


Introduction

Mobile App Programming
Fall, 2024

An abstract graphic in the top-left corner consisting of several overlapping, flowing, wavy bands of color. The colors include shades of pink, purple, blue, and yellow, creating a sense of movement and depth.

Introduction of TA

About Teaching Assistants

CSI Labortory

TA. Seongho Lee

TA. Minwoo Kang

Contact

map.at.skku@gmail.com

Office

Cooperation and Collaboration Center **#85553** (5th floor)

ICAMPUS for questions

When you have a question, use the google sheet announced on i-Campus.

Do not send i-Campus direct messages to TAs.



Course Overview



Class Overview

- **Offline Lecture**
 - All lectures will be performed offline.
 - There are no online classes. All students must come to the classroom.
- **Weekly Assignments (WAs)**
 - Weekly assignment will be uploaded with lecture materials, and students must confirm the assignment application works well before the class is finished(before 21:45:00).
 - You receive 1 point for attending class.
 - You receive 2 points for implementing WA.



Offline Classroom

- **SWE3047-42 (Wed, Prof. Younghoon Kim)**
 - Cooperation and Collaboration Center **85712, 18:00 ~**

Grading factors

- **Attendance : 10%**
 - If you are absent more than 4 weeks, you will get '**F**' grade
- **Lab practice (Weekly Assignment) : 20%**
 - Weekly Assignment must be confirmed before the class is end.
- **Quiz (**Tentative**) : 20%**
 - If we don't have a quiz, 20% will be included in the assignment score.
- **2 Assignments : 20%**
- **1 Project : 30%**
 - All assignments and project are for **individuals**.

Lecture Schedule (**Tentative**)

Week	Subject	PA
1	Orientation & Development environment settings	
2	Basic of Kotlin (Basic Kotlin Grammers)	
3	Android Basic Layout	
4	Android Advanced Layout	
5	Constraint Layout & Debugging Methods	
6	Explicit Intent	PA 1
7	Implicit Intent	
8	Midterm (Quiz)	Quiz
9	Co-routine	
10	HTTP and Networking	
11	Opensource API 1	
12	Opensource API (OAuth2)	
13	AWS (No Week Assignment)	Project
14	Programming Exam (Offline)	
15	Project QNA	
16	Project Presentation	

No WAs

What do we learn today?

- **Install Android Studio on Microsoft Windows**
 - Ask TA if you do on Ubuntu or other with your laptop
- **Run Android mobile emulator**
 - However, we highly recommends you use real **android smartphones** when debugging.
- **From this semester, we will use Kotlin**
 - **Not Java or flutter etc.**

An abstract graphic in the top-left corner consisting of several overlapping, flowing, wavy bands of color. The colors include shades of pink, purple, blue, and yellow, creating a sense of movement and depth.

About what we learn

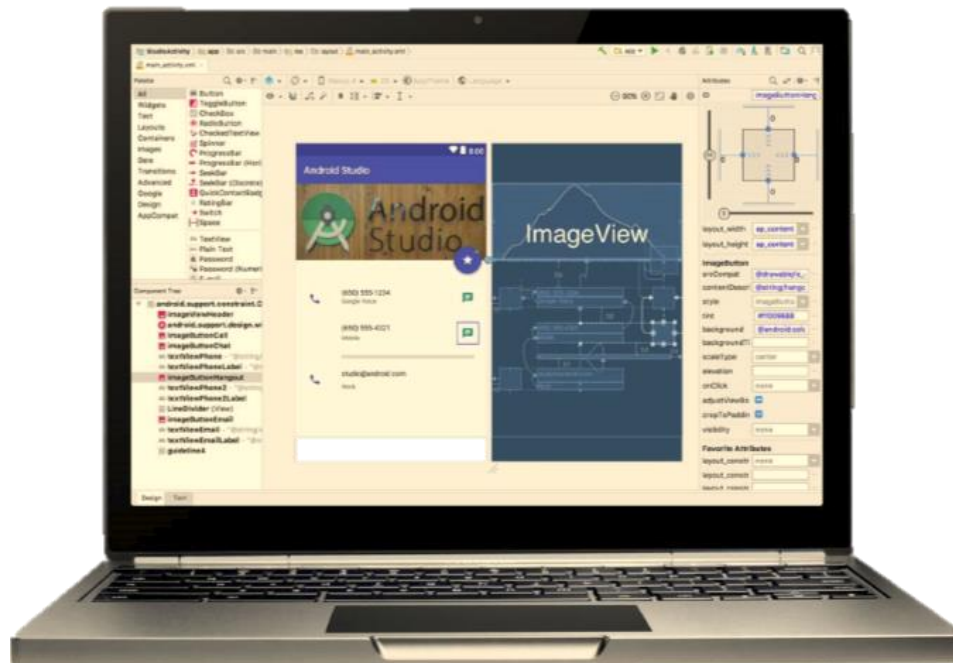
Android is..

- A mobile operating system developed by Google.
- Based on a modified version of the Linux kernel and other open-source software.
- Designed primarily for touchscreen mobile devices such as smartphones and tablets.
- Further developed for Android TV, Android Auto, and Android Wear.
- Executing an application written in Java or Kotlin programming language.



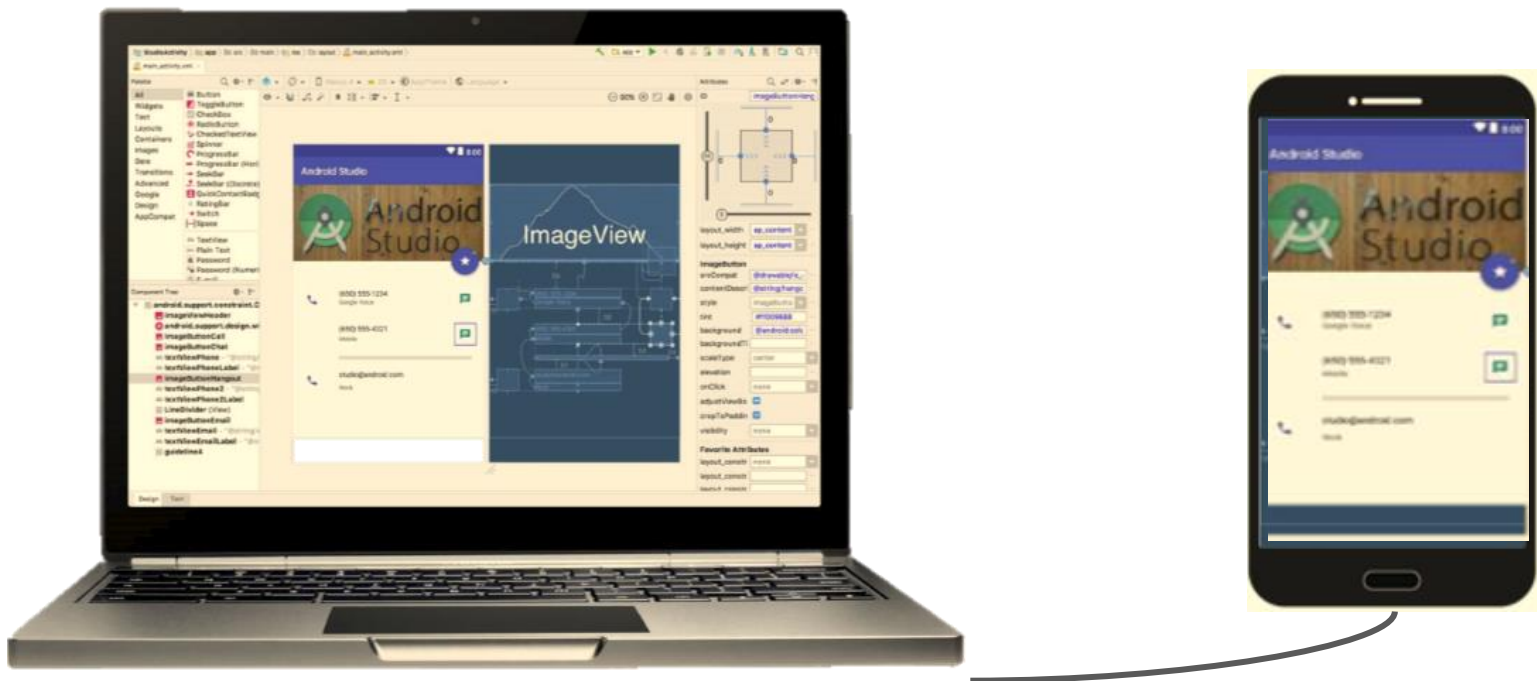
Prerequisites

- All you need to do for developing Android application is install IDE called as **Android Studio**



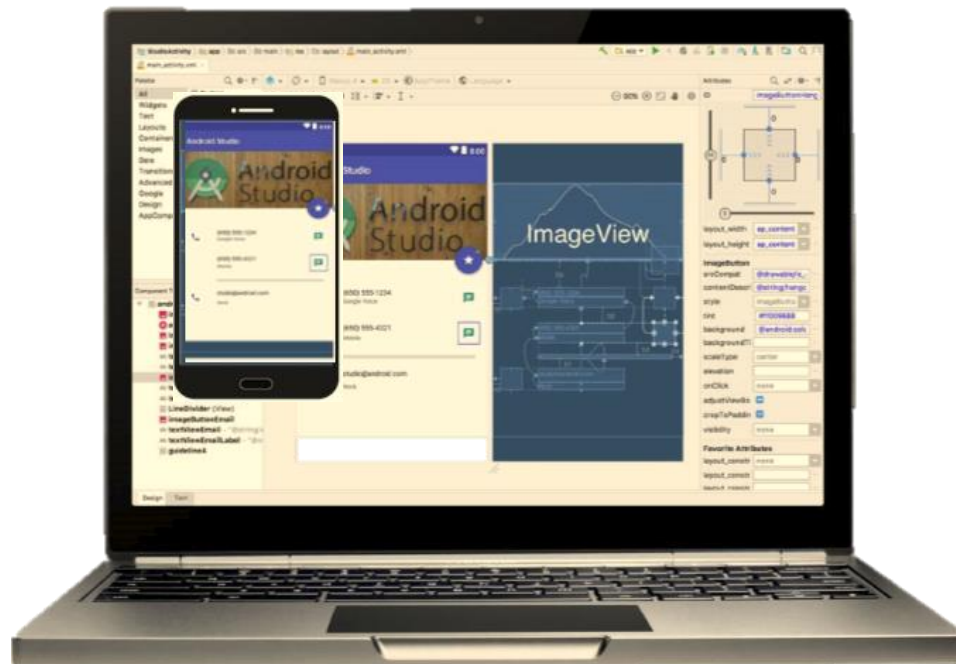
Prerequisites

- **Android Studio** allows to use your Android mobile device as the execution environment



Prerequisites

- **Android Studio** support the Android Smartphone emulator!
 - You can run this emulator on the other CPU, **but it might be too slow..**





Android Studio

- **Most famous and powerful IDE for implementing Android Application**
- Pros
 - Project management
 - Support GUI based layout implementing methods
 - Easy to port the application on the real device
 - Android mobile phone emulation...
- You can download the installer from here
 - <https://developer.android.com/studio/>
 - This site will detect your OS, and show you a proper download link.

