



ANDROID DEVELOPMENT

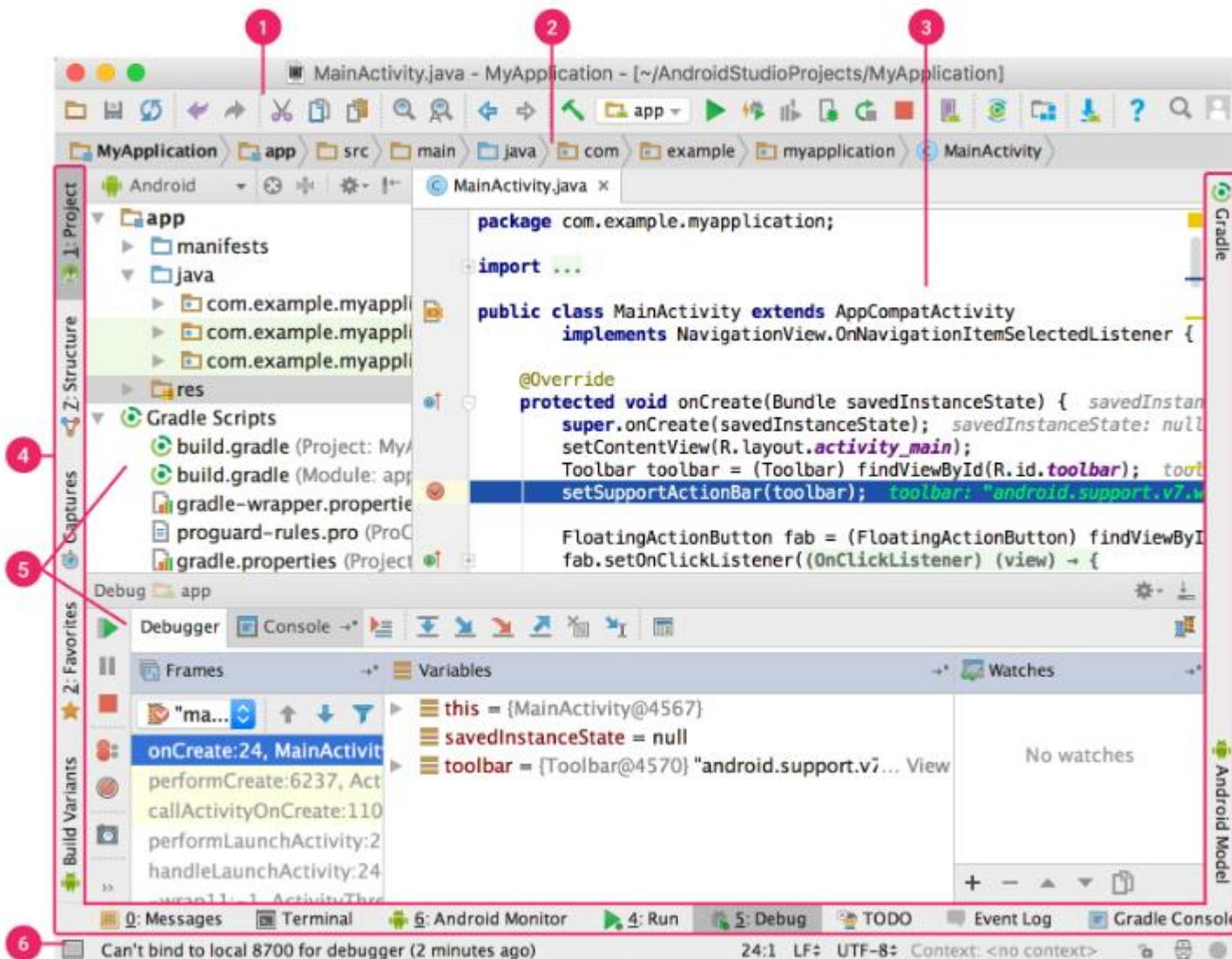
ANDROID DEVELOPMENT

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- Overview of Android Studio
- Android Virtual Device (AVD)
- Android Emulator



