



Lab 1 – Introduction to Android & Hello World Example

KUAN-TINGLAI



Apple Pie 1.0



Cupcake 1.5



Donut 1.6



Eclair 2.0/ 2.1



Froyo 2.2



Gingerbread 2.3.x



Honeycomb 3.x



Ice Cream Sandwich 4.0.x



Jelly Bean 4.1/4.2/4.3



KitKat 4.4



Lollipop 5.0



Marshmallow 6.0



Nougat 7.0



Oreo 8.0



Pie 9.0

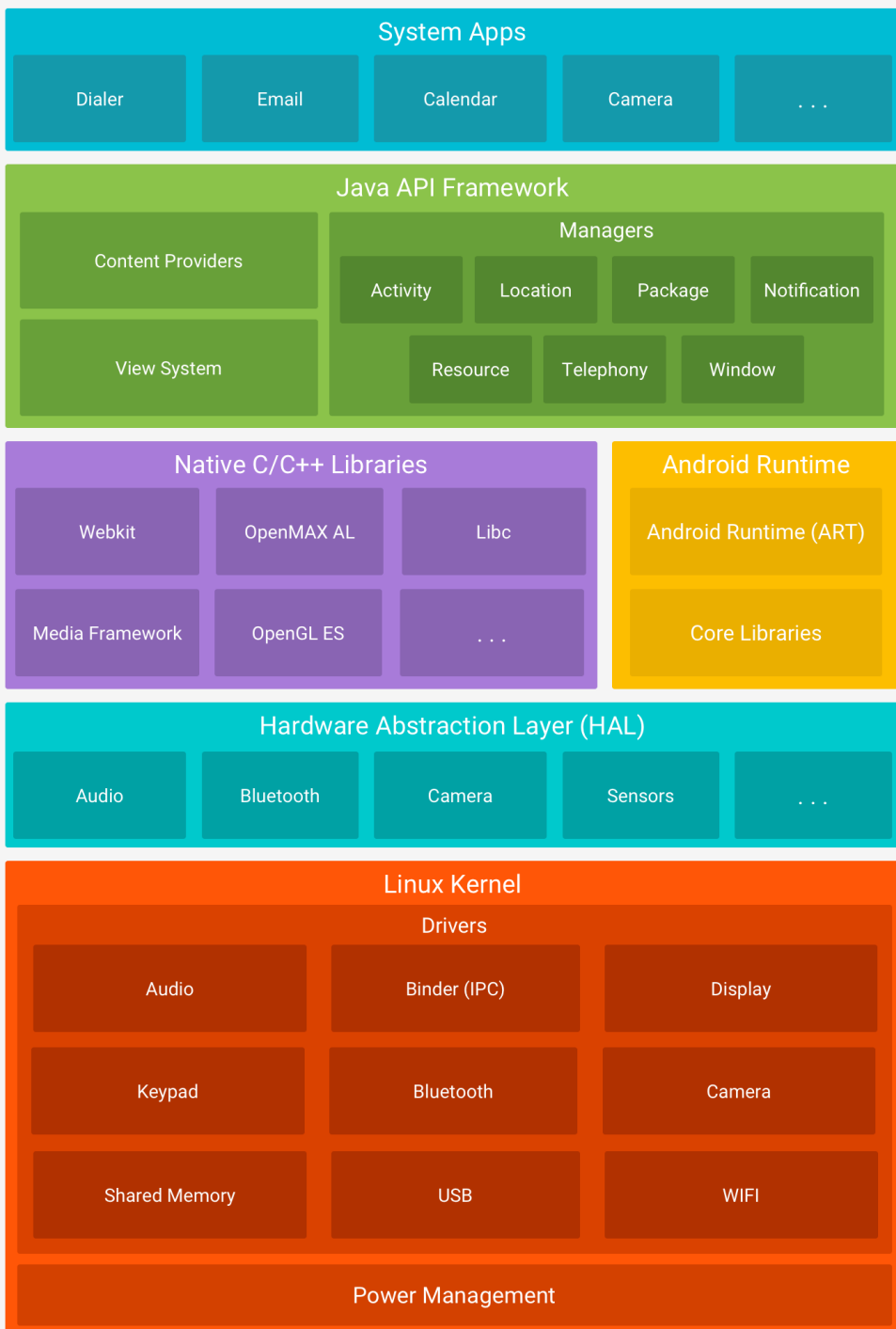
Android History

name	version number	issue date	API level	Security update status
Android 1.0	1.0	September 23, 2008	1	Does not support
Android 1.1	1.1	February 9, 2009	2	Does not support
Android Cupcake	1.5	April 27, 2009	3	Does not support
Android Donut ^[4]	1.6	September 15, 2009	4	Does not support
Android Lightning ^[5]	2.0 – 2.1	October 26, 2009	5 – 7	Does not support
Android Froyo ^[6]	2.2 – 2.2.3	May 20, 2010	8	Does not support
Android Gingerbread ^[7]	2.3 – 2.3.7	December 6, 2010	9 – 10	Does not support
Android Honeycomb ^[8]	3.0 – 3.2.6	February 22, 2011	11 – 13	Does not support
Android Ice Cream Sandwich ^[9]	4.0 – 4.0.4	October 18, 2011	14 – 15	Does not support
Android Jelly Bean ^[10]	4.1 – 4.3.1	July 9, 2012	16 – 18	Does not support
Android KitKat ^[11]	4.4 – 4.4.4	October 31, 2013	19 – 20	Not supported ^[12]
Android Lollipop ^[13]	5.0 – 5.1.1	November 12, 2014	21 – 22	Not supported ^[14]
Android Marshmallow ^[15]	6.0 – 6.0.1	October 5, 2015	twenty three	Not supported ^[16]
Android Nougat ^[17]	7.0 – 7.1.2	August 22, 2016	24 – 25	Not supported ^[18]
Android Oreo ^[19]	8.0 – 8.1	August 21, 2017	26 – 27	support
Android Pie	9	August 6, 2018	28	support
Android 10 ^[20]	10	September 3, 2019	29	support
Android 11 ^[21]	11	February 19, 2020	30	support

format: old version Old version, still supported **Current version** The latest preview

Android versions

Courtesy: https://en.wikipedia.org/wiki/Android_version_history



Platform Architecture

- Linux Kernel
- Hardware Abstraction Layer (HAL)
- Android Runtime (ART)
- Native C/C++ Libraries
- JavaAPIFramework
 - ❖ View System
 - ❖ Resource Manager
 - ❖ Notification Manager
 - ❖ Activity Manager
 - ❖ Content Providers

Android Studio

Install tools:

- 1.Install (Java Development Kit , JDK)
2. install Android Studio
- 3.Install Android (Software Development Kit, SDK)

Install Java Development Kit (JDK)

- Download Java SE Development Kit from Oracle website
- <https://www.oracle.com/java/technologies/javase-downloads.html#javasejdk>



The screenshot shows the Oracle Java SE Downloads page for Java SE 14. The page title is "Java SE Downloads" with the subtitle "Java Platform, Standard Edition". Under the heading "Java SE 14", it states "Java SE 14.0.1 is the latest release for the Java SE Platform". A list of links is provided on the left, including Documentation, Installation Instructions, Release Notes, Oracle License (with sub-links for Binary License and Documentation License), Java SE Licensing Information User Manual (with a sub-link for Includes Third Party Licenses), Certified System Configurations, and Readme. On the right, under the heading "Oracle JDK", there are two download links: "JDK Download" and "Documentation Download". The "JDK Download" link is highlighted with a red rectangular box. At the bottom, there is a section titled "Looking for Oracle OpenJDK builds?" followed by a bullet point: "• Oracle Customers and ISVs targeting Oracle LTS releases: Oracle JDK is Oracle's supported Java SE version for customers and for developing, testing, prototyping or demonstrating your Java".

Java SE Downloads

Java Platform, Standard Edition

Java SE 14

Java SE 14.0.1 is the latest release for the Java SE Platform

- Documentation
- Installation Instructions
- Release Notes
- Oracle License
 - Binary License
 - Documentation License
- Java SE Licensing Information User Manual
 - Includes Third Party Licenses
- Certified System Configurations
- Readme

Oracle JDK

JDK Download

Documentation Download


Looking for Oracle OpenJDK builds?

- Oracle Customers and ISVs targeting Oracle LTS releases: Oracle JDK is Oracle's supported Java SE version for customers and for developing, testing, prototyping or demonstrating your Java

Install Android Studio

Go to the official website to download Android Studio

<https://developer.android.com/studio>

developers 

Platform

Android Studio


Google Play

Jetpack

Kotlin


Docs

News

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ENGLISH ▾

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android
studio 

Android Studio provides the fastest tools for building apps on every type of Android device.

DOWNLOAD ANDROID STUDIO

4.0.1 for Windows 64-bit (871 MB)

DOWNLOAD OPTIONS

RELEASE NOTES



Install Android Studio

Check the agreement and download it。

Download Android Studio

Before downloading, you must agree to the following terms and conditions.

8.1 Google Data APIs

8.1.1 If you use any API to retrieve data from Google, you acknowledge that the data may be protected by intellectual property rights which are owned by Google or those parties that provide the data (or by other persons or companies on their behalf). Your use of any such API may be subject to additional Terms of Service. You may not modify, rent, lease, loan, sell, distribute or create derivative works based on this data (either in whole or in part) unless allowed by the relevant Terms of Service.

8.1.2 If you use any API to retrieve a user's data from Google, you acknowledge and agree that you shall retrieve data only with the user's explicit consent and only when, and for the limited purposes for which, the user has given you permission to do so. If you use the Android Recognition Service API, documented at the following URL: <https://developer.android.com/reference/android/speech/RecognitionService>, as updated from time to time, you acknowledge that the use of the API is subject to the Data Processing Addendum for Products where Google is a Data Processor, which is located at the following URL: <https://privacy.google.com/businesses/gdprprocessorterms/>, as updated from time to time. By clicking to accept, you hereby agree to the terms of the Data Processing Addendum for Products where Google is a Data Processor.