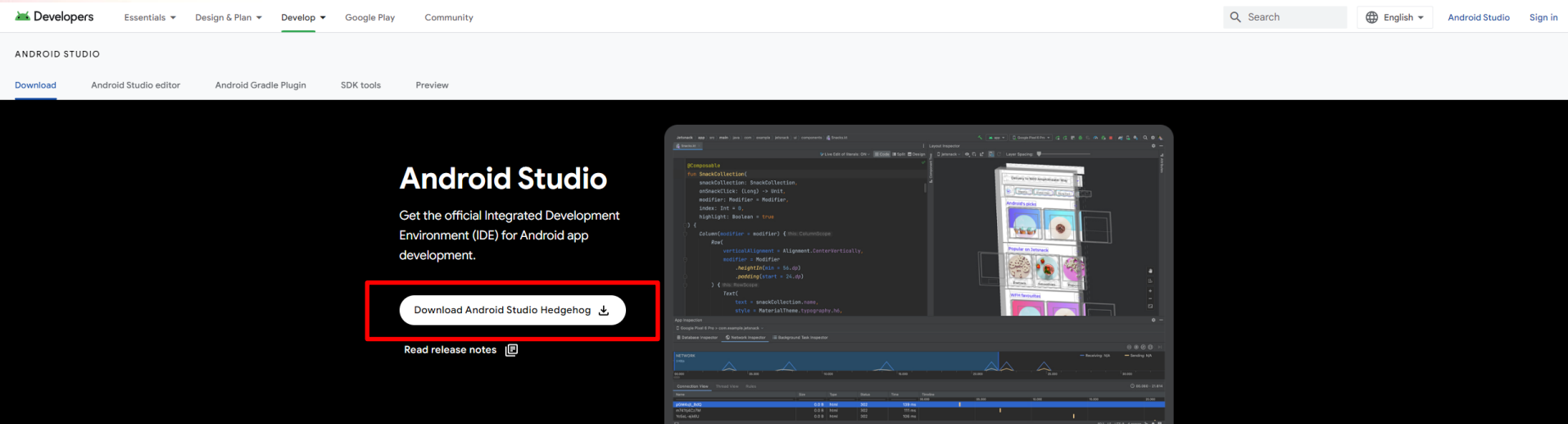
Installation Recommended Specifications

- **Operating System** : Microsoft Windows 8 as minimum
Mac OS 10.14 (Mojave) as minimum
- CPU : At least, Dual Core **(the more the better)**
- Memory : 8GB **(the more the better)**
- This material is based on above system specifically 64bit windows system. Please just reference this material and install according to your own system.
- **Official Installation Guide** –
<https://developer.android.com/studio/install>

An abstract graphic in the top-left corner consisting of several overlapping, flowing, wavy bands of color. The colors include shades of pink, purple, blue, and yellow, creating a dynamic, fluid effect.

Install Android Studio


Get Android Studio install file




The screenshot shows the top navigation bar of the Android Studio website. The 'Developers' tab is active. Below the navigation bar, the 'Download' link is highlighted. The main content area features the 'Android Studio' logo and the text 'Get the official Integrated Development Environment (IDE) for Android app development.' A red rectangular box highlights the 'Download Android Studio Hedgehog' button, which includes a download icon. Below the button is a link to 'Read release notes'. To the right, a preview of the Android Studio IDE is shown, displaying Kotlin code, a UI design, and a performance monitor.

Android Studio

Get the official Integrated Development Environment (IDE) for Android app development.

[Download Android Studio Hedgehog](#) 

[Read release notes](#) 

New features

FEATURE

Themed app icon preview

Preview how your themed app icons respond to dynamic background wallpaper changes.

FEATURE

Try Android Studio Bot

Studio Bot is an AI assistant that helps you generate code, fix code, and answer questions about Android app development.

- You can download Android Studio install file at below link.
<https://developer.android.com/studio>

Install Android Studio

through such third party applications are the sole responsibility of the person from which they originated and that Google is not liable for any loss or damage that you may experience as a result of the use or access or any of those third party applications, data, content, or resources. 7.2 You should be aware the data, content, and resources presented to you through such a third party application may be protected by intellectual property rights which are owned by the providers (or by other persons or companies on their behalf). You may not modify, rent, lease, loan, sell, distribute or create derivative works based on these data, content, or resources (either in whole or in part) unless you have been specifically given permission to do so by the relevant owners. 7.3 You acknowledge that your use of such third party applications, data, content, or resources may be subject to separate terms between you and the relevant third party. In that case, the License Agreement does not affect your legal relationship with these third parties.

8. Using Android APIs

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. 9.2 If you want to terminate the License Agreement, you may do so by ceasing your use of the SDK and any relevant developer credentials. 9.3 Google may at any time, terminate the License Agreement with you if: (A) you have breached any provision of the License Agreement; or (B) Google is required to do so by law; or (C) the partner with whom Google offered certain parts of SDK (such as APIs) to you has terminated its relationship with Google or ceased to offer certain parts of the SDK to you; or (D) Google decides to no longer provide the SDK or certain parts of the SDK to users in the country in which you are resident or from which you use the service, or the provision of the SDK or certain SDK services to you by Google is, in Google's sole discretion, no longer commercially viable. 9.4 When the License Agreement comes to an end, all of the legal rights, obligations and liabilities that you and Google have benefited from, been subject to (or which have accrued over time whilst the License Agreement has been in force) or which are expressed to continue indefinitely, shall be unaffected by this cessation, and the provisions of paragraph 14.7 shall continue to apply to such rights, obligations and liabilities indefinitely.

10. DISCLAIMER OF WARRANTIES

10.1 YOU EXPRESSLY UNDERSTAND AND AGREE THAT YOUR USE OF THE SDK IS AT YOUR SOLE RISK AND THAT THE SDK IS PROVIDED "AS IS" AND "AS AVAILABLE" WITHOUT WARRANTY OF ANY KIND FROM GOOGLE. 10.2 YOUR USE OF THE SDK AND ANY MATERIAL DOWNLOADED OR OTHERWISE OBTAINED THROUGH THE USE OF THE SDK IS AT YOUR OWN DISCRETION AND RISK AND YOU ARE SOLELY RESPONSIBLE FOR ANY DAMAGE TO YOUR COMPUTER SYSTEM OR OTHER DEVICE OR LOSS OF DATA THAT RESULTS FROM SUCH USE. 10.3 GOOGLE FURTHER EXPRESSLY DISCLAIMS ALL WARRANTIES AND CONDITIONS OF ANY KIND, WHETHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT.

11. LIMITATION OF LIABILITY

11.1 YOU EXPRESSLY UNDERSTAND AND AGREE THAT GOOGLE, ITS SUBSIDIARIES AND AFFILIATES, AND ITS LICENSORS SHALL NOT BE LIABLE TO YOU UNDER ANY THEORY OF LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES THAT MAY BE INCURRED BY YOU, INCLUDING ANY LOSS OF DATA, WHETHER OR NOT GOOGLE OR ITS REPRESENTATIVES HAVE BEEN ADVISED OF OR SHOULD HAVE BEEN AWARE OF THE POSSIBILITY OF ANY SUCH LOSSES ARISING.

12. Indemnification

12.1 To the maximum extent permitted by law, you agree to defend, indemnify and hold harmless Google, its affiliates and their respective directors, officers, employees and agents from and against any and all claims, actions, suits or proceedings, as well as any and all losses, liabilities, damages, costs and expenses (including reasonable attorneys fees) arising out of or accruing from (a) your use of the SDK, (b) any application you develop on the SDK that infringes any copyright, trademark, trade secret, trade dress, patent or other intellectual property right of any person or defames any person or violates their rights of publicity or privacy, and (c) any non-compliance by you with the License Agreement.

13. Changes to the License Agreement

13.1 Google may make changes to the License Agreement as it distributes new versions of the SDK. When these changes are made, Google will make a new version of the License Agreement available on the website where the SDK is made available.