Android Studio



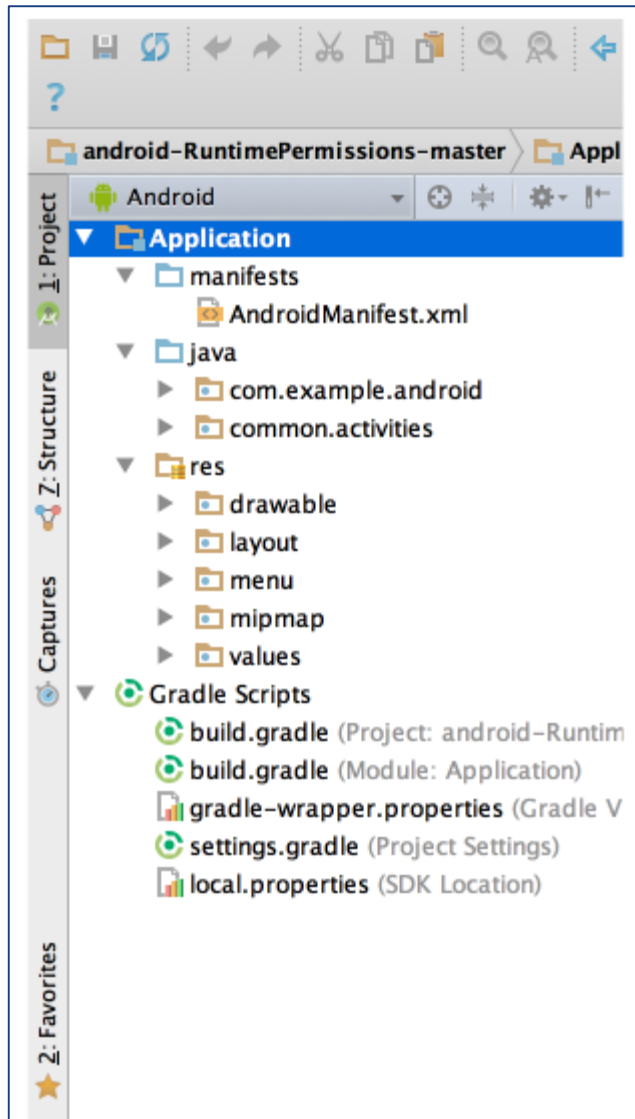


Android Studio

- 1 The **toolbar** lets you carry out a wide range of actions, including running your app and launching Android tools.
- 2 The **navigation bar** helps you navigate through your project and open files for editing. It provides a more compact view of the structure visible in the **Project** window.
- 3 The **editor window** is where you create and modify code. Depending on the current file type, the editor can change. For example, when viewing a layout file, the editor displays the Layout Editor.
- 4 The **tool window bar** runs around the outside of the IDE window and contains the buttons that allow you to expand or collapse individual tool windows.
- 5 The **tool windows** give you access to specific tasks like project management, search, version control, and more. You can expand them and collapse them.
- 6 The **status bar** displays the status of your project and the IDE itself, as well as any warnings or messages.



