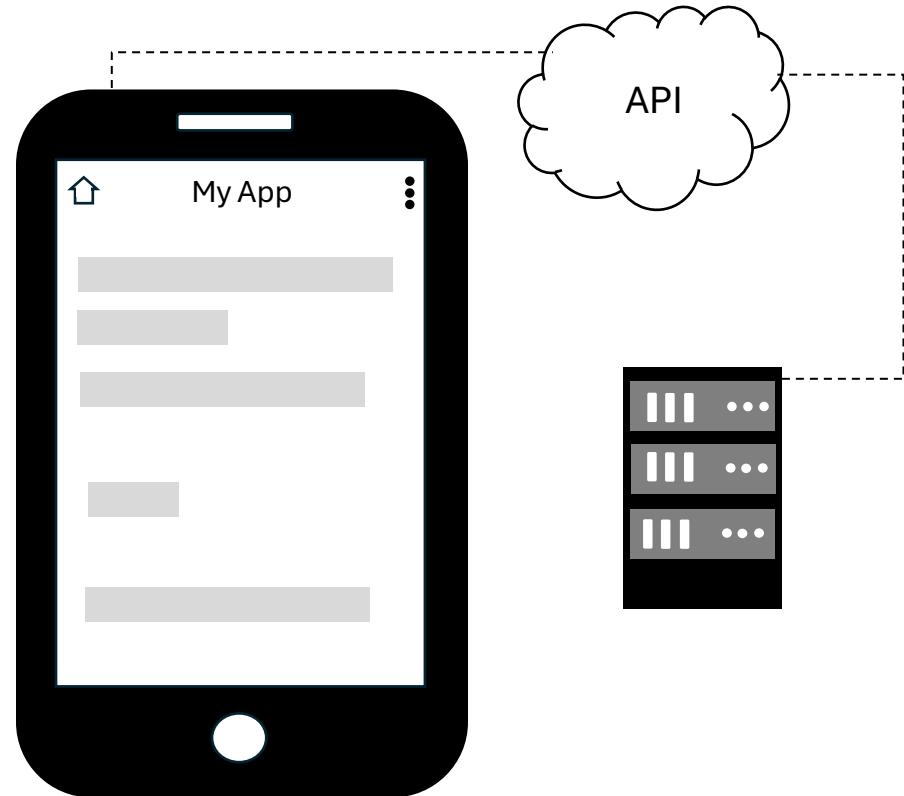


MOBILE & WEB SERVICES : REVIEW BAHASA PEMROGRAMAN DAN INSTALASI FLUTTER



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PENDAHULUAN REVIEW BAHASA PEMROGRAMAN

Penggunaan jenis bahasa pemrograman berbeda-beda sesuai dengan tipe platform yang digunakan. Tipe Platform berupa web, mobile, desktop, dan embedded. Bahasa pemrograman yang digunakan dalam membuat web adalah Python, JavaScript, PHP, dll. Web memerlukan Web server untuk menerima layanan dari pengiriman layanan klien dengan jenisnya adalah Apache web server, Nginx web server, Node.js, dll. Web juga memerlukan database server untuk menyimpan data. Database terdapat dua macam yaitu relasional (RDBMS) dan NoSQL. Macam RDBMS yaitu Oracle, MySQL, PostgreSQL, dll. NoSQL jenisnya seperti MongoDB, CouchDB, Cassandra, dll. Sedangkan pada desktop, digunakannya bahasa pemrograman dengan jenis delphi, Java, dan Electron JS

Pada mobile, terdapat bermacam jenis OS seperti ios, android, nokia, blackberry, windows, dll dengan dua OS yang terkenalnya adalah android dan ios. Bahasa pemrograman aplikasi android menggunakan java dan bahasa kemajuan dari java ialah Kotlin. Sedangkan, ios menggunakan objective-c dan SWIFT. Bahasa pemrograman yang dapat berjalan di kedua OS tersebut adalah flutter dan ReactNative.

Web

BAHASA PEMROGRAMAN	API SERVER	KEUNGGULAN	KEKURANGAN
RUBY	RACK	<ul style="list-style-type: none">- sintaks yang cukup sederhana- mudah dikelola- antarmuka yang minimal, modular, dan mudah beradaptasi	<ul style="list-style-type: none">- kurang cocok membangun aplikasi berbasis web- Performa cenderung lebih lambat- Fleksibilitas tinggi bisa menjadi kendala
PYTHON	WSGI, ASGI	<ol style="list-style-type: none">1. Mudah dipelajari, sintaksnya cukup sederhana dan mudah dimengerti2. Mudah diaplikasikan dalam mengembangkan produk3. Mendukung IoT (Internet of Things)4. Fleksibel pemrograman lain5. Meningkatkan produktivitas dikarenakan memiliki banyak library dan desain berorientasi objek yang bersih6. Bersifat open source dan free sehingga dapat diunduh secara gratis dan tidak perlu membeli lisensi	<ol style="list-style-type: none">1. Kurangnya dukungan multiprosesor sehingga dapat membatasi penulisan kode2. Tidak ideal untuk memory intensive task (konsumsi memori tinggi)3. Memiliki batasan desain (diketik secara dinamis)4. Kecepatan yang lebih lambat dibandingkan dengan bahasa pemrograman lainnya

JAVASCRIPT	JSGI	<ul style="list-style-type: none"> - Interaktif dan Responsif - Beban Server Lebih Ringan - Fleksibel untuk Digunakan 	<ul style="list-style-type: none"> - Keamanan sangat rendah - Bukan untuk Pengembangan Standalone Aplikasi - Terbatas objek (sangat sederhana)
PERL	PSGI	<ul style="list-style-type: none"> - Open source - Memiliki sistem dukungan yang kuat - Mengandung bahasa pemrograman yang canggih 	<ul style="list-style-type: none"> - Sulit untuk memperbaiki bug - Tidak ditujukan untuk web development

Database

JENIS	CONTOH	KEUNGGULAN	KEKURANGAN
RDBMS	MySQL	<ul style="list-style-type: none"> - integrasi dengan bahasa pemrograman lain - multi user - RAM yang dibutuhkan tidak begitu besar 	<ul style="list-style-type: none"> - Kurang untuk mengelola database dalam jumlah besar - Tidak cocok untuk aplikasi game dan mobile - open source, technical support nya menjadi kurang bagus
	Oracle	<ul style="list-style-type: none"> - Multi-user - Client-server environment - Bisa Diakses berbagai sistem operasi 	<ul style="list-style-type: none"> - Spesifikasi hardware Cukup tinggi - Harga Mahal
	SQLyog	<ul style="list-style-type: none"> - Mudah digunakan - Kecepatan tinggi - efisien 	<ul style="list-style-type: none"> - Kueri tidak mulus - Fitur premium mahal - Kegunaan terbatas
NoSQL	MongoDB	<ul style="list-style-type: none"> - kecepatan tinggi - Fleksibel - Mudah setup 	<ul style="list-style-type: none"> - Tinggi penggunaan memori - Indeks lama Ketika eror - Kapasitas terbatas 16 MB tiap dokumen
	CouchDB	<ul style="list-style-type: none"> - Kecepatan tinggi - Mengatasi redundan penyimpanan - Backup cepat 	<ul style="list-style-type: none"> - Tidak bisa backup database besar - lambat di memori dbms - lambat Ketika database besar
	Firebase	<ul style="list-style-type: none"> - Luas layanan dan fitur - mudah dan cepat setup - gratis untuk umum 	<ul style="list-style-type: none"> - Kurang mendukung iOS - Ketergantungan platform - migrasi data terbatas

Web Service (Melakukan CRUD)

JENIS	KELEBIHAN	KEKURANGAN
REST (Umum)	<ul style="list-style-type: none"> - antarmuka simple dan familiar - mudah dimengerti status komunikasi - Layanan cepat dan ringan 	<ul style="list-style-type: none"> - Desain terbatas - Tidak punya standar yang jelas - Lama mendapatkan output
SOAP	<ul style="list-style-type: none"> - Mudah mengatasi eror - Layanan luas bagi beda bahasa pemrograman - Punya standar desain yang jelas 	<ul style="list-style-type: none"> - lebih lambat dari REST - Susah setup - Layanan terbatas bagi mobile dan web
WSDL	<ul style="list-style-type: none"> - Standar desain jelas - Update dinamis - mendukung semua bahasa pemrograman 	<ul style="list-style-type: none"> - Layanan berat - butuh input dan output - Terbatas pada SOAP dan MIME

Mobile

OS	BAHASA PEMROGRAMAN	KELEBIHAN	KEKURANGAN
ANDROID	KOTLIN	<ul style="list-style-type: none"> - mudah deteksi bug dan eror - Mendukung lintas platform - Framework, library, fitur dari java mudah diakses 	<ul style="list-style-type: none"> - Komunitas kecil - Lambat kompilasi - tidak ada mode pengembang
	JAVA	<ul style="list-style-type: none"> - Simpel - Mendukung OOP - Komunitas Besar 	<ul style="list-style-type: none"> - GUI jelek - tidak ada fitur backup - penggunaan memori besar
IOS	SWIFT	<ul style="list-style-type: none"> - mudah dipelajari - penggunaan Memori kecil - Cepat dalam proses pengembangan aplikasi 	<ul style="list-style-type: none"> - Kurang support iOS 6 dan sebelumnya - Belum sempurna dalam lintas platform - Belum ada IDEs yang mendukung
	OBJECTIVE-C	<ul style="list-style-type: none"> - Kompilasi Cepat - Mendukung C dan C++ - Operasi dinamis saat runtime 	<ul style="list-style-type: none"> - Performa lebih lambat daripada swift - Update kurang berguna - Komunitas sedikit
KEDUANYA	Dart (Flutter)	<ul style="list-style-type: none"> - mendukung lintas platform - Komunitas dan Library sangat besar - maintenance dan update mudah 	<ul style="list-style-type: none"> - Butuh Storage besar - Butuh Native Platforms secara manual - Library lebih sedikit daripada reactnative
	Javascript (ReactNative)	<ul style="list-style-type: none"> - UI lebih mulus dan cepat - kompatibel dengan plugin - Looping cepat 	<ul style="list-style-type: none"> - Module susah dibuat custom - Susah update dan maintenance

			- Susah debug dan mengatasi eror
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PERTEMUAN 1

Flutter

Mengenal Flutter

Flutter adalah framework yang dibuat menggunakan bahasa pemrograman Dart sebagai pengembang aplikasi mobile (iOS & Android), web, dan desktop. Fitur Dart adalah sebagai berikut,

- Ahead of Time (AOT) ialah kompilasi kode-nya menjadi kode mesin sebelum runtime
- Just in Time (JIT) ialah kompilasi kode-nya saat runtime

Fitur Flutter sebagai berikut,

- Single Codebase, menulis satu set kode yang bisa digunakan di Android, iOS, web, dan desktop
- Hot reload, hasil kode berubah tanpa refresh / harus klik runtime
- Plugin dan paket, pengguna dapat berkreasi dan membagikan fitur widget buatan sendiri ke komunitas

Kebutuhan dasar Flutter sebagai berikut,

- Java Development Kit (JDK) [untuk running di android virtual device]
- Android Studio (sudah termasuk Android SDK)
- Android SDK [untuk running di android virtual device] :
 - o Android SDK Platform, API 35.0.1
 - o Android SDK Command-line Tools
 - o Android SDK Build-Tools
 - o Android SDK Platform-Tools
 - o Android Emulator
- Flutter SDK
- Visual Studio (untuk running di windows app / GUI)
- Microsoft VS Code
- Web Browser (untuk running di browser [disarankan chrome])

Tabel 1.1 Kebutuhan Dasar Flutter Tiap OS

Sistem Operasi	x86_64 CPU Cores	Memori satuan GB	Resolusi tampilan dalam piksel	Penyimpanan Kosong Satuan GB
Windows	4	8	WXGA (1366 x 768)	11
MacOS	4	8	WXGA (1366 x 768)	44
Linux	4	8	WXGA (1366 x 768)	11
ChromeOS	4	8	WXGA	11

(1366 x 768)

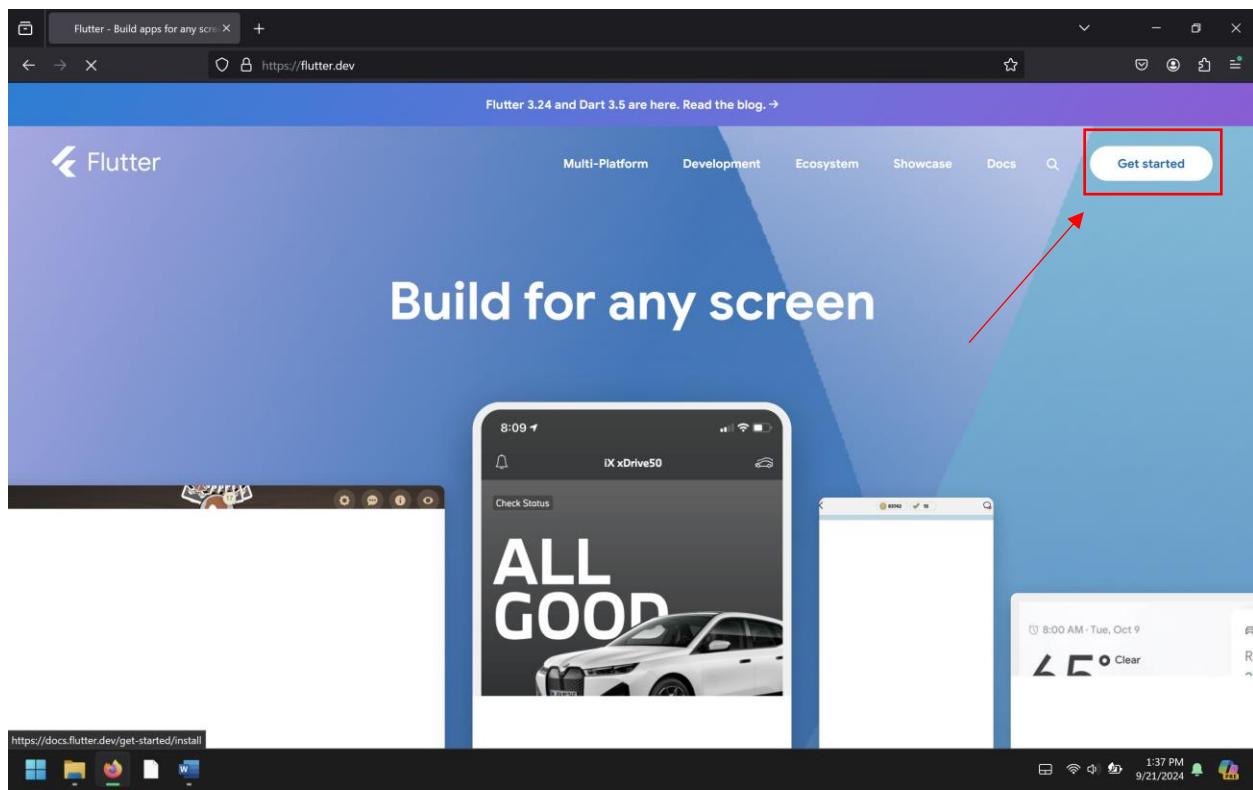
Tabel 1.2 Sistem Operasi yang mendukung pembuatan aplikasi di platform tertentu

Sistem Operasi	Mendukung Android	Mendukung iOS	Mendukung Web	Mendukung Desktop
Windows	√	-	√	√
MacOS	√	√	√	√
Linux	√	-	√	√
ChromeOS	√	-	√	-

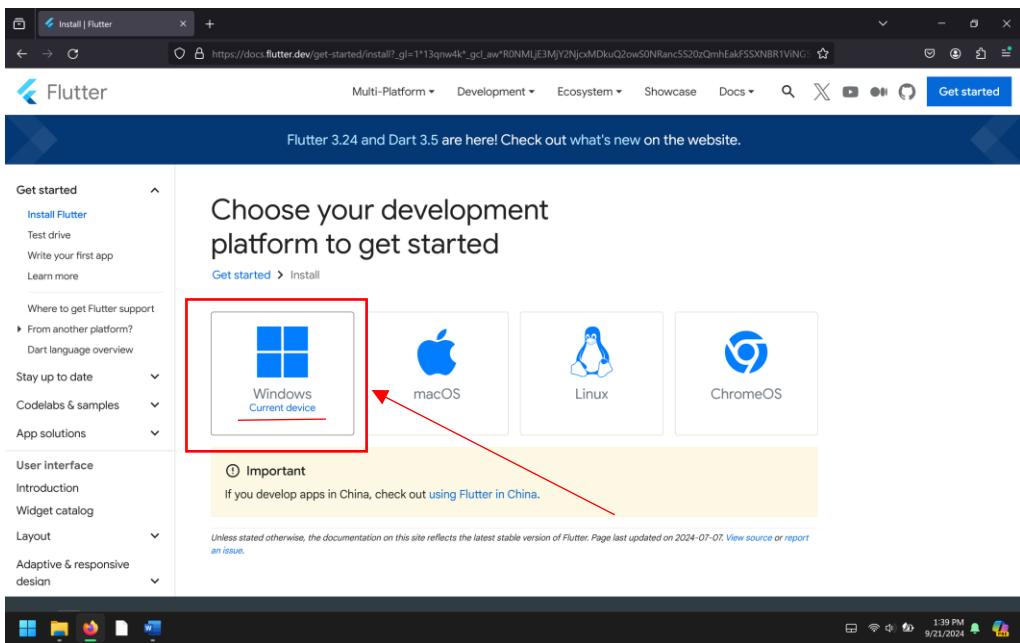
INSTALASI SDK FLUTTER

Download SDK Flutter

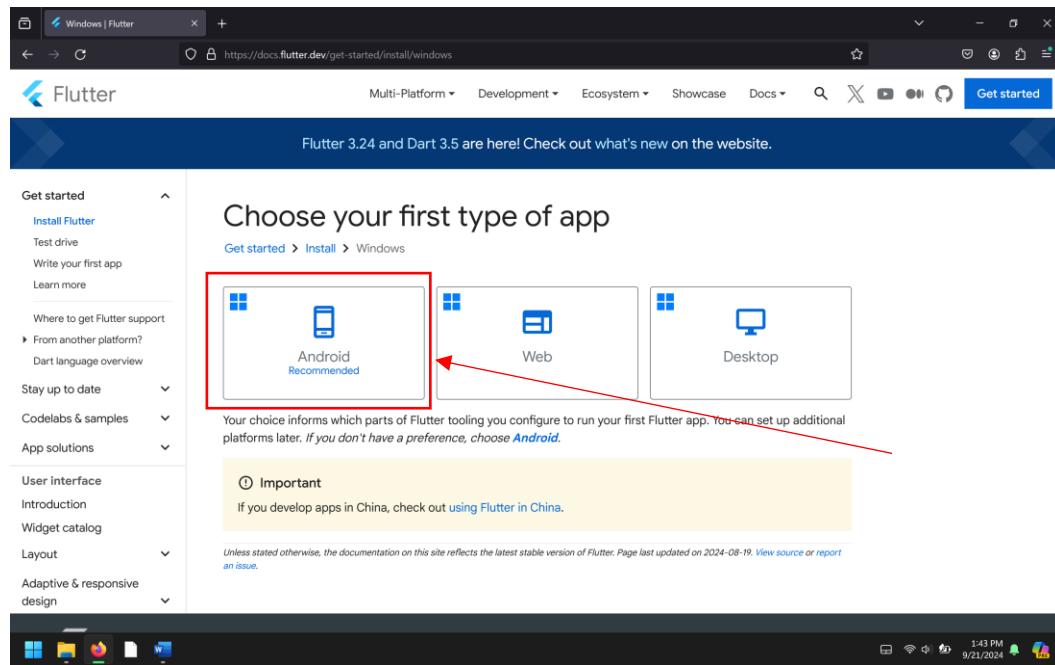
1. Pergi ke situs flutter.dev → klik tombol get started



2. Pilih yang sesuai dengan OS yang digunakan, ciri-cirinya ada catatan Current device



3. Pilih sesuai tipe perangkat lunak yang akan dikembangkan atau dibuat, karena ini tentang mobile maka pilih android



4. Klik menu install the Flutter SDK di navigasi sebelah kanan

The screenshot shows a browser window displaying the Flutter documentation for Windows. The URL is <https://docs.flutter.dev/get-started/install/windows/mobile#install-the-flutter-sdk>. On the right side of the page, there is a sidebar titled 'Contents' which includes links like 'Verify system requirements', 'Hardware requirements', and 'Install the Flutter SDK'. A red arrow points from the text above to the 'Install the Flutter SDK' link in the sidebar.

