

# Android Programming

---

# Materi

---

- ☐ Pengenalan Android
- ☐ Android Structure Directory
- ☐ Android Activity - Intent
- ☐ Android Layout - Template
- ☐ Android ListView
- ☐ Android Component & Event Handler
- ☐ Android Model Data Adapter
- ☐ Android SQLite
- ☐ Android SQLite - CRUD
- ☐ Android Web Service : READ DATA
- ☐ Studi Kasus

# Pengenalan Android

---



# Background Android ?

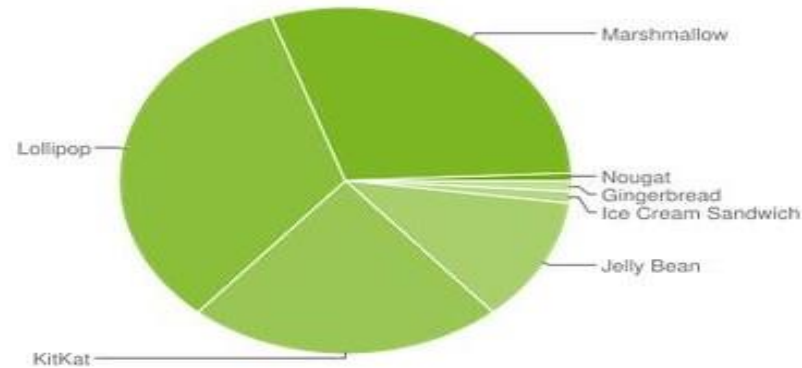
---

- ✓ Sebuah sistem operasi (OS) untuk perangkat mobile seperti smartphone dan komputer tablet, kini dikembangkan oleh Google.
- ✓ Juli 2005, Google membeli (akuisisi) perusahaan Android Corp
- ✓ November 2007, aliansi perusahaan2 bernama **Open Handset Alliance** yang dipimpin oleh **Google**
- ✓ Oktober 2008, android tersedia dalam platform OpenSource
- ✓ Desember 2008, 14 member baru bergabung ke project android
- ✓ April 30, 2009 : rilis Android 1.5 inisial name : **Cupcake**1.
- ✓ Sept 15, 2009 : rilis Android 1.6 inisial name : **Donut**

# Android Version

---

Version	Codename	API	Distribution
2.3.3 - 2.3.7	Gingerbread	10	1.0%
4.0.3 - 4.0.4	Ice Cream Sandwich	15	1.1%
4.1.x	Jelly Bean	16	4.0%
4.2.x		17	5.9%
4.3		18	1.7%
4.4	KitKat	19	22.6%
5.0	Lollipop	21	10.1%
5.1		22	23.3%
6.0	Marshmallow	23	29.6%
7.0	Nougat	24	0.5%
7.1		25	0.2%



Data collected during a 7-day period ending on January 9, 2017.

<https://developer.android.com/about/dashboards/index.html>

# Android Name

---



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

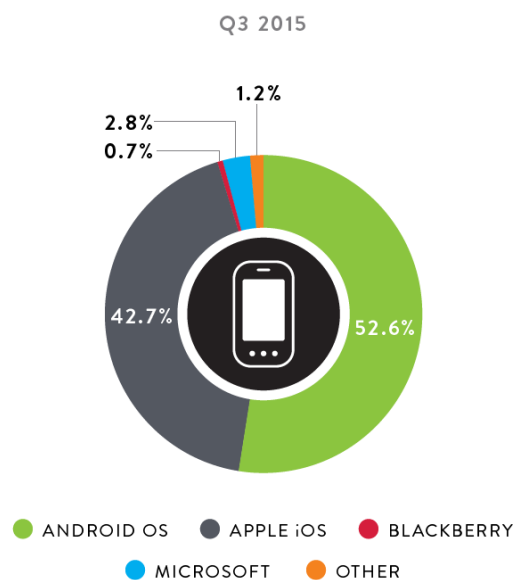


Pie 9.0



# Android Market Share

## TOP U.S. SMARTPHONE OPERATING SYSTEMS BY MARKET SHARE



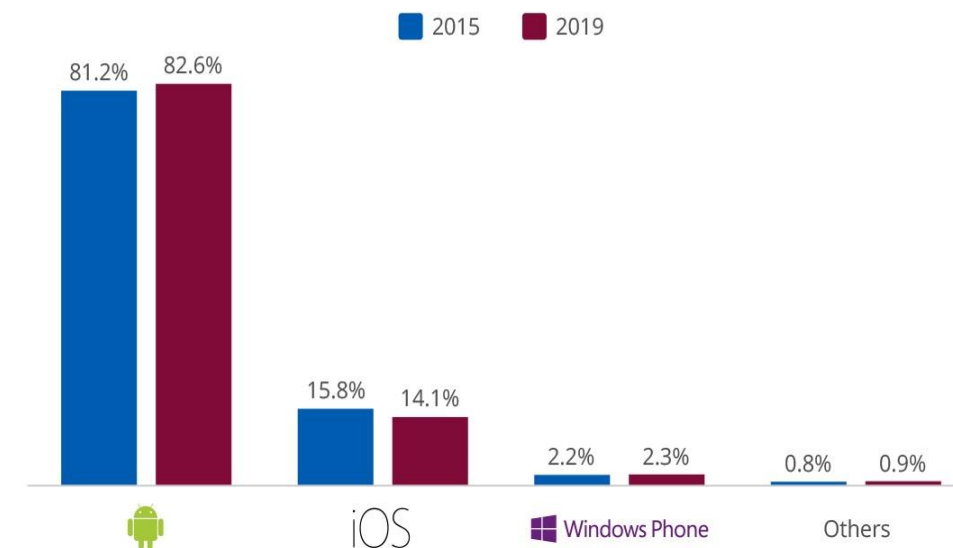
Read As: During Q3 2015, 52.6% of U.S. smartphone owners used a handset that runs on the Android operating system.  
Source: Nielsen