Project Structure

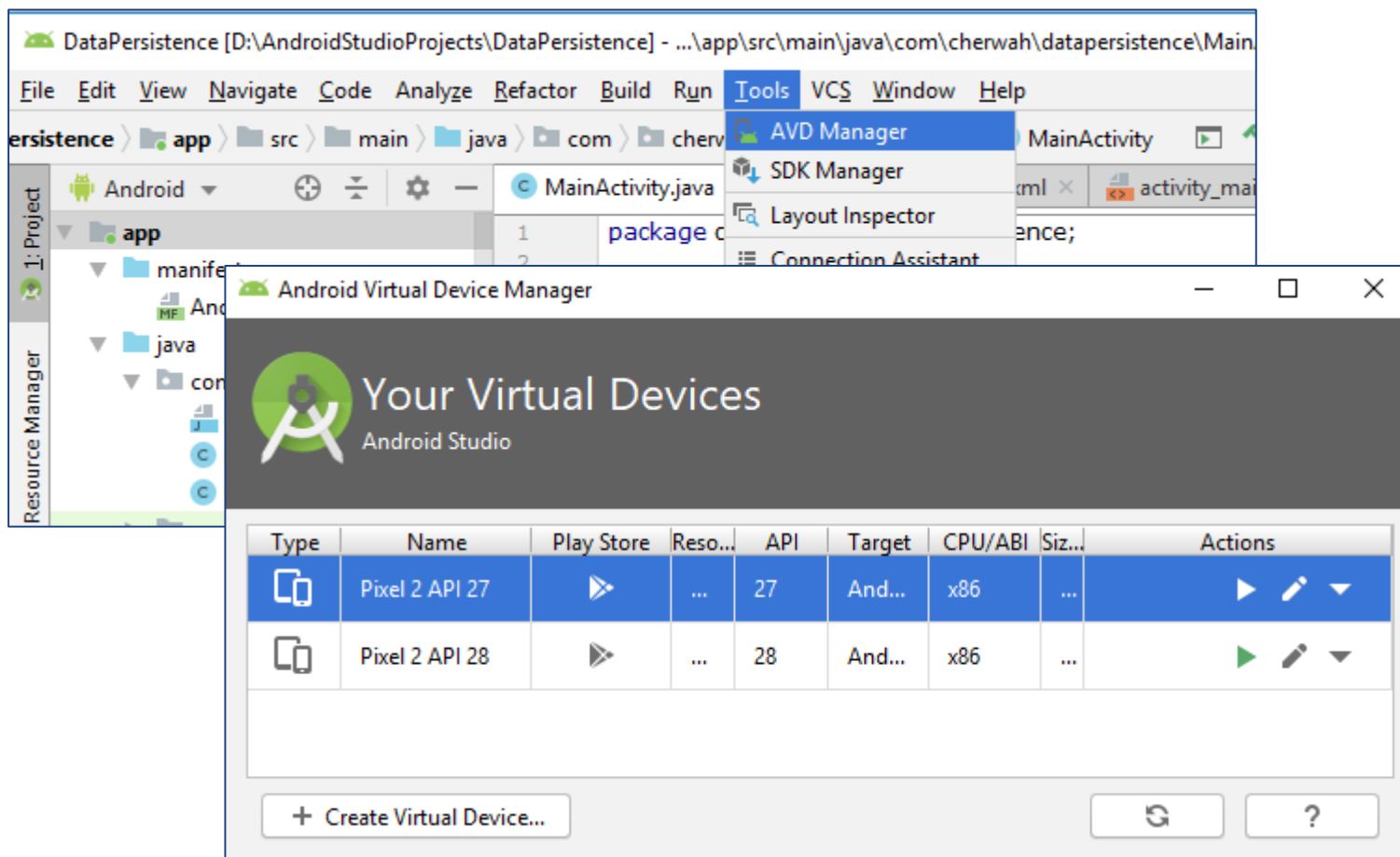


- **manifests:** Contains the AndroidManifest.xml file
- **java:** Contains the Java source code files
- **res:** Contains all non-code resources, such as XML layouts, UI strings, and bitmap images
- **Gradle:** Is a Build Automation Tool. Compiles and download library-dependencies automatically based on what's specified in the gradle scripts (e.g. build.gradle)



Setup SDK versions

- Create emulators (Android Virtual Devices) via Tools -> AVD Manager






Setup SDK versions

- Select the API version that your emulator will run against

Virtual Device Configuration


 **System Image**
Android Studio

Select a system image

Recommended x86 Images Other Images

Release Name	API Level ▼	ABI	Target
Q Download	Q	x86	Android 9.0 (Goog
Pie	28	x86	Android 9.0 (Goog
Oreo	27	x86	Android 8.1 (Goog
Oreo Download	26	x86	Android 8.0 (Goog
Nougat Download	25	x86	Android 7.1.1 (Goo
Nougat Download	24	x86	Android 7.0 (Googl

Pie



API Level
28

Android
9.0

Google Inc.