9. Terminating this License Agreement

9.1 The License Agreement will continue to apply until terminated by either you or Google as set out below.

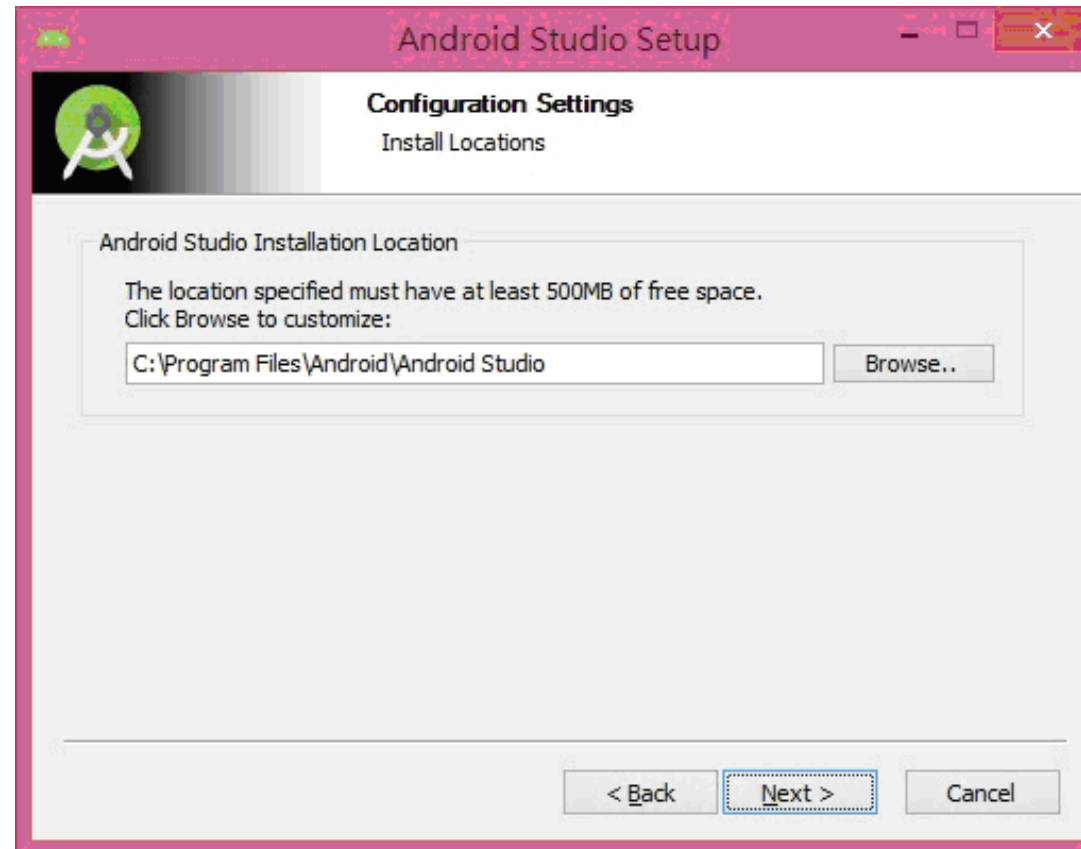
☒ I have read and agree with the above terms and conditions

DOWNLOAD ANDROID STUDIO FOR WINDOWS

android-studio-ide-193.6626763-windows.exe

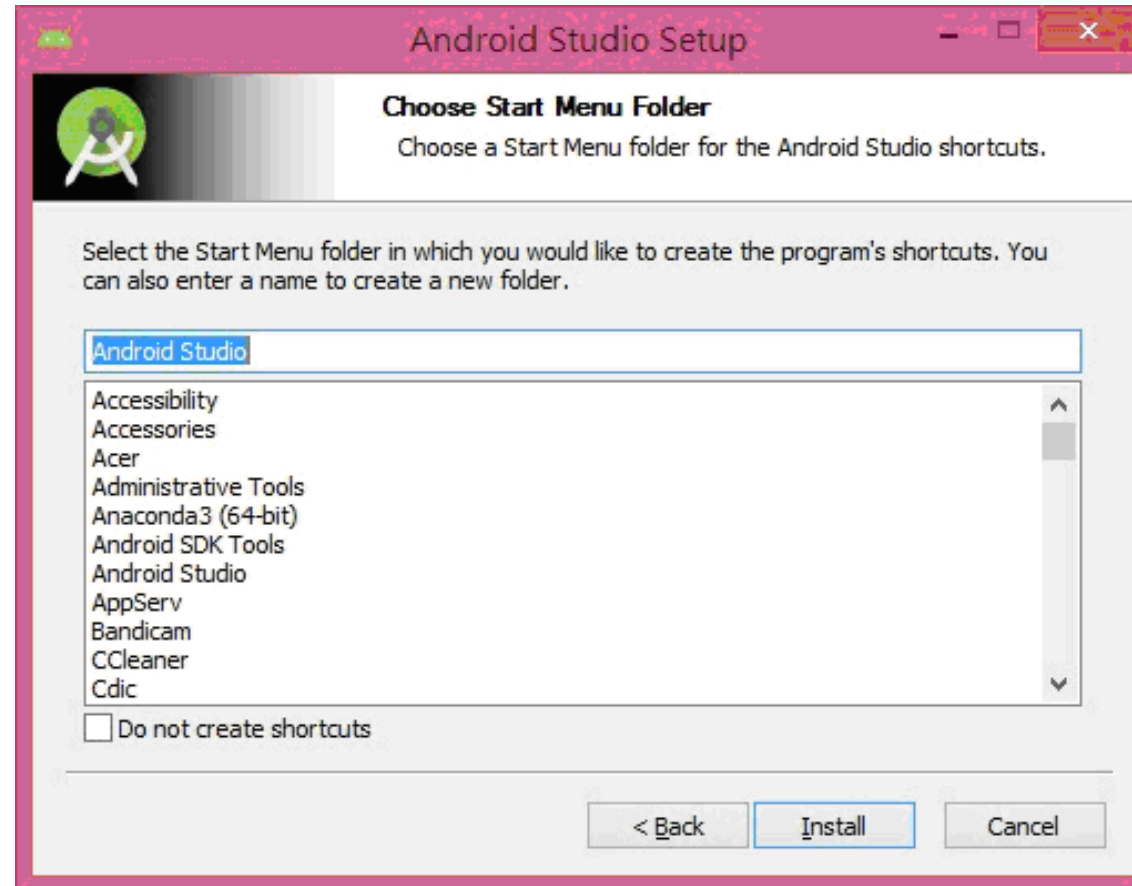
Install Android Studio

Start the installation process and keep pressing "Next"



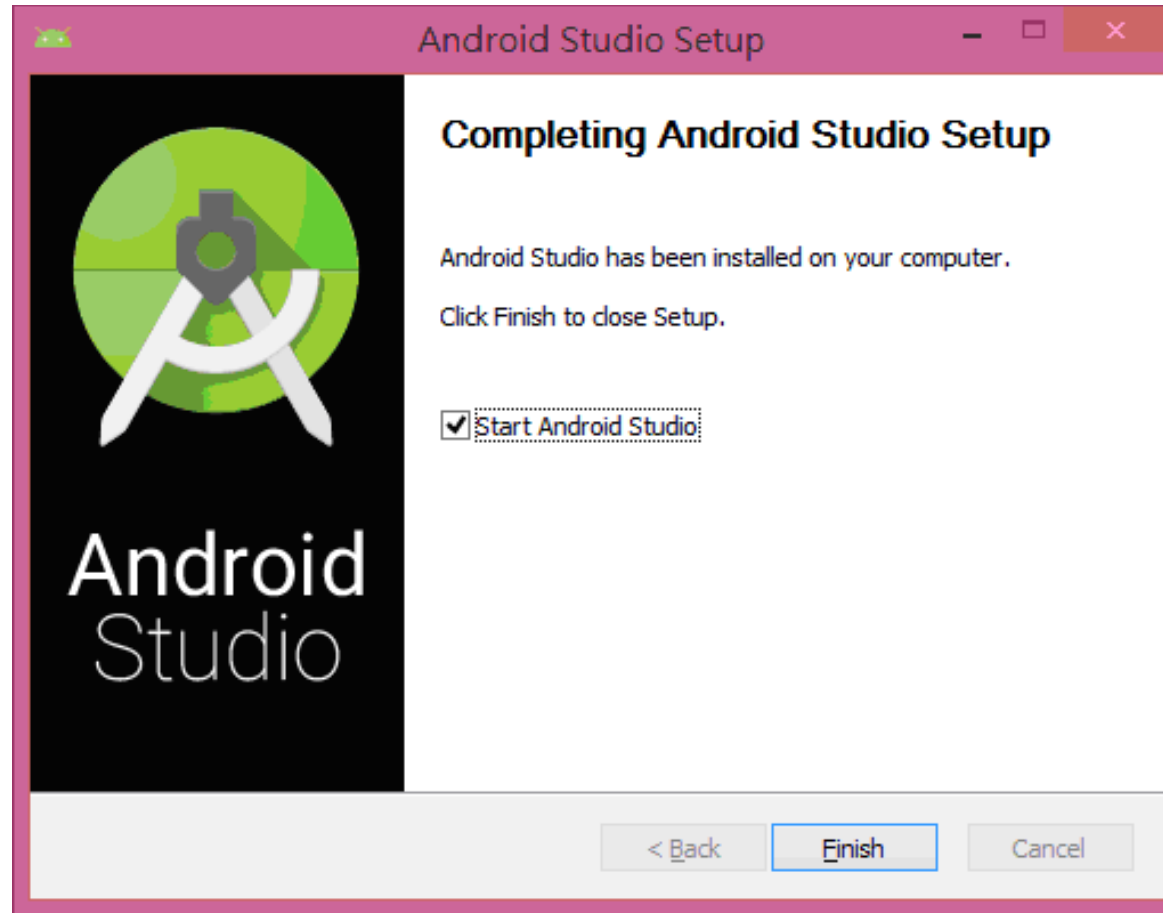
Install Android Studio

Keep pressing "Next"



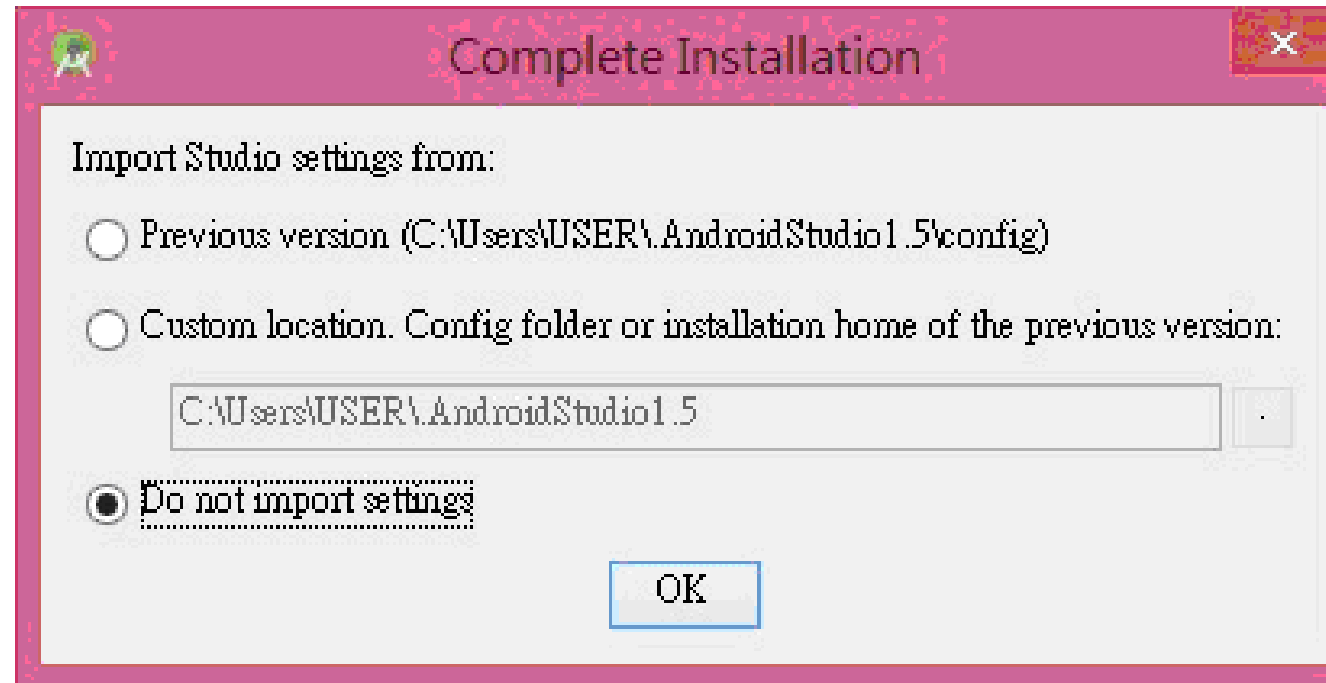
Install Android Studio

After installation, clicked the “Finish” button and open the application.