Copyright © 2015 The Nielsen Company

## Tech Chart of the Day

### Smartphone Platform Market Share

Worldwide smartphone operating system market share (% of new device shipments)\*



\* Forecast

BUSINESS INSIDER

Source: IDC



# Ekosistem Android

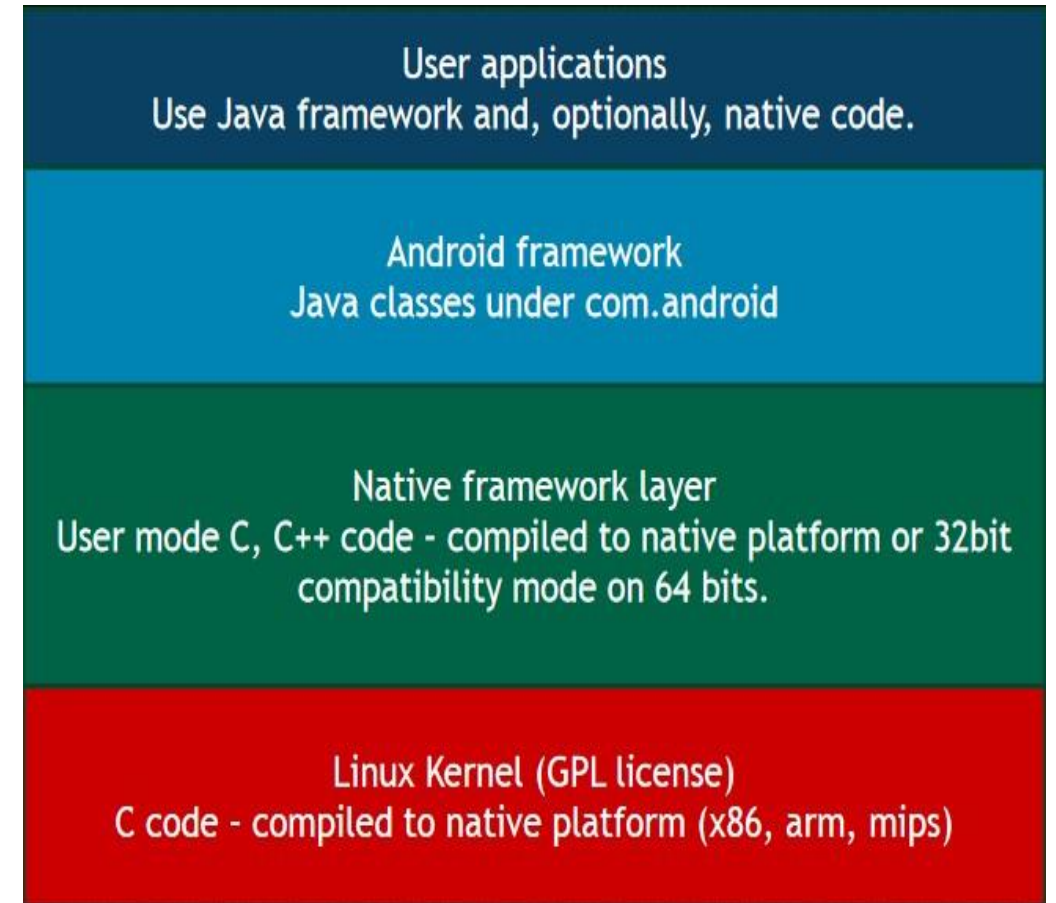
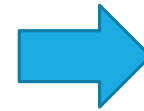
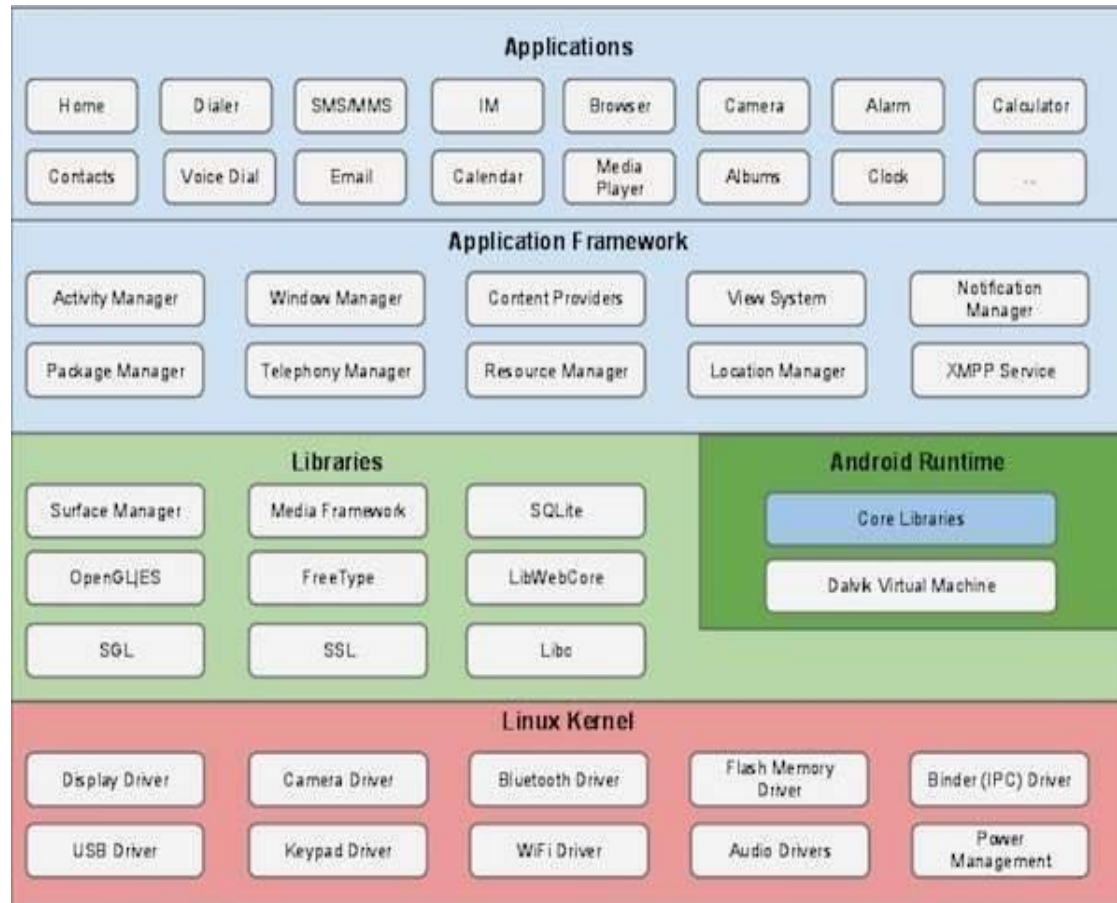
---

- ✓ Platform Open Source untuk perangkat mobile, system embedded dan perangkat pakai lainnya
- ✓ Google bertanggung jawab maintenance system
- ✓ Perusahaan lain berkontribusi ke system
- ✓ Setiap device (vendor) dapat mengembangkan system android sesuai dengan kebutuhan masing2





# Arsitektur Android



# Mobile App Development



- ✓ Proses pengembangan aplikasi piranti lunak (software) untuk perangkat mobile





# Strategi pengembangan aplikasi mobile

## ✓ Native App

Pengembangan aplikasi mobile yang spesifik untuk system operasi / platform tertentu. Dikembangkan menggunakan SDK native code sesuai platform.

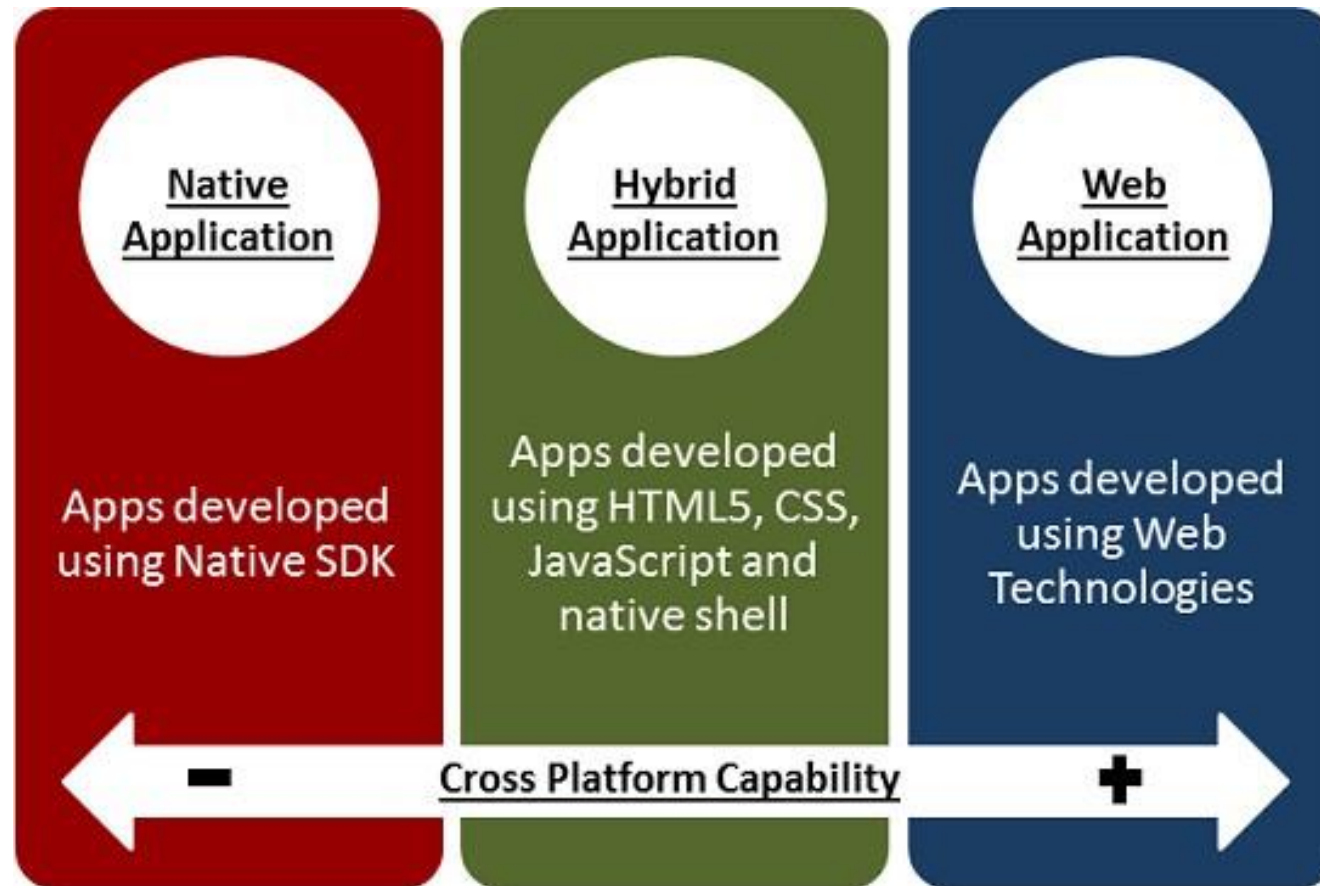
## ✓ Web App

Pengembangan aplikasi mobile menggunakan standard teknologi web: HTML5, JavaScript & CSS