14. General Legal Terms

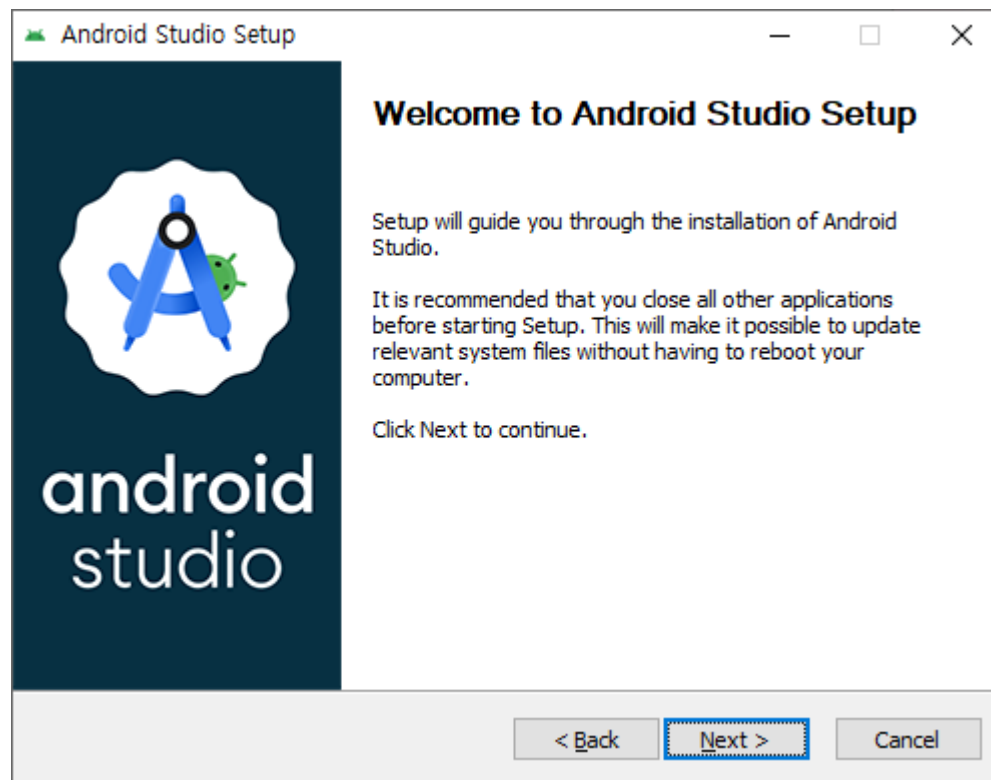
14.1 The License Agreement constitutes the whole legal agreement between you and Google and governs your use of the SDK (excluding any services which Google may provide to you under a separate written agreement), and completely replaces any prior agreements between you and Google in relation to the SDK. 14.2 You agree that if Google does not exercise or enforce any legal right or remedy which is contained in the License Agreement (or which Google has the benefit of under any applicable law), this will not be taken to be a formal waiver of Google's rights and that those rights or remedies will still be available to Google. 14.3 If any court of law, having the jurisdiction to decide on this matter, rules that any provision of the License Agreement is invalid, then that provision will be removed from the License Agreement without affecting the rest of the License Agreement. The remaining provisions of the License Agreement will continue to be valid and enforceable. 14.4 You acknowledge and agree that each member of the group of companies of which Google is the parent shall be third party beneficiaries to the License Agreement and that such other companies shall be entitled to directly enforce, and rely upon, any provision of the License Agreement that confers a benefit on (or rights in favor of) them. Other than this, no other person or company shall be third party beneficiaries to the License Agreement. 14.5 EXPORT RESTRICTIONS. THE SDK IS SUBJECT TO UNITED STATES EXPORT LAWS AND REGULATIONS. YOU MUST COMPLY WITH ALL DOMESTIC AND INTERNATIONAL EXPORT LAWS AND REGULATIONS THAT APPLY TO THE SDK. THESE LAWS INCLUDE RESTRICTIONS ON DESTINATIONS, END USERS AND END USE. 14.6 The rights granted in the License Agreement may not be assigned or transferred by either you or Google without the prior written approval of the other party. Neither you nor Google shall be permitted to delegate their responsibilities or obligations under the License Agreement without the prior written approval of the other party. 14.7 The License Agreement, and your relationship with Google under the License Agreement, shall be governed by the laws of the State of California without regard to its conflict of laws provisions. You and Google agree to submit to the exclusive jurisdiction of the courts located within the county of Santa Clara, California to resolve any legal matter arising from the License Agreement. Notwithstanding this, you agree that Google shall still be allowed to apply for injunctive remedies (or an equivalent type of urgent legal relief) in any jurisdiction. July 27, 2021

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

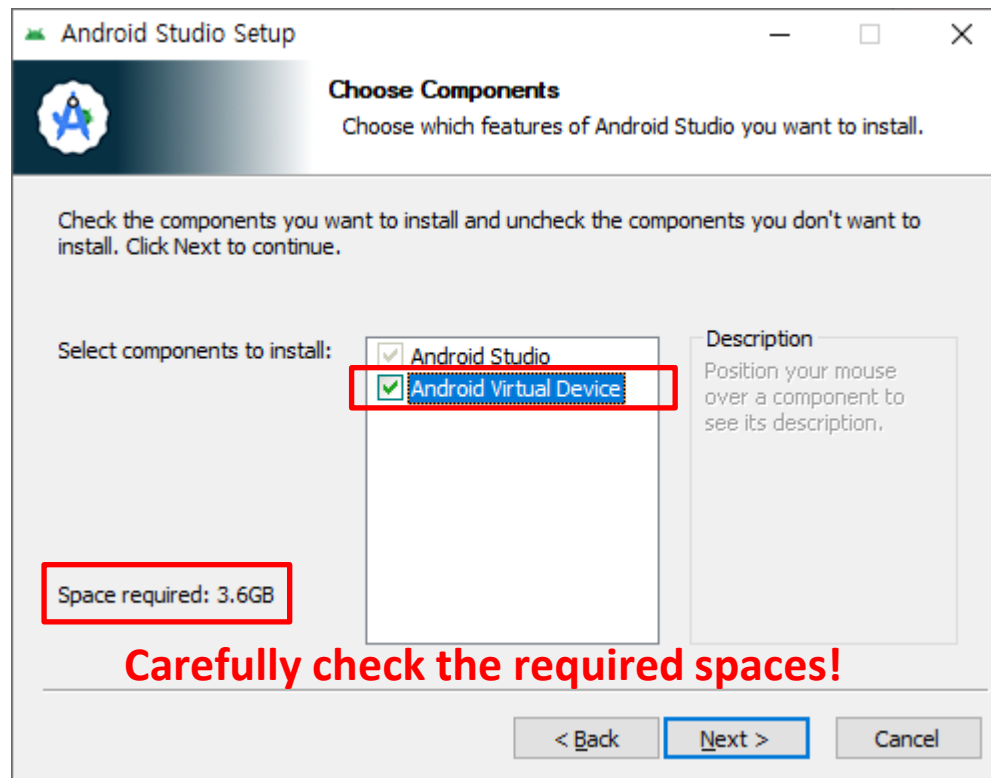
Download Android Studio Hedgehog | 2023.1.1 Patch 2 for Windows

android-studio-2023.1.1.28-windows.exe

Install Android Studio

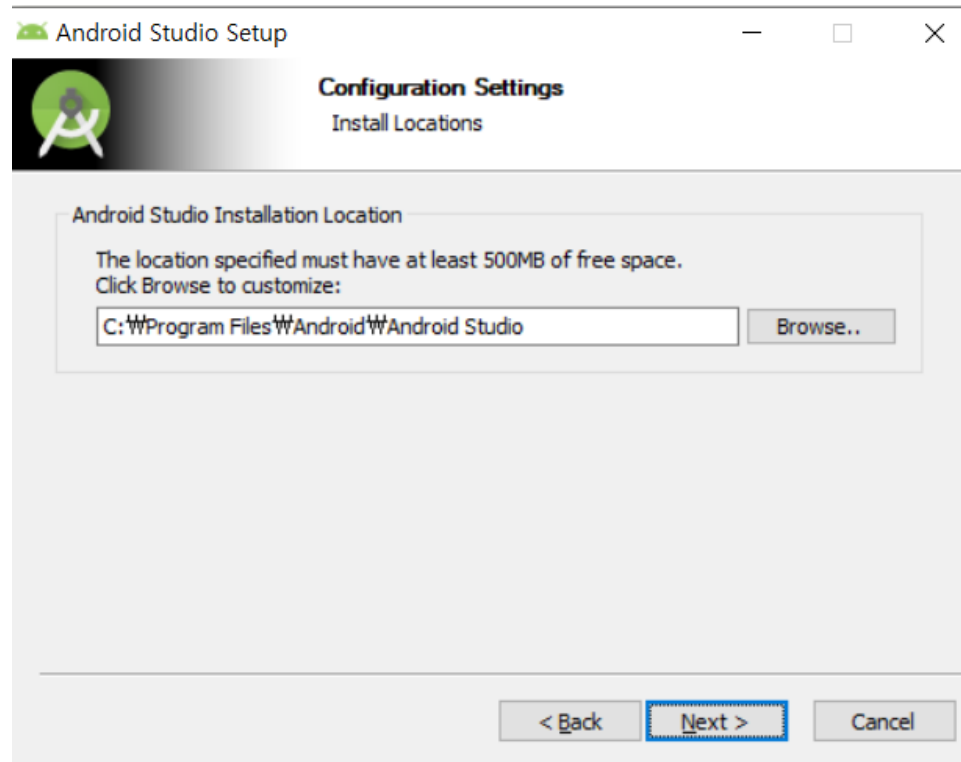


Install Android Studio

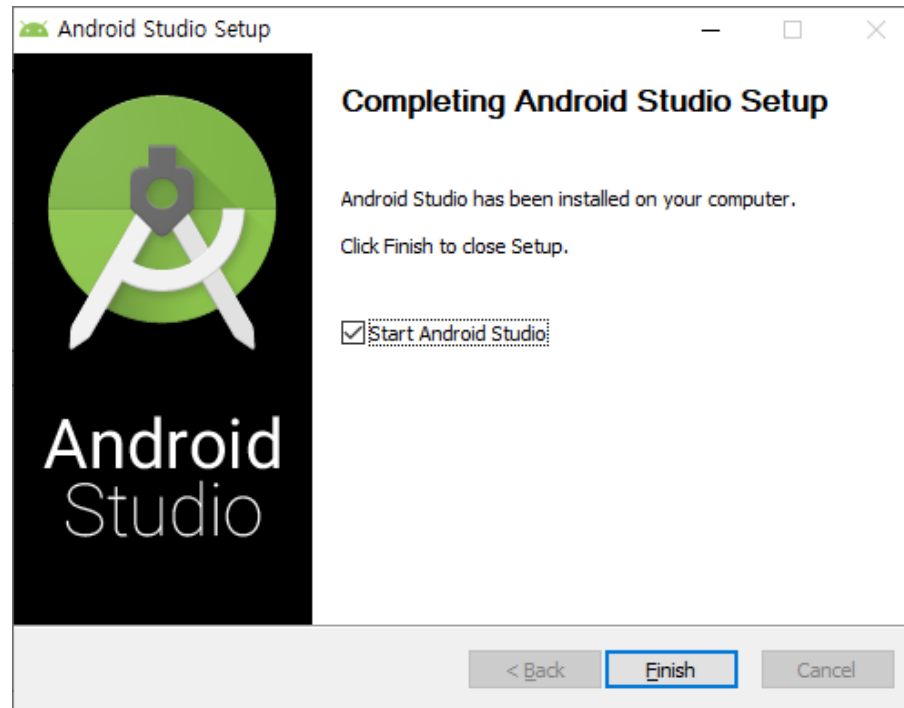


Carefully check the required spaces!