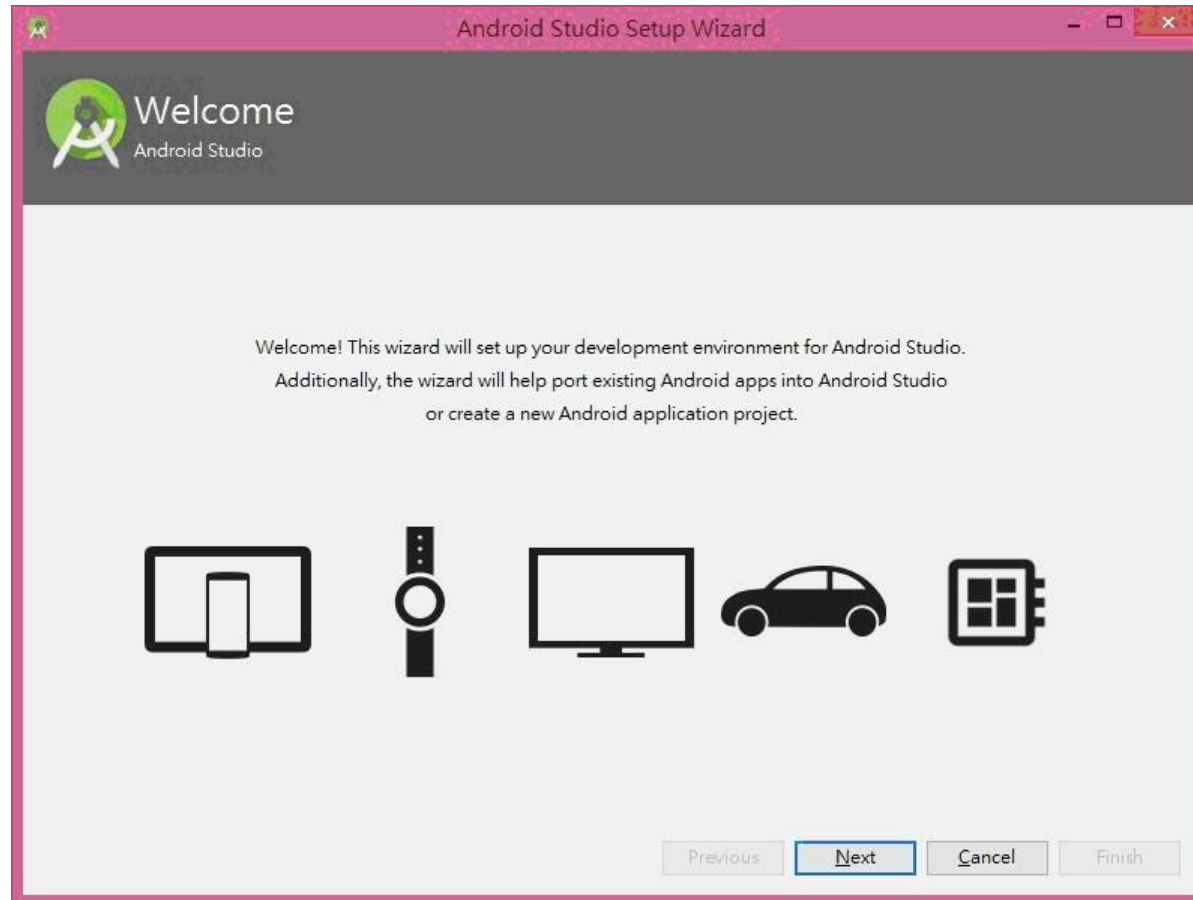
Install Android Studio

If you open the application, it will ask whether you need to back the previous version or not. Select "Do not import settings" here, if you use it for the first time.



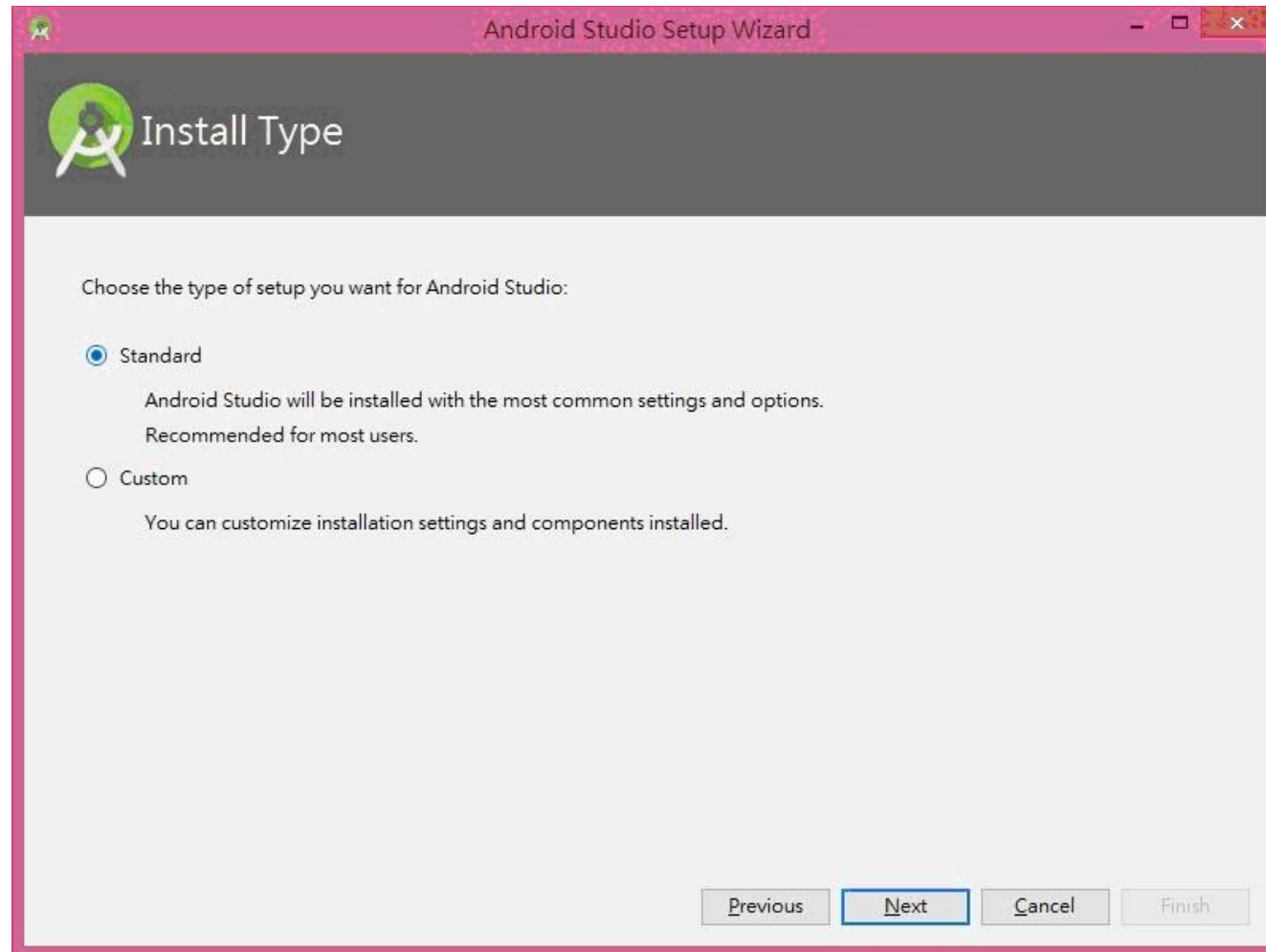
Software Development Kit

If you watch this page, you complete the installation.
Then we need to install the SDK now.



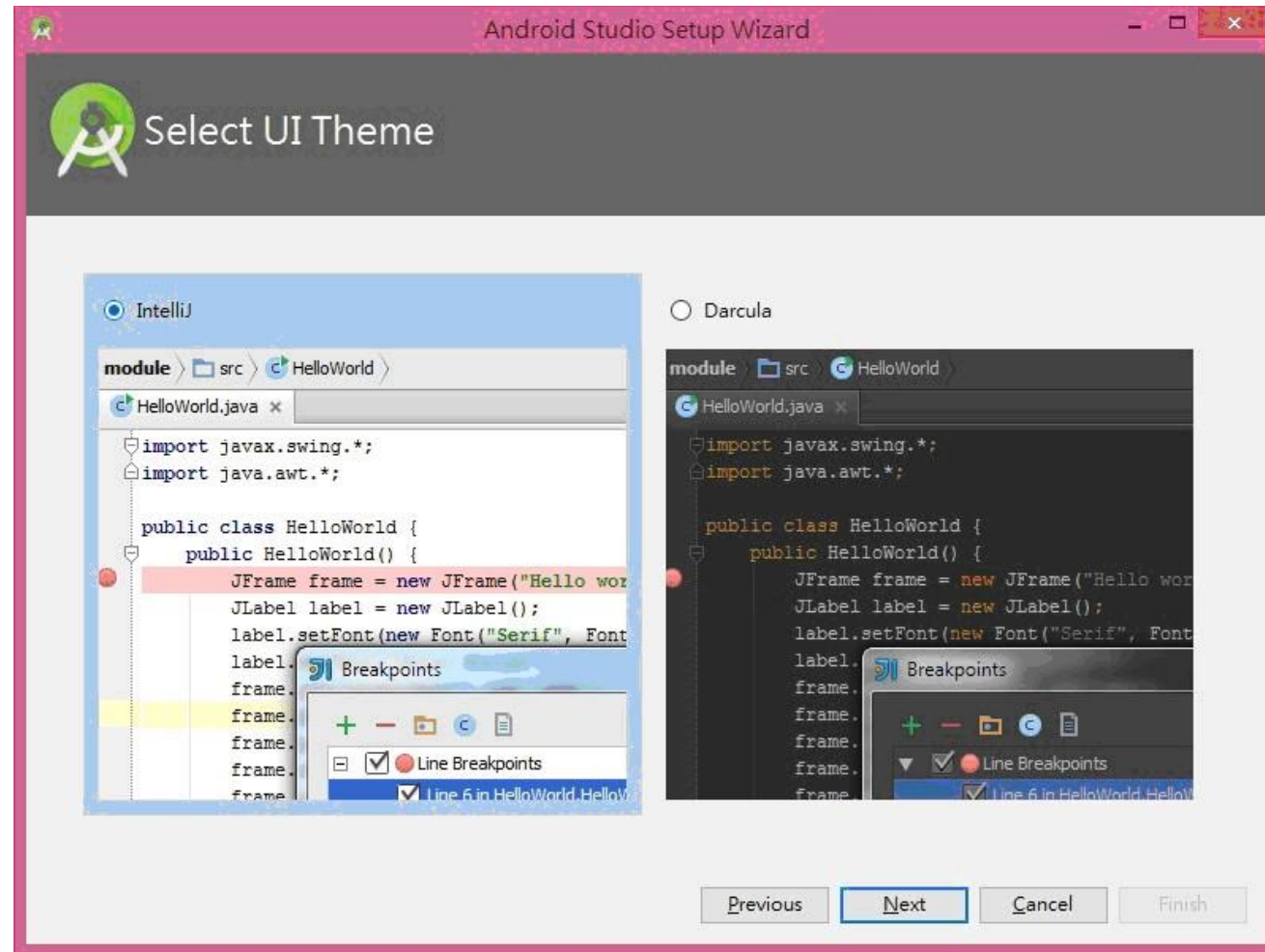
Software Development Kit

select the "Standard" type, and click "Next"



