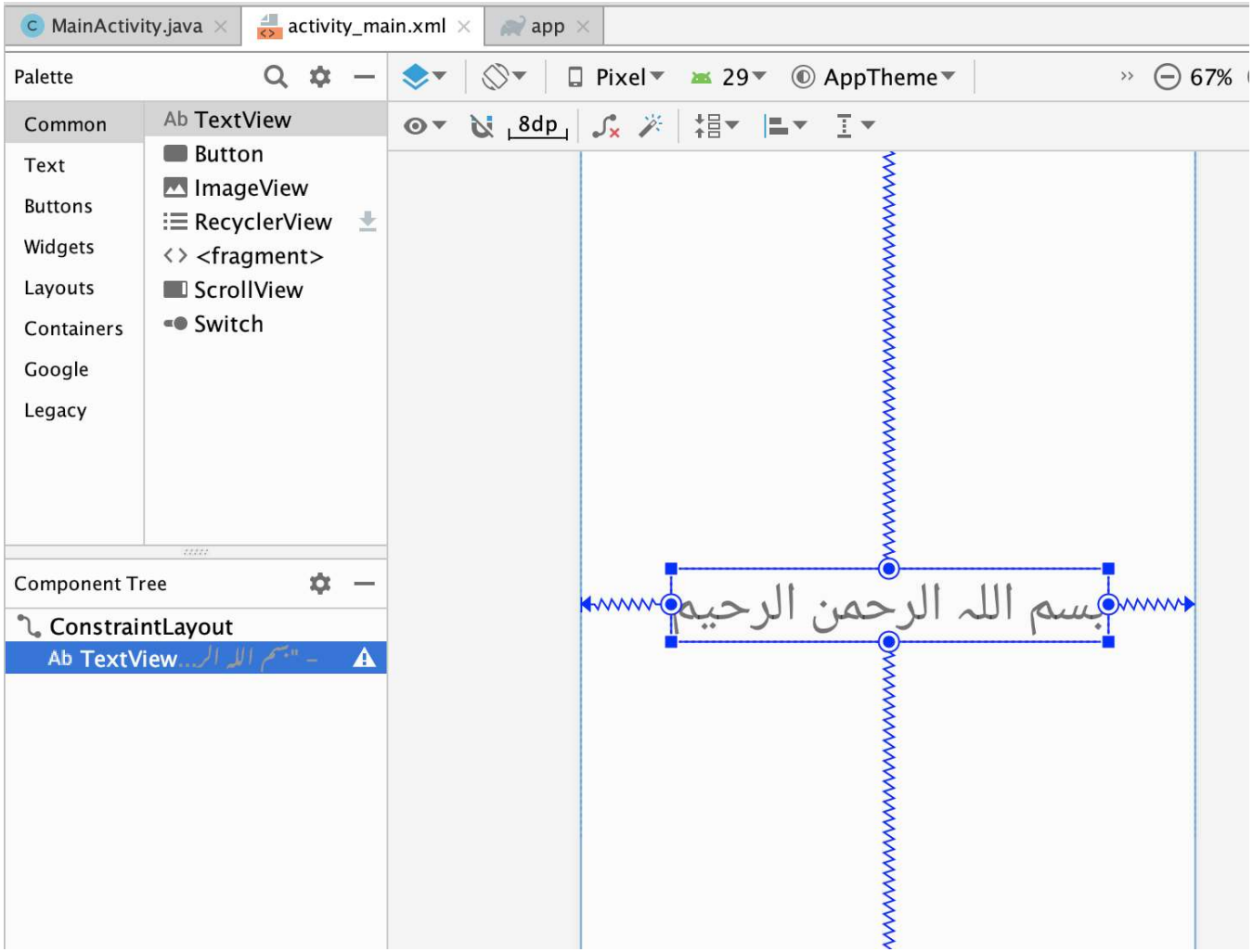
- **Look at the tag for the ConstraintLayout, and notice that it says androidx.constraintlayout.widget.ConstraintLayout instead of just ConstraintLayout like the TextView. This is because ConstraintLayout is part of Android Jetpack, which contains libraries of code which offers additional functionality on top of the core Android platform. Jetpack has useful functionality you can take advantage of to make building apps easier. You'll recognize this UI component is part of Jetpack because it starts with "androidx"**

XML Anatomy

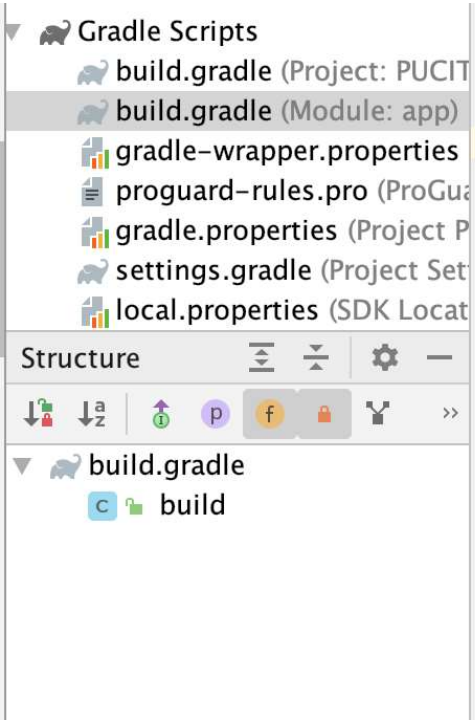
```
xmlns:app="http://schemas.android.com/apk/res-auto"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".MainActivity">
```

- The xmlns stands for XML namespace, and each line defines a schema, or vocabulary for attributes related to those words. The android: namespace, for example, marks attributes that are defined by the Android system. All of the attributes in the layout XML begins with one of those namespaces.

Constraint Layout



Constraint Layout




```
        versionCode 1
        versionName "1.0"
        testInstrumentationRunner "androidx.test.runner.AndroidJUnitRunner"
    }
    buildTypes {
        release {
            minifyEnabled false
            proguardFiles getDefaultProguardFile('proguard-android-optimize.txt'), 'proguard-rules.pro'
        }
    }
}

dependencies {
    implementation fileTree(dir: 'libs', include: ['*.jar'])
    implementation 'androidx.appcompat:appcompat:1.2.0'
    implementation 'androidx.constraintlayout:constraintlayout:2.0.1'
    testImplementation 'junit:junit:4.12'
    androidTestImplementation 'androidx.test:runner:1.3.0'
    androidTestImplementation 'androidx.test.espresso:espresso-core:3.3.0'
}
```

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