5. Klik pilihan Download and Install

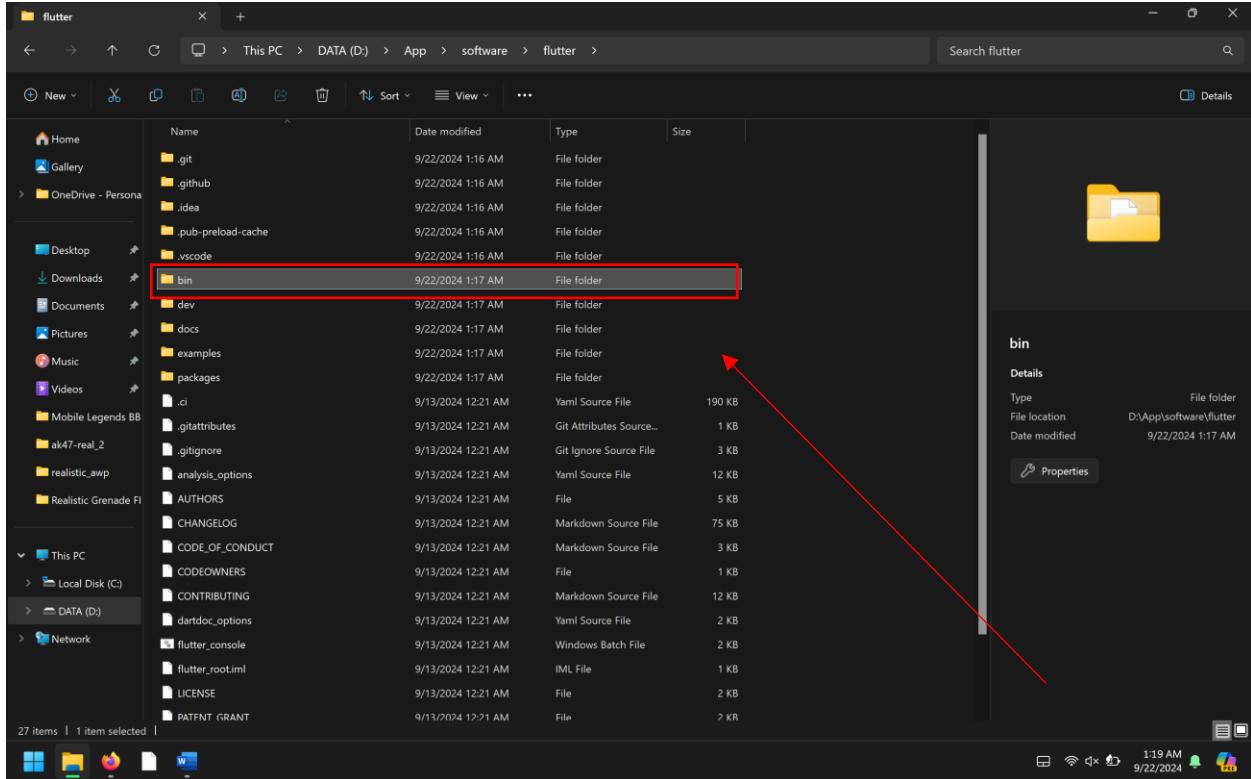
The screenshot shows the 'Install the Flutter SDK' section of the Flutter documentation. It includes instructions for using VS Code or downloading the bundle. A red arrow points from the text above to the 'Download and install' button, which is highlighted with a red box.

6. Klik tombol biru format zip untuk mendownload flutter SDK

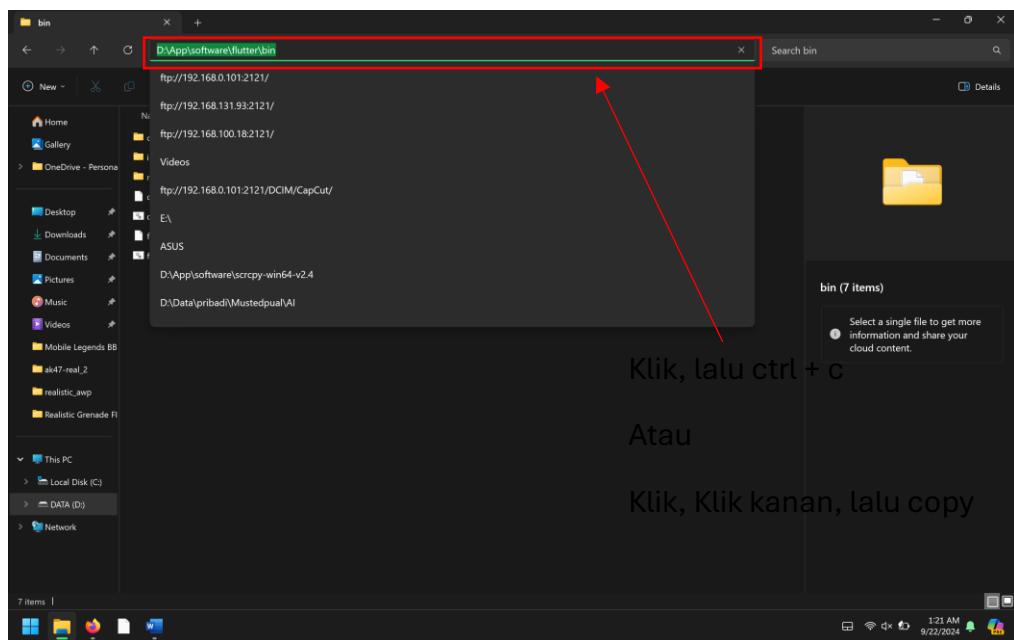
The screenshot shows a web browser displaying the official Flutter documentation at <https://docs.flutter.dev/get-started/install/windows/mobile#install-the-flutter-sdk>. The page title is "Install the Flutter SDK". On the left, there's a sidebar with navigation links like "Get started", "Stay up to date", and "User interface". The main content area has a heading "Download then install Flutter" and a sub-section "1. Download the following installation bundle to get the latest stable release of the Flutter SDK.". A blue rectangular box highlights the download link "flutter_windows_3.24.3-stable.zip". A red arrow points from the top-left towards this highlighted link. To the right of the main content, there's a "Contents" sidebar with various development-related links.

Install Flutter SDK

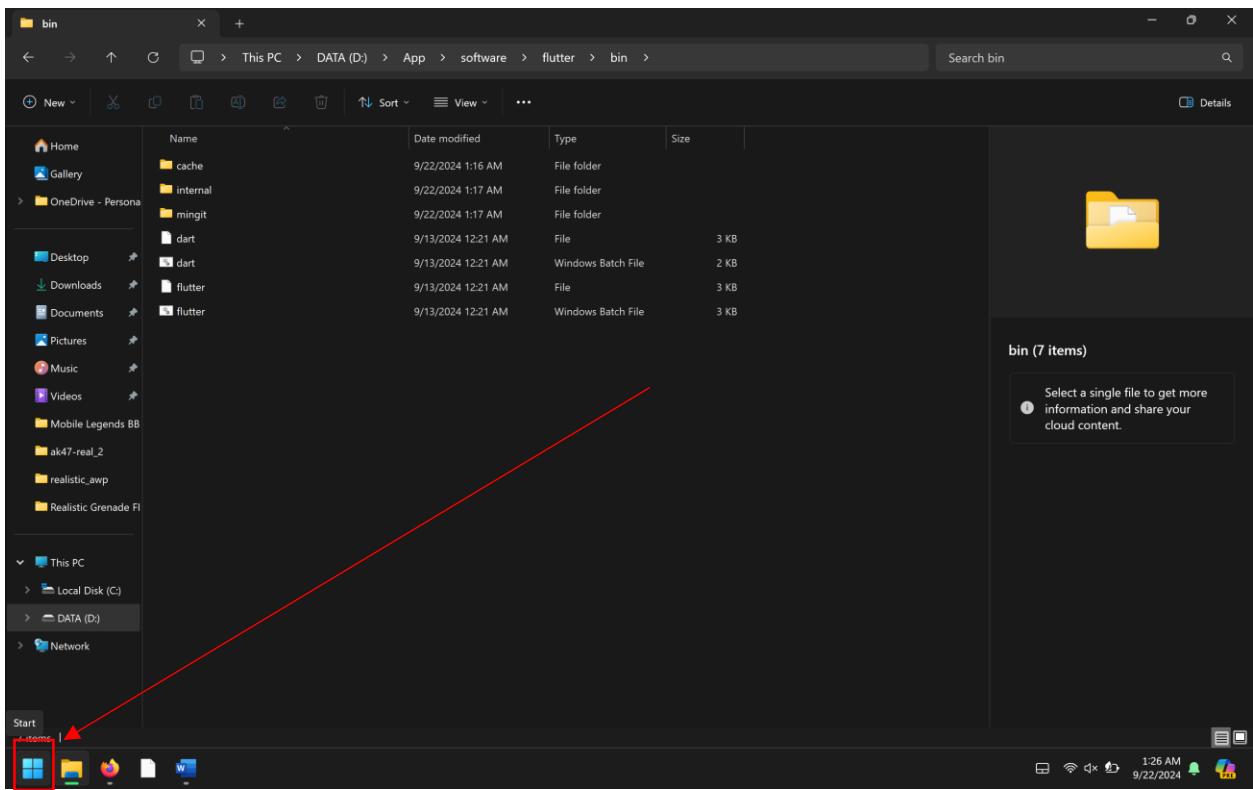
1. Extract File zip hasil download flutter
2. Masuk ke folder Flutter → bin



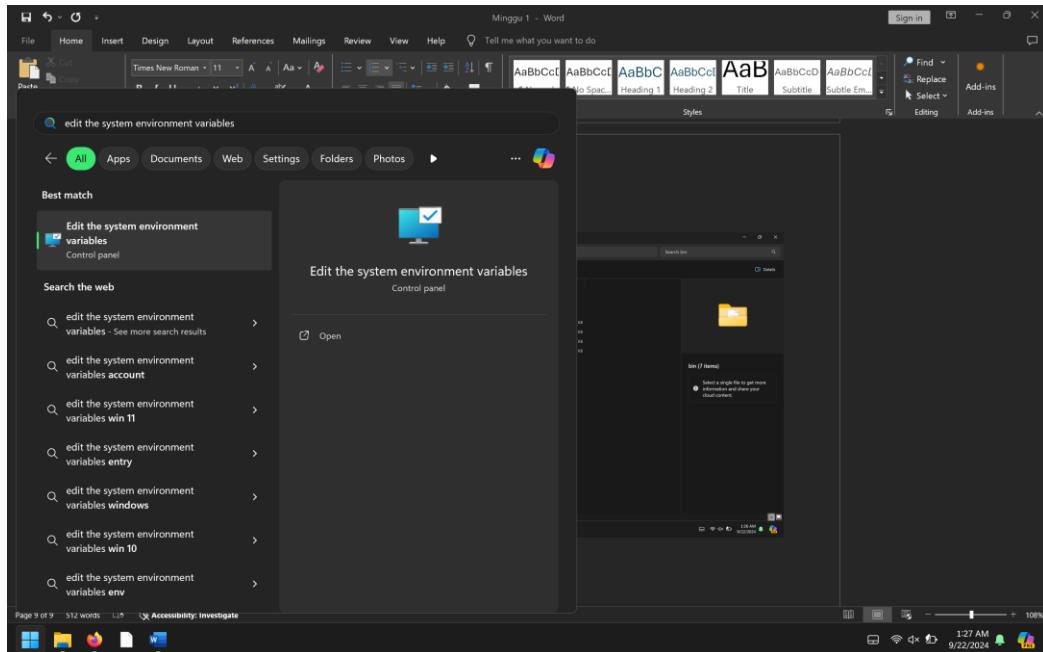
3. Copy path setelah masuk ke dalam folder bin



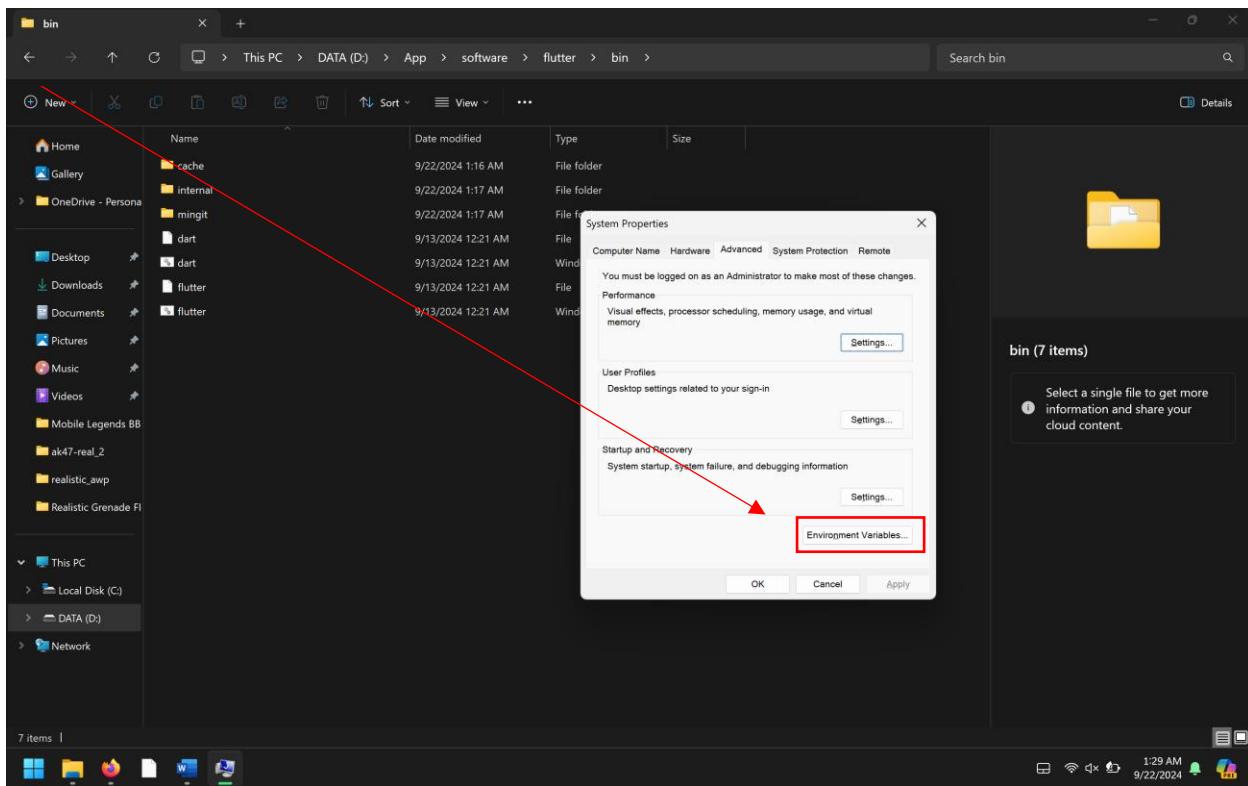
4. Pergi ke ikon windows



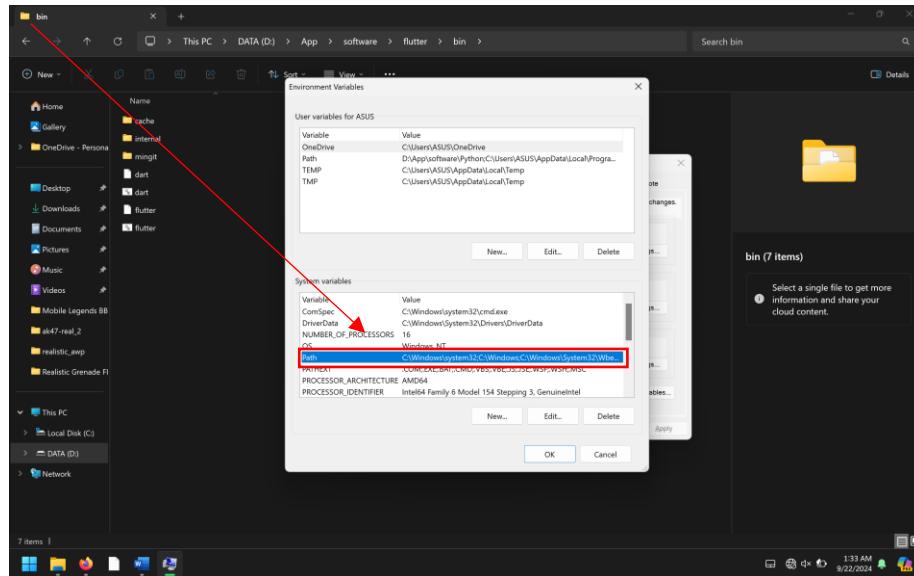
5. Ketik edit the system environment variables dan enter



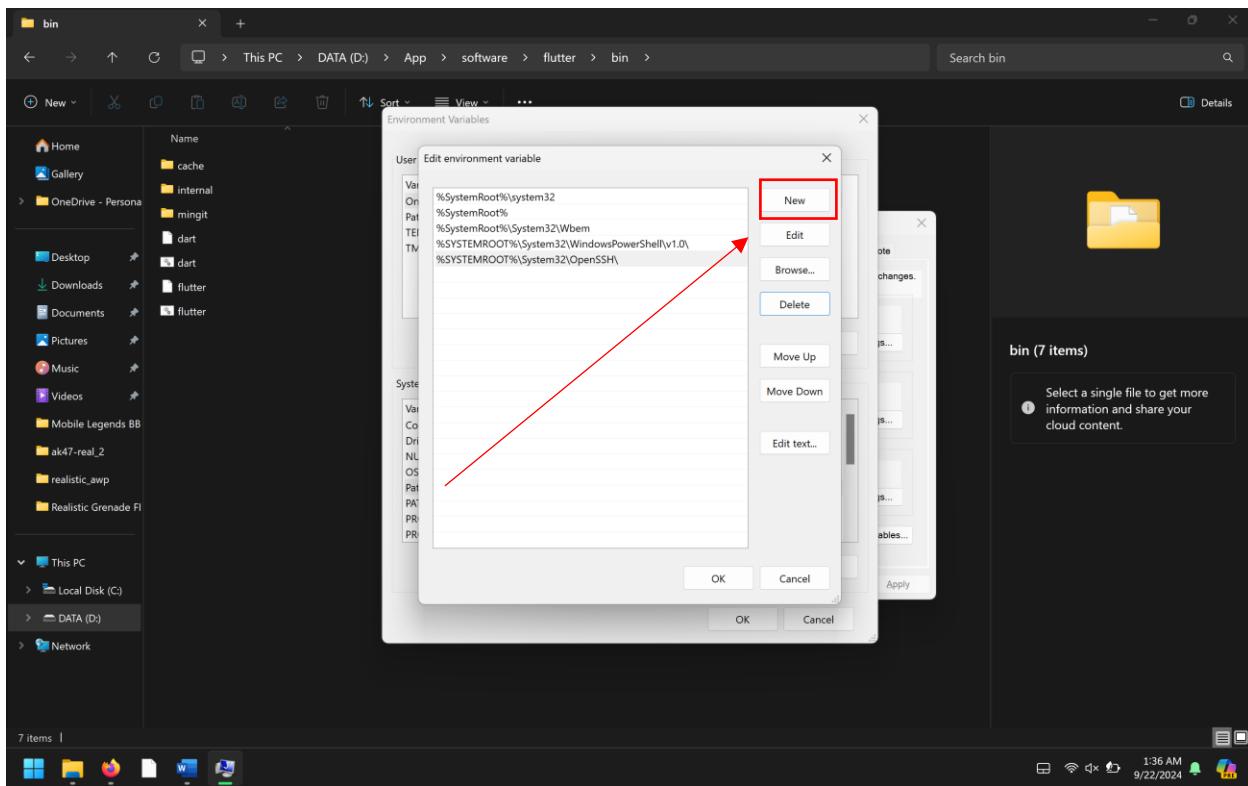
6. Klik Environment Variables...