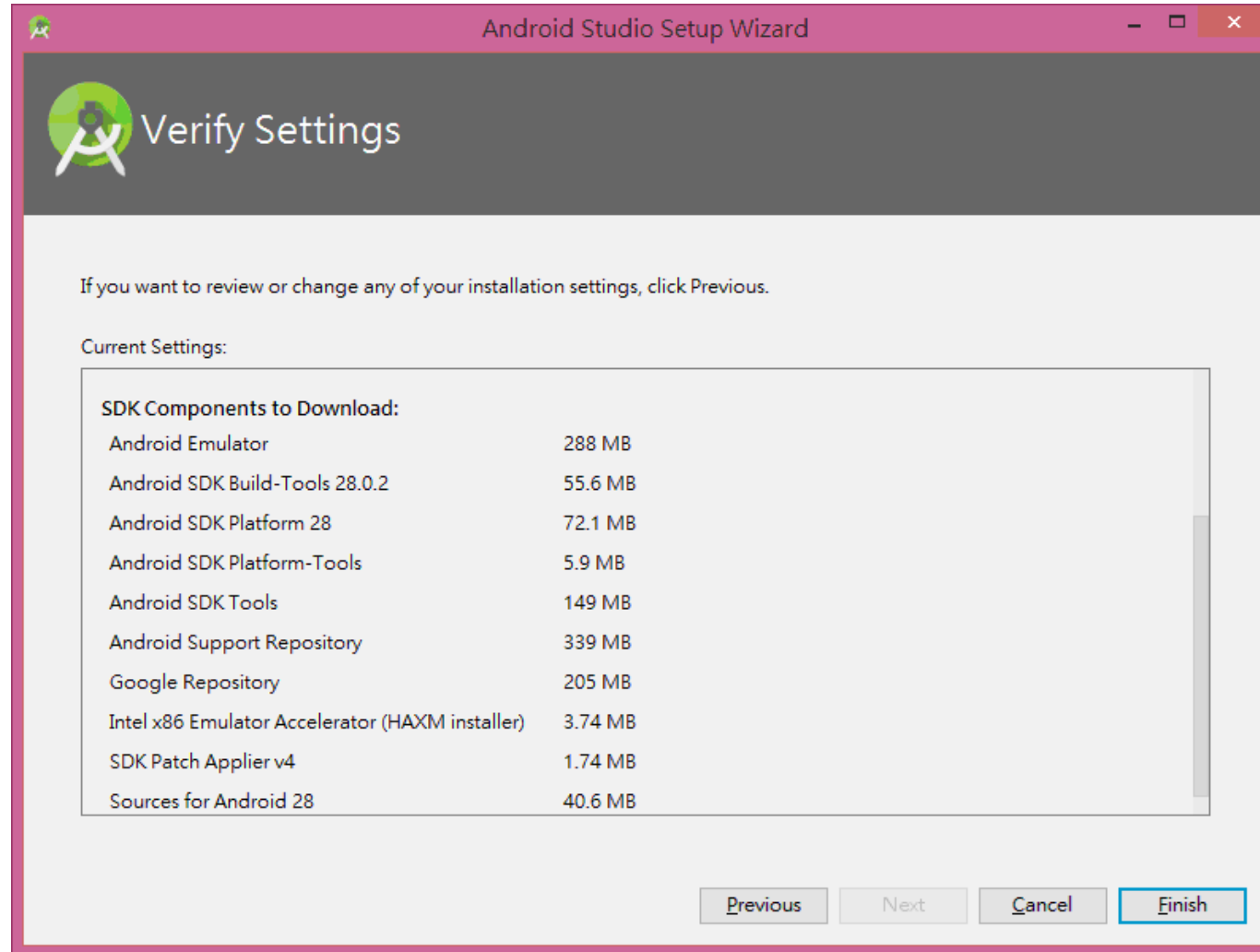
Software Development Kit

Select your IDE style and keep pressing the “Next”.

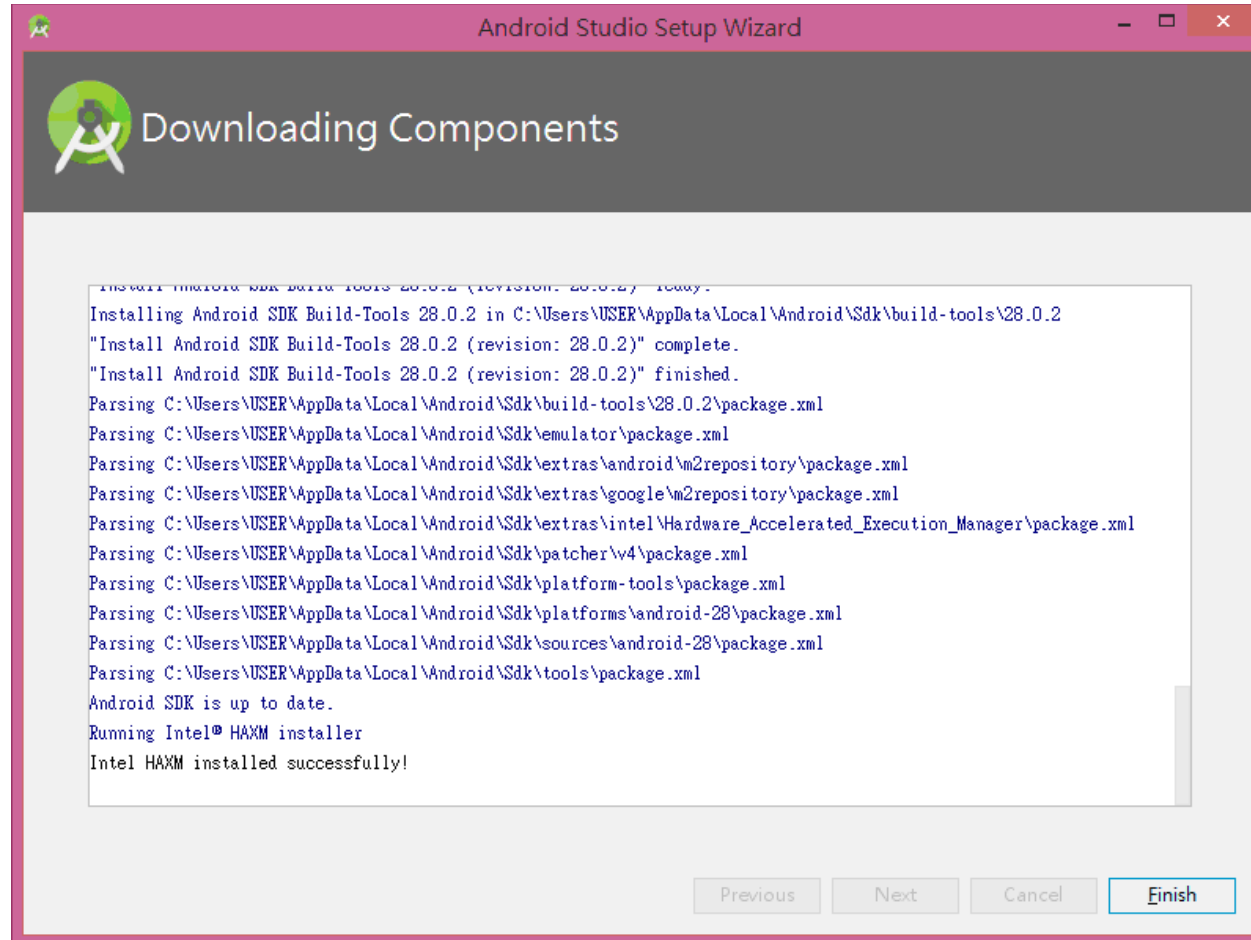


Software Development Kit

Click "Finish" and start SDK installation.

