1.3 Android Studio, APKs, and emulators

Android Studio

Android Studio is the official IDE for creating Android apps.

project

An Android Studio project is a collection of files that define an Android app's appearance, behavior, and build configuration.

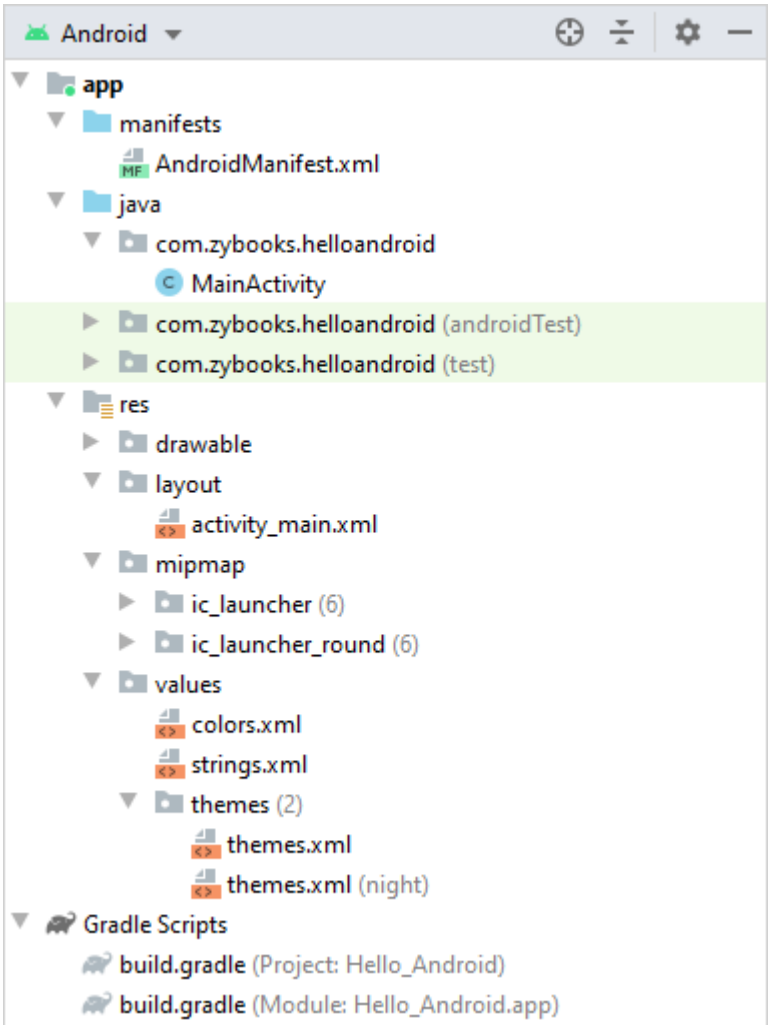
Gradle build tool

The Gradle build tool compiles the project's source files and combines other project files into a single APK file.

Android application package / APK

An Android application package (APK) file is a zipped collection of files that compose an Android app. APK files have a .apk file extension.

Figure 1.3.1: Example Android Studio project.



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AndroidManifest.xml

AndroidManifest.xml is an XML file that specifies important information about the app including the app name, theme, and permissions needed (like access to the camera).

java folder

The java folder holds the app's Java or Kotlin source code and files to test the code.

res folder

The res folder holds the app's resources.

app resource

An app resource is any additional file or content that an app needs, including UI layouts, strings displayed in the UI, animation instructions, images, and audio files.

drawable folder

The drawable folder holds the images that are displayed in the app.

layout folder

The layout folder holds the XML layout files.

layout

A layout defines an app's UI, which includes the visual structure and UI components that the user sees and interacts with.

mipmap folder

The mipmap folder holds the app's launcher icons.

launcher icon

A launcher icon is an image that represents an app and is displayed on Android device's Home screen.

values folder

The values folder holds the XML files that provide various values used by the app like colors, strings, and themes.