System Image
x86

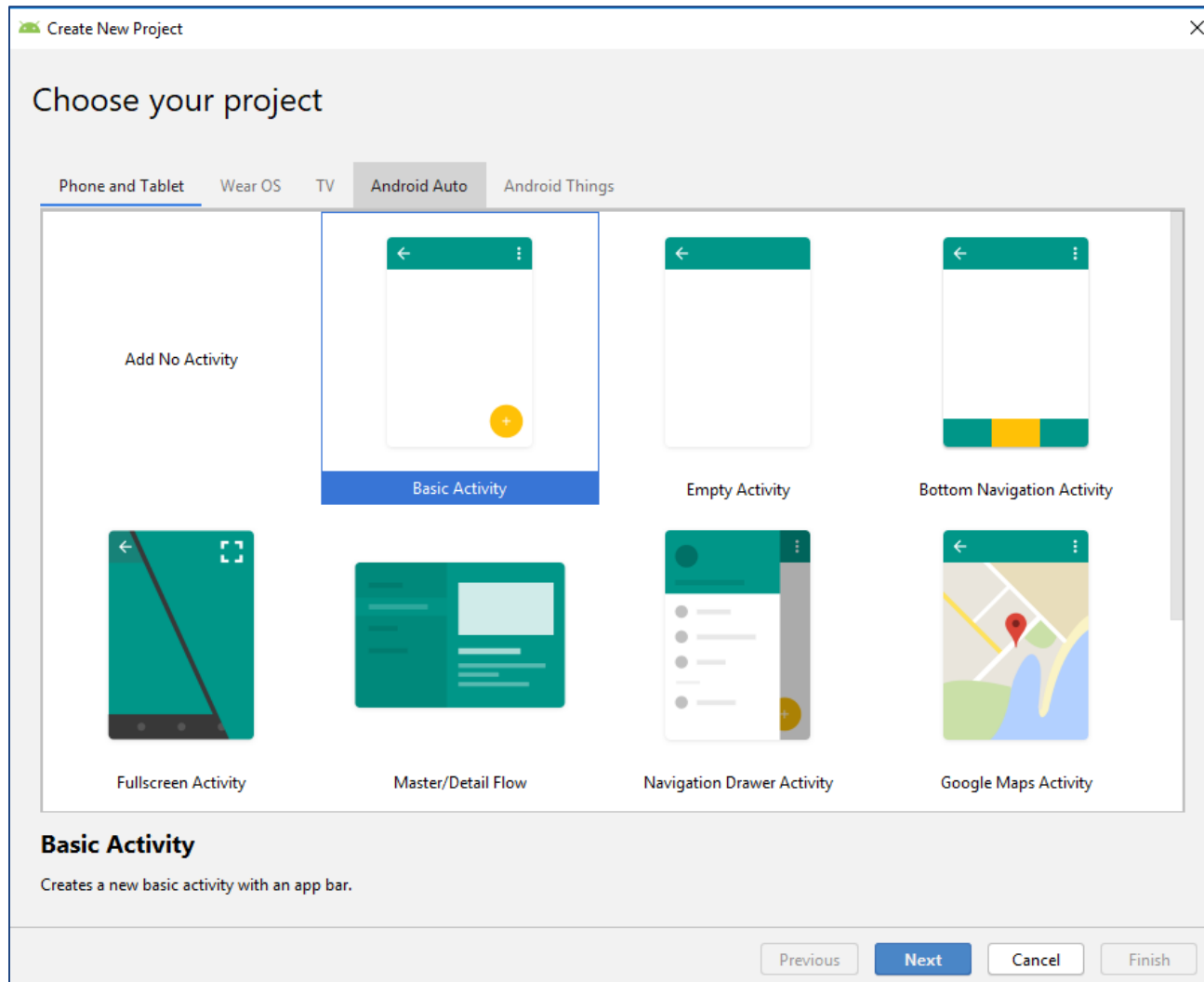
We recommend these Google Play images because this device is compatible with Google Play.