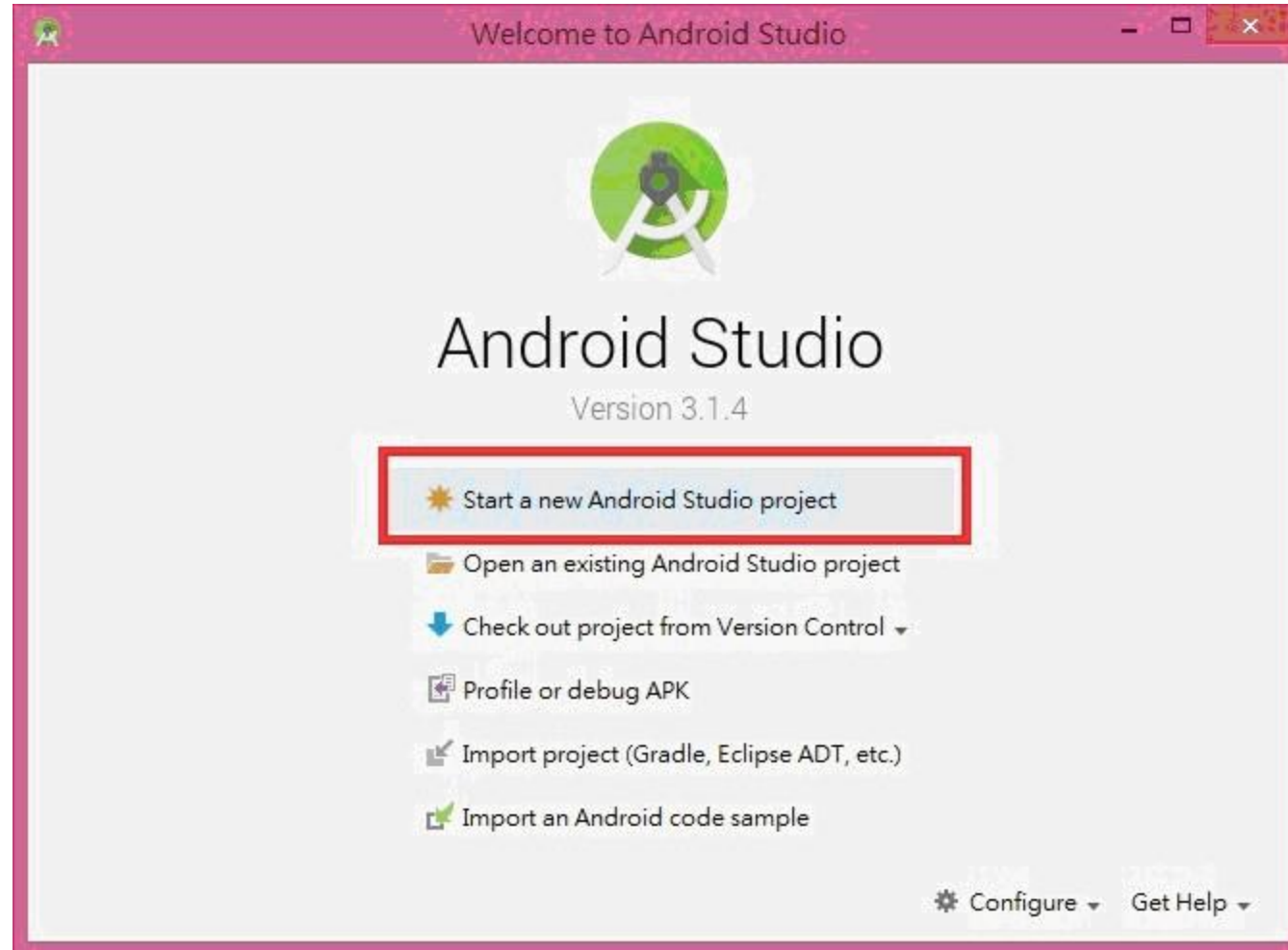


If you click “Show Details”, you can see the detail information about the file you downloaded. When the download completed, you can click “Finish” and starting coding the application

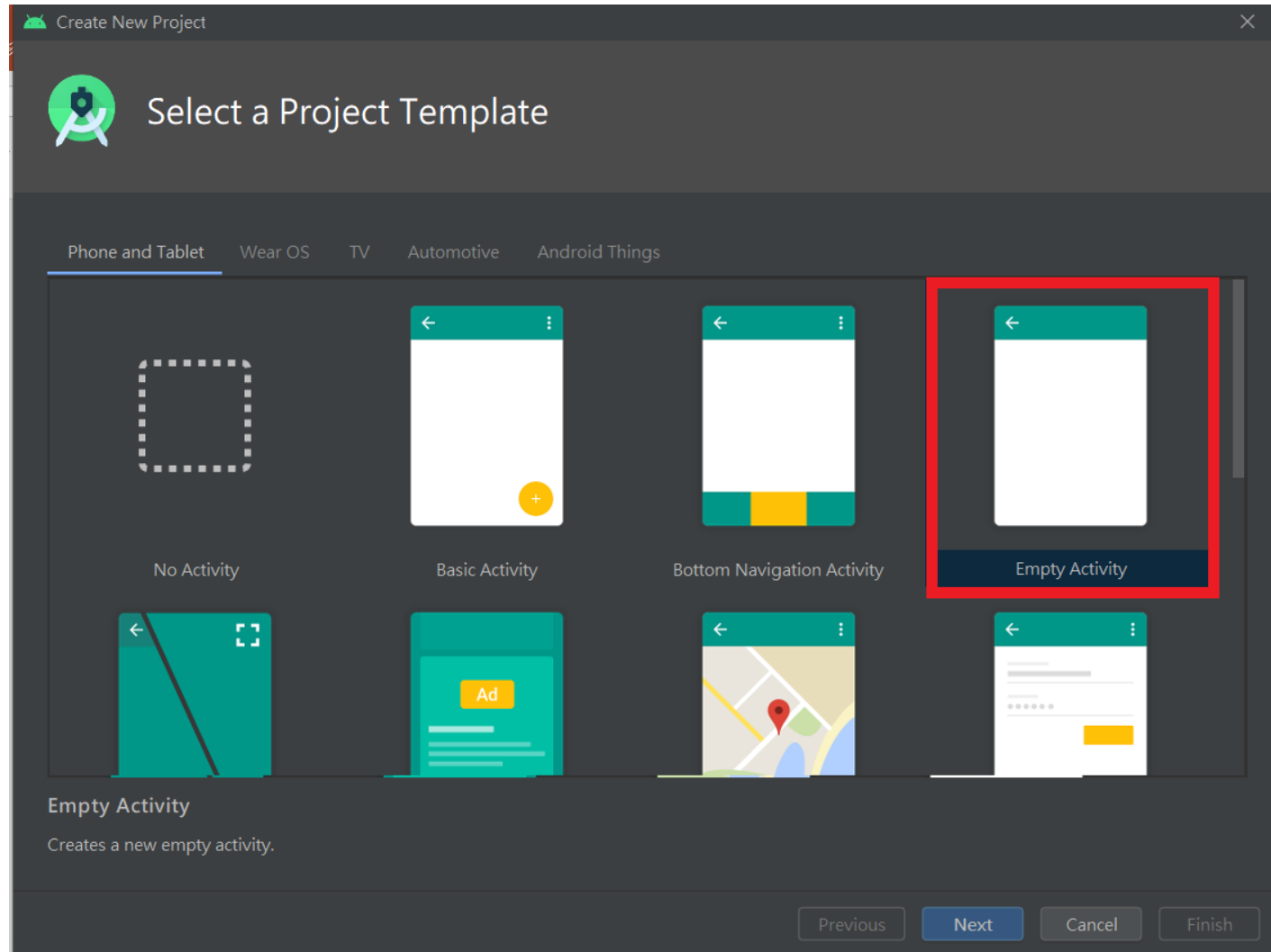


Today's Assignment

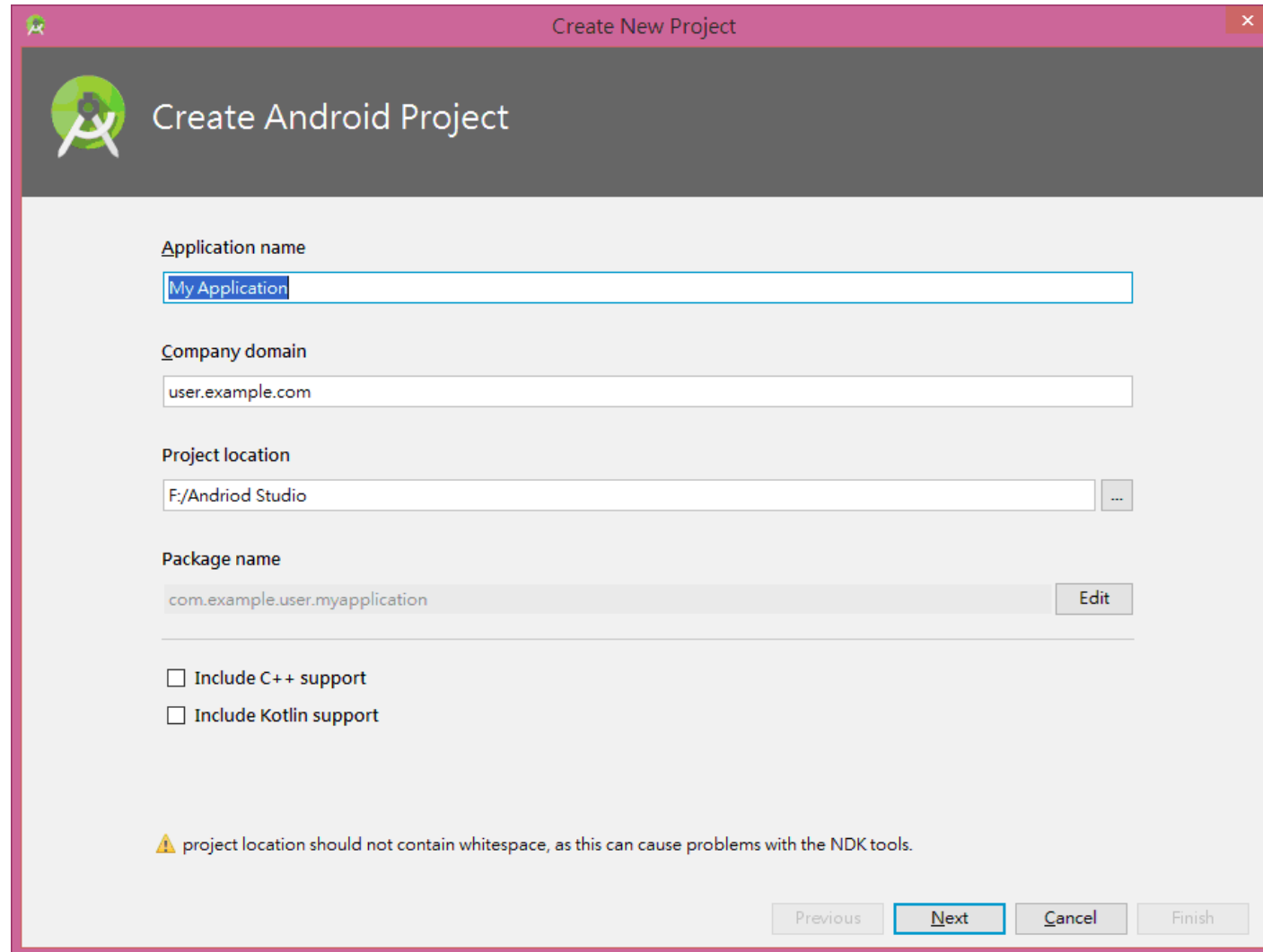
Start a new Android Studio project



Create New Project



Create New Project



The screenshot shows the 'Create New Project' dialog box in Android Studio. The dialog has a pink title bar with the text 'Create New Project' and a close button. The main content area has a dark gray header with the Android Studio logo and the text 'Create Android Project'. Below the header, there are four input fields: 'Application name' with the text 'My Application', 'Company domain' with the text 'user.example.com', 'Project location' with the text 'F:/Andriod Studio' and a browse button, and 'Package name' with the text 'com.example.user.myapplication' and an 'Edit' button. Below these fields are two checkboxes: 'Include C++ support' and 'Include Kotlin support', both of which are unchecked. At the bottom, there is a warning message: 'project location should not contain whitespace, as this can cause problems with the NDK tools.' and four buttons: 'Previous', 'Next', 'Cancel', and 'Finish'.

Create New Project

Create Android Project

Application name
My Application

Company domain
user.example.com

Project location
F:/Andriod Studio



Package name
com.example.user.myapplication Edit

☐ Include C++ support
☐ Include Kotlin support

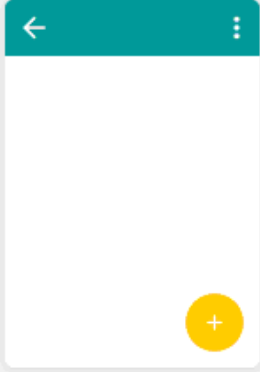
⚠ project location should not contain whitespace, as this can cause problems with the NDK tools.