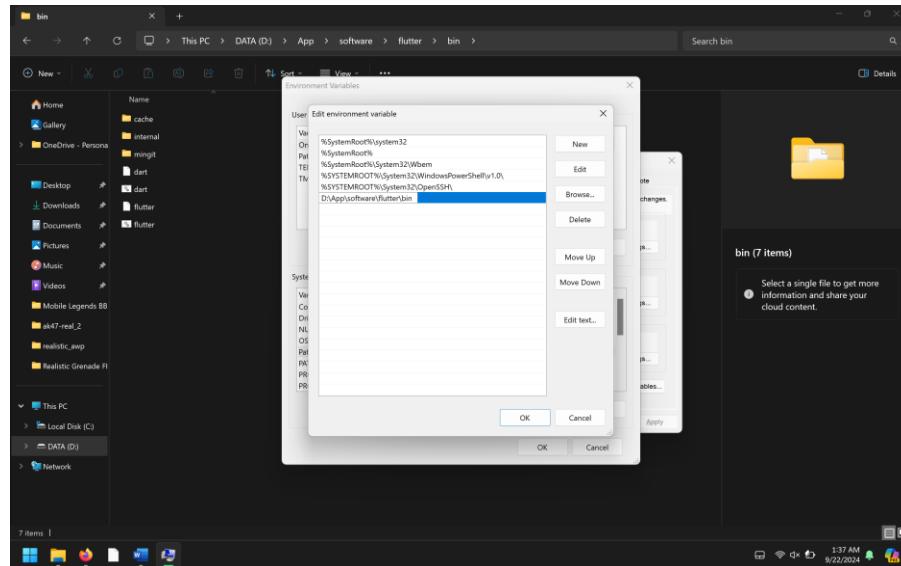
7. Klik dua kali atau klik tombol edit... pada system variable Path



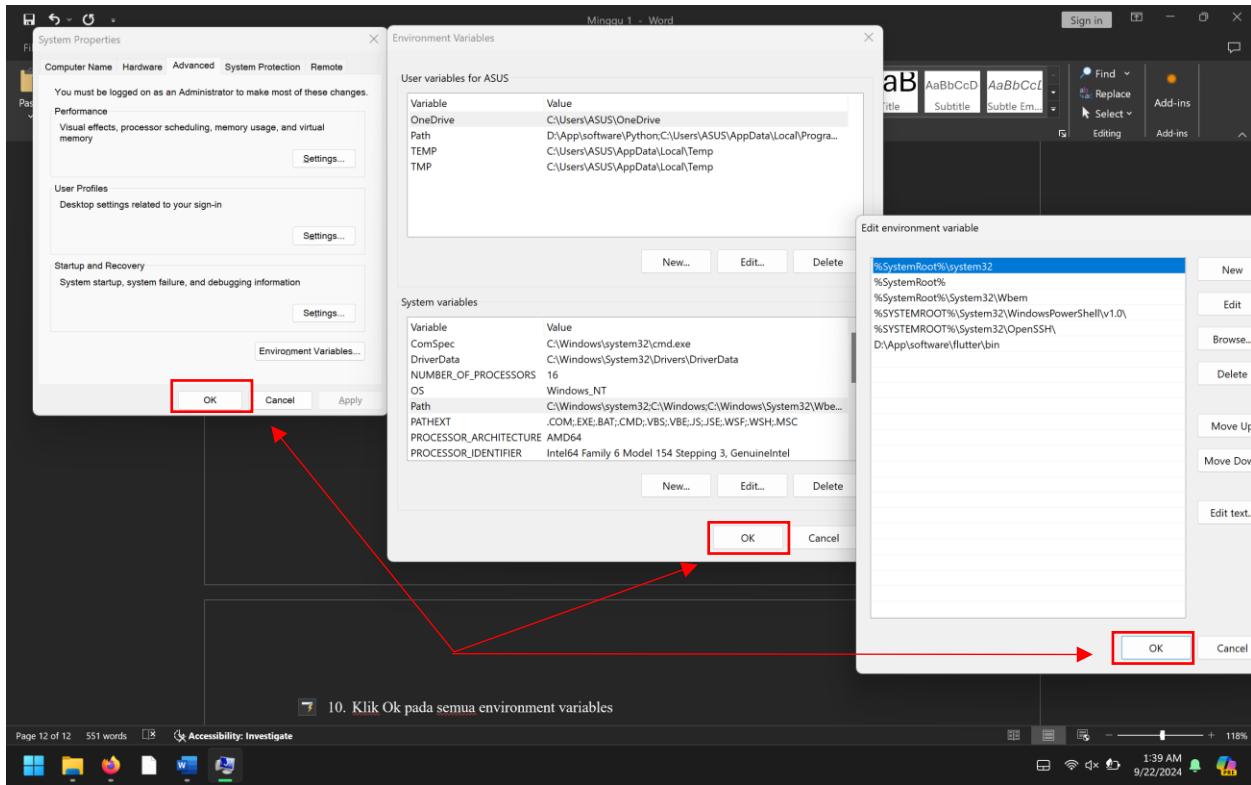
8. Klik New



9. Paste dengan cara tekan tombol ctrl + v

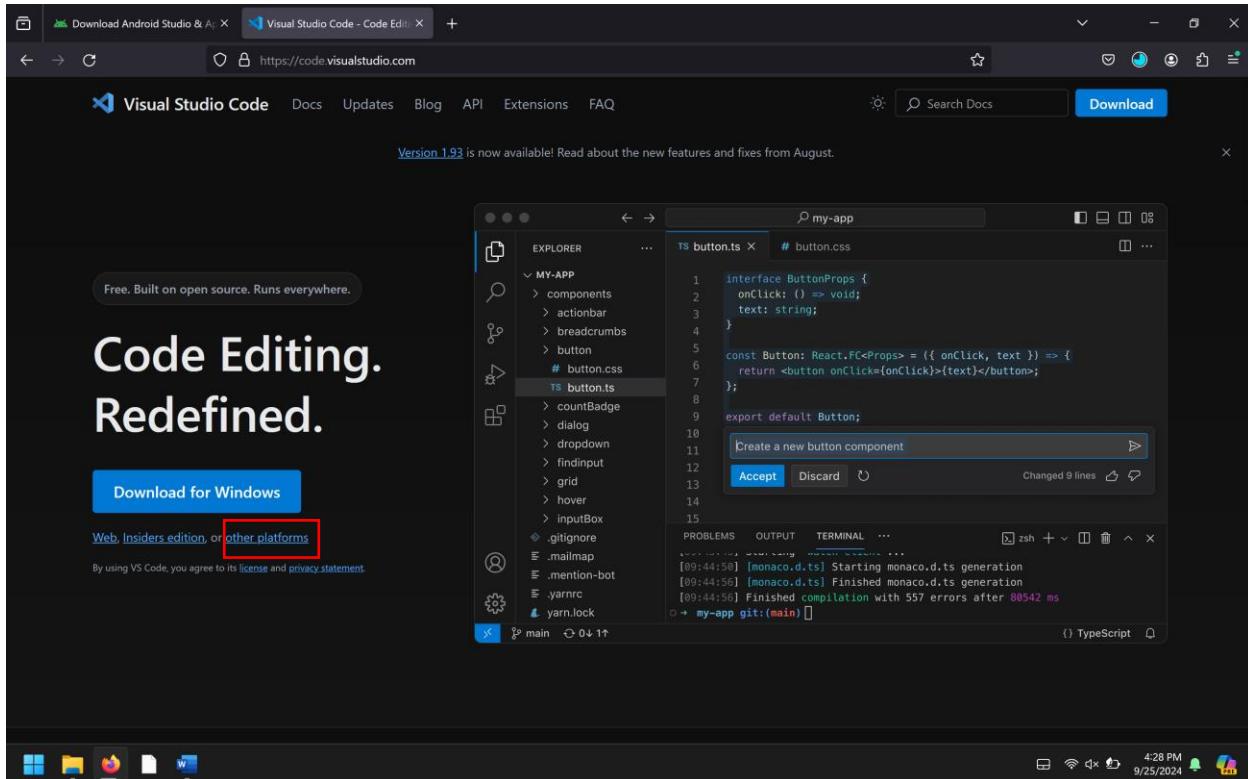


10. Klik Ok pada semua environment variables

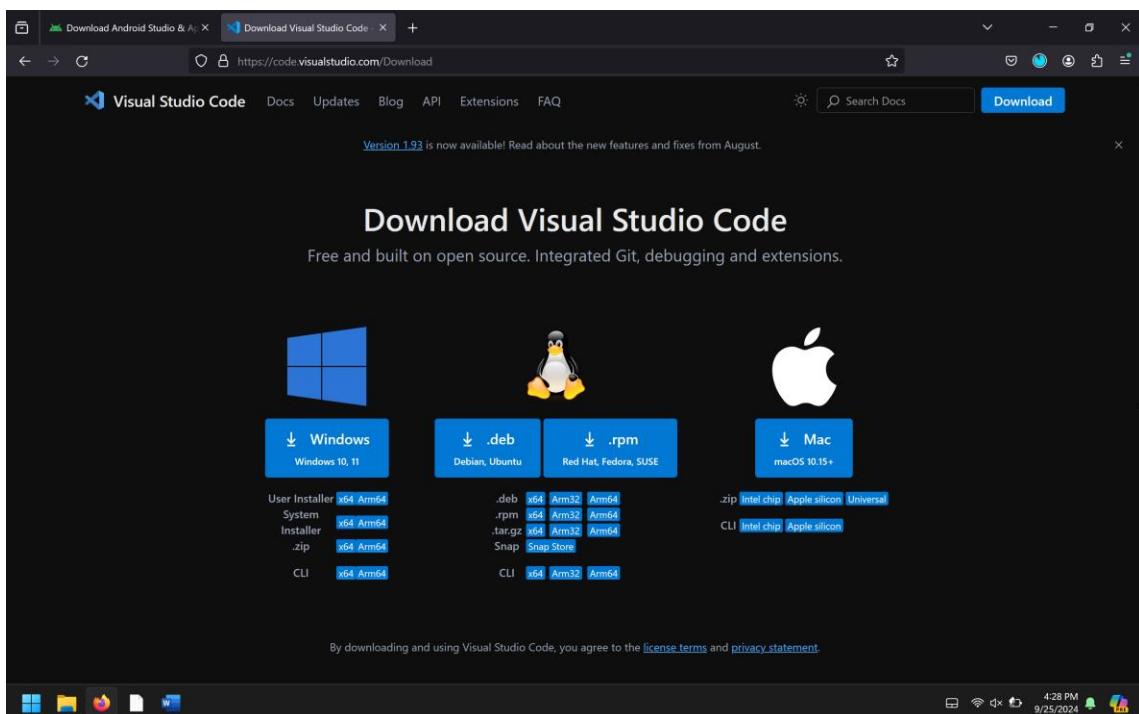


INSTALASI MICROSOFT VS CODE

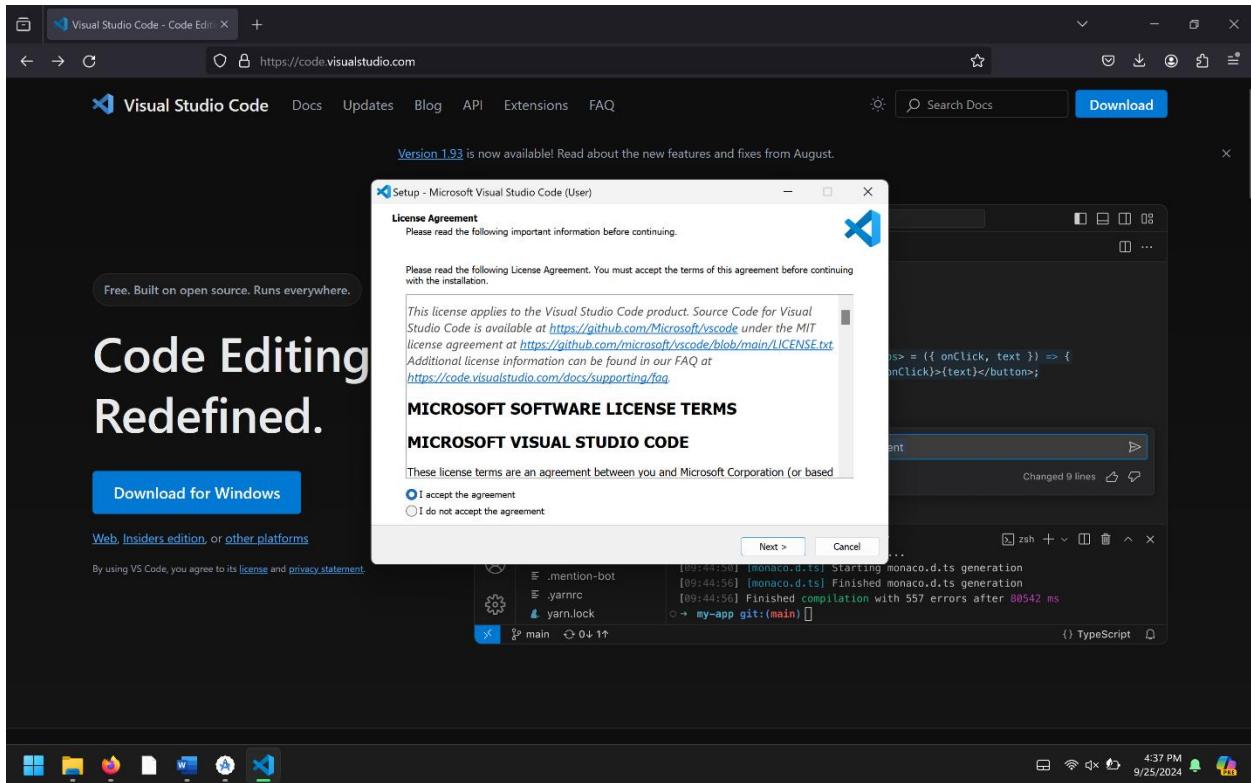
1. Pergi ke code.visualstudio.com dan klik other platform di bawah tombol download



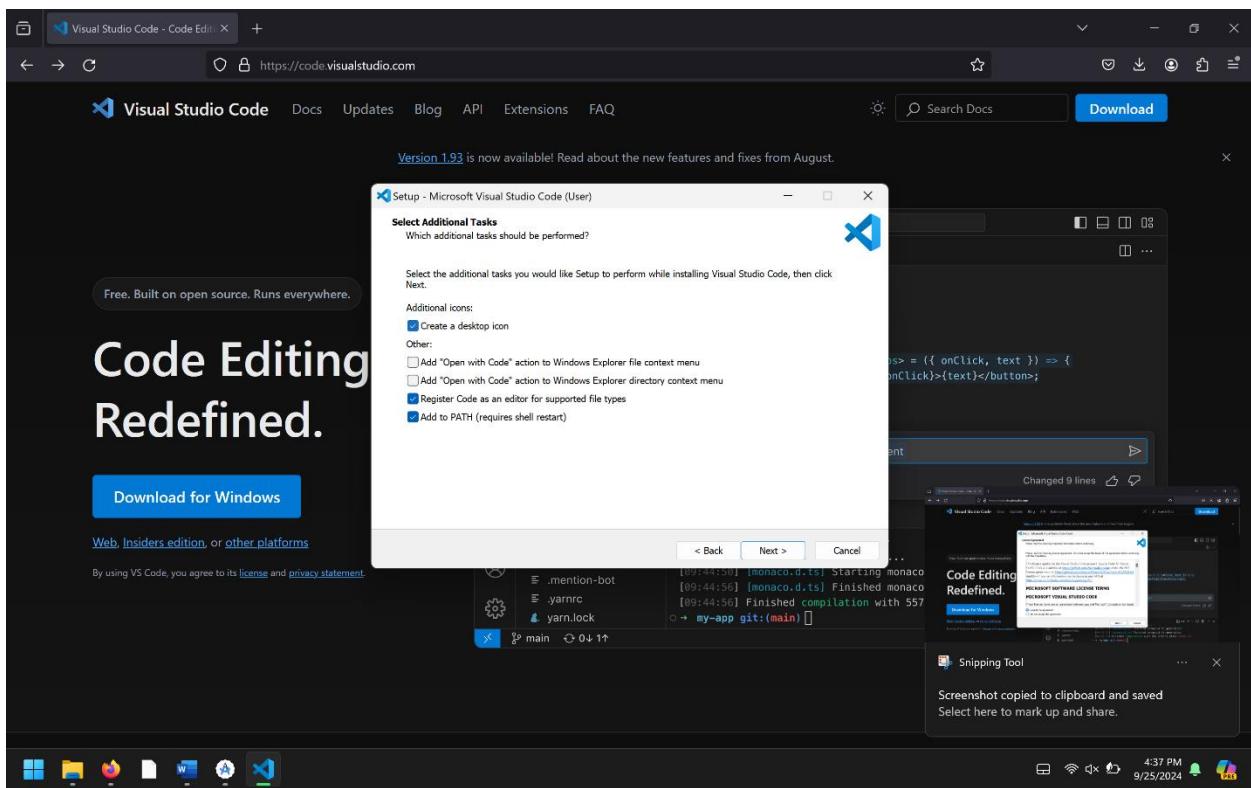
2. Pilih jenis download sesuai kebutuhan



3. Klik accept lalu next



4. Klik next dan proses instalasi berlangsung



CEK HASIL INSTALASI FLUTTER

Lakukan perintah di terminal berupa flutter doctor -v

```
C:\Users\ASUS>flutter doctor -v
```

Hasil :

```
[X] Android toolchain - develop for Android devices
  X Unable to locate Android SDK.
    Install Android Studio from: https://developer.android.com/studio/index.html
    On first launch it will assist you in installing the Android SDK components.
    (or visit https://flutter.dev/to/windows-android-setup for detailed instructions).
    If the Android SDK has been installed to a custom location, please use
      `flutter config --android-sdk` to update to that location.
```

```
[X] Chrome - develop for the web (Cannot find Chrome executable at .\Google\Chrome\Application\chrome.exe)
  ! Cannot find Chrome. Try setting CHROME_EXECUTABLE to a Chrome executable.
```

```
[X] Visual Studio - develop Windows apps
  X Visual Studio not installed; this is necessary to develop Windows apps.
    Download at https://visualstudio.microsoft.com/downloads/.
    Please install the "Desktop development with C++" workload, including all of its default components
```

```
[!] Android Studio (not installed)
  • Android Studio not found; download from https://developer.android.com/studio/index.html
    (or visit https://flutter.dev/to/windows-android-setup for detailed instructions).
```