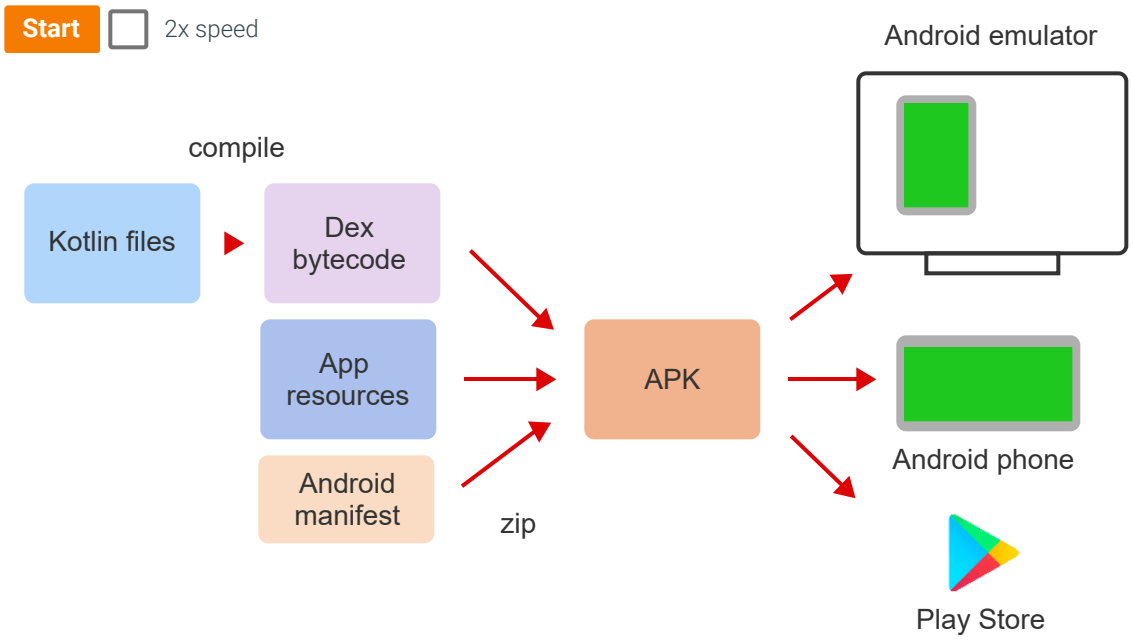
Gradle Scripts

Gradle Scripts holds the app's configurable build files.

build.gradle

By default, two build.gradle files contain configuration information for building the app. The build.gradle marked "Project: *ProjectName*" is the top-level build file that applies configurations to all modules. The build.gradle marked "Module: *ProjectName*.app" specifies app configurations like targeted Android platform and library dependencies.

PARTICIPATION ACTIVITY 1.3.2: Creating and installing the APK file.



Captions

1. An Android Studio project is composed of Kotlin code, app resources, and the Android manifest.
2. Gradle starts the build by compiling an app's Kotlin files into Dex bytecode.
3. Gradle zips the Dex bytecode (.dex files), the app resources, and manifest into a single APK file.
4. The APK file can be installed on an Android emulator or device, or the APK can be published in Google Play Store where others can download the app.

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Code obfuscation

Code obfuscation is the process of renaming classes, methods, and variables and manipulating the code in other ways to obscure the code's meaning.