Previous Next Cancel Finish

Create New Project

 Configure Activity

Creates a new basic activity with an app bar.



Activity Name: MainActivity

Layout Name: activity_main

Title: MainActivity

☐ Use a Fragment

The name of the activity class to create

Previous

Next

Cancel

Finish



Component Installer

Installing Requested Components

SDK Path: C:\Users\USER\AppData\Local\Android\Sdk

Preparing "Install ConstraintLayout for Android 1.0.2 (revision: 1)".

Downloading

file:/C:/Program%20Files/Android/Android%20Studio/plugins/sdk-updates/offline-repo/com.android.support.constraint-constraint-layout-1.0.2.zip

"Install ConstraintLayout for Android 1.0.2 (revision: 1)" ready.

Installing Solver for ConstraintLayout 1.0.2 in

C:\Users\USER\AppData\Local\Android\Sdk\extras\m2repository\com\android\support\constraint\constraint-layout-solver\1.0.2

"Install Solver for ConstraintLayout 1.0.2 (revision: 1)" complete.

Writing Maven metadata to

C:\Users\USER\AppData\Local\Android\Sdk\extras\m2repository\com\android\support\constraint\constraint-layout-solver\maven-metadata.xml

"Install Solver for ConstraintLayout 1.0.2 (revision: 1)" finished.

Installing ConstraintLayout for Android 1.0.2 in

C:\Users\USER\AppData\Local\Android\Sdk\extras\m2repository\com\android\support\constraint\constraint-layout\1.0.2

"Install ConstraintLayout for Android 1.0.2 (revision: 1)" complete.

Writing Maven metadata to

C:\Users\USER\AppData\Local\Android\Sdk\extras\m2repository\com\android\support\constraint\constraint-layout\maven-metadata.xml

"Install ConstraintLayout for Android 1.0.2 (revision: 1)" finished.

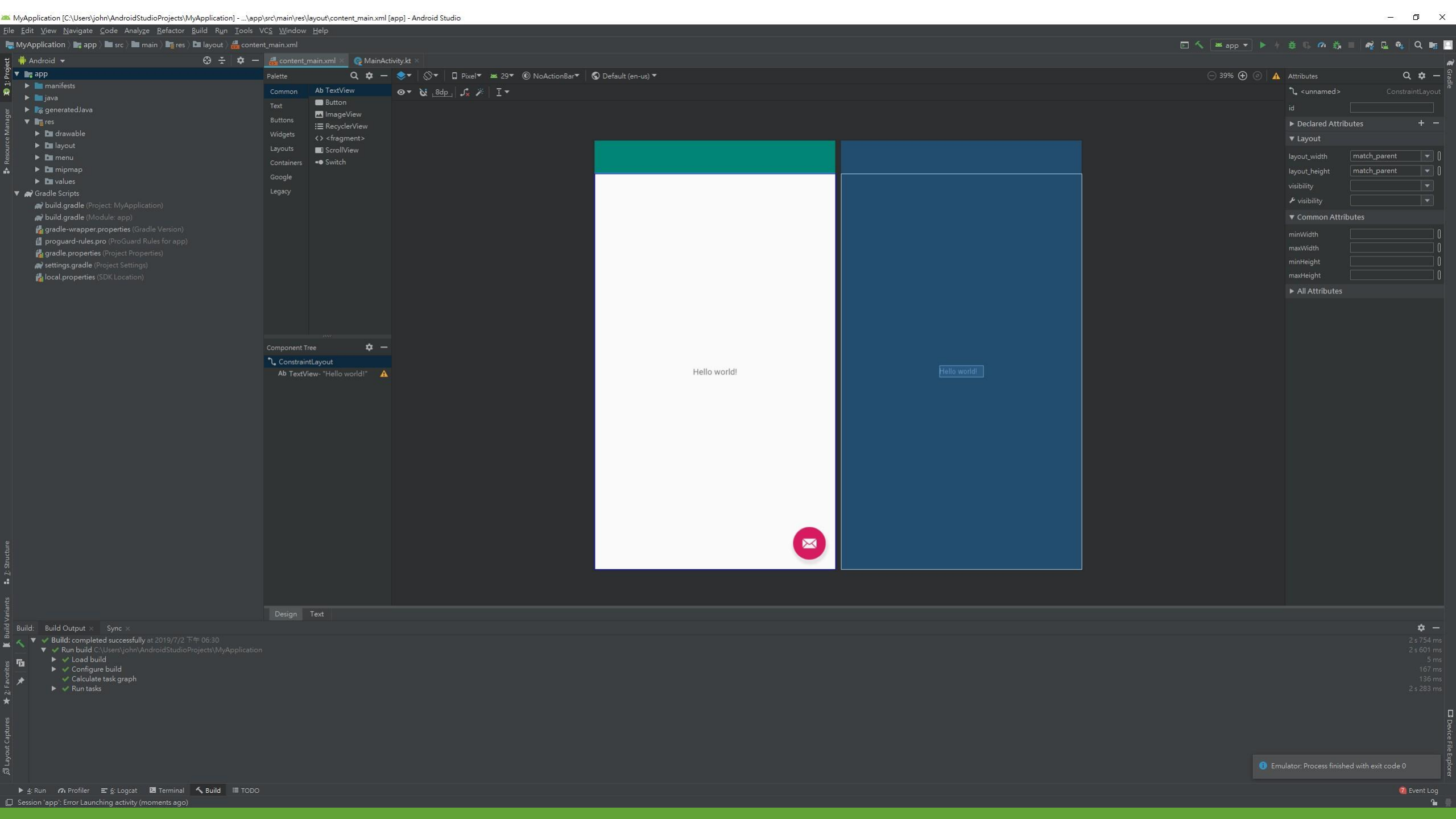
Done

Previous

Next

Cancel

Finish



MyApplication [C:\Users\john\AndroidStudioProjects\MyApplication] - ...app\src\main\res\layout\content_main.xml [a

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

MyApplication > app

Android > app

1: Project

▼ manifests

▼ java

▼ generatedJava

▼ res

▼ drawable

▼ layout

activity_main.xml

content_main.xml

▼ menu

▼ mipmap

▼ values

▼ Gradle Scripts

build.gradle (Project: MyApplication)

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)

Resource Manager

content_main.xml x MainActi

Palette

Common Ab TextView

Text Button

Buttons ImageView

Widgets RecyclerView

Layouts <> <fragment>

Containers ScrollView

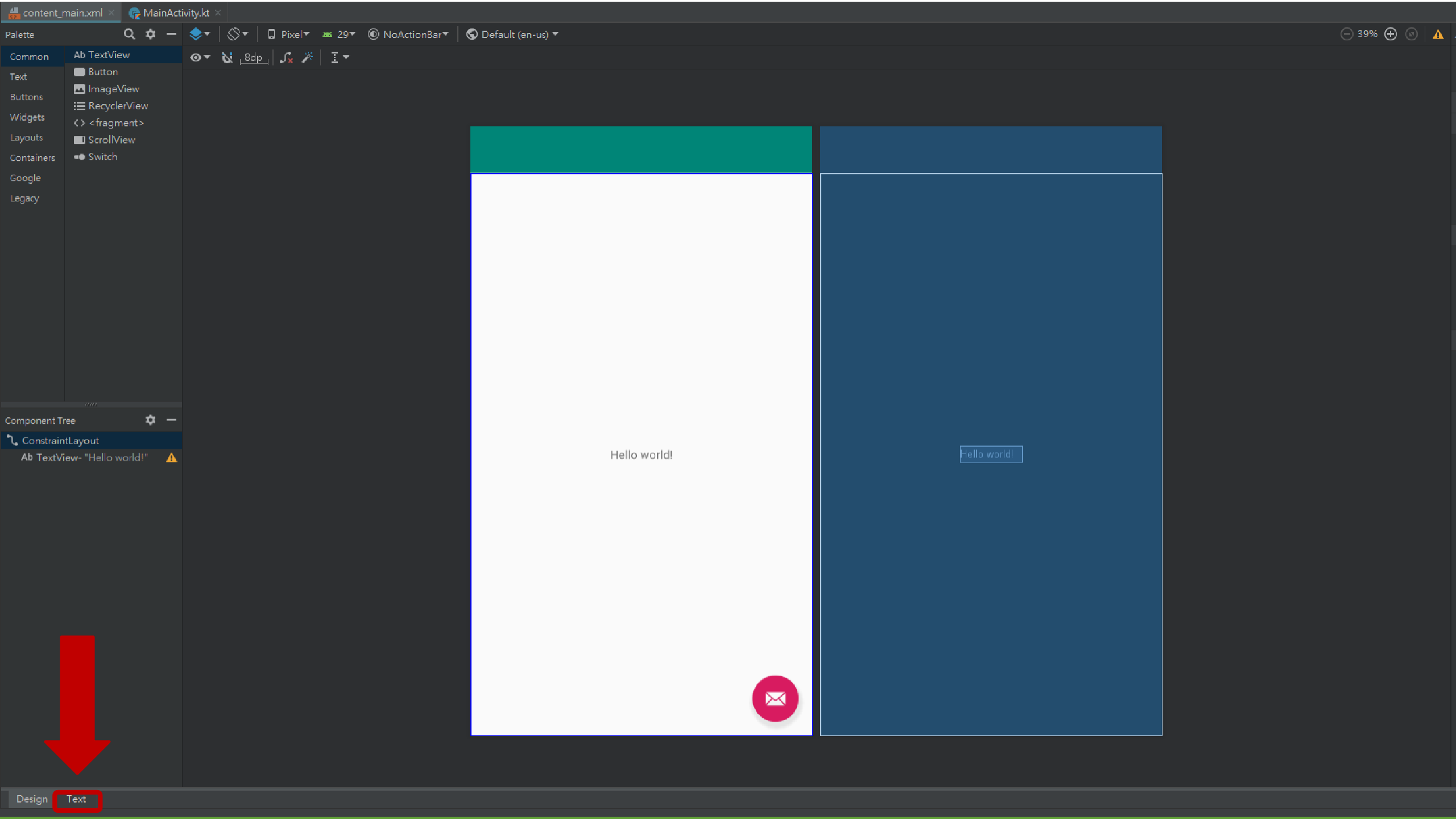
Google Switch

Legacy

Component Tree

ConstraintLayout

Ab TextView- "Hello world!"