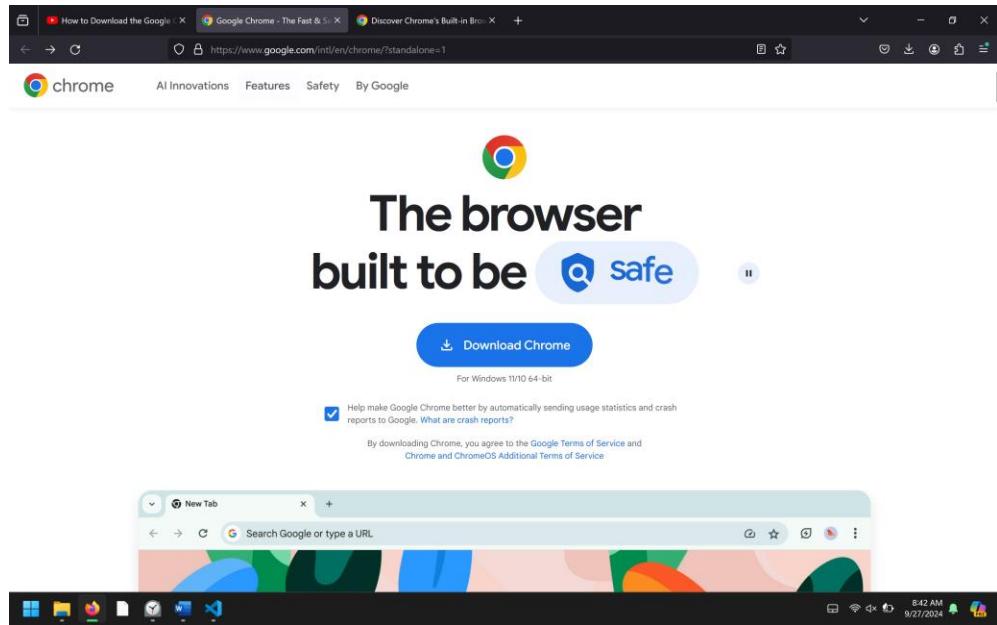
Catatan :

Untuk tanda x diharuskan menginstalasi software tersebut seperti android sdk, chrome, visual studio

Untuk tanda ! direkomendasikan instalasi tersebut karena lebih mudah seperti android studio

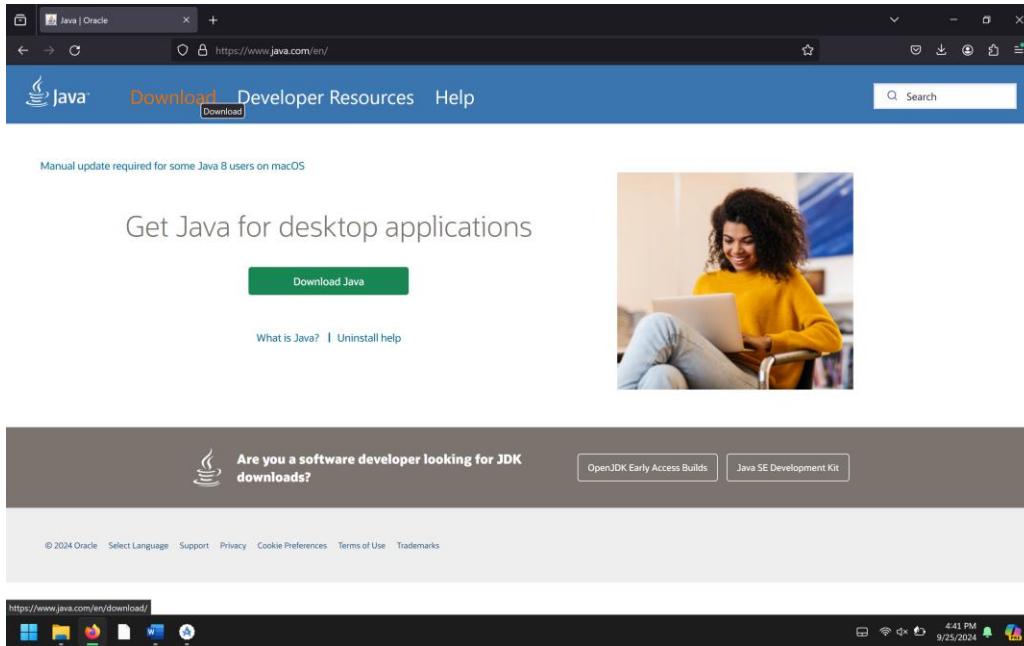
INSTALASI CHROME

1. Pergi ke www.google.com/intl/en/chrome/?standalone untuk mendapatkan instalasi lebih cepat yaitu standalone

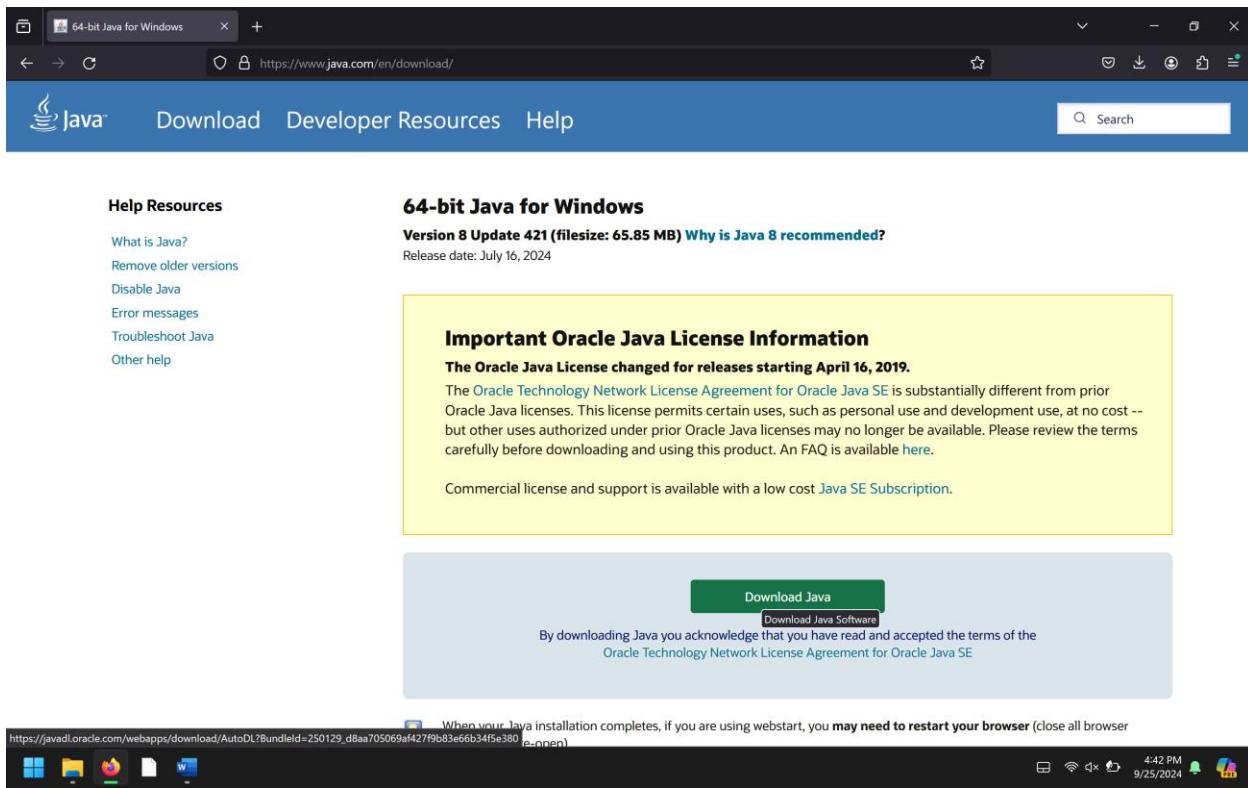


INSTALASI JAVA DEVELOPMENT KIT (JDK)

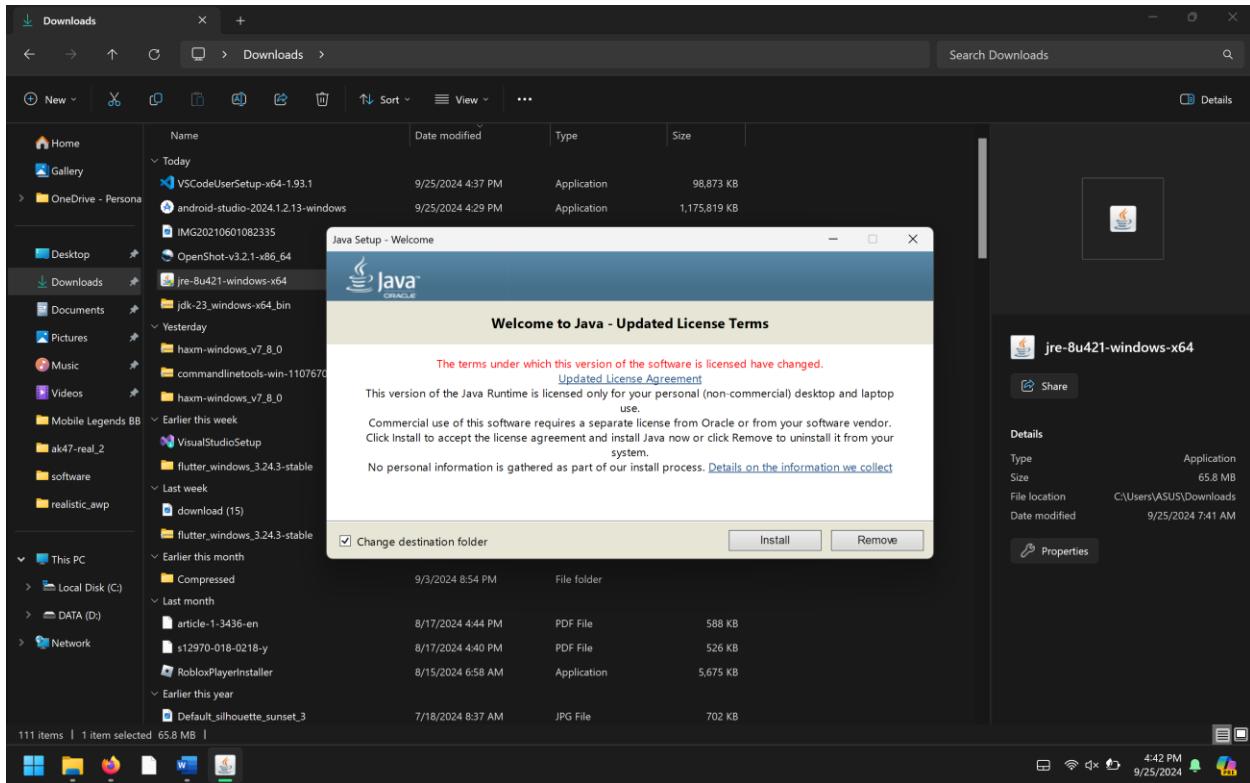
1. Pergi ke [java.com](https://www.java.com/en/) dan klik download java



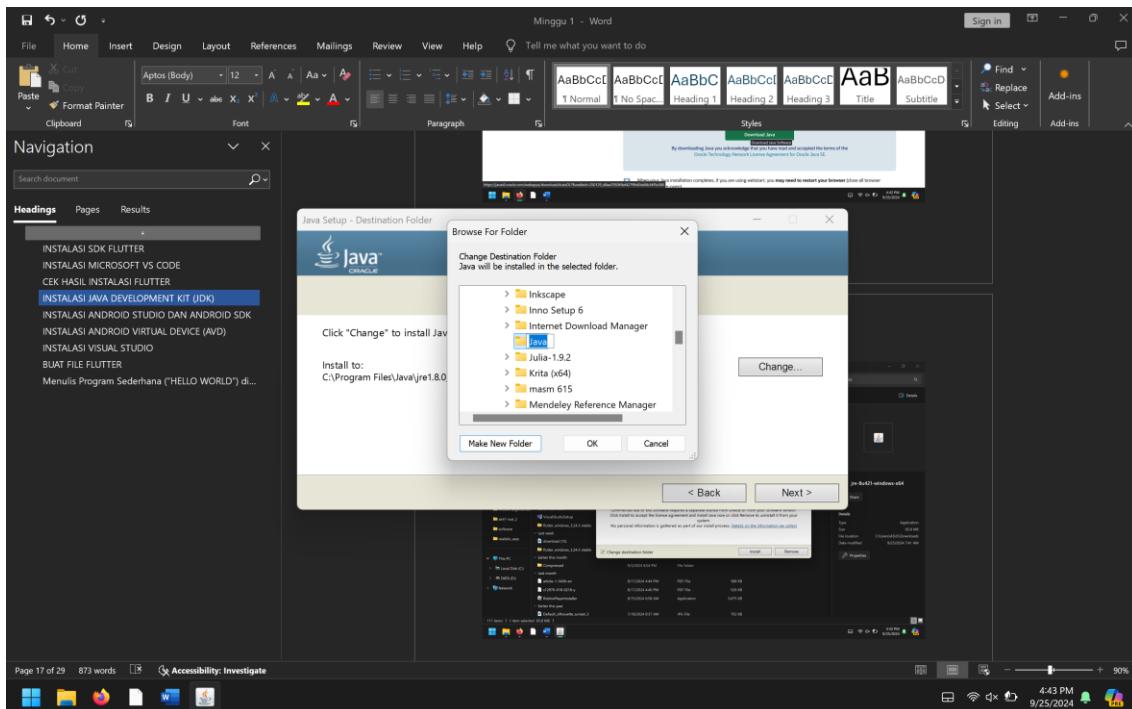
2. Klik tombol download java



3. Buka installer dan klik install

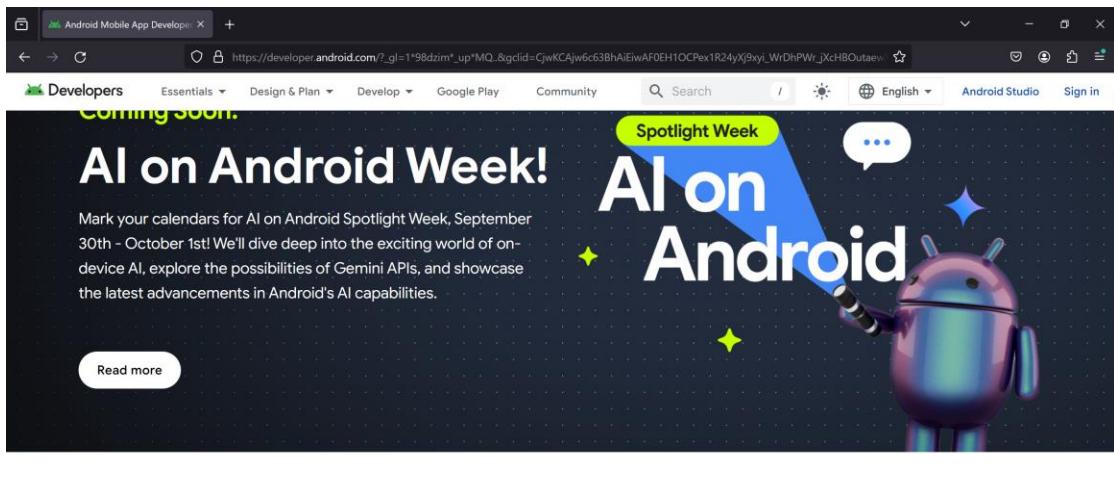


4. Klik change untuk ubah directory dan klik new folder untuk menambah directory lalu ok. Lalu klik next dan proses instalasi berlangsung

