Mobile Apps Development

Introduction

Lesson 1
Introduction to Android

Contents

- Android is an ecosystem
- Android platform architecture
- Android Versions
- Challenges of Android app development
- App fundamentals

Android Ecosystem

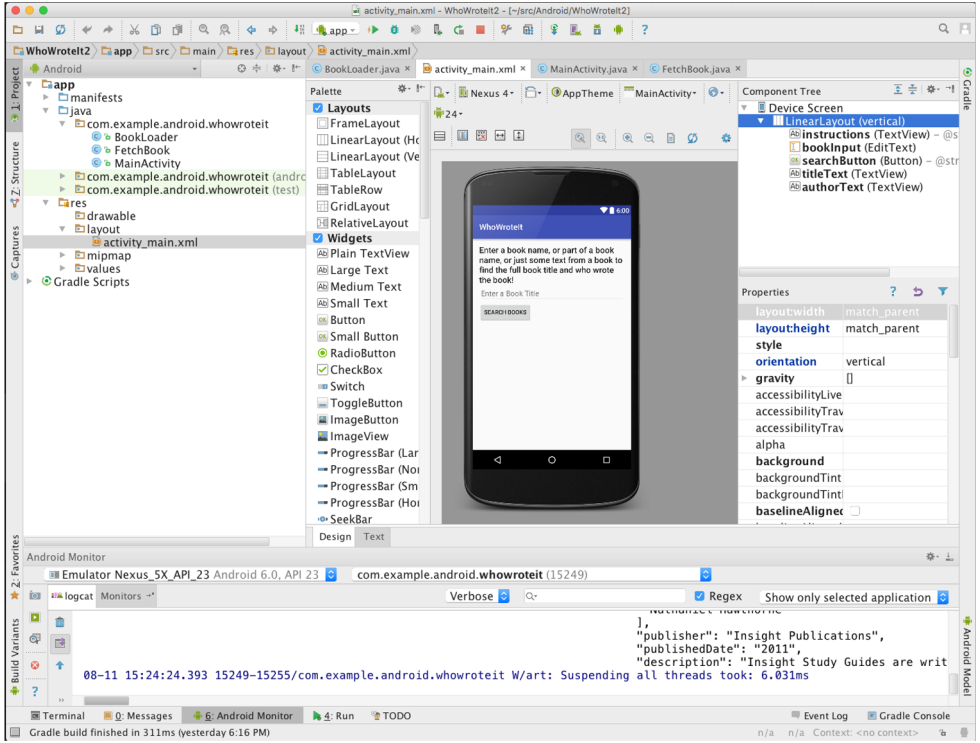
What is Android?

- Mobile operating system based on Linux kernel
- User Interface for touch screens
- Used on over 80% of all smartphones
- Powers devices such as watches, TVs, and cars
- Over 2 Million Android apps in Google Play store
- Highly customizable for devices / by vendors
- Open source

Android Software Developer Kit (SDK)

- Development tools (debugger, monitors, editors)
- Libraries (maps, wearables)
- Virtual devices (emulators)
- Documentation (developers.android.com)
- Sample code

Android Studio



- Official Android IDE
- Develop, run, debug, test, and package apps
- Monitors and performance tools
- Virtual devices
- Project views
- Visual layout editor