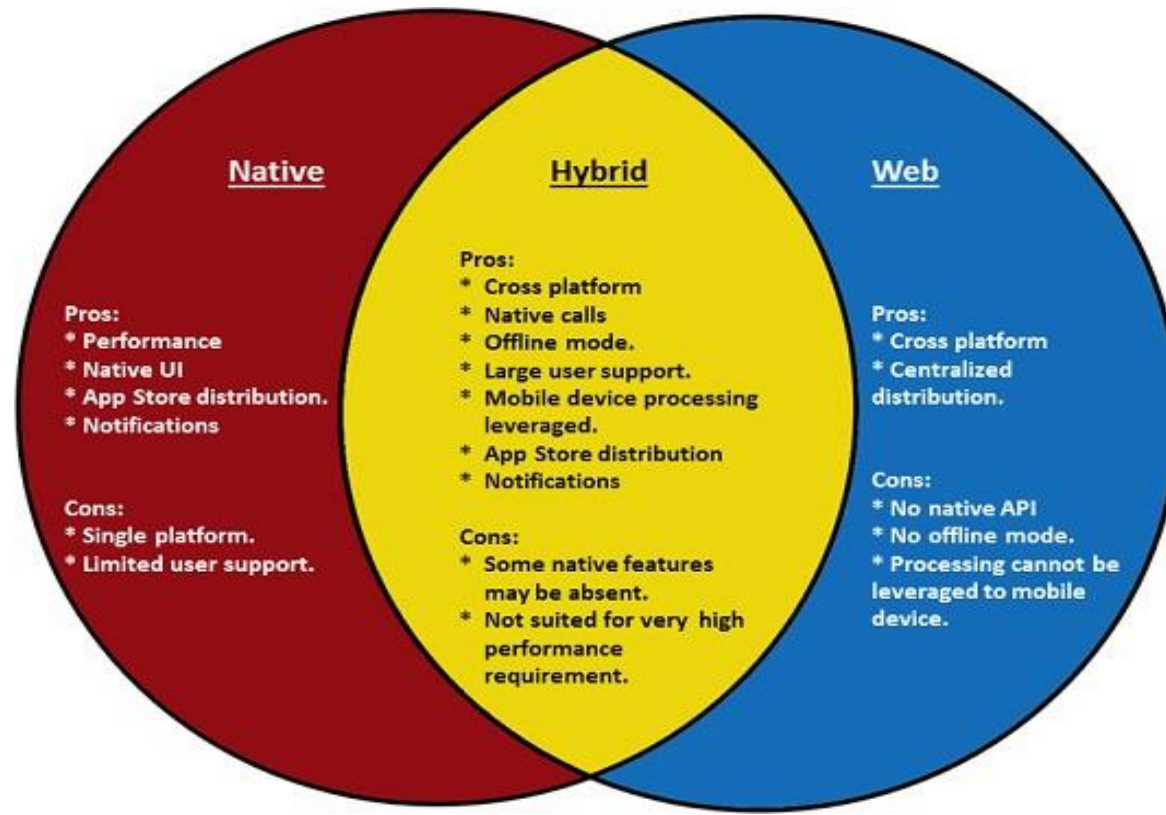
## ✓ Hybrid App

Pengembangan aplikasi mobile menggunakan standard web yang merupakan wrapper ke native shell platform mobile. Wrapper member akses ke fitur2 pada platform mobile : GPS, Camera, Native Look and Feel dan lain-lain.

# Strategi pengembangan aplikasi mobile



# Strategi pengembangan aplikasi mobile



# Android Developer

---

- Developer site : <https://developer.android.com/index.html>
- Android studio : <https://developer.android.com/studio/index.html>
- Source :
  - <https://android.googlesource.com/>
  - <https://source.android.com/devices/index.html>
- Tutorial :
  - <https://developer.android.com/training/index.html>
  - <https://guides.codepath.com/android/>
  - <https://www.tutorialspoint.com/android/>
  - <http://www.vogella.com/tutorials/android.html>





# Minimum Requirement Development



## Windows

- Microsoft® Windows® 8/7/Vista/2003 (32 or 64-bit)
- 2 GB RAM minimum, 4 GB RAM recommended
- 400 MB hard disk space + at least 1 G for Android SDK, emulator system images, and caches
- 1280 x 800 minimum screen resolution
- Java Development Kit (JDK) 7
- Optional for accelerated emulator: Intel® processor with support for Intel® VT-x, Intel® EM64T (Intel® 64), and Execute Disable (XD) Bit functionality

<https://www.quora.com/What-are-the-recommended-hardware-for-Android-Studio>



# Minimum Requirement Development

## **Mac OS X**

- Mac® OS X® 10.8.5 or higher, up to 10.9 (Mavericks)
- 2 GB RAM minimum, 4 GB RAM recommended
- 400 MB hard disk space
- At least 1 GB for Android SDK, emulator system images, and caches
- 1280 x 800 minimum screen resolution
- Java Runtime Environment (JRE) 6
- Java Development Kit (JDK) 7
- Optional for accelerated emulator: Intel® processor with support for Intel® VT-x, Intel® EM64T (Intel® 64), and Execute Disable (XD) Bit functionality

<https://www.quora.com/What-are-the-recommended-hardware-for-Android-Studio>



# Minimum Requirement Development



## **Linux**

- GNOME or KDE desktop
- GNU C Library (glibc) 2.11 or later
- 2 GB RAM minimum, 4 GB RAM recommended
- 400 MB hard disk space
- At least 1 GB for Android SDK, emulator system images, and caches
- 1280 x 800 minimum screen resolution
- Oracle® Java Development Kit (JDK) 7