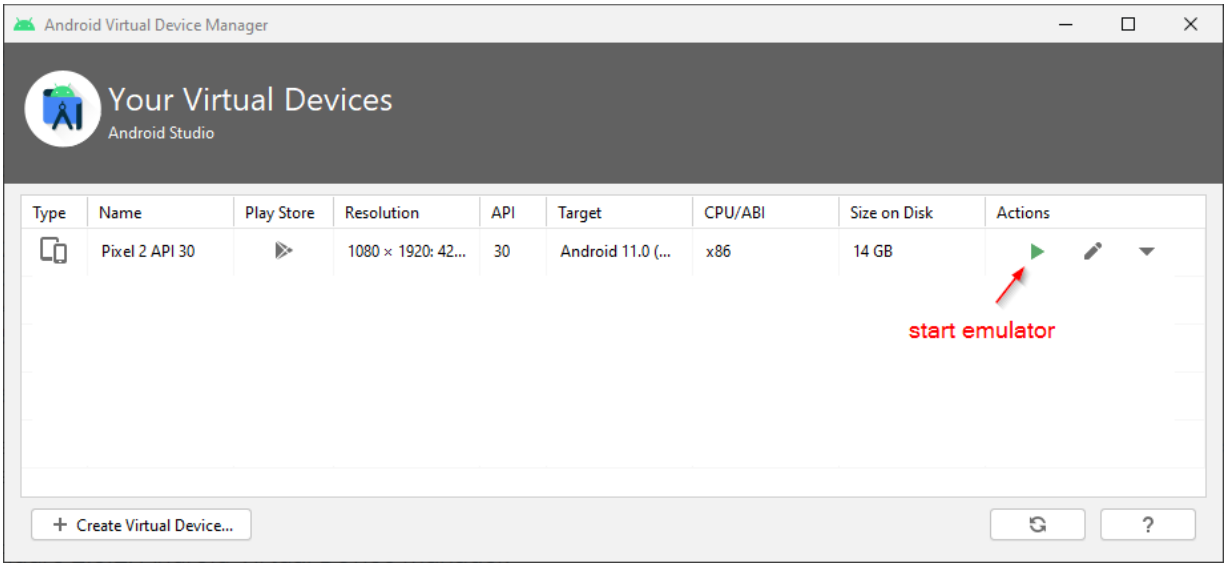
Android emulator

Developers usually test Android apps on an Android emulator, a program that simulates an actual Android device on a development computer.

Android Virtual Device / AVD

An emulator requires an Android Virtual Device (AVD), which defines the hardware characteristics of an Android device to emulate.

Figure 1.3.2: Android Virtual Device Manager.



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Back button

The Back button navigates back to a previous screen.

Home button

The Home button navigates to the Home screen.

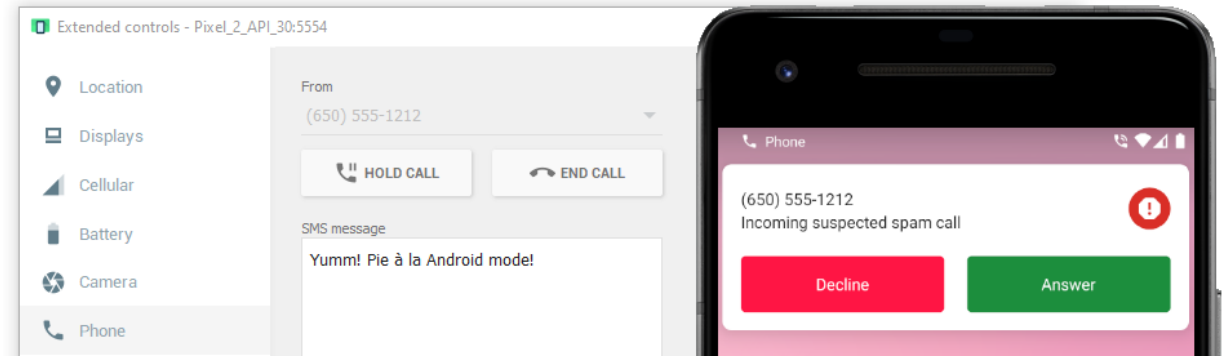
Recents button

The Recents button shows a list of recently accessed screens the user can navigate to.

Figure 1.3.3: Emulator displaying the Home screen.

Feedback?

Figure 1.3.4: Simulating an incoming call to the emulator.



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