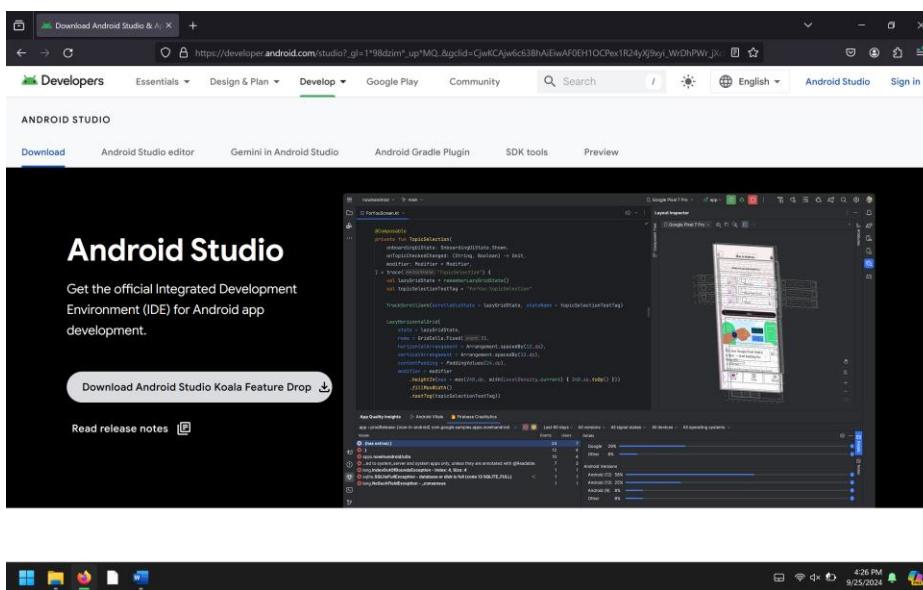


INSTALASI ANDROID STUDIO DAN ANDROID SDK

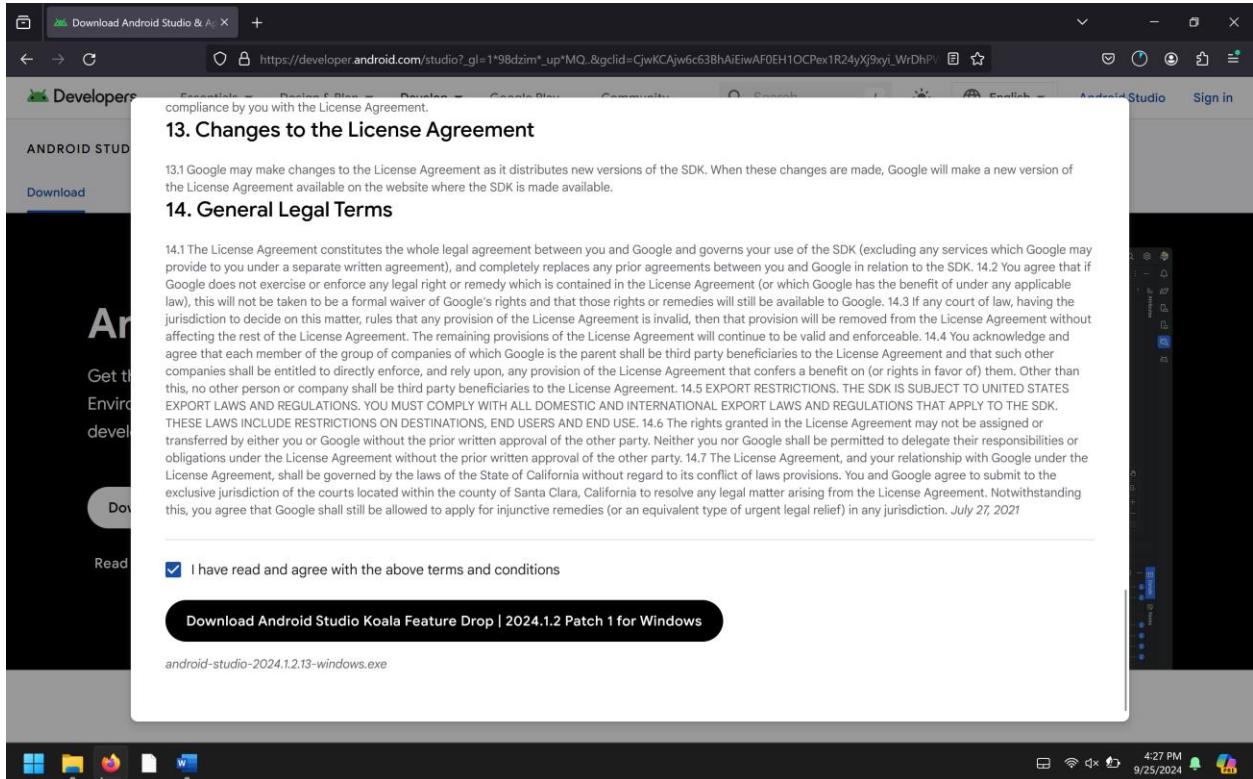
1. Pergi ke developer.android.com



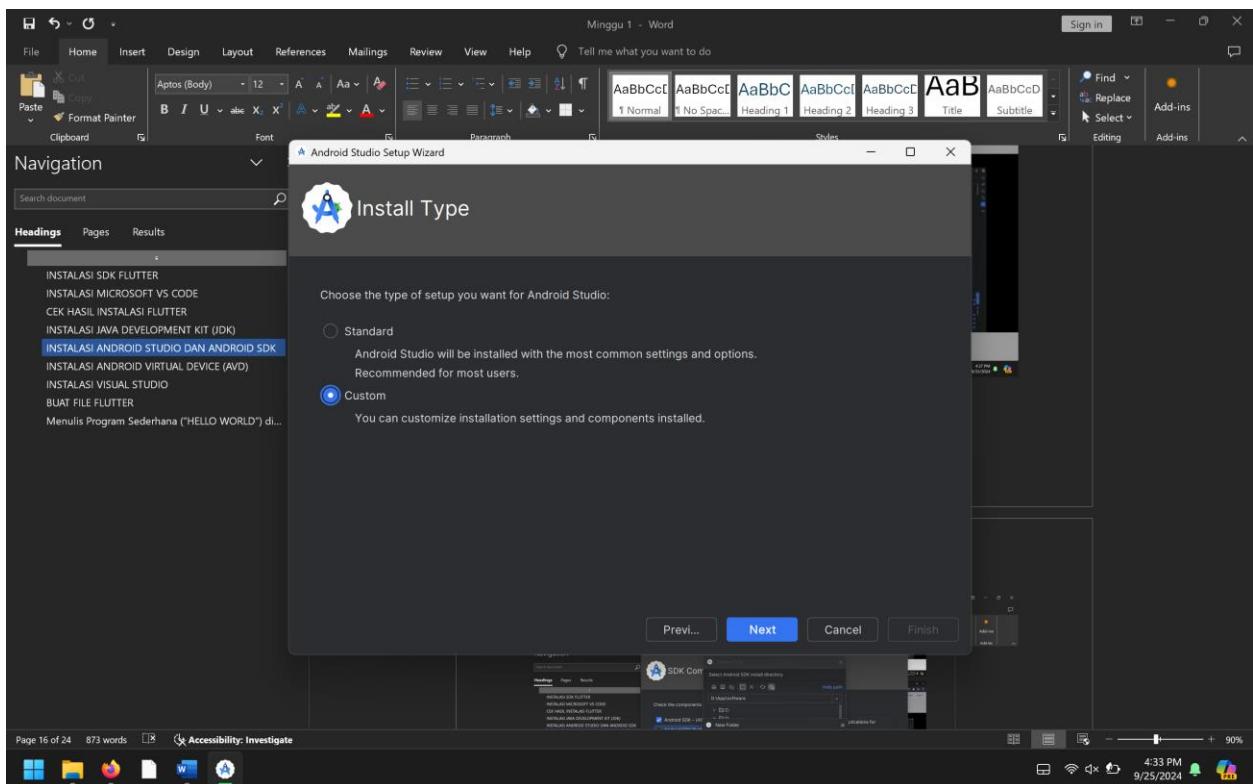
2. Klik menu develop → pilih menu download (dibawah android studio) → Pilih tombol download



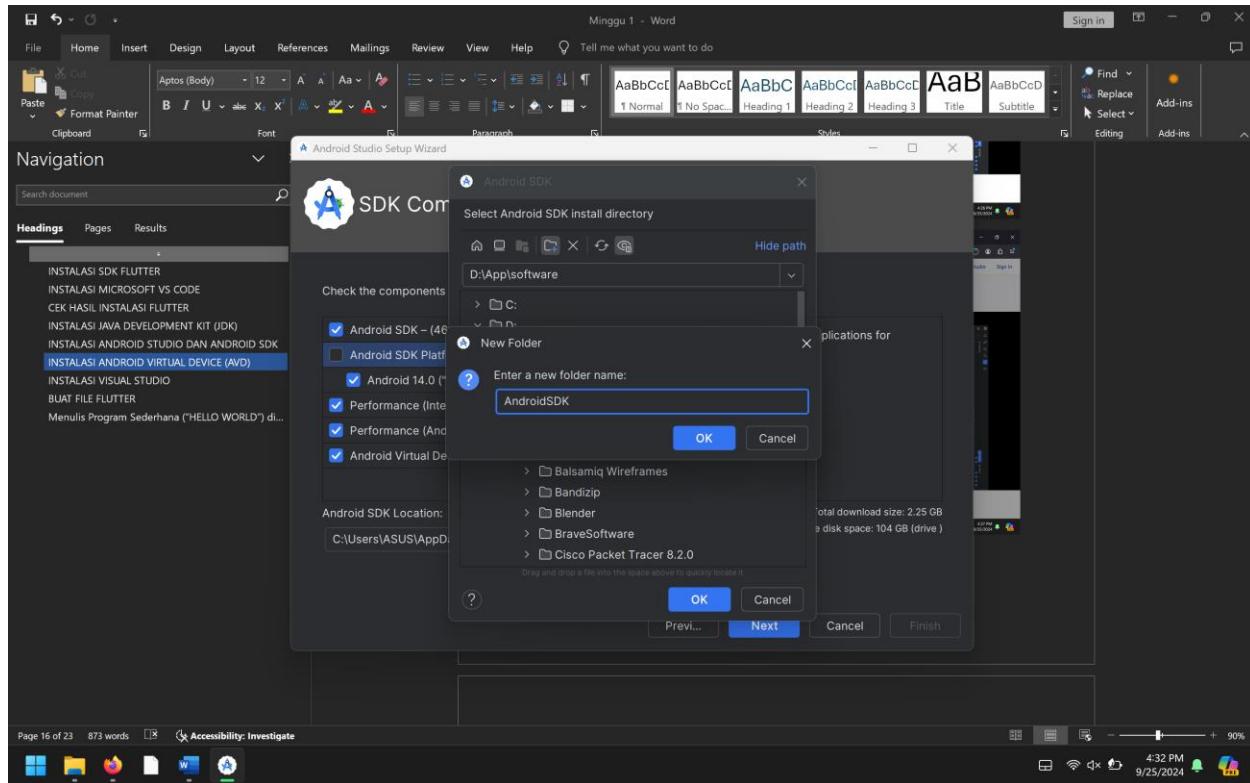
3. Scroll ke bawah → Centang kotak term and condition → klik download



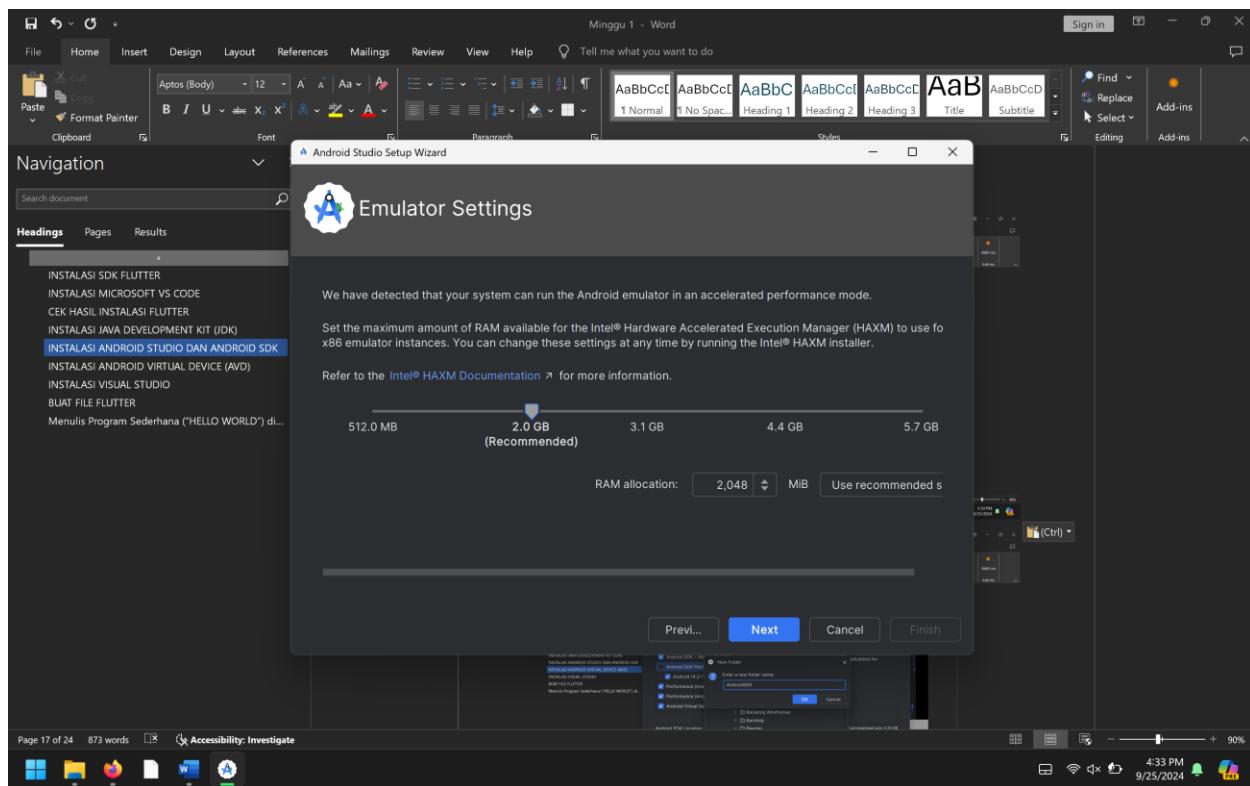
4. Buka installer dan pilih custom jika ingin directory berbeda



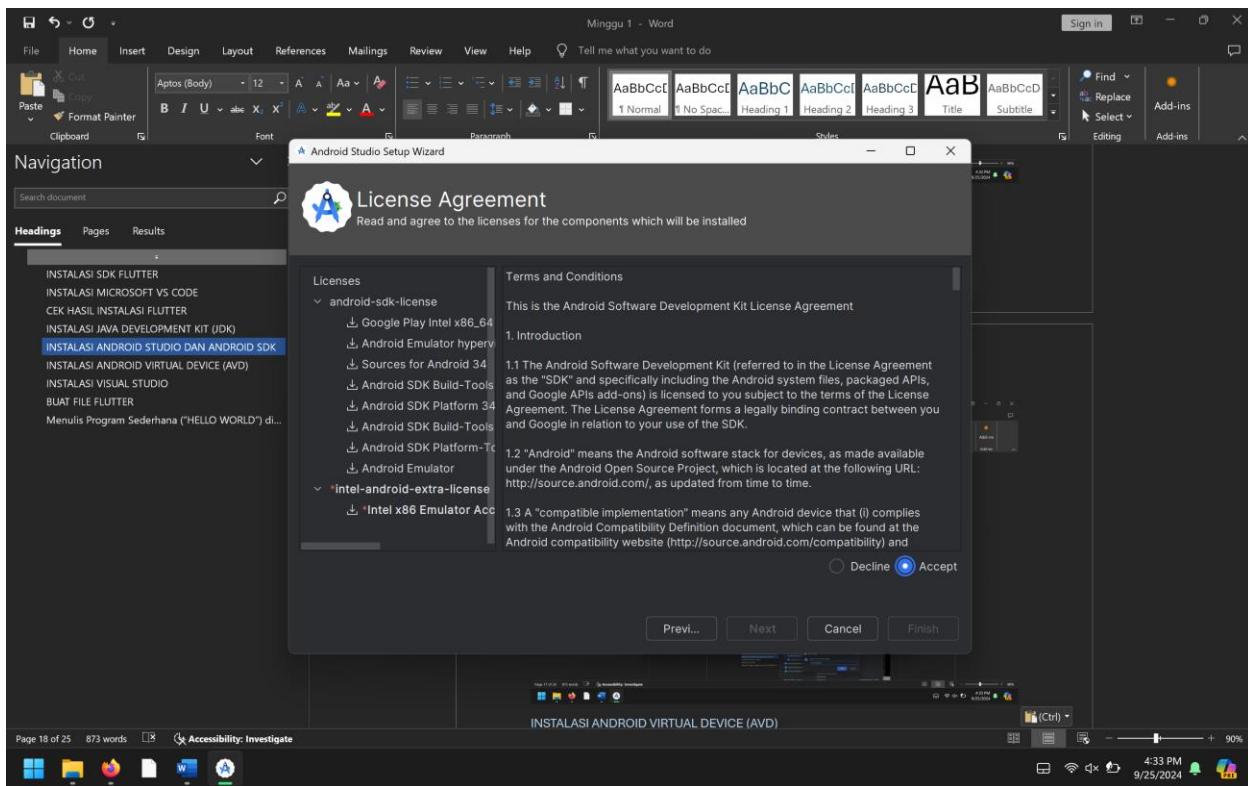
5. Klik gambar folder yang ada tanda + dan beri nama folder lalu klik oke



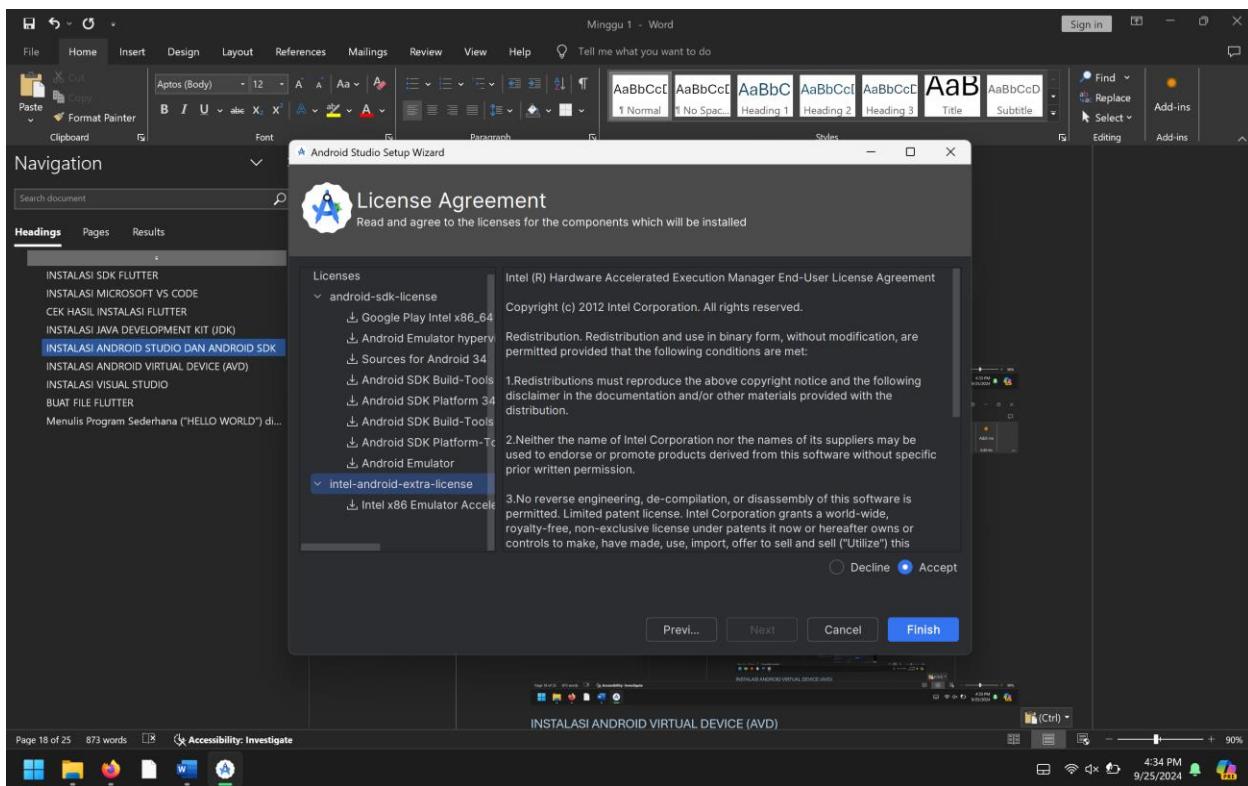
6. Klik next aja (boleh diubah sesuai keinginan)



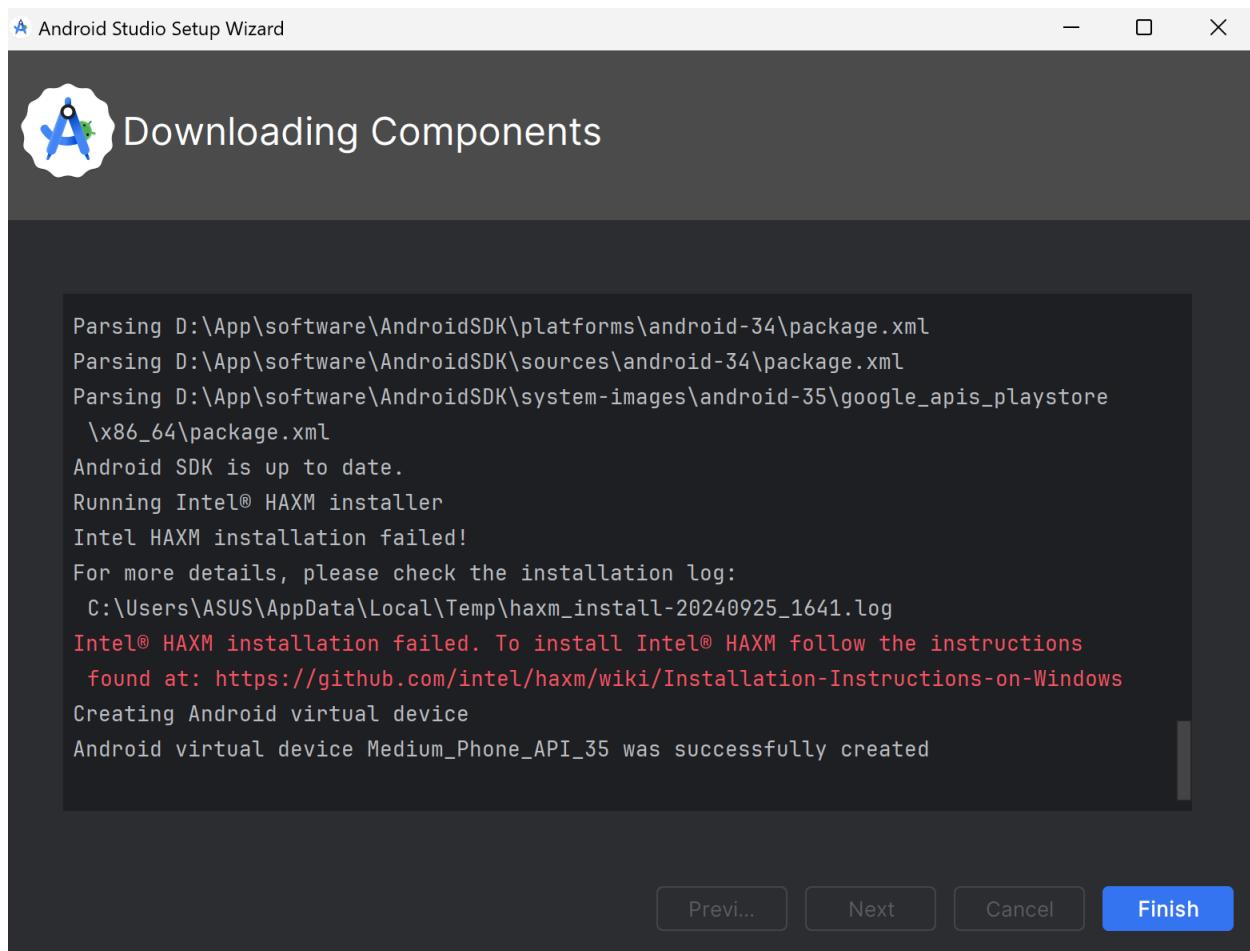
7. Klik android-sdk-license dan ubah check radio ke accept