Install Android Studio

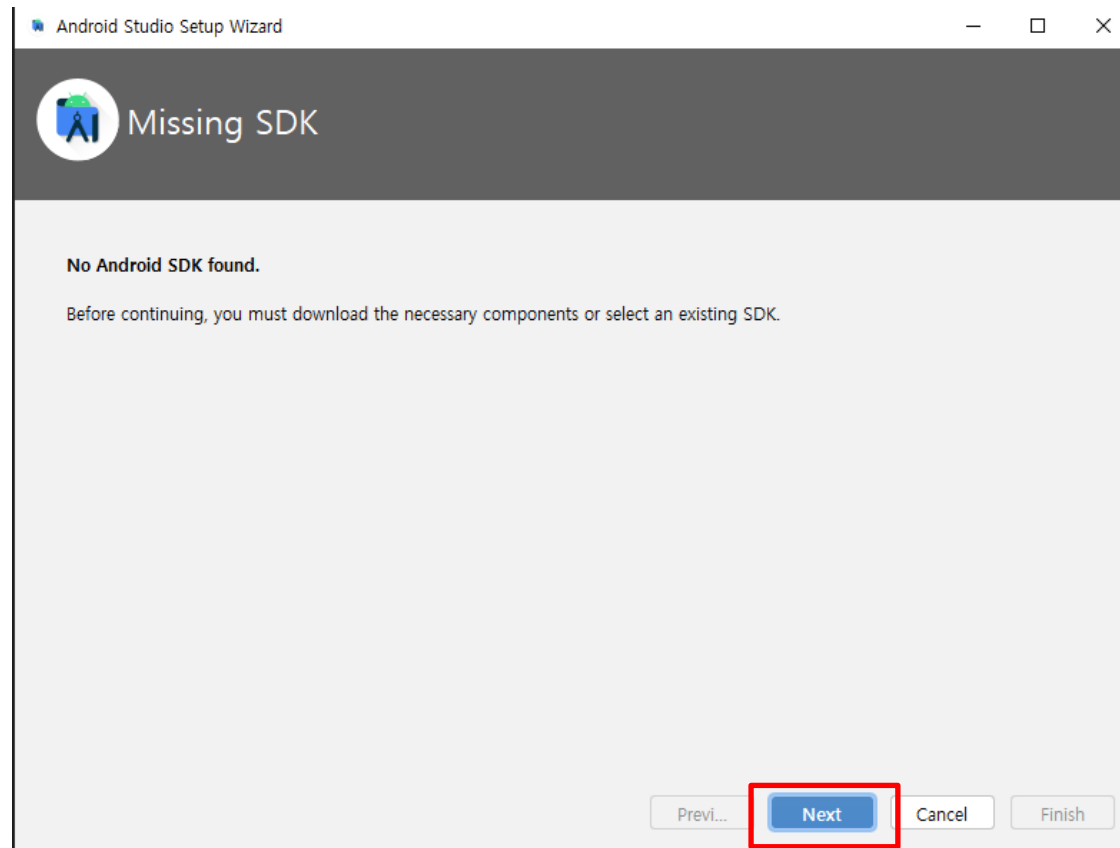


Install Android Studio



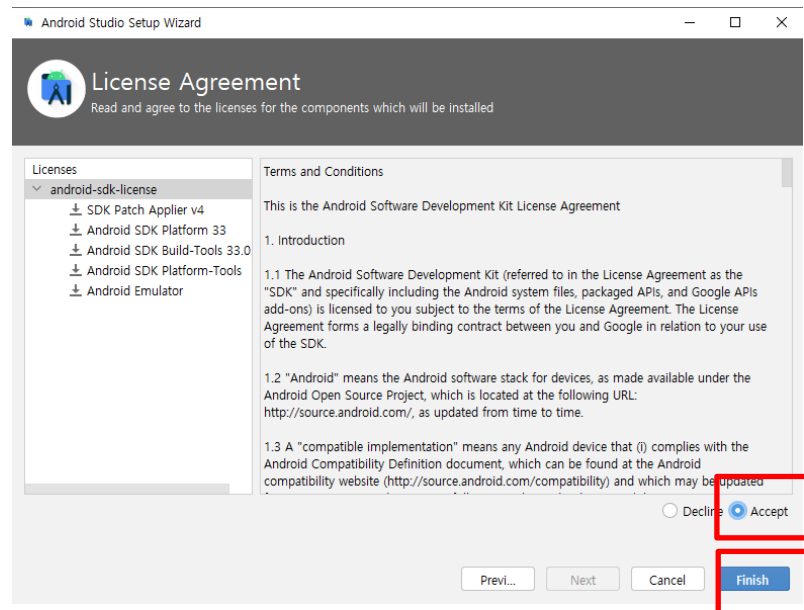
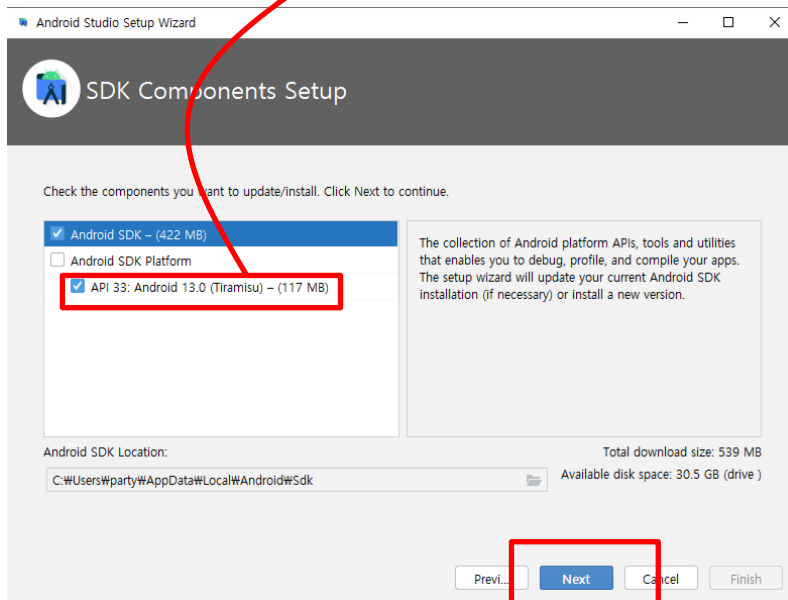
- You can start new Android project with **“Start a new Android Studio project”**