<https://www.quora.com/What-are-the-recommended-hardware-for-Android-Studio>

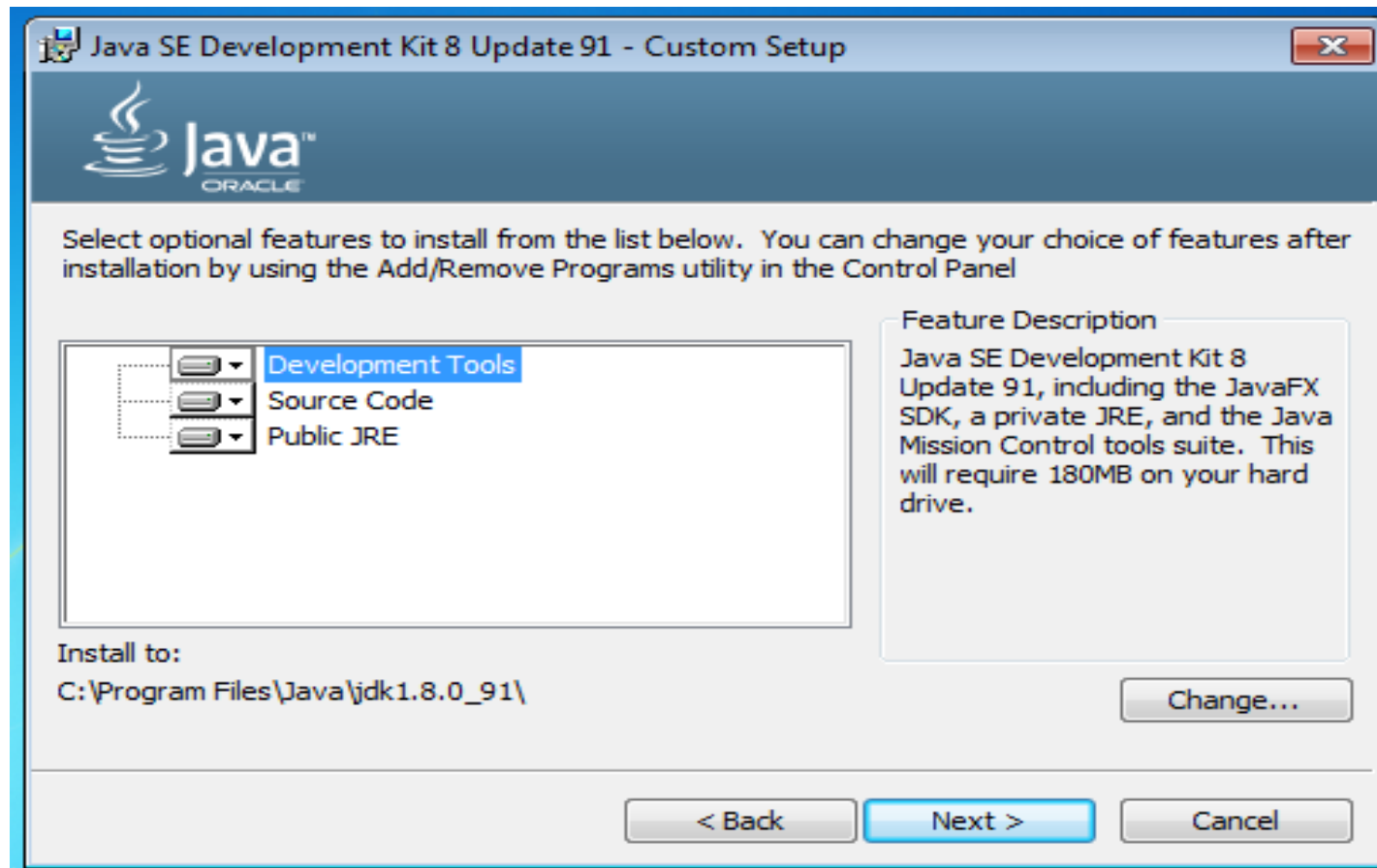
# Tools Development

---

- ✓ Java Development Kit (JDK)
- ✓ Android Standard Development Kit (SDK)
- ✓ IDE : Android Studio
- ✓ Emulator
  - ✓ Android Virtual Device (AVD)
  - ✓ Genymotion
  - ✓ Your smartphone

# Java Development Kit (JDK)

---



# Android SDK

Appearance & Behavior > System Settings > Android SDK

Manager for the Android SDK and Tools used by Android Studio

Android SDK Location:  [Edit](#)

SDK Platforms SDK Tools SDK Update Sites

Each Android SDK Platform package includes the Android platform and sources pertaining to an API level by default. Once installed, Android Studio will automatically check for updates. Check "show package details" to display individual SDK components.

	Name	API Level	Revision	Status
<input type="checkbox"/>	Android 7.1.1 (Nougat)	25	3	Partially installed
<input type="checkbox"/>	Android 7.0 (Nougat)	24	2	Not installed
<input checked="" type="checkbox"/>	Android 6.0 (Marshmallow)	23	3	Update available
<input type="checkbox"/>	Android 5.1 (Lollipop)	22	2	Update available
<input type="checkbox"/>	Android 5.0 (Lollipop)	21	2	Not installed
<input type="checkbox"/>	Android 4.4W (KitKat Wear)	20	2	Not installed
<input type="checkbox"/>	Android 4.4 (KitKat)	19	4	Not installed
<input type="checkbox"/>	Android 4.3 (Jelly Bean)	18	3	Not installed
<input type="checkbox"/>	Android 4.2 (Jelly Bean)	17	3	Not installed
<input type="checkbox"/>	Android 4.1 (Jelly Bean)	16	5	Partially installed
<input type="checkbox"/>	Android 4.0.3 (IceCreamSandwich)	15	5	Not installed
<input type="checkbox"/>	Android 4.0 (IceCreamSandwich)	14	4	Not installed
<input type="checkbox"/>	Android 3.2 (Honeycomb)	13	1	Not installed
<input type="checkbox"/>	Android 3.1 (Honeycomb)	12	3	Not installed
<input type="checkbox"/>	Android 3.0 (Honeycomb)	11	2	Not installed
<input type="checkbox"/>	Android 2.3.3 (Gingerbread)	10	2	Not installed
<input type="checkbox"/>	Android 2.3 (Gingerbread)	9	2	Not installed
<input type="checkbox"/>	Android 2.2 (Froyo)	8	3	Not installed
<input type="checkbox"/>	Android 2.1 (Eclair)	7	3	Not installed

☐ Show Package Details

# Android SDK

## SDK Tools

Appearance & Behavior > System Settings > Android SDK

Manager for the Android SDK and Tools used by Android Studio

Android SDK Location:  [Edit](#)

SDK Platforms SDK Tools SDK Update Sites

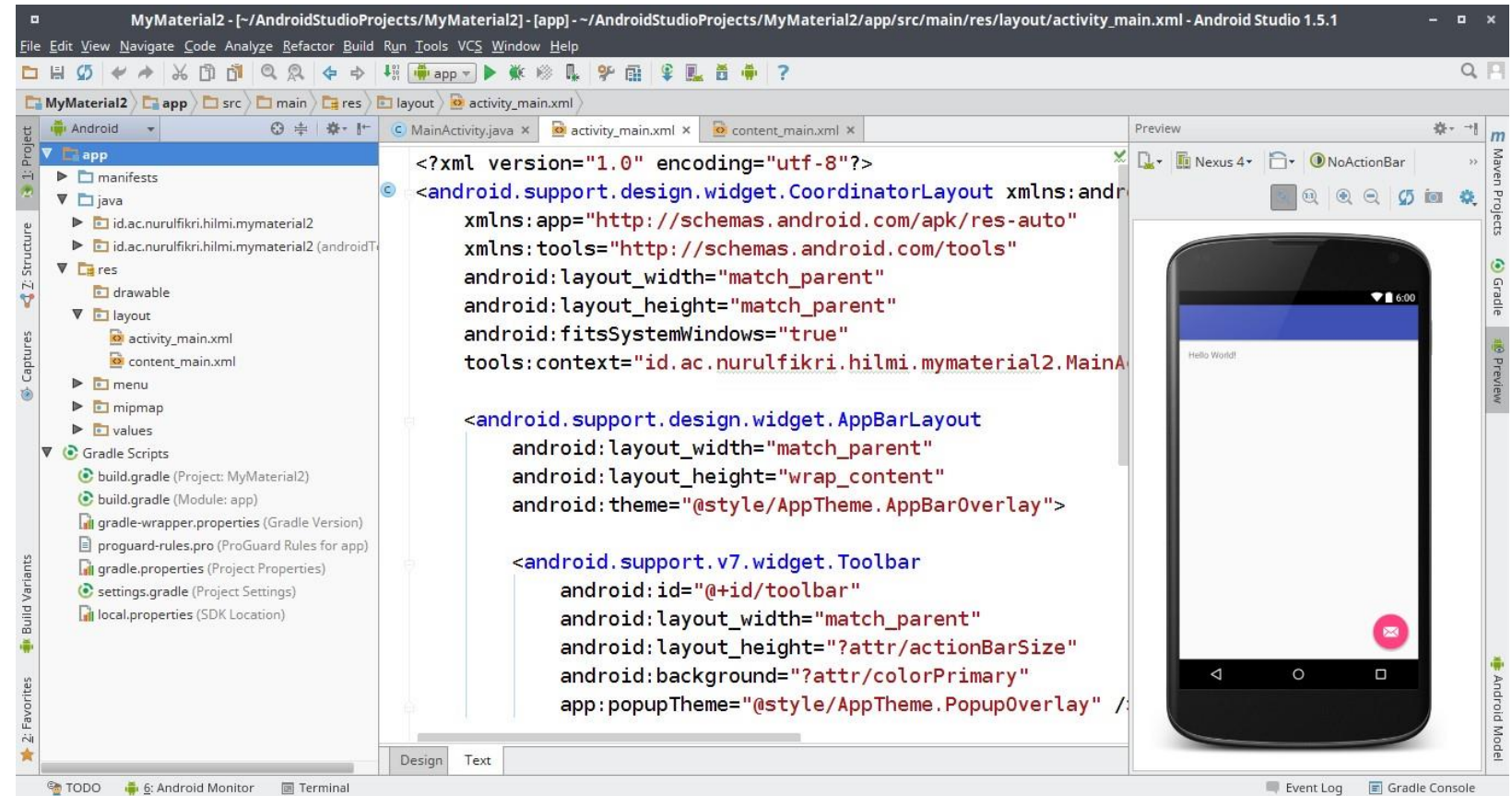
Below are the available SDK developer tools. Once installed, Android Studio will automatically check for updates.  
Check "show package details" to display available versions of an SDK Tool.