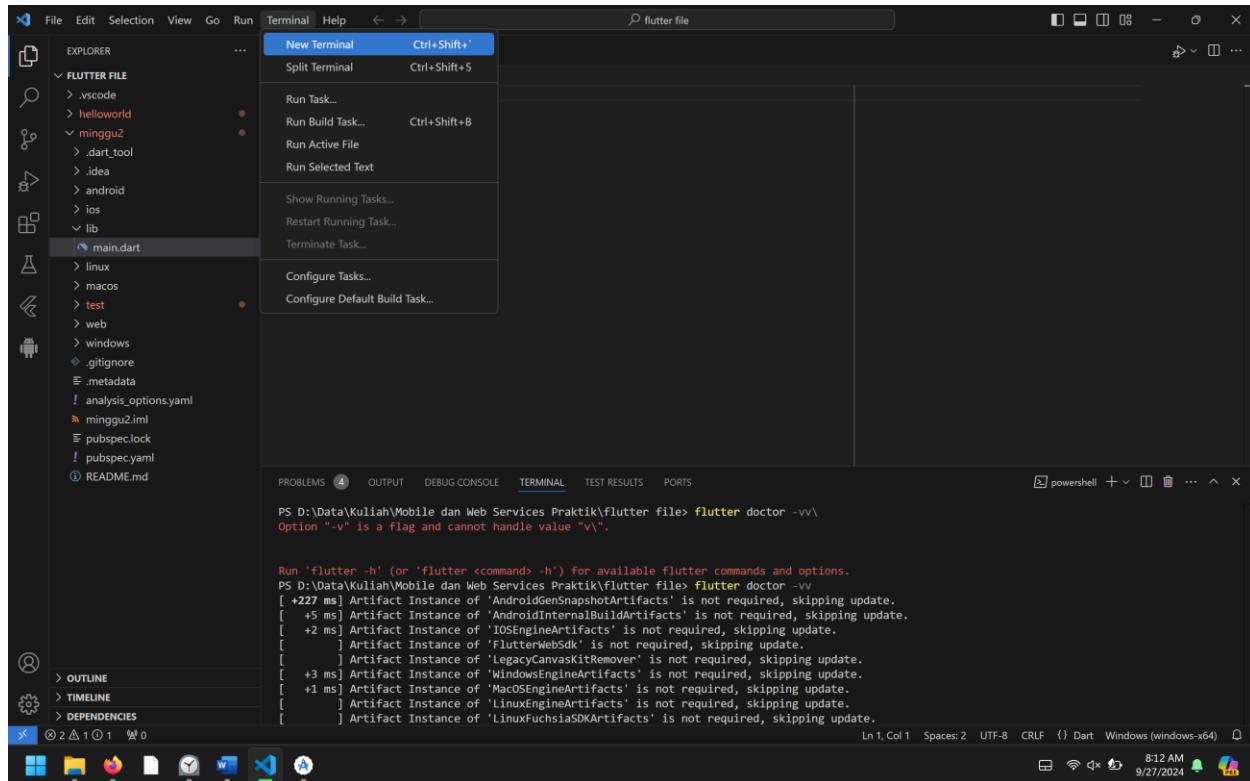
8. Klik intel-android-extra-license dan ubah check radio ke accept. Lalu klik finish



9. Tunggu selesai dan klik finish



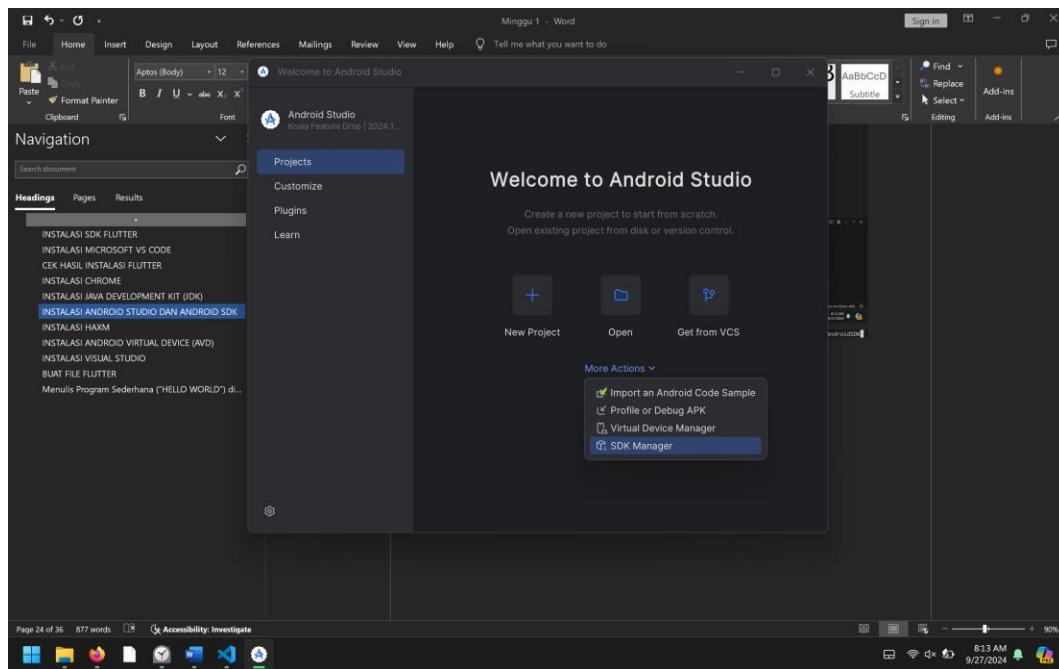
10. Pergi ke vscode dan buka terminal baru



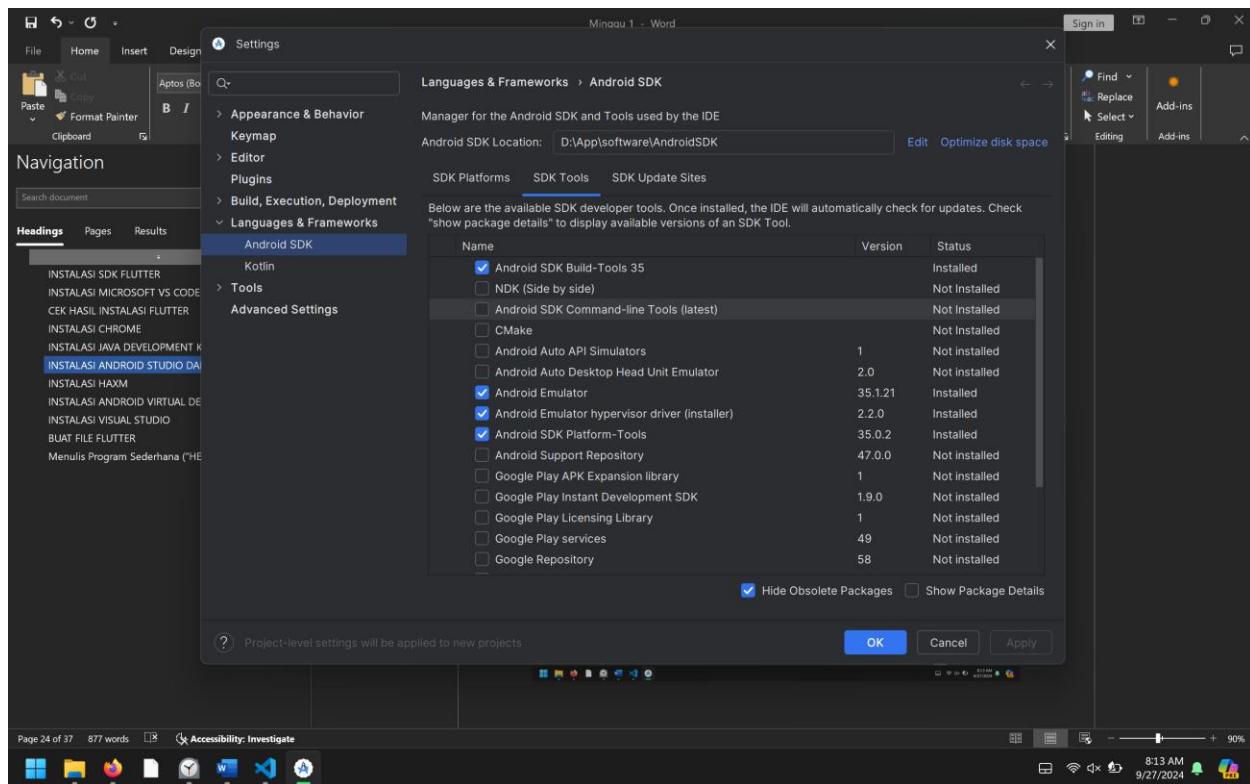
11. lakukan perintah flutter config –android-sdk [path directory android sdk] seperti di bawah

```
PS D:\Data\Kuliah\Mobile dan Web Services Praktik\flutter file> flutter config --android-sdk D:\App\software\AndroidSDK
```

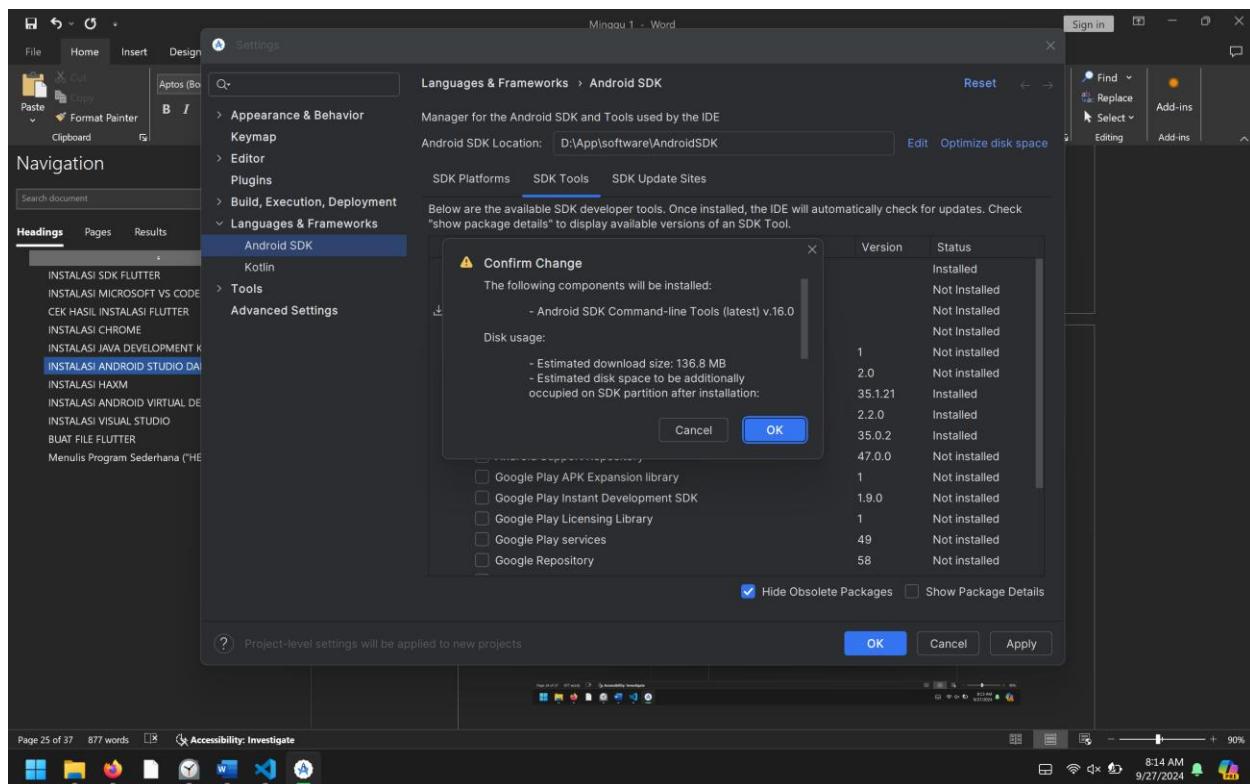
12. buka android studio dan klik more actions → pilih sdk manager



13. Checklist (klik tanda kotak pada android SDK Command-line Tools (latest)) dan klik OK



14. Ketika ada peringatan konfirmasi langsung klik OK



15. Setelah selesai, pergi ke terminal di vscode dan ketik perintah flutter doctor --android-licenses

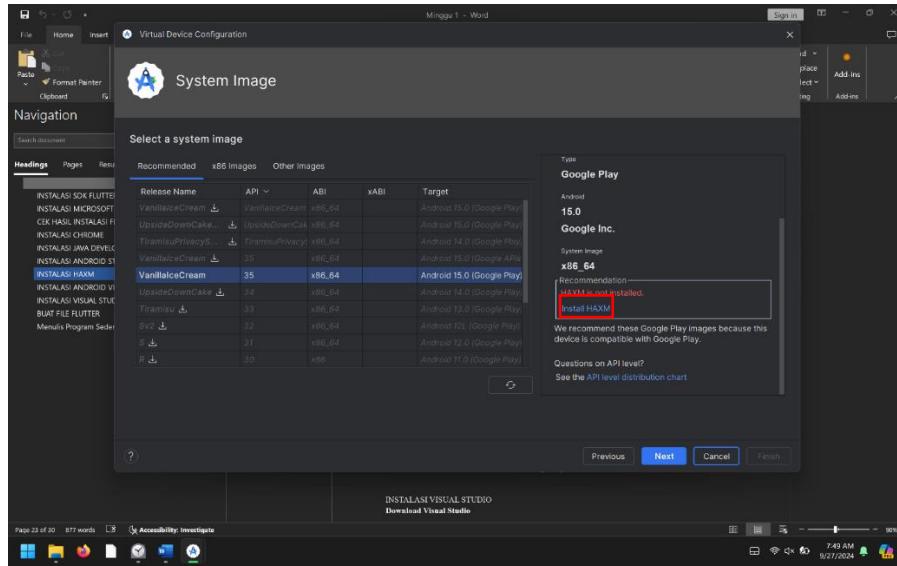
```
PS D:\Data\Kuliah\Mobile dan Web Services Praktik\flutter file> flutter doctor --android-licenses
```

16. Setiap ada pertanyaan Accept? Ketik y

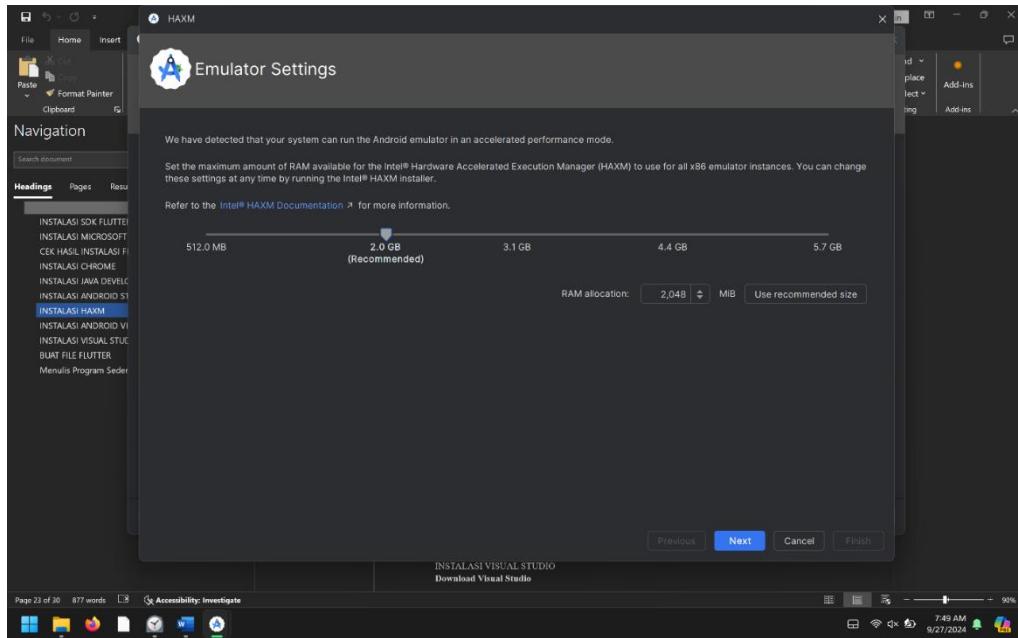
```
Accept? (y/N): y
```

INSTALASI HAXM

1. Pergi ke android studio, pilih more action → Virtual Device Manager → create device (ikon +)
→ Pilih bebas device-nya (habis itu next). Ketika ada peringatan warna merah berupa **HAXM is not installed**, klik install HAXM

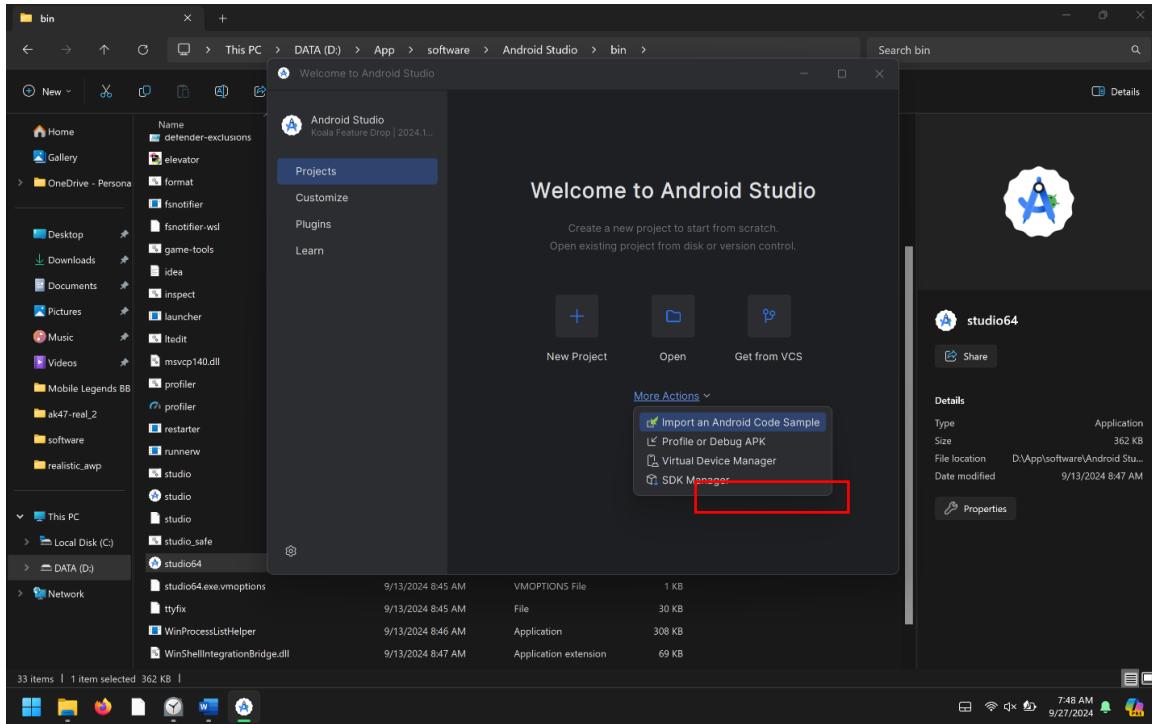


2. Klik Next aja seterusnya dan proses instalasi berlangsung

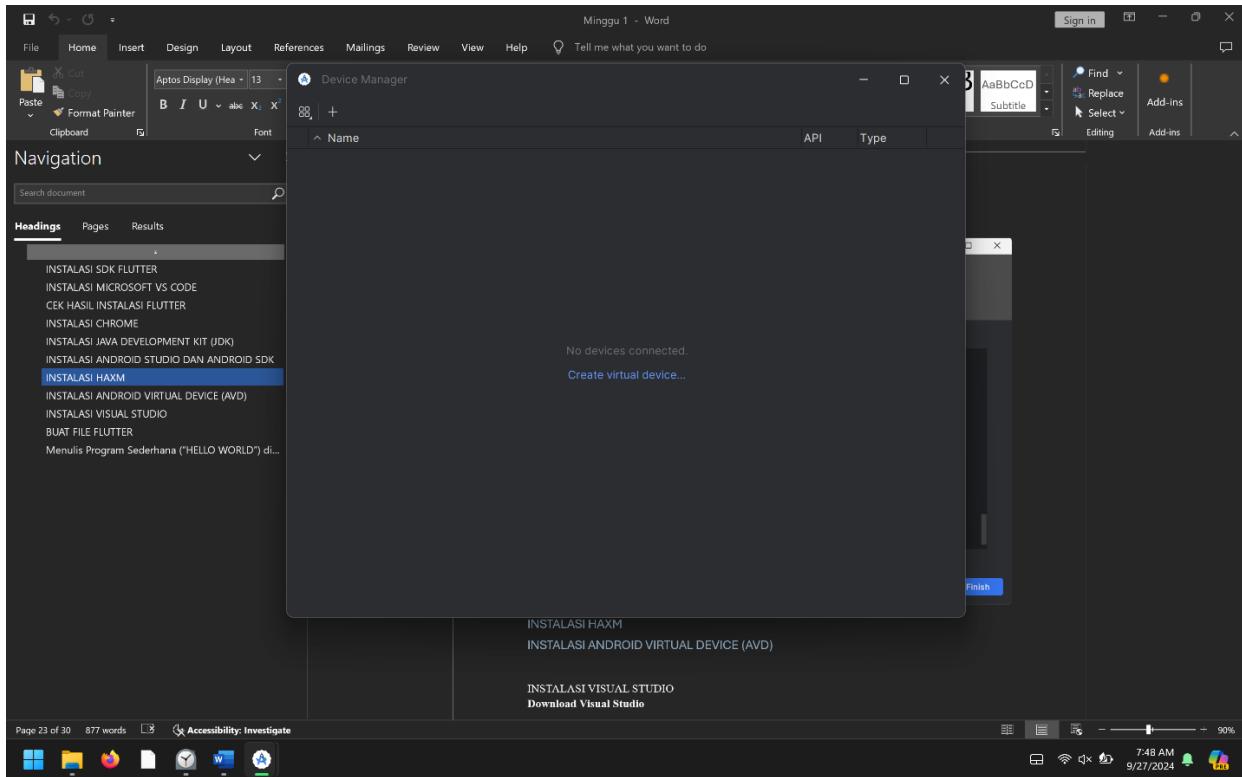


INSTALASI ANDROID VIRTUAL DEVICE (AVD)