If SDK is missing,

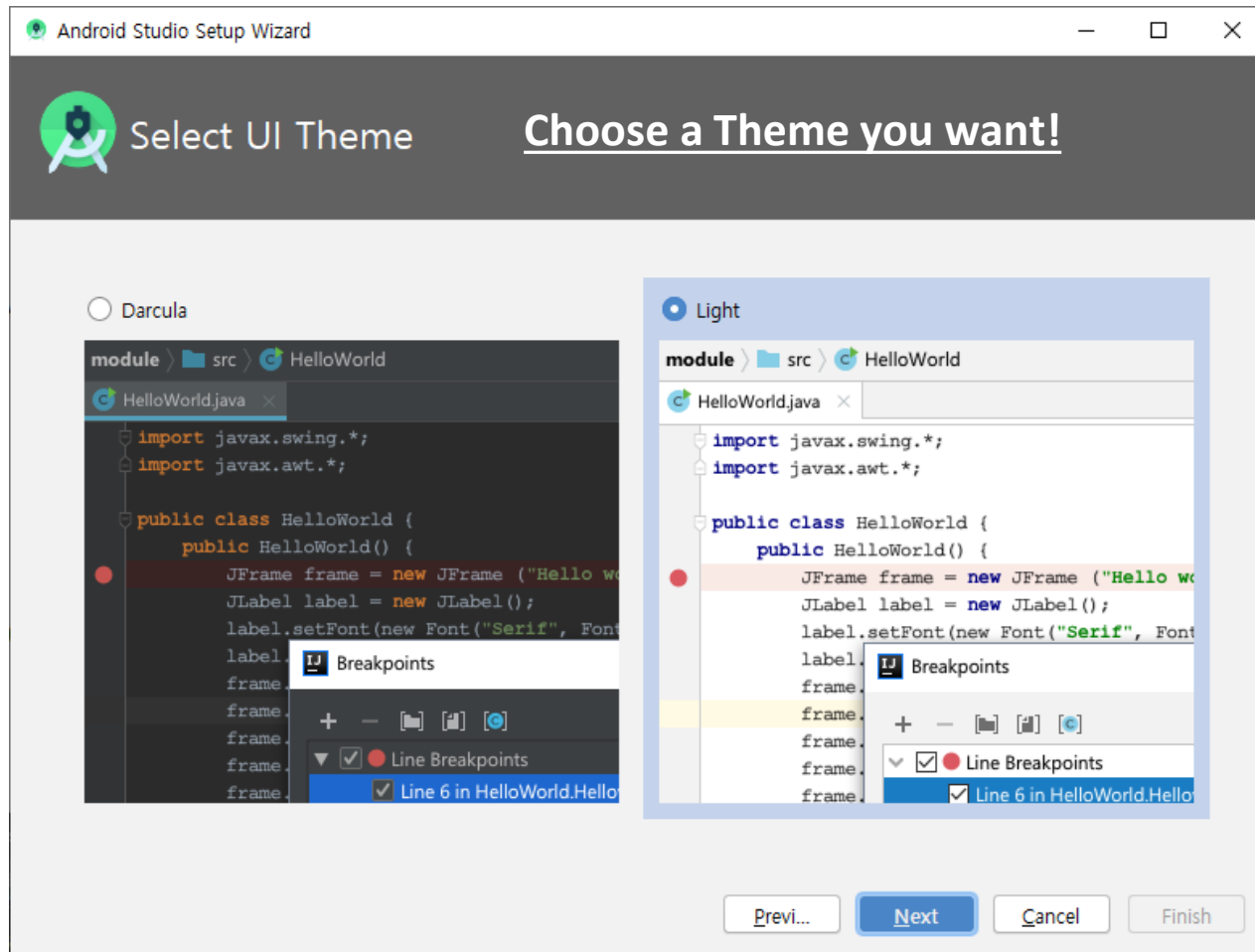


Install Android Studio

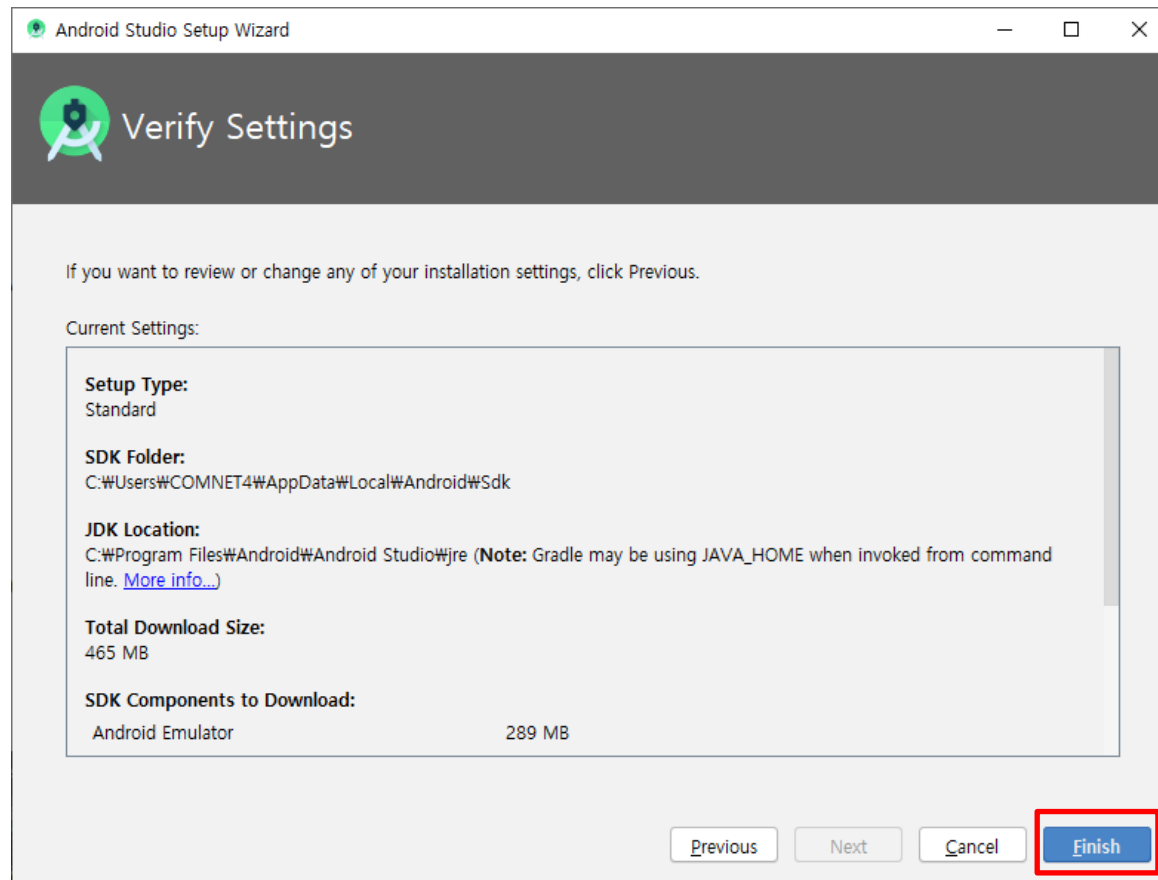
Maybe, API 34 (UpsideDownCake) is the newest version...