	Name	Version	Status
<input type="checkbox"/>	Android SDK Build-Tools		Update Available: 25.0.2
<input type="checkbox"/>	CMake		Not Installed
<input type="checkbox"/>	LLDB		Not Installed
<input type="checkbox"/>	Android Auto API Simulators	1	Not installed
<input type="checkbox"/>	Android Auto Desktop Head Unit emulator	1.1	Not installed
<input checked="" type="checkbox"/>	Android SDK Platform-Tools 25.0.3	25.0.3	Installed
<input checked="" type="checkbox"/>	Android SDK Tools 25.2.5	25.2.5	Installed
<input checked="" type="checkbox"/>	Android Support Library, rev 23.2.1	23.2.1	Installed
<input checked="" type="checkbox"/>	Documentation for Android SDK	1	Installed
<input type="checkbox"/>	GPU Debugging tools	1.0.3	Not installed
<input type="checkbox"/>	GPU Debugging tools	3.1.0	Not installed
<input type="checkbox"/>	Google Play APK Expansion library	1	Not installed
<input type="checkbox"/>	Google Play Billing Library	5	Not installed
<input type="checkbox"/>	Google Play Licensing Library	1	Not installed
<input checked="" type="checkbox"/>	Google Play services	38	Installed
<input checked="" type="checkbox"/>	Google USB Driver, rev 11	11.0.0	Installed
<input type="checkbox"/>	Google Web Driver	2	Not installed
<input checked="" type="checkbox"/>	Intel x86 Emulator Accelerator (HAXM installer)	6.0.5	Installed
<input type="checkbox"/>	NDK	13.1.3345770	Not installed
▼ <input type="checkbox"/>	<b>Support Repository</b>		
<input type="checkbox"/>	ConstraintLayout for Android		Update Available: 1
<input type="checkbox"/>	Solver for ConstraintLayout		Update Available: 1

☐ Show Package Details

[Launch Standalone SDK Manager](#)