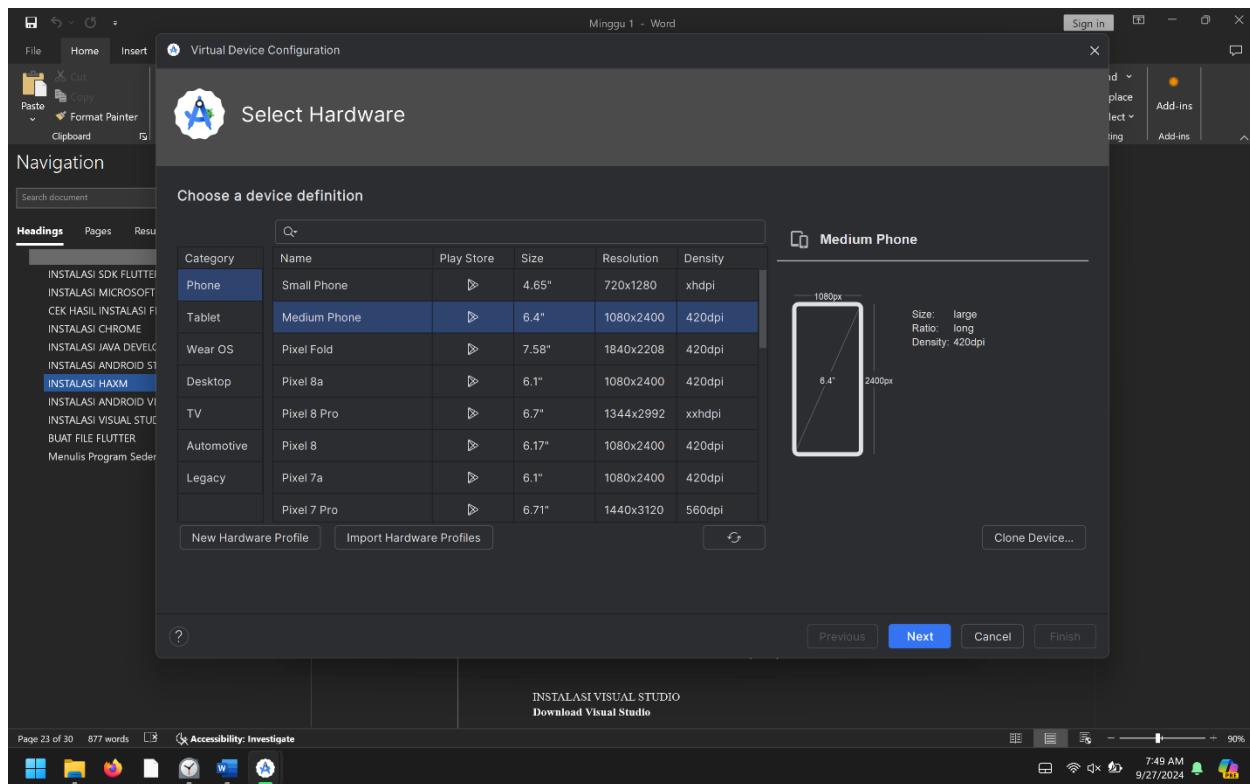
1. Pergi ke android studio, pilih more actions, pilih Virtual Device Manager



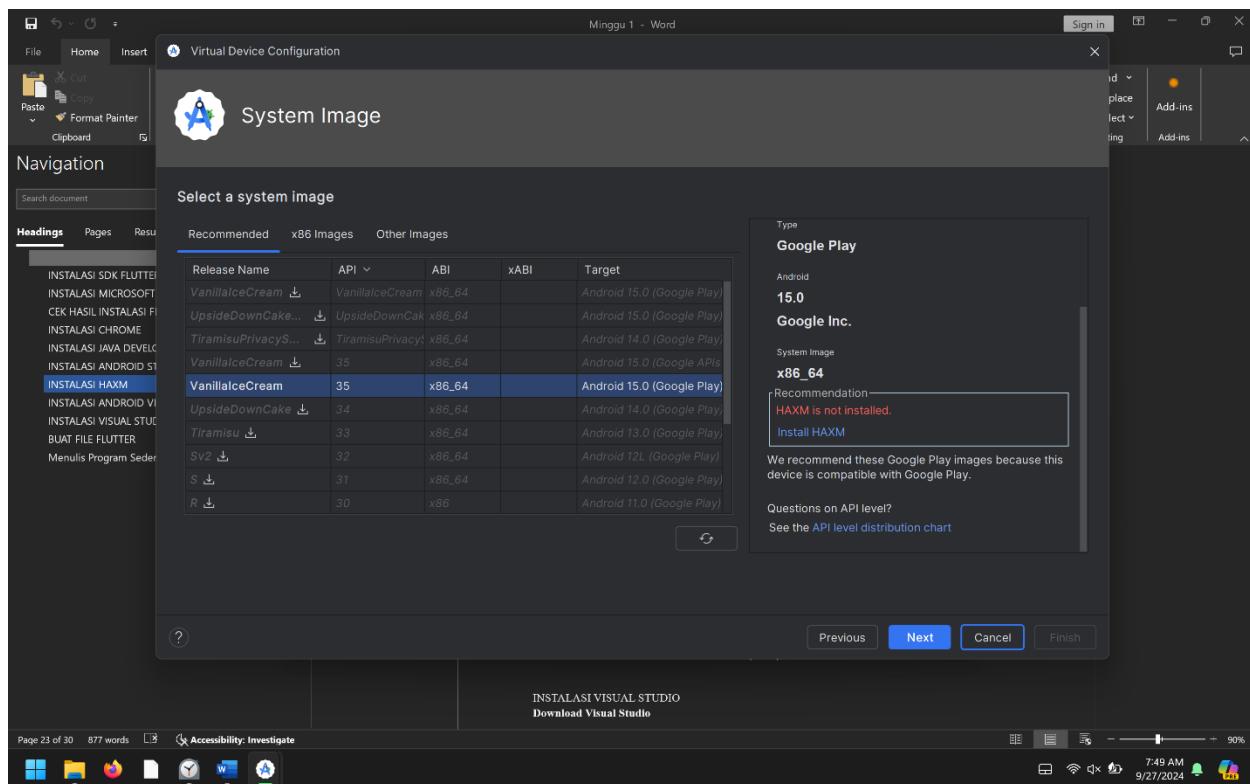
2. Klik ikon + atau klik create virtual device



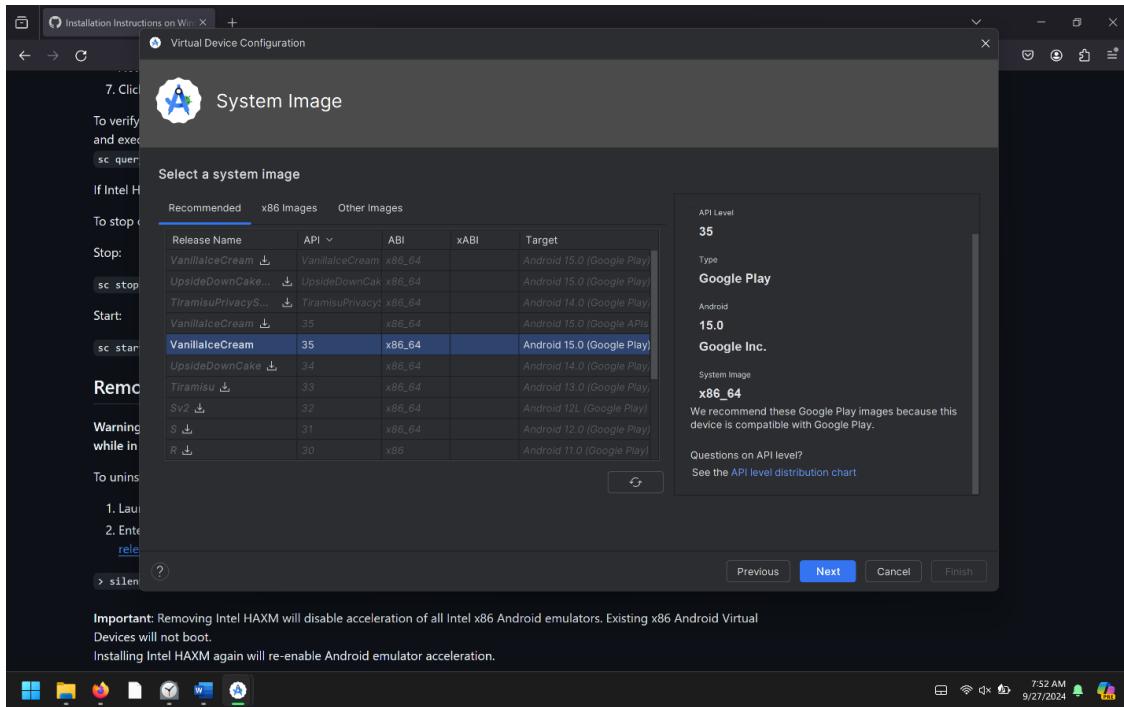
3. Pilih Jenis Device dan klik next



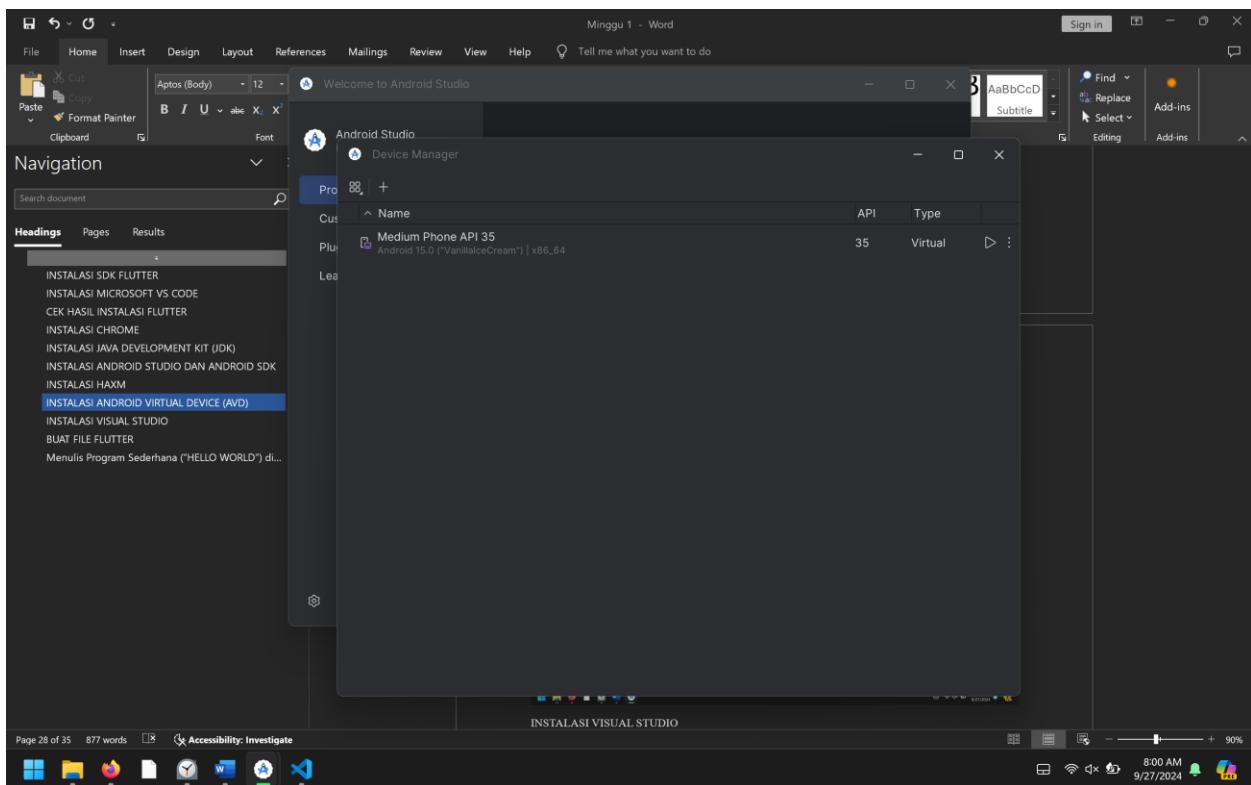
4. Klik Next (Rekomendasi install HAXM ada di [tutorial INSTALASI HAXM](#))



5. Ketika sudah instalasi, tidak terlihat warna merah lalu klik next



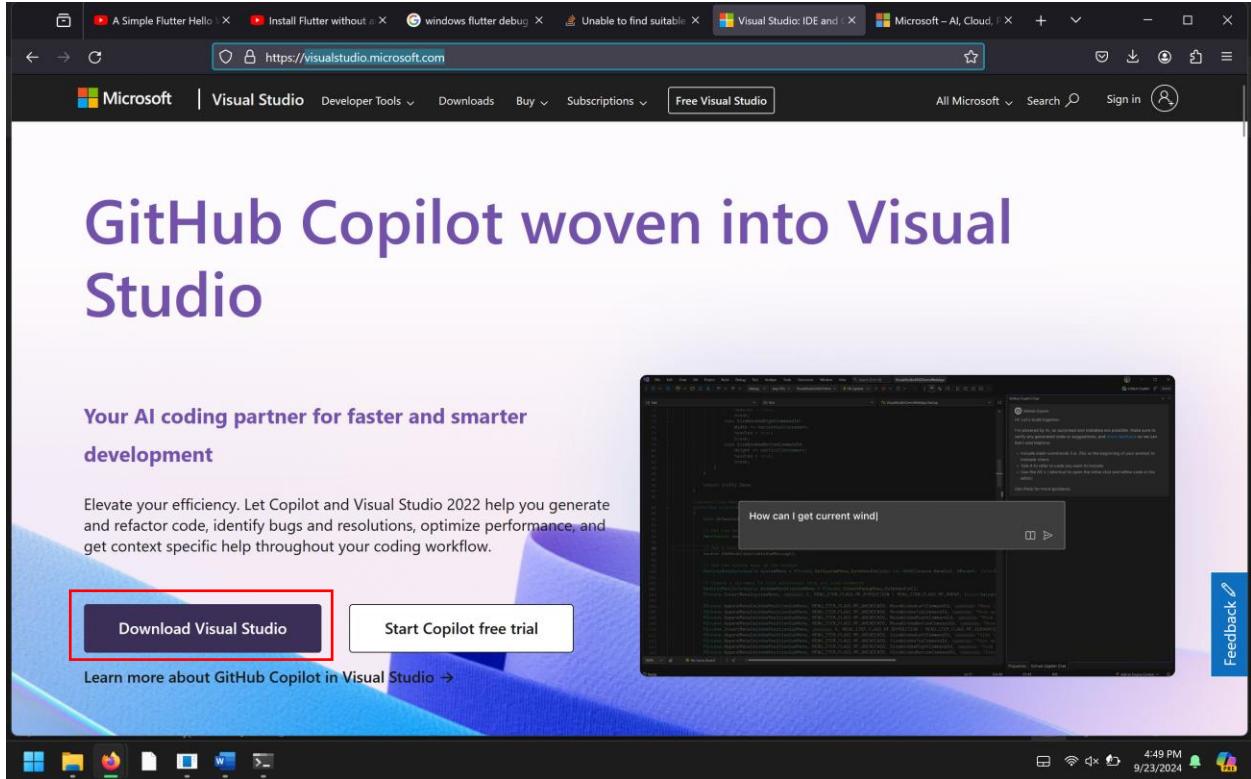
6. Setelah Proses pembuatan selesai, terlihat virtual device di device manager