Previous Next Cancel Finish Help




Android "Hello World"

- File -> New Project

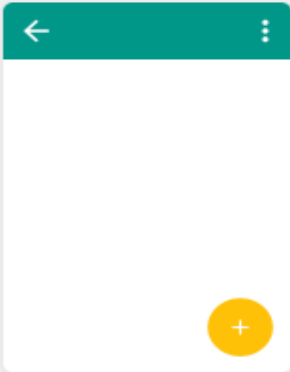




Android "Hello World"

 Create New Project

Configure your project



Name

Package name

Save location

Language

Minimum API level

API 28: Android 9.0 (Pie)

API 22: Android 5.1 (Lollipop)

API 23: Android 6.0 (Marshmallow)

API 24: Android 7.0 (Nougat)

API 25: Android 7.1.1 (Nougat)

API 26: Android 8.0 (Oreo)

API 27: Android 8.1 (Oreo)

API 28: Android 9.0 (Pie)

API Q: Android 9.+ (Q preview)

Basic Activity

Creates a new basic activity with an app bar.

☒ Your app will run on the minimum API level.
[Help me choose](#)

☐ This project will use the AndroidX library.

☐ Use androidx.* as the package name.

Previous

Next

Cancel

Finish



Target API version

- Minimum API Level
 - Your code will be **compiled against** that API version
 - Only Android devices with OS that implements **that API version and higher** can run your code



Android "Hello World"

The screenshot displays the Android Studio IDE interface. The top menu bar includes File, Edit, View, Navigate, Code, Analyze, Refactor, Build, Run, Tools, VCS, Window, and Help. The breadcrumb navigation shows the path: DataPersistence > app > src > main > res > layout > content_main.xml. The left sidebar shows the Project and Resource Manager views. The Project view lists the following structure:

- app
 - manifests
 - AndroidManifest.xml
 - java
 - com.cherwah.datapersistence
 - HelloWorld.java
 - MainActivity
 - UserSettingActivity
 - com.cherwah.datapersistence
 - generatedJava
 - res
 - drawable
 - layout
 - activity_main.xml
 - activity_user_setting.xml
 - content_main.xml
 - menu
 - mipmap

The main editor displays the XML code for 'content_main.xml':

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <android.support.constraint.ConstraintLayout xmlns:android="http://schemas.android.com/
3   xmlns:app="http://schemas.android.com/apk/res-auto"
4   xmlns:tools="http://schemas.android.com/tools"
5   android:layout_width="match_parent"
6   android:layout_height="match_parent"
7   app:layout_behavior="android.support.design.v
8   tools:context=".MainActivity"
9   tools:showIn="@layout/activity_main">
10
11   <TextView
12     android:layout_width="wrap_content"
13     android:layout_height="wrap_content"
14     android:text="Hello World!"
15     app:layout_constraintBottom_toBottomOf="pa
16     app:layout_constraintLeft_toLeftOf="parent"
17     app:layout_constraintRight_toRightOf="parent"
18     app:layout_constraintTop_toTopOf="parent" /
19
20 </android.support.constraint.ConstraintLayout>
```

On the right, a preview of the app interface is shown. It features a green header bar with the text "Hello World" and a white body with the text "Hello World!". A red envelope icon is visible in the bottom right corner of the preview area.



Android Emulator

- Emulates an actual Android device
 - Software emulates how a hardware behaves
- What does the Emulator emulate
 - Battery (e.g. charge level)
 - Camera (e.g. photo-taking)
 - Motion (e.g. accelerometer)
 - Orientation (e.g. tilt-detection)
 - Location (e.g. GPS data points)
 - and more...

- AVD is an “emulator configuration”
 - Model an actual device in terms of hardware and software options
 - Screen Size
 - Pixel Density (dots per inch)
 - Android API version



Using your Android phone for development

- Here are the Steps
 - Turn on **Developer Mode** on Android phone
 - Enable **USB debugging** on Android phone
 - Attach a USB cable from computer to Android phone
 - When starting your app, during **Select Deployment Target**, select Android phone listed under “Connected Devices”
- For steps 1 and 2, see “Enable developer options and debugging” in the References slide



References

- Android Studio -
<https://developer.android.com/studio/intro>
- Create and manage virtual devices -
<https://developer.android.com/studio/run/managing-avds>
- Android Emulator -
<https://developer.android.com/studio/run/emulator>
- Enable developer options and debugging -
<https://developer.android.com/studio/debug/dev-options>



Active Recall