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

<TextView

```
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
```

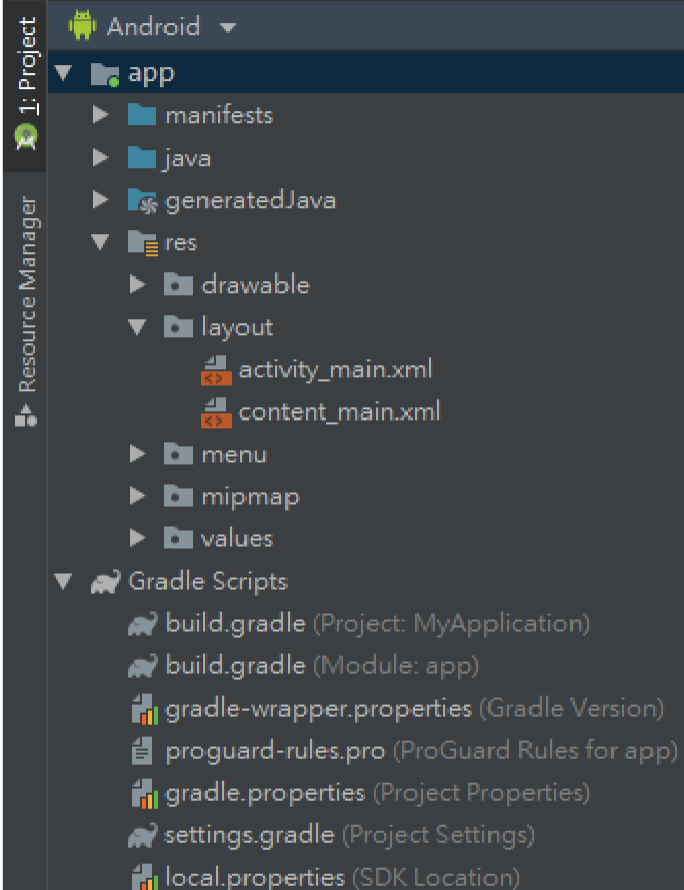
```
    android:text="Hello world!"
```



Hello Android!

```
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintLeft_toLeftOf="parent"
    app:layout_constraintRight_toRightOf="parent"
    app:layout_constraintTop_toTopOf="parent"/>
```

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



your XML resources in the 'standard' Android way. Choose 'Set from... | Android' in the XML code style settings.

```
version="1.0" encoding="utf-8"?>
```

```
<include layout="@layout/content_main" xmlns:android="http://schemas.android.com/apk/res/android"
```

```
xmlns:tools="http://schemas.android.com/tools"
```

```
xmlns:app="http://schemas.android.com/apk/res-auto"
```

```
android:layout_width="match_parent"
```

```
android:layout_height="match_parent"
```

```
app:layout_behavior="com.google.android.material.appbar.AppBarLayout$Scrolli..."
```

```
tools:showIn="@layout/activity_main"
```

```
tools:context=".MainActivity">
```

```
12 <TextView
13     android:layout_width="wrap_content"
14     android:layout_height="wrap_content"
15     android:text="Hello world!"
16     app:layout_constraintBottom_toBottomOf="parent"
17     app:layout_constraintLeft_toLeftOf="parent"
18     app:layout_constraintRight_toRightOf="parent"
19     app:layout_constraintTop_toTopOf="parent" />
20
21 </androidx.constraintlayout.widget.ConstraintLayout>
```



Select Hardware

Android Studio

Choose a device definition



Category	Name ▾	Play Store	Size	Resolution	Density
TV	Pixel XL		5.5"	1440x2560	560dpi
Phone	Pixel 3 XL		6.3"	1440x2960	560dpi
Wear OS	Pixel 3		5.46"	1080x2160	440dpi
Tablet	Pixel 2 XL		5.99"	1440x2880	560dpi
	Pixel 2		5.0"	1080x1920	420dpi
	Pixel		5.0"	1080x1920	420dpi
	Nexus S		4.0"	480x800	hdpi
	Nexus One		3.7"	480x800	hdpi
	Nexus 6P		5.7"	1440x2560	560dpi

New Hardware Profile

Import Hardware Profiles



Clone Device...



Pixel 2



Size: large
Ratio: long
Density: 420dpi



Previous

Next

Cancel

Finish



System Image

Select a system image

Recommended

x86 Images

Other Images

Release Name	API Level ▼	ABI	Target
R Download	30	x86	Android 10.0+ (Google Play)
Q Download	29	x86	Android 10.0 (Google Play)
Pie Download	28	x86	Android 9.0 (Google Play)
Oreo Download	27	x86	Android 8.1 (Google Play)
Oreo Download	26	x86	Android 8.0 (Google Play)
Nougat Download	25	x86	Android 7.1.1 (Google Play)
Nougat Download	24	x86	Android 7.0 (Google Play)

R



API Level

30

Android

10.0+**Google Inc.**

System Image

x86

We recommend these Google Play images because this device is compatible with Google Play.

Questions on API level?

[See the API level distribution chart](#)

[Previous](#)[Next](#)[Cancel](#)[Finish](#)



Android Virtual Device (AVD)

Android Studio

Verify Configuration

AVD Name



Pixel 2

5.0 1080x1920 xxhdpi

Change...



Q

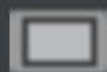
Android 9.+ x86

Change...

Startup orientation



Portrait



Landscape

Emulated
Performance

Graphics:

Automatic



Device Frame ☒ Enable Device Frame

Show Advanced Settings

AVD Name

The name of this AVD.