INSTALASI VISUAL STUDIO

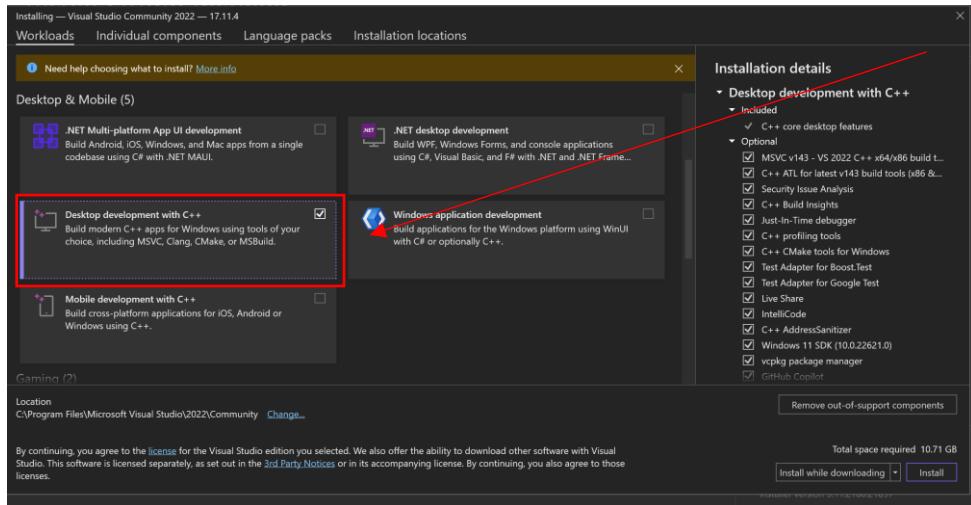
Download Visual Studio

1. Pergi ke situs visualstudio.microsoft.com dan klik download visual studio



Install Visual Studio

1. Buka Installer dan pilih **Desktop development with c++** dan klik install



CEK KEMBALI INSTALASI FLUTTER

1. Perintah berupa flutter doctor -v

```
C:\Users\ASUS>flutter doctor -v
```

2. Hasil (menunjukkan centang hijau semua berarti aman)

```
[✓] Flutter (Channel stable, 3.24.3, on Microsoft Windows [Version 10.0.22631.4169], locale en-US)
  • Flutter version 3.24.3 on channel stable at D:\App\software\flutter
  • Upstream repository https://github.com/flutter/flutter.git
  • Framework revision 2663184aa7 (3 weeks ago), 2024-09-11 16:27:48 -0500
  • Engine revision 36335019a8
  • Dart version 3.5.3
  • DevTools version 2.37.3

[✓] Windows Version (Installed version of Windows is version 10 or higher)

[✓] Android toolchain - develop for Android devices (Android SDK version 34.0.0)
  • Android SDK at D:\App\software\AndroidSDK
  • Platform android-34, build-tools 34.0.0
  • Java binary at: D:\App\software\Android Studio\jbr\bin\java
  • Java version OpenJDK Runtime Environment (build 17.0.11+0--11852314)
  • All Android licenses accepted.

[✓] Chrome - develop for the web
  • Chrome at C:\Program Files\Google\Chrome\Application\chrome.exe

[✓] Visual Studio - develop Windows apps (Visual Studio Community 2022 17.11.4)
  • Visual Studio at D:\App\software\Visual Studio
  • Visual Studio Community 2022 version 17.11.35312.102
  • Windows 10 SDK version 10.0.22621.0

[✓] Android Studio (version 2024.1)
  • Android Studio at D:\App\software\Android Studio
  • Flutter plugin can be installed from:
    https://plugins.jetbrains.com/plugin/9212-flutter
  • Dart plugin can be installed from:
    https://plugins.jetbrains.com/plugin/6351-dart
  • Java version OpenJDK Runtime Environment (build 17.0.11+0--11852314)

[✓] VS Code (version 1.93.1)
  • VS Code at C:\Users\ASUS\AppData\Local\Programs\Microsoft VS Code
  • Flutter extension version 3.96.0

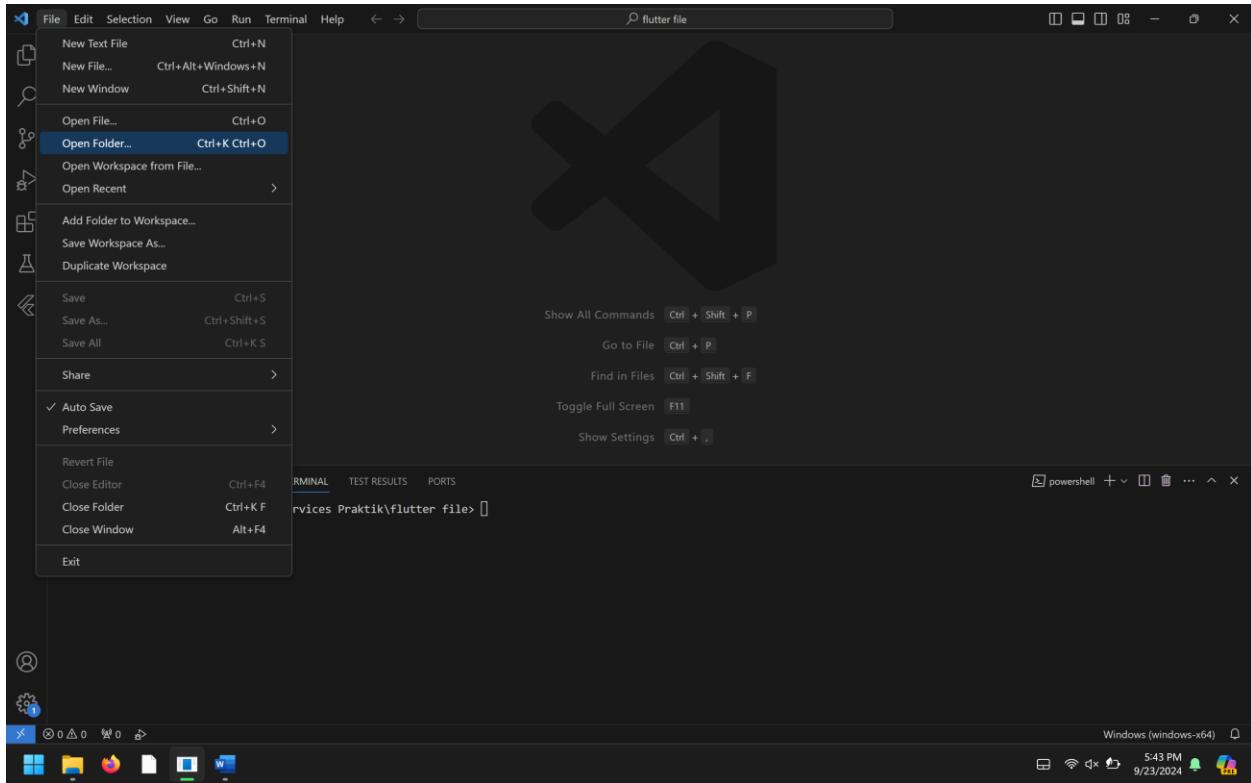
[✓] Connected device (3 available)
  • Windows (desktop) • windows • windows-x64 • Microsoft Windows [Version 10.0.22631.4169]
  • Chrome (web)      • chrome   • web-javascript • Google Chrome 129.0.6668.71
  • Edge (web)        • edge     • web-javascript • Microsoft Edge 124.0.2478.51

[✓] Network resources
  • All expected network resources are available.

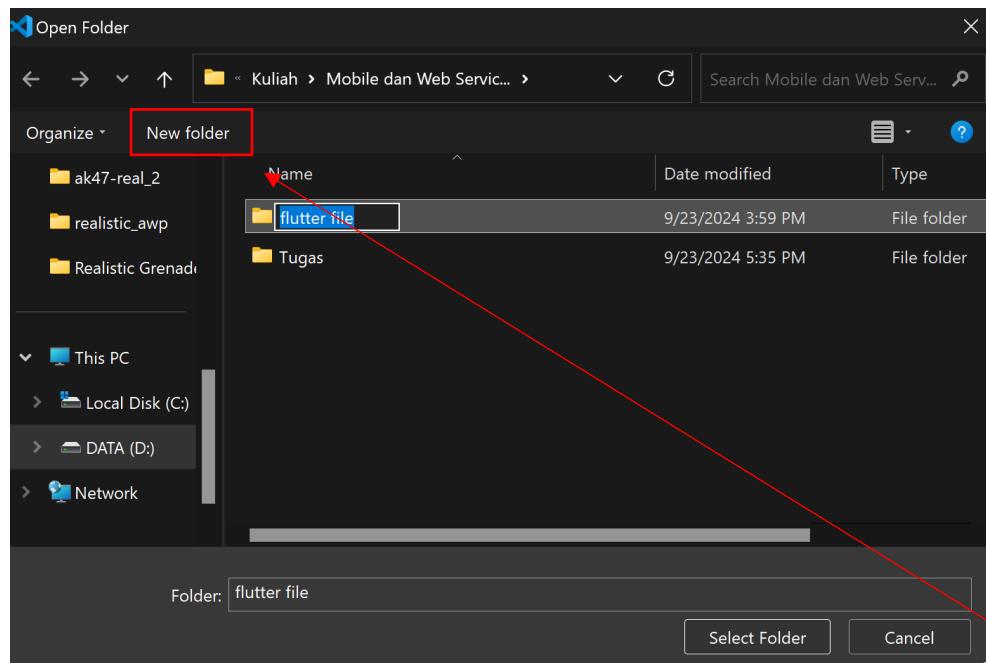
• No issues found!
```

BUAT FILE FLUTTER

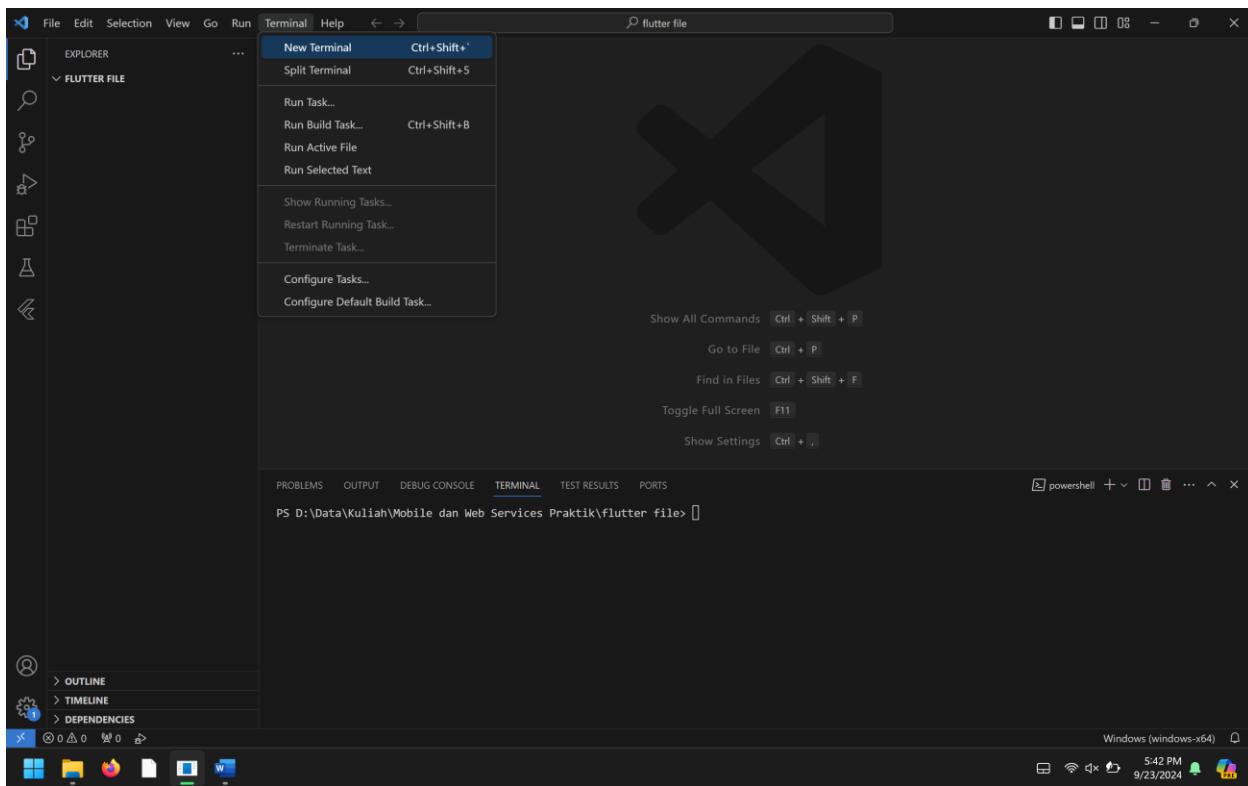
1. Buka menu file, pilih menu open folder



2. Buat Folder dengan Lokasi bebas dengan cara klik menu new folder, setelah itu klik buka folder yang telah dibuat, dan klik select Folder



3. Buka VS Code, pilih menu terminal, pilih new terminal

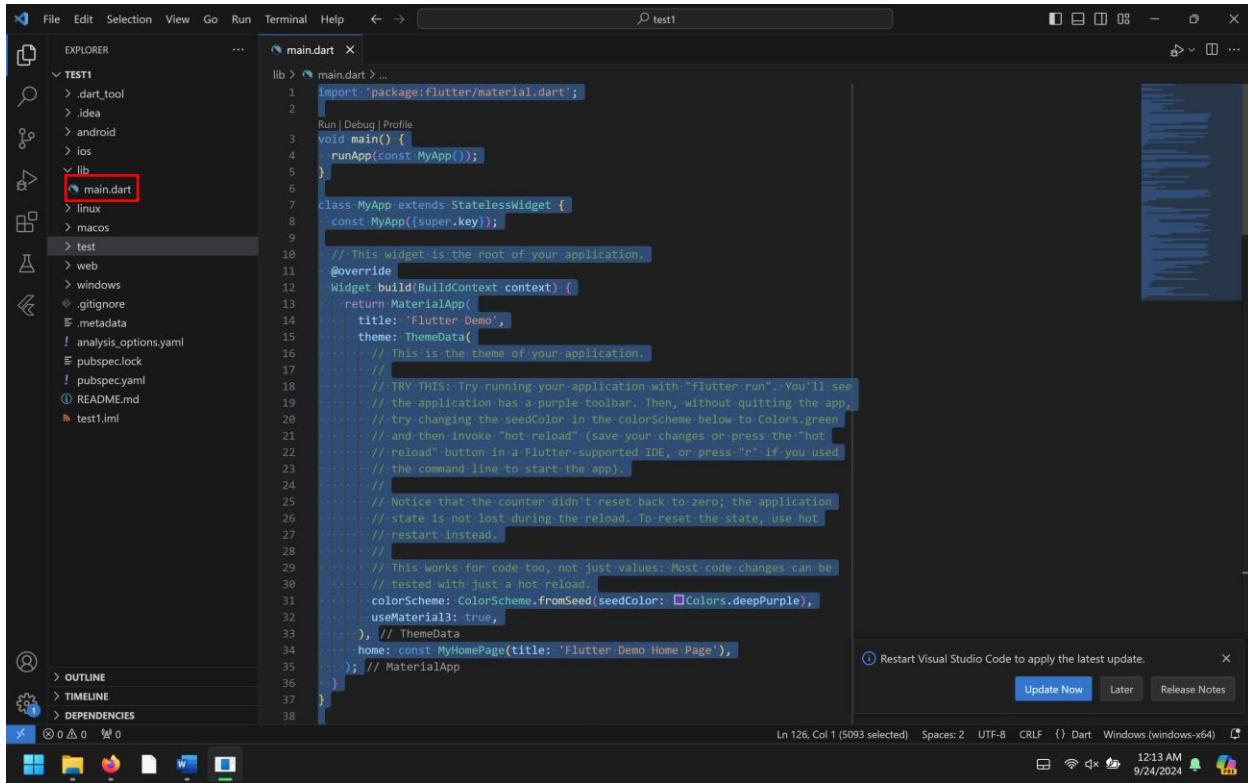


4. Tulis `flutter create nama_folder_projek_flutter`, contoh `flutter create test1`

```
PS D:\Data\Kuliah\Mobile dan Web Services Praktik\flutter file> flutter create test1
```

Menulis Program Sederhana (“HELLO WORLD”) di FLUTTER

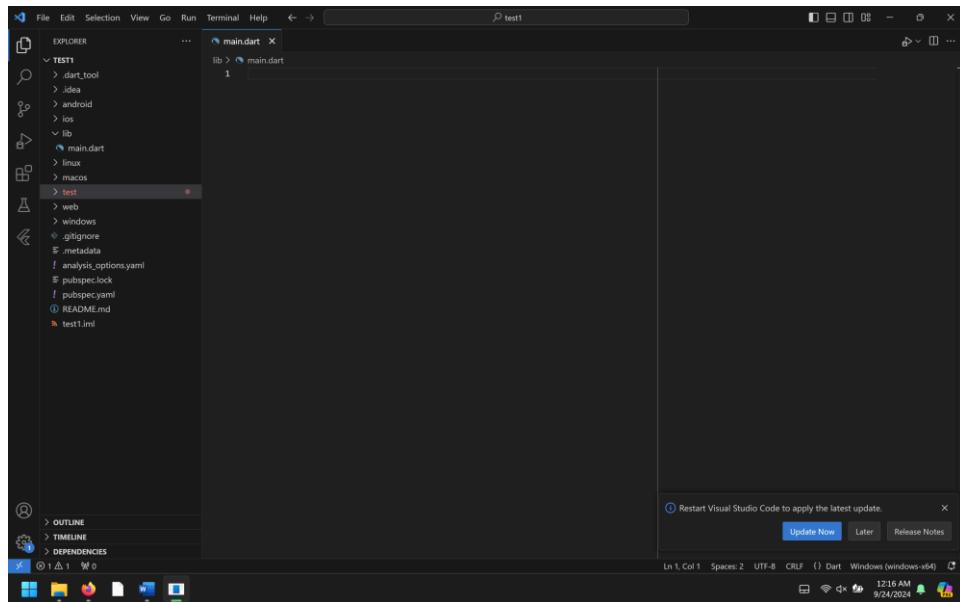
1. Buka folder dari hasil flutter yang telah dibuat dan buka file main.dart di dalam folder lib



The screenshot shows the Visual Studio Code interface with the following details:

- File Explorer:** Shows the project structure with a red box around the "lib/main.dart" file.
- Code Editor:** Displays the content of the main.dart file, which is the standard Flutter "Hello World" application code.
- Bottom Status Bar:** Shows the current line (Ln 126), column (Col 1), and character count (5093 selected). It also indicates the file type (Dart) and operating system (Windows (windows-x64)).
- Bottom Taskbar:** Shows icons for various applications like File Explorer, Task Manager, and Start Menu.
- Notification Bar:** A message at the bottom right says "Restart Visual Studio Code to apply the latest update." with options "Update Now", "Later", and "Release Notes".

2. Hapus semua isi main.dart



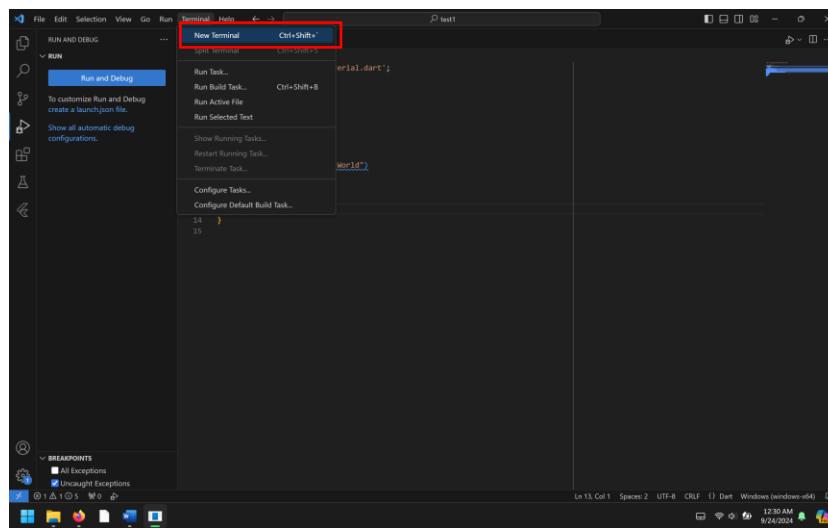
The screenshot shows the Visual Studio Code interface with the following details:

- File Explorer:** Shows the project structure with a red box around the "lib/main.dart" file.
- Code Editor:** Displays the main.dart file, which now contains only the first line: "1".
- Bottom Status Bar:** Shows the current line (Ln 1), column (Col 1), and character count (1 selected). It also indicates the file type (Dart) and operating system (Windows (windows-x64)).
- Bottom Taskbar:** Shows icons for various applications like File Explorer, Task Manager, and Start Menu.
- Notification Bar:** A message at the bottom right says "Restart Visual Studio Code to apply the latest update." with options "Update Now", "Later", and "Release Notes".

3. Buat code seperti di bawah,

```
lib > main.dart > main
1 import 'package:flutter/material.dart';
2
3 void main() {
4     print("Hello World");
5     runApp(
6         MaterialApp(
7             home:Scaffold(
8                 body: Center(
9                     child: Text("Hello World")
10                ) // Center
11            ) // Scaffold
12        ); // MaterialApp
13    }
14
15 }
```

4. Pergi ke menu terminal dan pilih new terminal



5. Ketik **flutter run** dan tekan enter

```
PS D:\Data\Kuliah\Mobile dan Web Services Praktik\flutter file\test1> flutter run
```

6. Pilih platform apa yang akan digunakan (windows butuh install visual studio serta web disarankan chrome atau bisa pakai android virtual device) dan muncul hasil berikut,