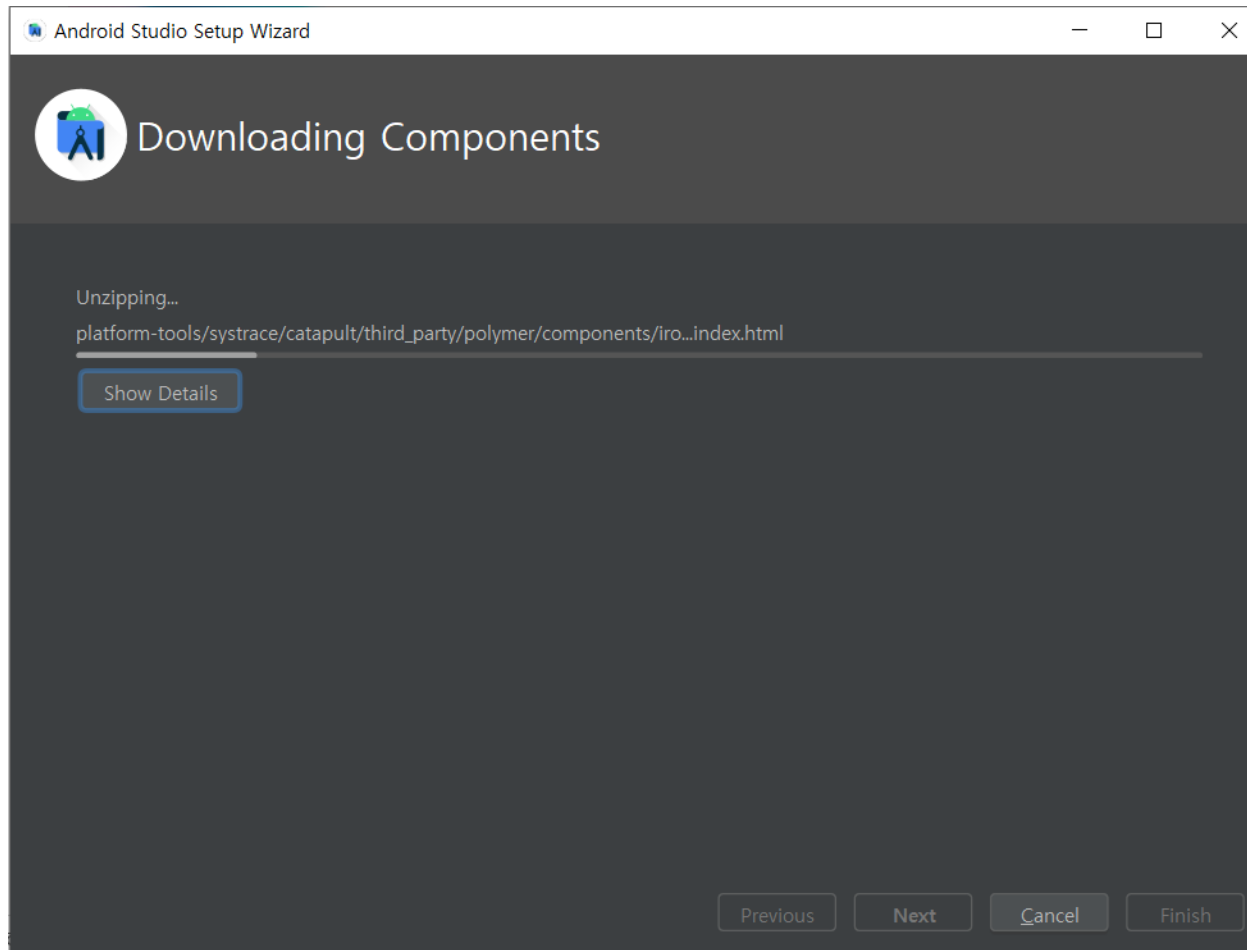
Install Android Studio



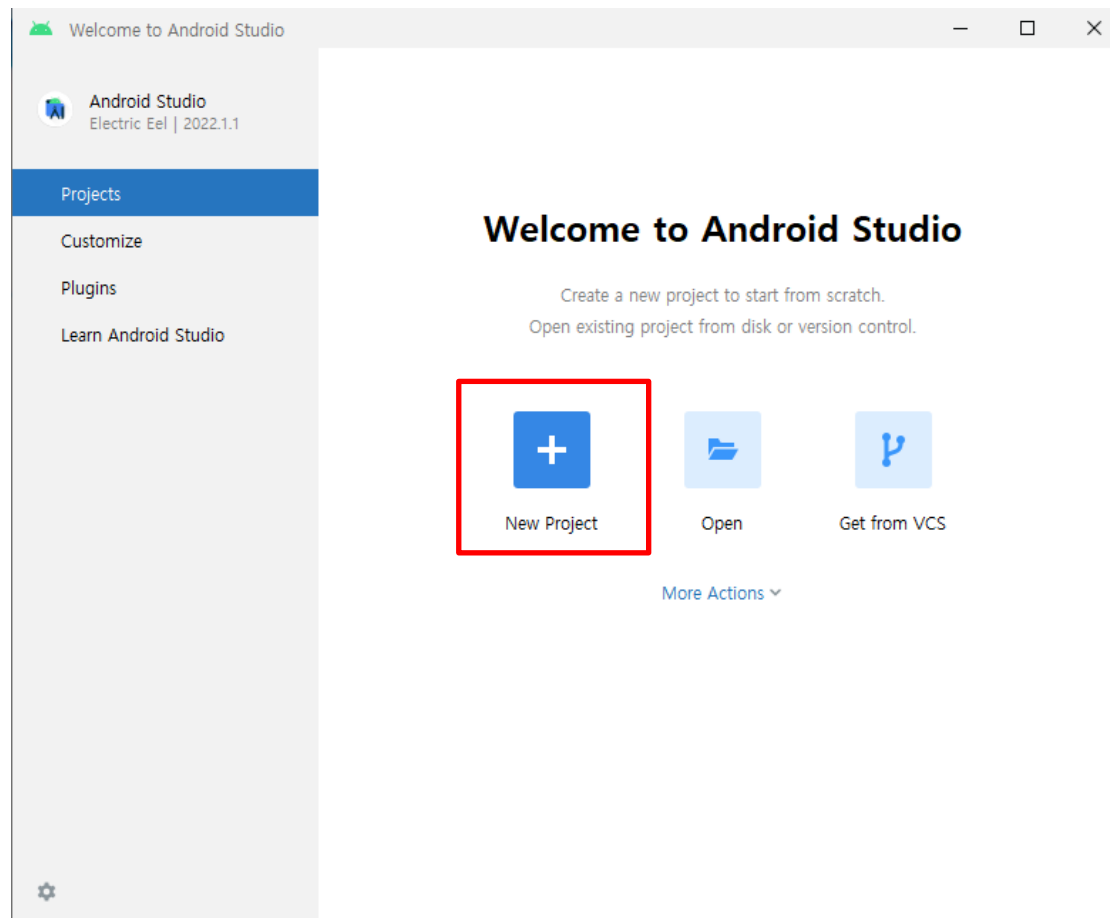
Install Android Studio



Install Android Studio



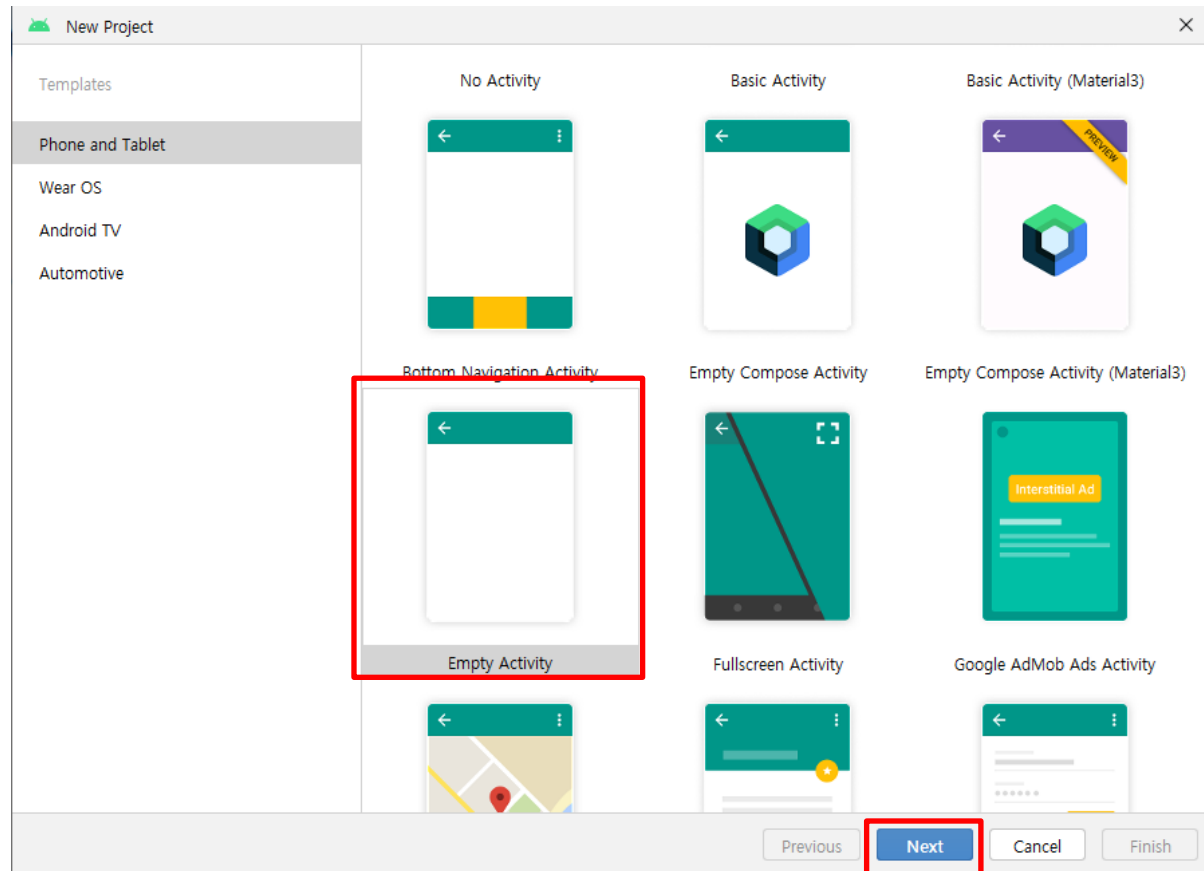
Install Android Studio





Hello World Tutorial

Choose your project



Configure your project

Carefully choose
the workspace location!
(based on your space limit)

The screenshot shows the 'New Project' dialog in Android Studio. The dialog has the following fields and options:

- Empty Activity**: Creates a new empty activity.
- Name**: My Application
- Package name**: com.example.myapplication
- Save location**: C:\Users\party\AndroidStudioProjects\MyApplication (highlighted with a red dashed box and an arrow pointing to the red text above).
- Language**: Kotlin (highlighted with a red solid box and the text 'You have to choose Kotlin!!' to its right).
- Minimum SDK**: A dropdown menu showing a list of Android versions from API 24 to API 31. API 28: Android 9.0 (Pie) is selected and highlighted with a blue bar. This section is enclosed in a red solid box with the text 'Can Choose minSDK here!' below it.

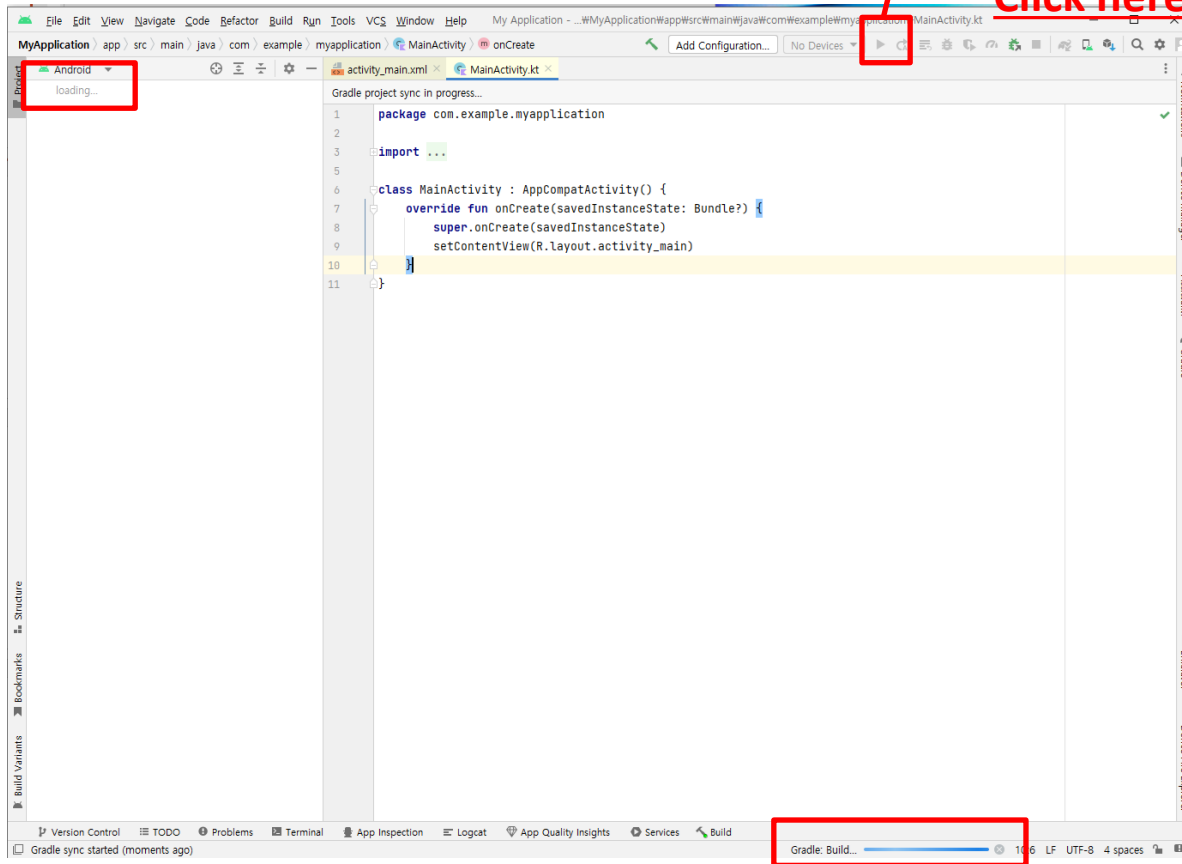
At the bottom of the dialog are four buttons: Previous, Next, Cancel, and Finish.

You have to choose Kotlin!!

Can Choose minSDK here!

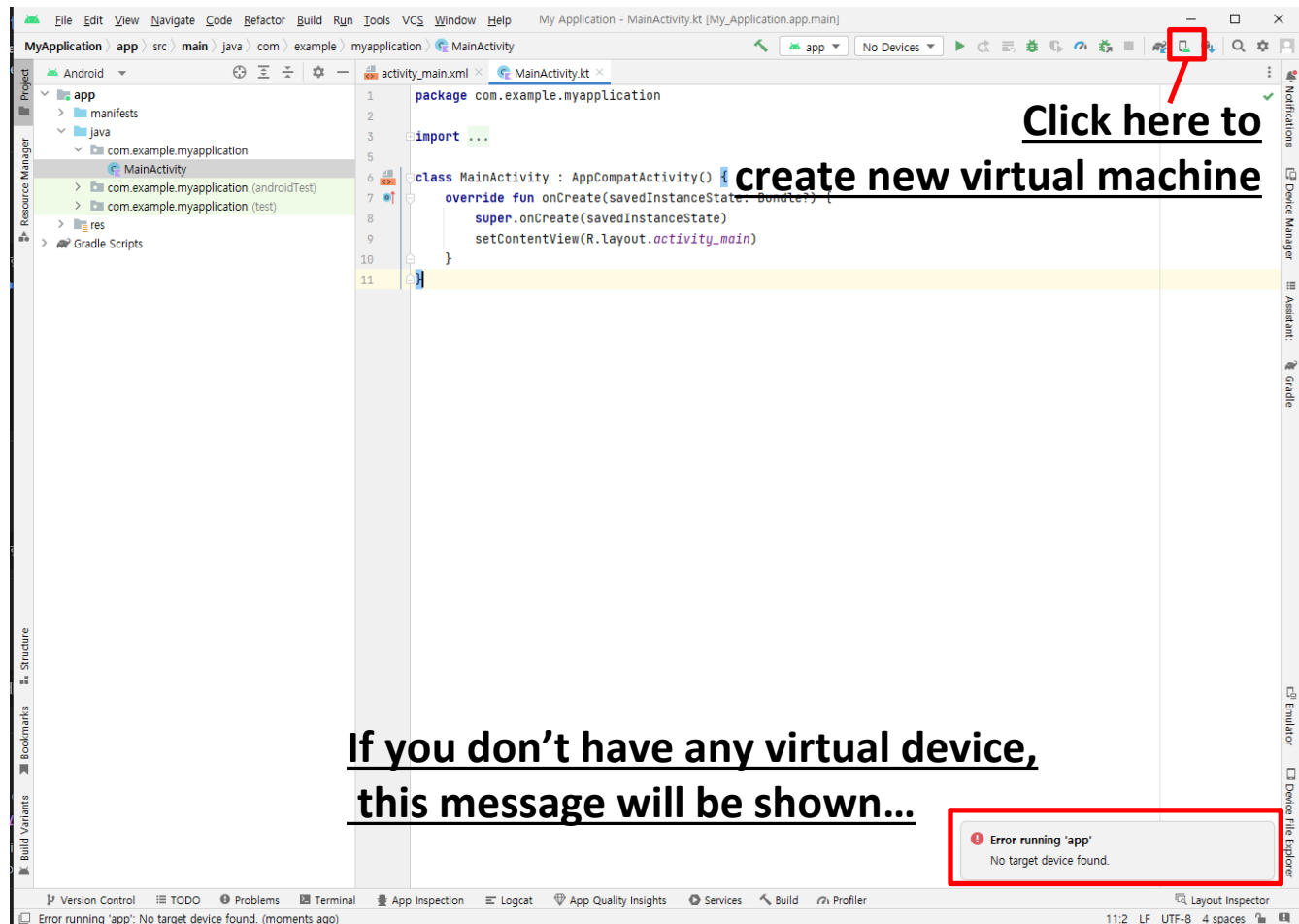
Start new project

After build the project,
Click here to run project!