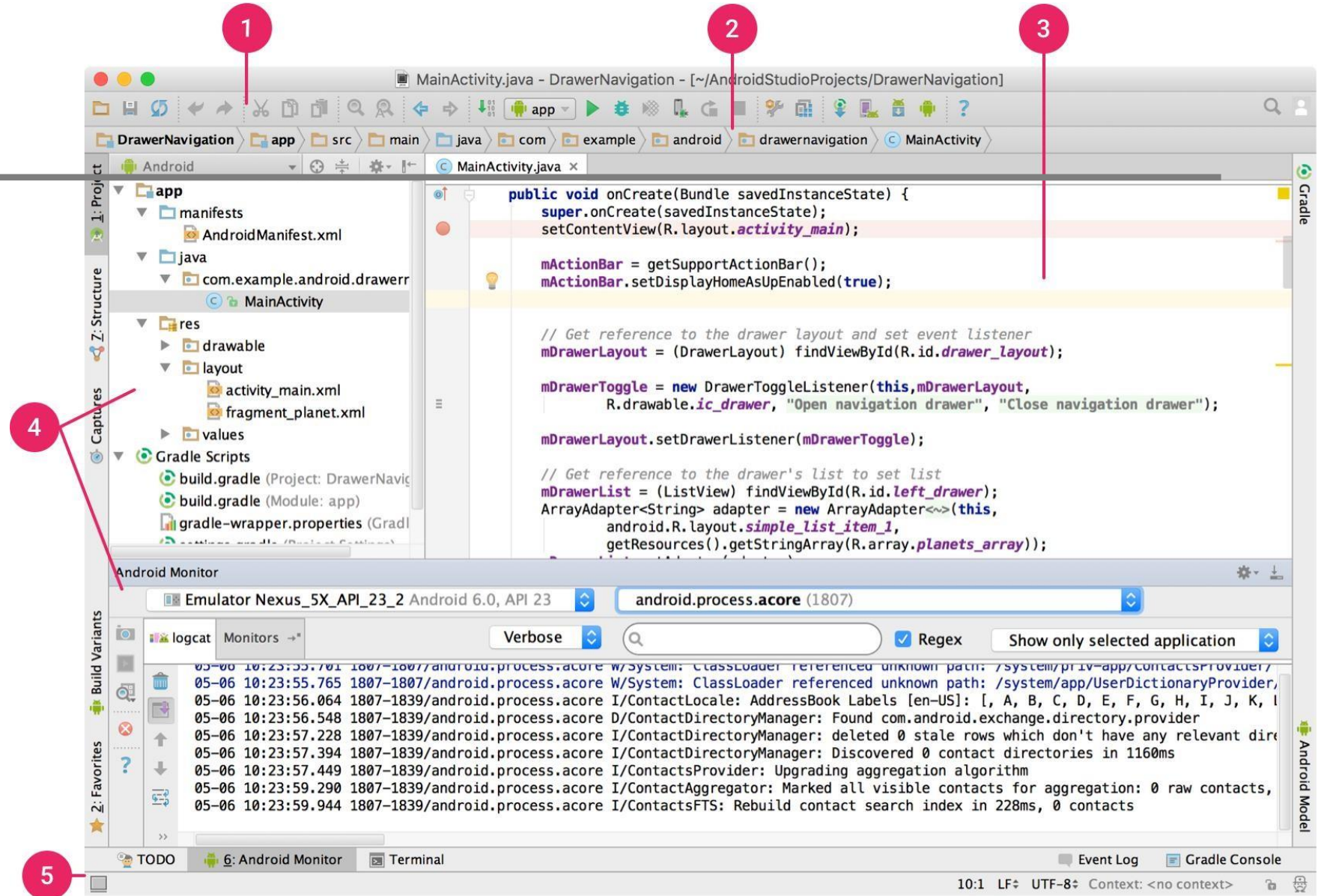
# IDE : Android Studio





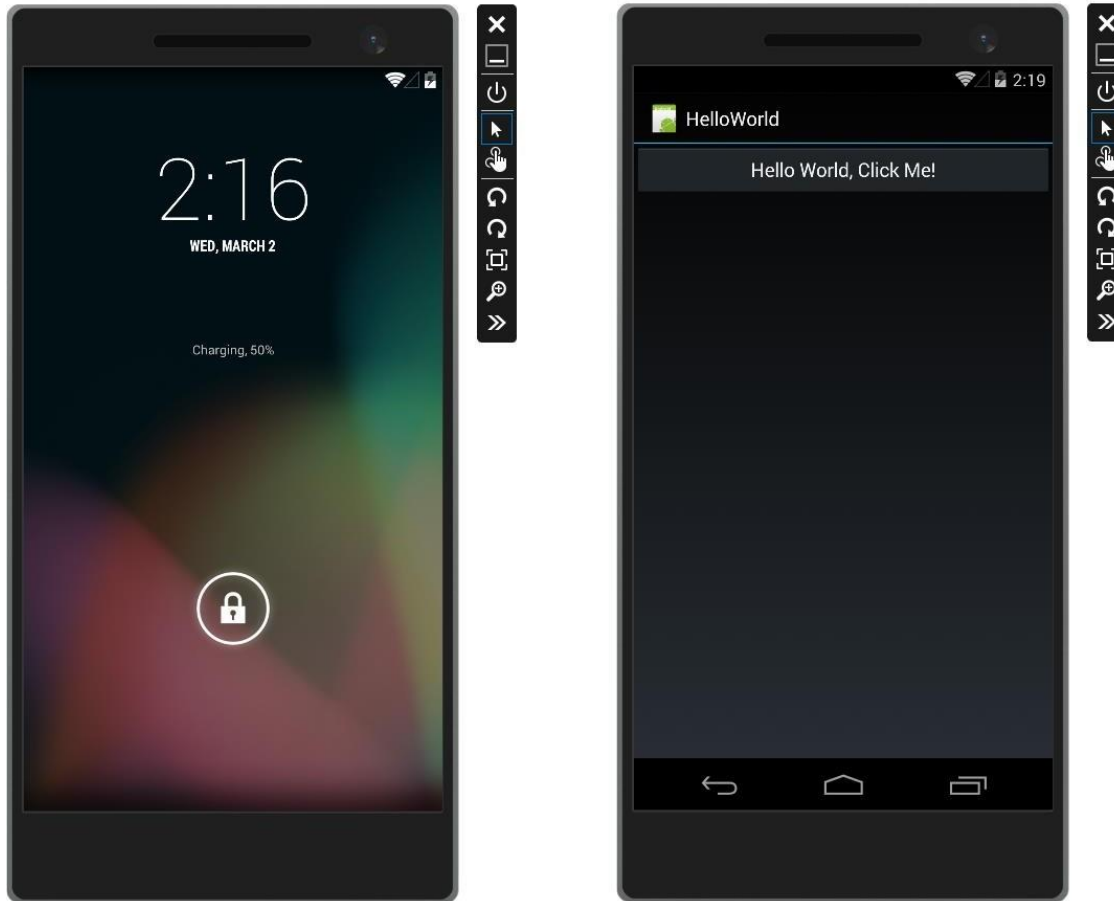
# IDE : Android Studio

1. Tab Tools
2. Tab Navigasi
3. Window Editor
4. Window Tools
5. Tab status



# Emulator

AVD



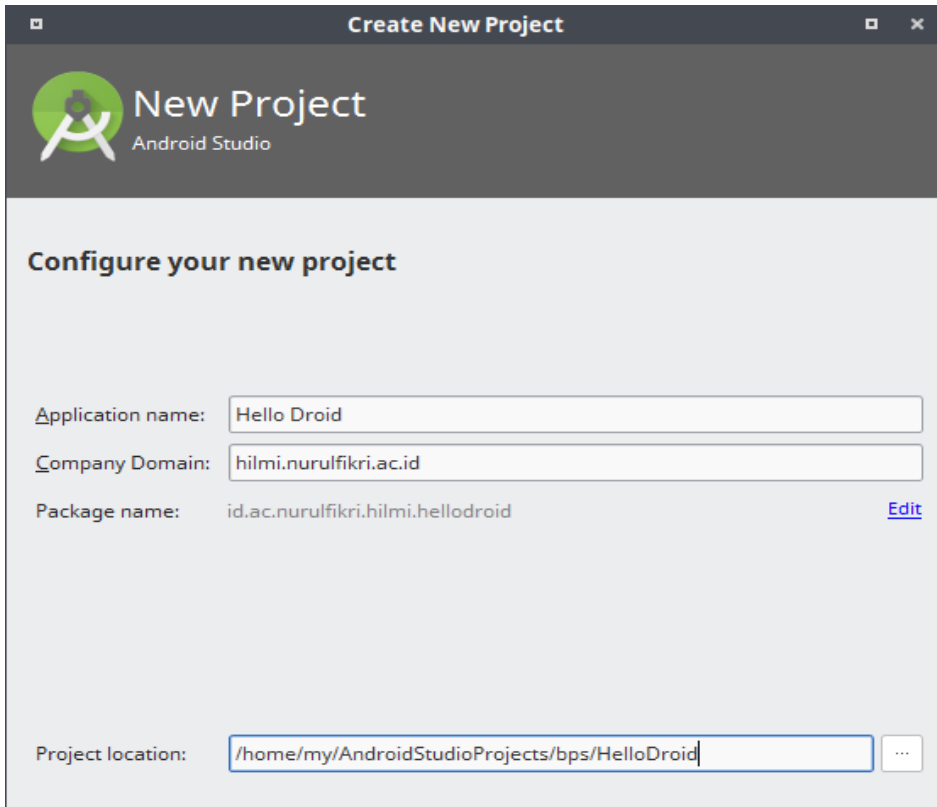
Genymotion



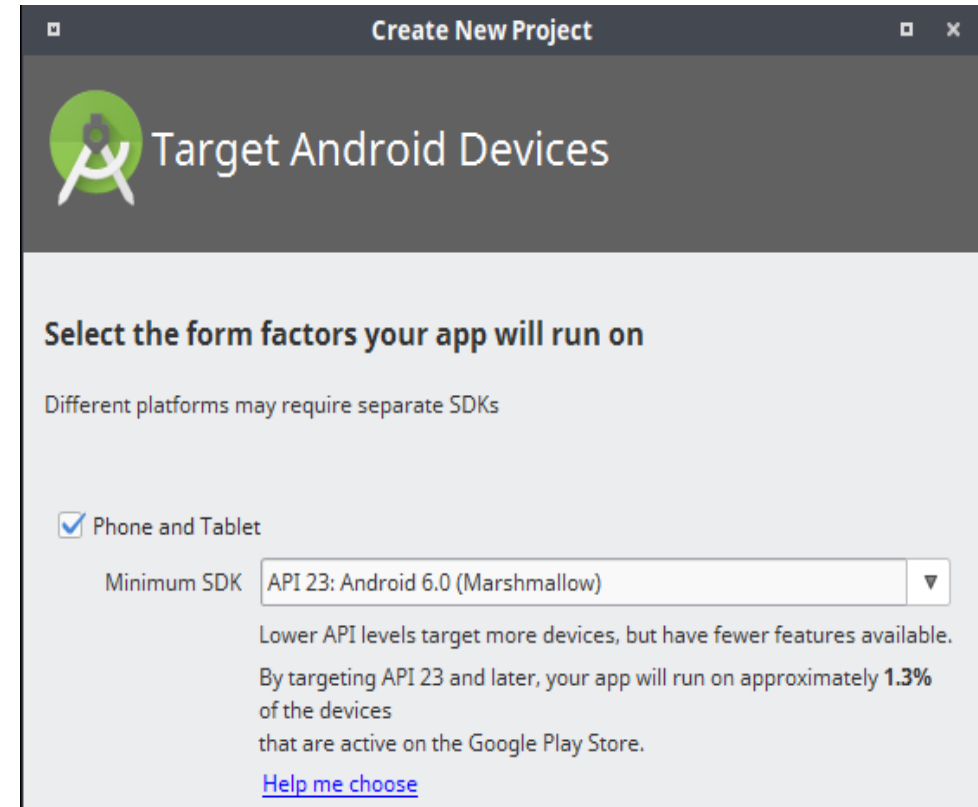


# Hello Droid

✓ Open Android Studio – Create New Project – Set Minimum API



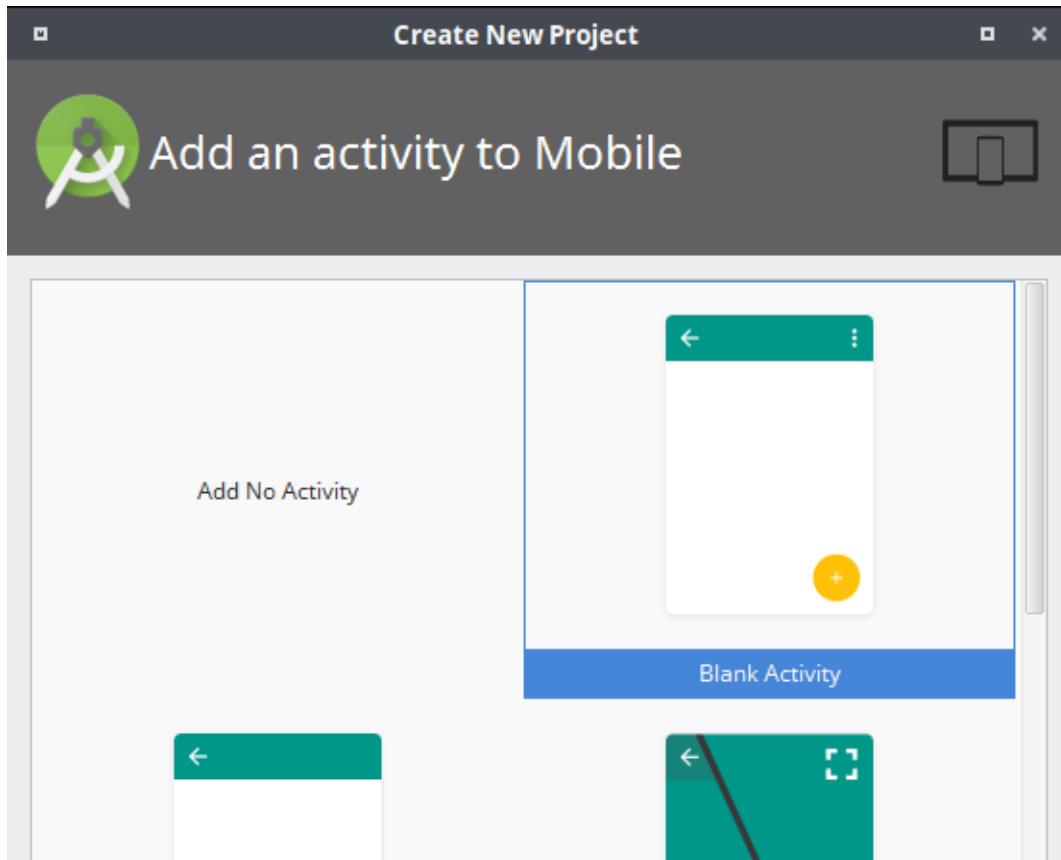
The screenshot shows the 'Create New Project' dialog in Android Studio. The title bar says 'Create New Project'. Below the title bar, there's a header with the Android Studio logo and the text 'New Project' and 'Android Studio'. The main section is titled 'Configure your new project'. It contains three input fields: 'Application name' with the value 'Hello Droid', 'Company Domain' with the value 'hilmi.nurulfikri.ac.id', and 'Package name' with the value 'id.ac.nurulfikri.hilmi.hellodroid'. There is an 'Edit' link next to the package name. At the bottom, there is a 'Project location' field with the value '/home/my/AndroidStudioProjects/bps/HelloDroid' and a button with three dots.