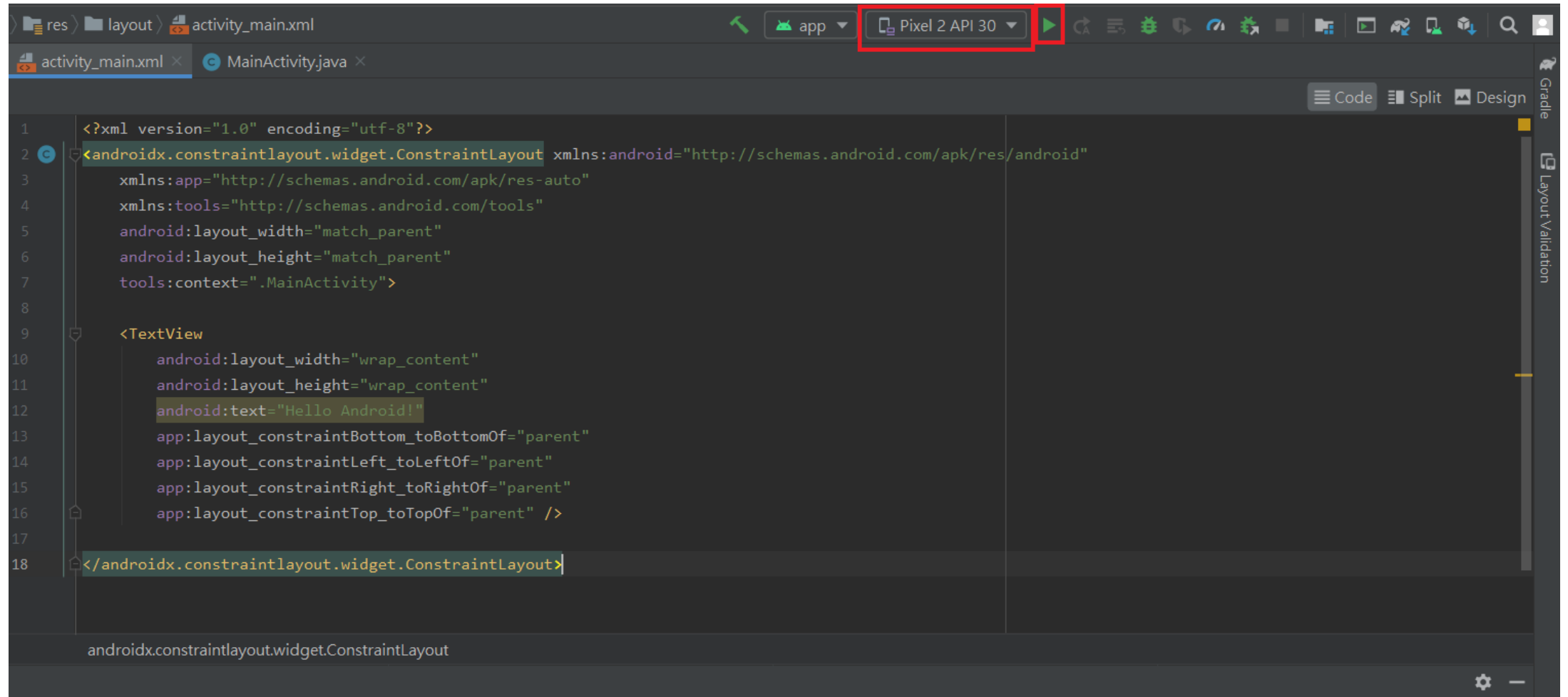
Previous

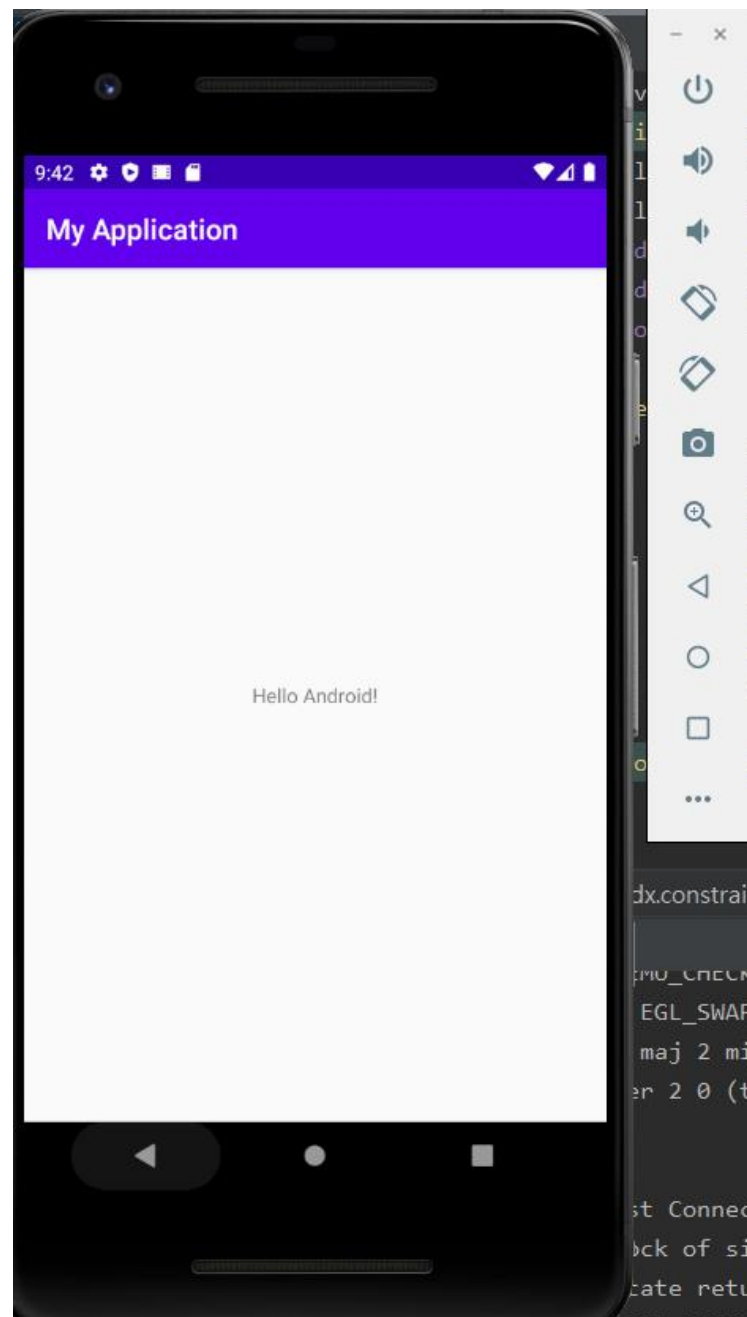
Next

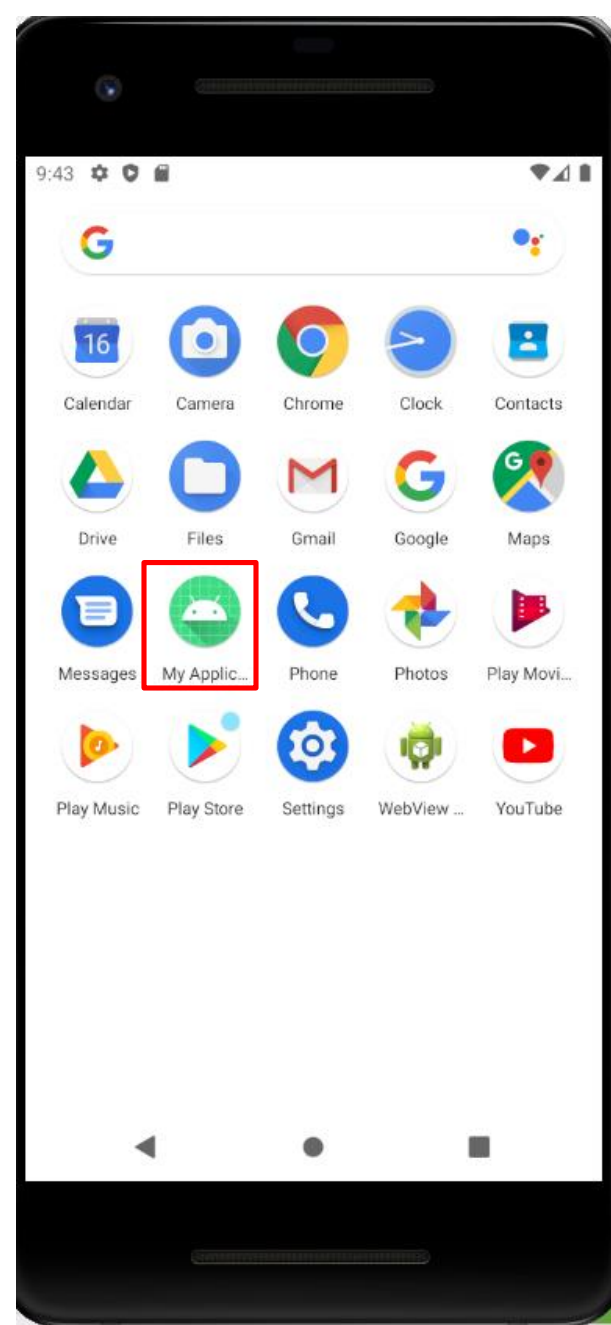
Cancel

Finish

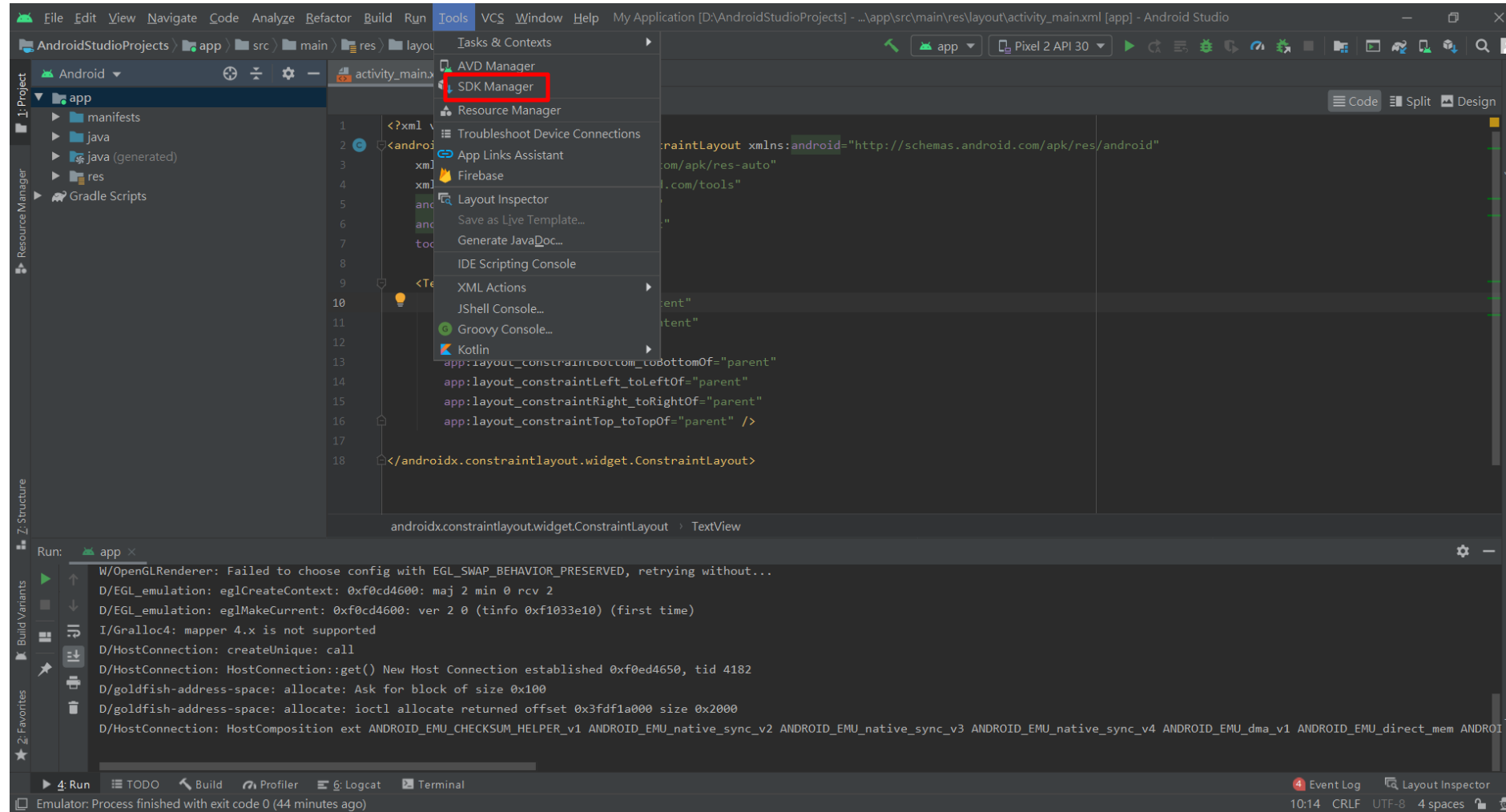
Check the virtual device, then click the play button



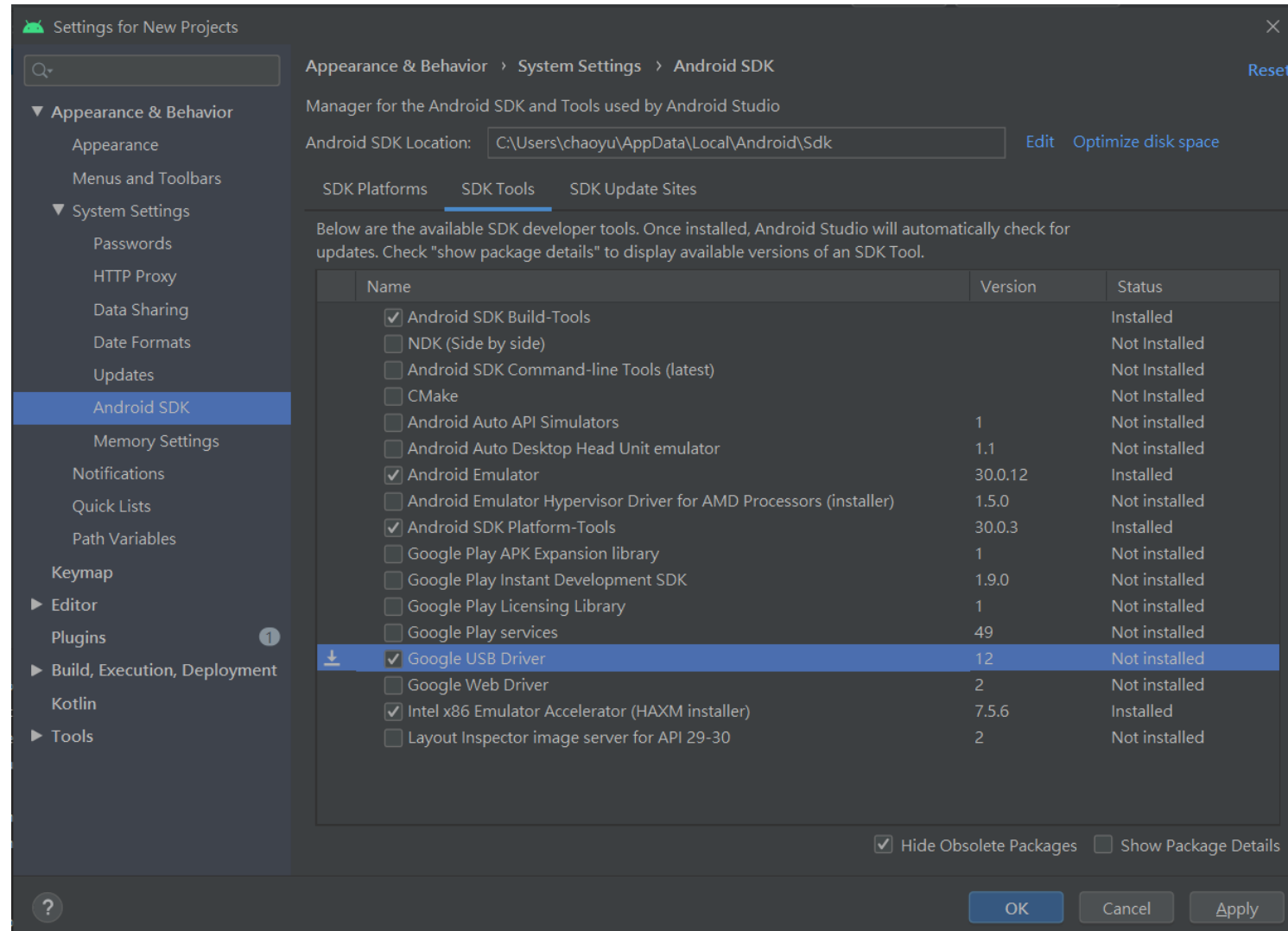




Use Physical machine



Use Physical machine



Practice:

Rock, Paper, Scissors