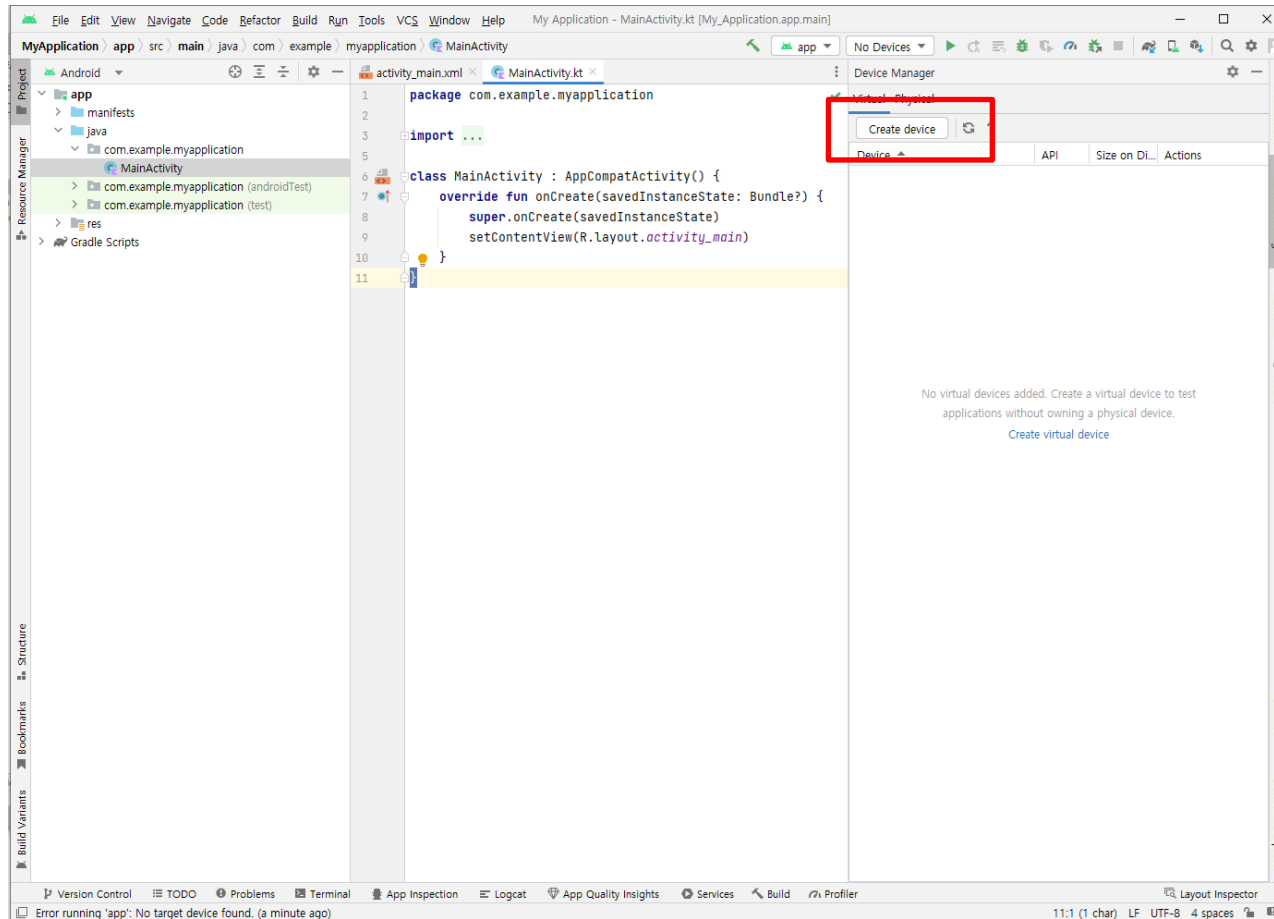


- When you made Android Studio project, it automatically made Hello World tutorial.
- To run project, **Alt+Shift + F10**