The screenshot shows the 'Create New Project' dialog in Android Studio, specifically the 'Target Android Devices' screen. The title bar says 'Create New Project'. Below the title bar, there's a header with the Android Studio logo and the text 'Target Android Devices'. The main section is titled 'Select the form factors your app will run on'. Below this, it says 'Different platforms may require separate SDKs'. There is a checkbox labeled 'Phone and Tablet' which is checked. Below the checkbox, there is a 'Minimum SDK' dropdown menu with the value 'API 23: Android 6.0 (Marshmallow)'. Below the dropdown, there is a paragraph of text: 'Lower API levels target more devices, but have fewer features available. By targeting API 23 and later, your app will run on approximately 1.3% of the devices that are active on the Google Play Store.' At the bottom, there is a link 'Help me choose'.

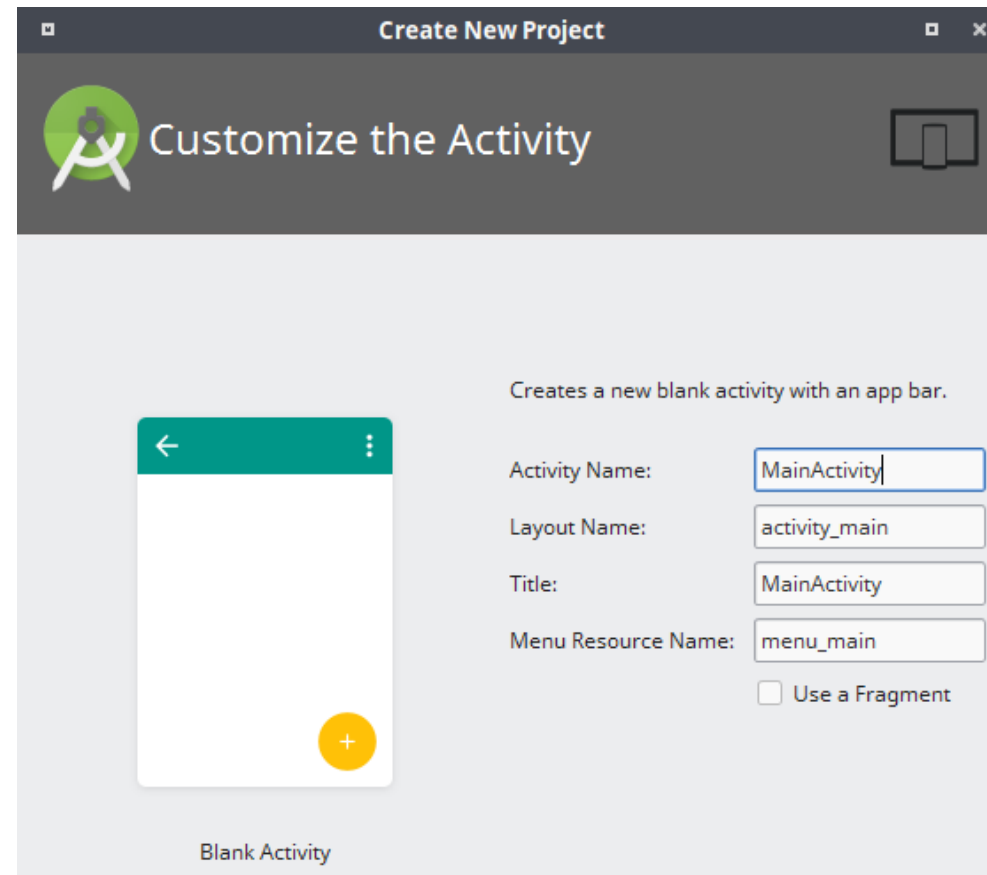
# Hello Droid

✓ Set Template App



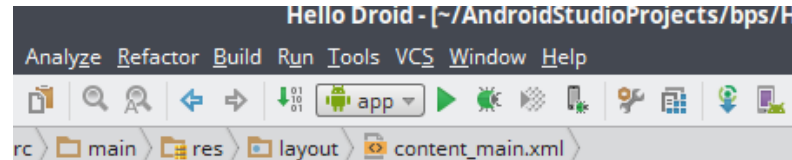
# Hello Droid

## ✓ Configure Activity

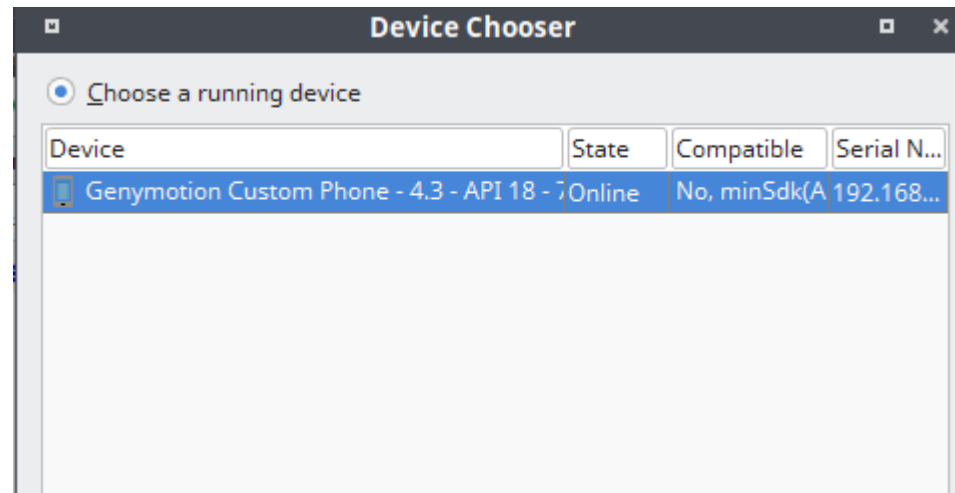


# Hello Droid

- ✓ Run Emulator ( AVD/ Genymotion / Smartphone Programming Mode On )
- ✓ Run Project

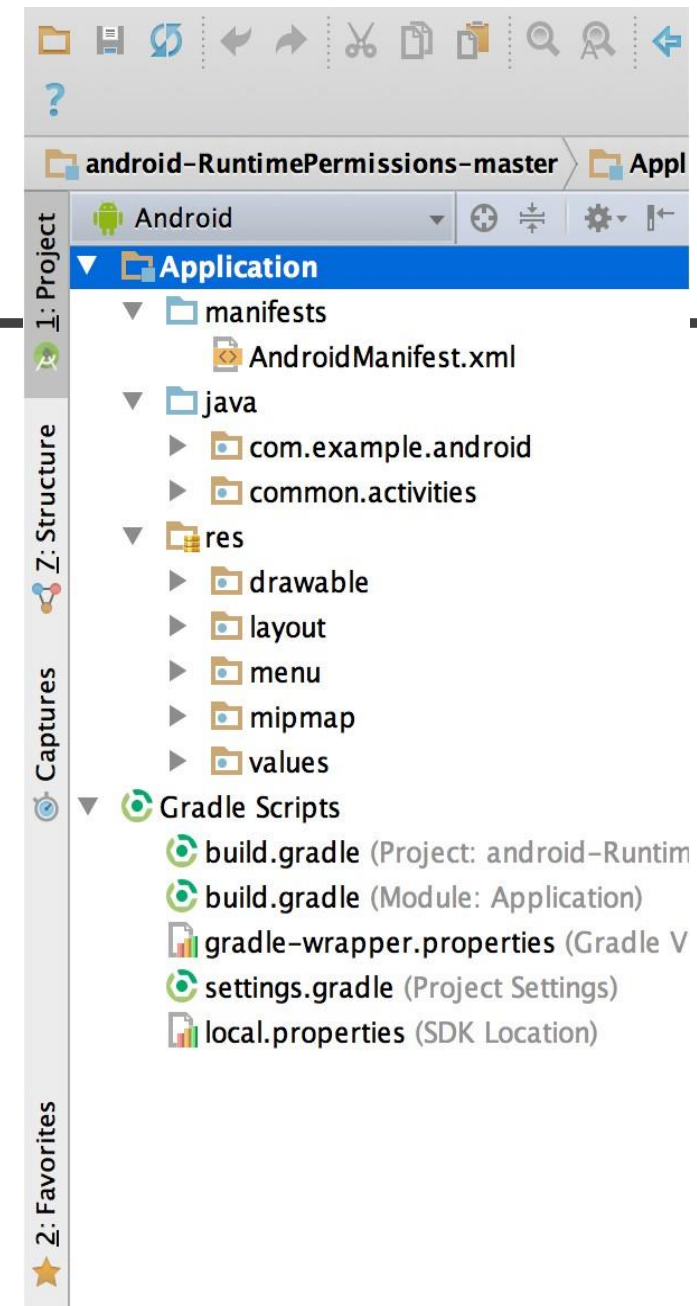


- ✓ Choose Target



# Android Project Structure

- ✓ Android Manifest
- ✓ Java Code
  - ✓ Activity
  - ✓ Java Class
- ✓ Resources files:
  - ✓ Layout
  - ✓ Values
  - ✓ Assets
- ✓ Gradle Scripts
  - ✓ Build
  - ✓ setting



# Android Project Structure

- ✓ AndroidManifest (XML)
  - ✓ Tempat mendaftarkan seluruh Activity
  - ✓ Seting akses resources berupa permission:
    - ✓ storage
    - ✓ camera
    - ✓ internet
    - ✓ other devices



```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example"
    android:versionCode="1"
    android:versionName="1.0">

    <uses-sdk android:minSdkVersion="15" />

    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE" />
    <uses-permission android:name="android.permission.INTERNET" />

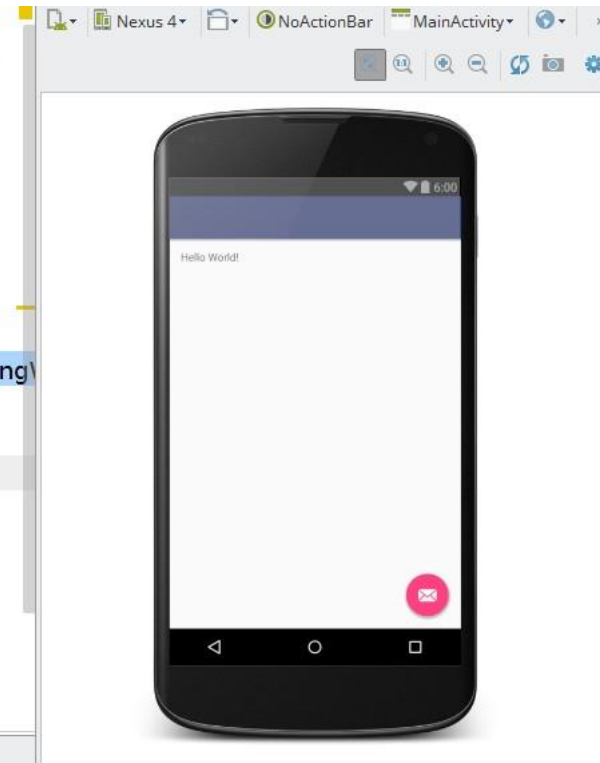
    <application
        android:label="@string/app_name"
        android:icon="@drawable/ic_launcher">
        <activity
            android:name="MyActivity"
            android:label="@string/app_name">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```

# Android Project Structure

## ✓ Resources : Layout (XML)

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout 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"
    android:paddingBottom="16dp"
    android:paddingLeft="16dp"
    android:paddingRight="16dp"
    android:paddingTop="16dp"
    app:layout_behavior="android.support.design.widget.AppBarLayout$ScrollingViewBehavior"
    tools:context="id.ac.nurulfikri.hilmi.hellodroid.MainActivity"
    tools:showIn="@layout/activity_main">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello World!" />
</RelativeLayout>
```



# Android Project Structure

## ✓ Activity (Java)



```
1 package com.ngopidevteam.pranadana.metime.fragment;
2
3
4 import android.app.Activity;
5 import android.content.Context;
6 import android.os.Bundle;
7 import android.support.v4.app.Fragment;
8 import android.view.LayoutInflater;
9 import android.view.View;
10 import android.view.ViewGroup;
11 import android.widget.Button;
12 import android.widget.EditText;
13 import android.widget.TextView;
14 import android.widget.Toast;
15
16 import com.ngopidevteam.pranadana.metime.History;
17 import com.ngopidevteam.pranadana.metime.LoginRegister;
18 import com.ngopidevteam.pranadana.metime.Model.User;
19 import com.ngopidevteam.pranadana.metime.R;
20
21 import retrofit2.Call;
22 import retrofit2.Callback;
23 import retrofit2.Response;
24
25
26 // ...
27 public class LoginActivity extends AppCompatActivity {
28     // ...
29     performLogin() {
30         new Callback() {
31             onResponse() {
32                 // ...
33             }
34         }
35     }
36 }
```



# Gradle



- ✓ Build tools yang digunakan pada Android Studio Activity :  
didalamnya termasuk proses compile, update system, import library
- ✓ Digunakan untuk proses versioning system
- ✓ Disediakan oleh Android Plugin for Gradle
- ✓ Fitur gradle:
  - ✓ Menyesuaikan, mengkonfigurasi dan memperluas proses pembuatan
  - ✓ Konfigurasi setingan APK untuk aplikasi android
  - ✓ Penggunaan reusable kode program berupa import archive \*.jar

# Latihan :

- ✓ Ubah “Hello World” ke “Hello Droid”