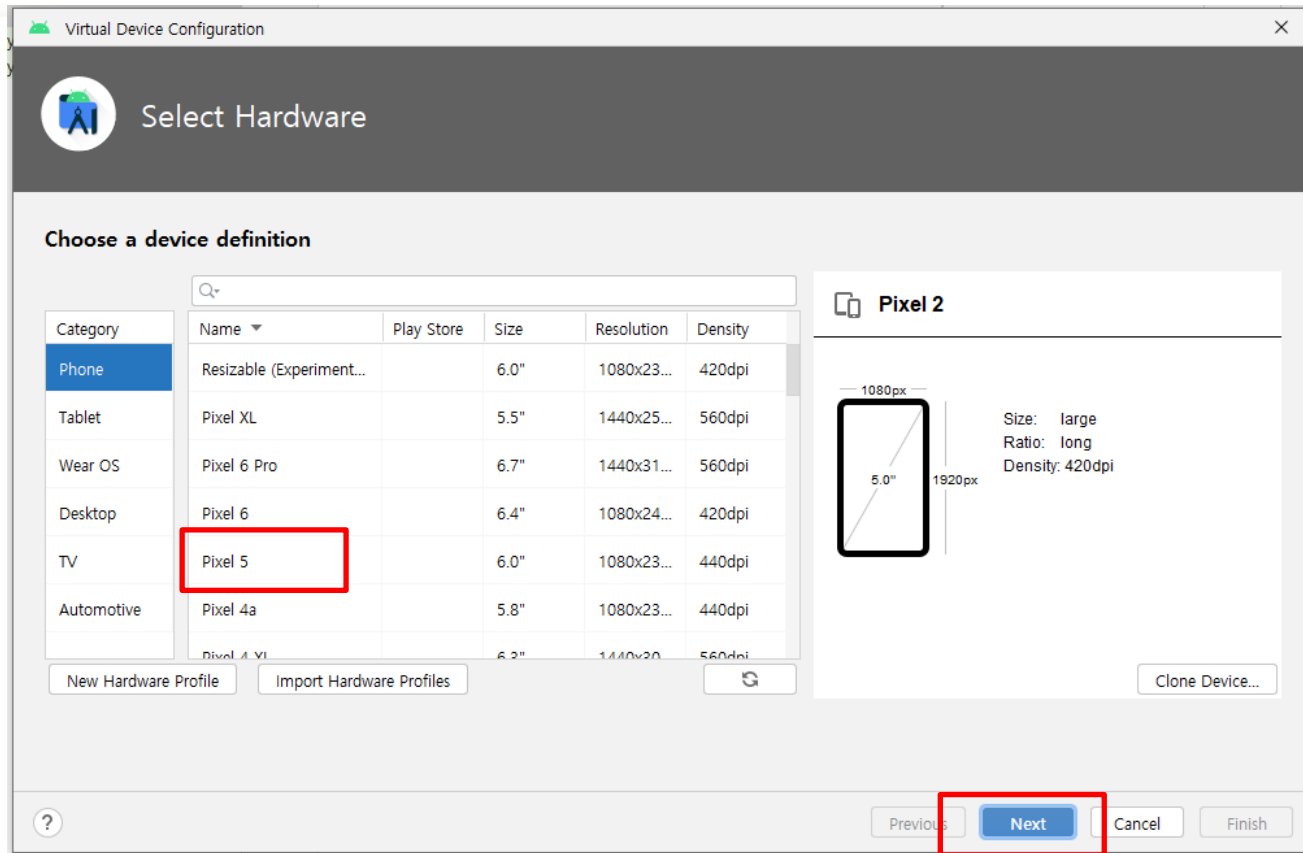
Start new project



Select Deployment Target

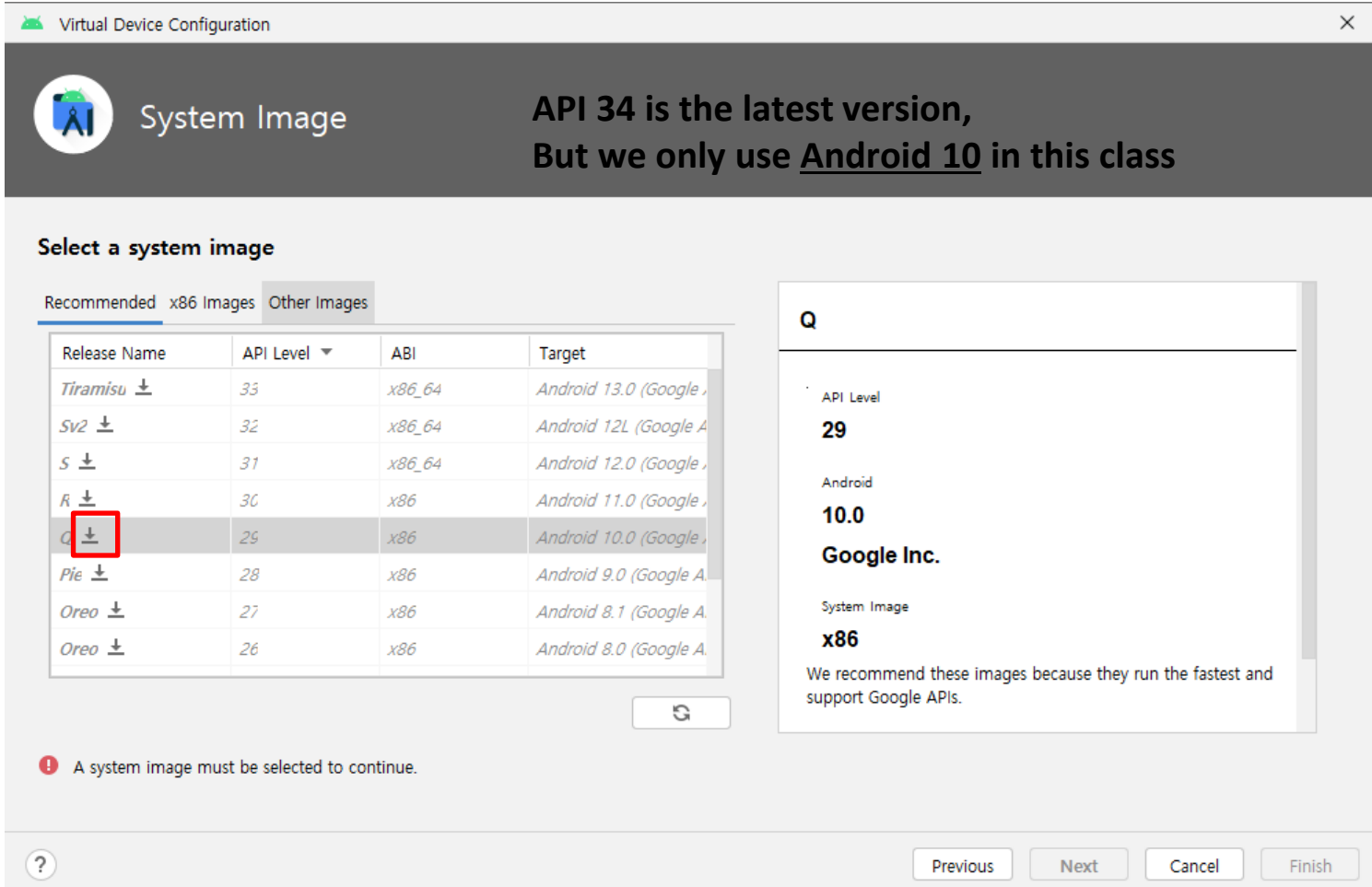


Virtual Device Configuration



Virtual Device Configuration

Intel CPU Computer



The screenshot shows the 'Virtual Device Configuration' window. At the top, there's a header bar with the title 'Virtual Device Configuration' and a close button. Below the header, there's a section titled 'System Image' with a sub-header 'API 34 is the latest version, But we only use Android 10 in this class'. The main area is titled 'Select a system image' and has three tabs: 'Recommended', 'x86 Images', and 'Other Images'. The 'Recommended' tab is active, showing a table of system images. The table has four columns: 'Release Name', 'API Level', 'ABI', and 'Target'. The row for 'Android 10.0 (Google A)' is highlighted, and its 'API Level' (29) is shown in a red box. To the right of the table, there's a sidebar with a search bar and a list of system images. The list shows 'API Level 29', 'Android 10.0', and 'Google Inc.'. Below the list, there's a section for 'System Image' showing 'x86' and a note: 'We recommend these images because they run the fastest and support Google APIs.' At the bottom of the window, there's a status bar with a question mark icon and a message: 'A system image must be selected to continue.' On the right side of the status bar, there are four buttons: 'Previous', 'Next', 'Cancel', and 'Finish'.

Virtual Device Configuration

System Image

API 34 is the latest version,
But we only use Android 10 in this class

Select a system image

Recommended x86 Images Other Images

Release Name	API Level	ABI	Target
Tiramisu	33	x86_64	Android 13.0 (Google A)
Sv2	32	x86_64	Android 12L (Google A)
S	31	x86_64	Android 12.0 (Google A)
R	30	x86	Android 11.0 (Google A)
Q	29	x86	Android 10.0 (Google A)
Pie	28	x86	Android 9.0 (Google A)
Oreo	27	x86	Android 8.1 (Google A)
Oreo	26	x86	Android 8.0 (Google A)

Q

API Level
29

Android
10.0

Google Inc.

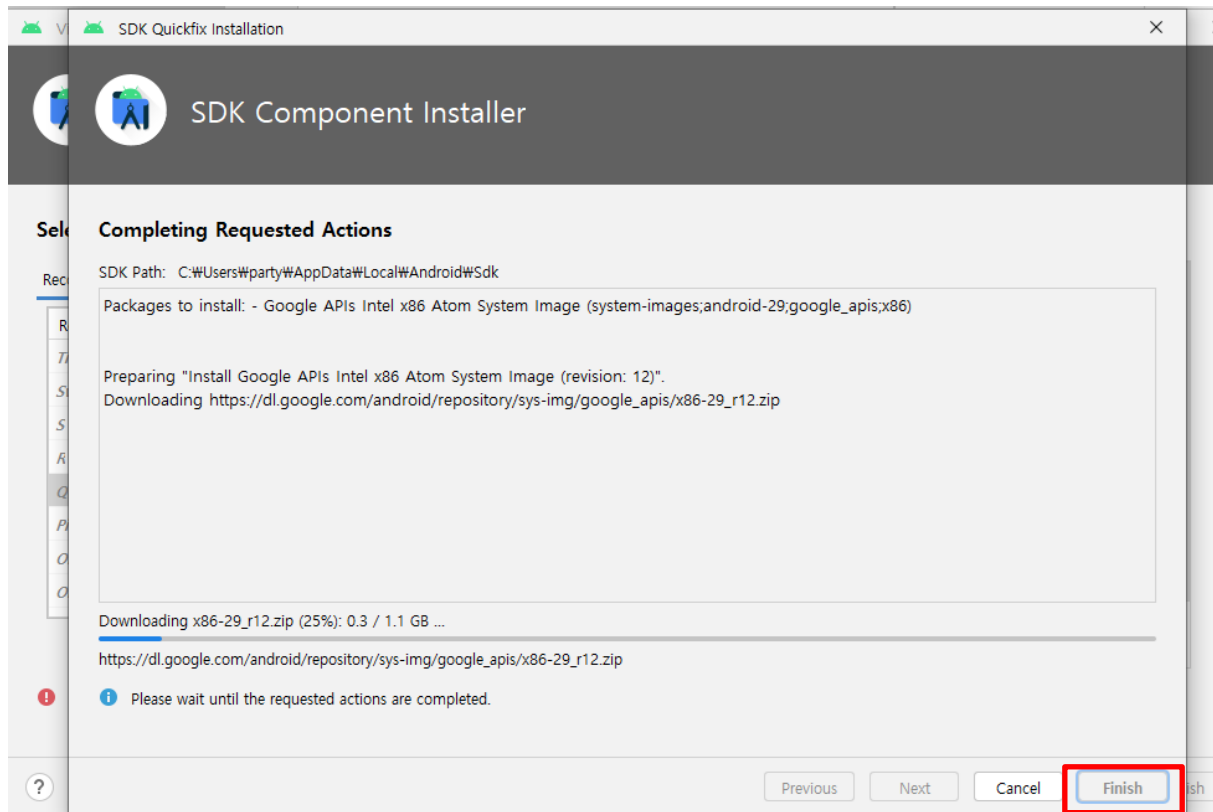
System Image
x86

We recommend these images because they run the fastest and support Google APIs.

A system image must be selected to continue.

Previous Next Cancel Finish

Virtual Device Configuration



Virtual Device Configuration - Optional

Virtual Device Configuration

Android Virtual Device (AVD)

Verify Configuration

AVD Name: Pixel 5 API 29

Pixel 5 6.0 1080x2340 440dpi Change...

Q Android 10.0 x86 Change...

Startup orientation: Portrait Landscape

Emulated Graphics: Automatic

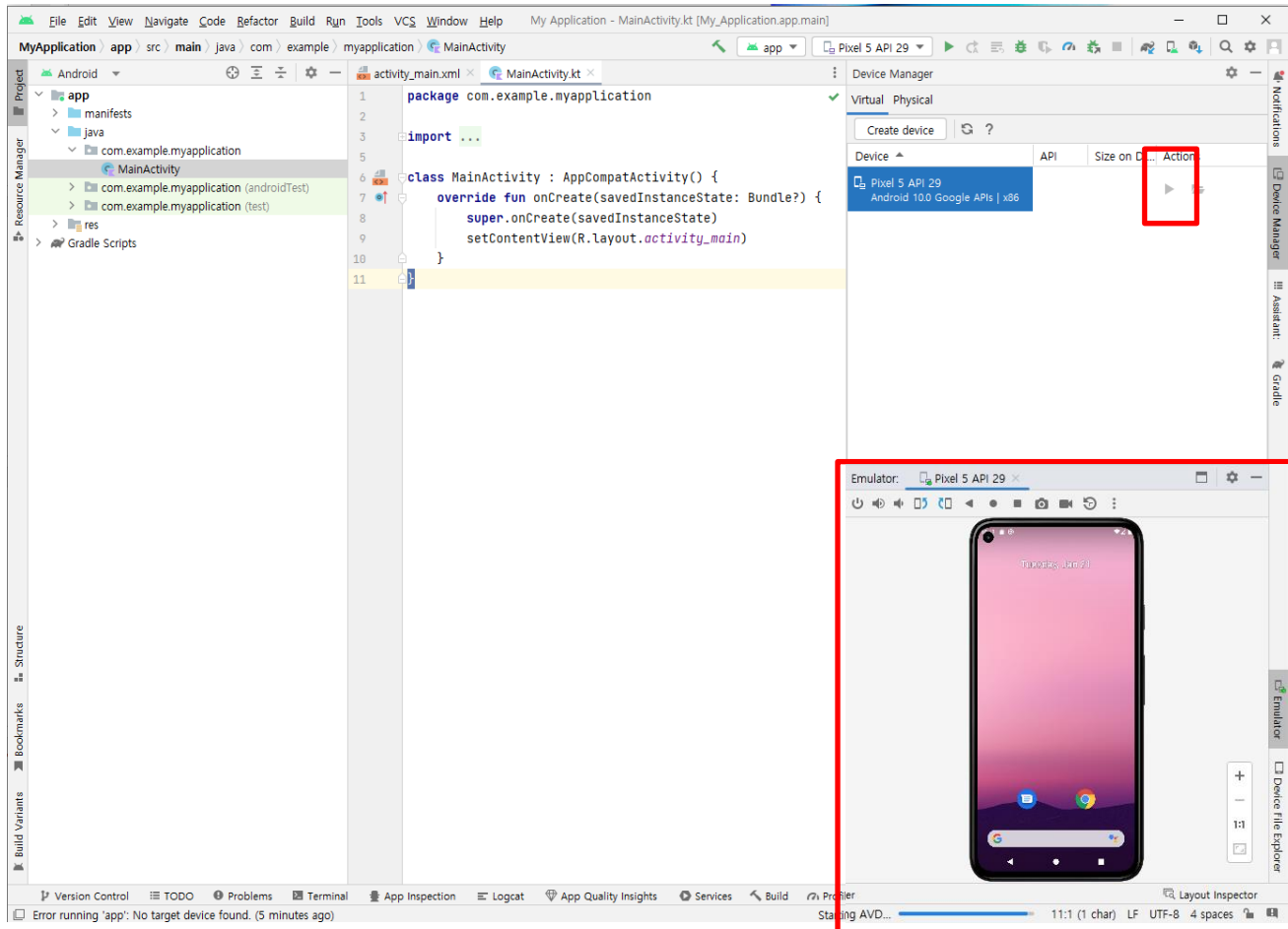
Show Advanced Settings

AVD Name

The name of this AVD.

Previous Next Cancel **Finish**

Virtual Device Configuration - Optional



Run Hello world project!