Google Play store

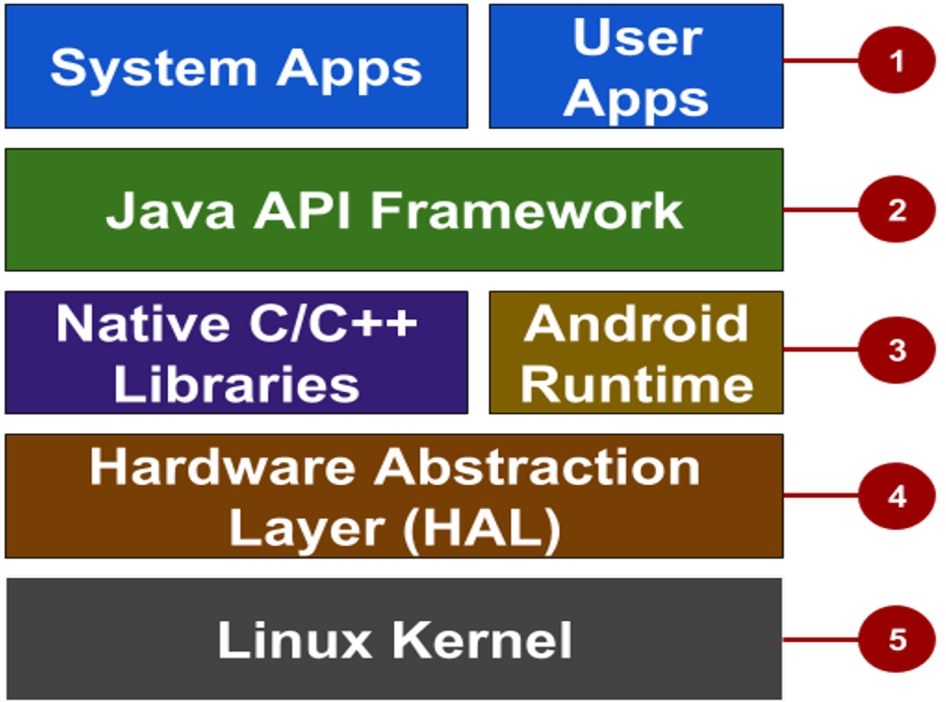
Publish apps through Google Play store:

- Official app store for Android
- Digital distribution service operated by Google

Android Platform Architecture

Android stack

1. System and user apps
2. Android OS API in Java framework
3. Expose native APIs; run apps
4. Expose device hardware capabilities
5. Linux Kernel



System and user apps

- System apps have no special status
- System apps provide key capabilities to app developers

Example:

Your app can use a system app to deliver a SMS message.

Java API Framework

The entire feature-set of the Android OS is available to you through APIs written in the Java language.

- View class hierarchy to create UI screens
- Notification manager
- Activity manager for life cycles and navigation
- Content providers to access data from other apps

Android runtime

Each app runs in its own process with its own instance of the Android Runtime.

C/C++ libraries

- Core C/C++ Libraries give access to core native Android system components and services.

Hardware Abstraction Layer (HAL)

- Standard interfaces that expose device hardware capabilities as libraries

  Examples: Camera, bluetooth module

Linux Kernel

- Threading and low-level memory management
- Security features
- Drivers

Android versions

Codename	Version	Released	API Level
Honeycomb	3.0 - 3.2.6	Feb 2011	11 - 13
Ice Cream Sandwich	4.0 - 4.0.4	Oct 2011	14 - 15
Jelly Bean	4.1 - 4.3.1	July 2012	16 - 18
KitKat	4.4 - 4.4.4	Oct 2013	19 - 20
Lollipop	5.0 - 5.1.1	Nov 2014	21 - 22
Marshmallow	6.0 - 6.0.1	Oct 2015	23
Nougat	7.0	Sept 2016	24

Android History and Platform Versions for more and earlier versions before 2011

Android versions

Codename	Version	Released	API Level
Android Oreo	8.0 - 8.1	Aug 2017	26 - 27
Android Pie	9.0	Aug 2018	28
Android 10	10	Sept 2019	29
Android 11	11	Sept 2020	30
Android 12	12	Oct 2021	31
Android 13	13	Aug 2022	32
Android 14	14	2023	33

App Development

What is an Android app?

- One or more interactive screens
- Written using Java Programming Language and XML
- Uses the Android Software Development Kit (SDK)
- Uses Android libraries and Android Application Framework
- Executed by Android Runtime Virtual machine (ART)

Challenges of Android development

- Multiple screen sizes and resolutions
- Performance: make your apps responsive and smooth
- Security: keep source code and user data safe
- Compatibility: run well on older platform versions
- Marketing: understand the market and your users
  (Hint: It doesn't have to be expensive, but it can be.)

App building blocks

- Resources: layouts, images, strings, colors as XML and media files
- Components: activities, services, …, and helper classes as Java code
- Manifest: information about app for the runtime
- Build configuration: APK versions in Gradle config files

Component types

- **Activity** is a single screen with a user interface
- **Service** performs long-running tasks in background
- **Content provider** manages shared set of data
- **Broadcast receiver** responds to system-wide announcements

Learn more

- Android History
- Introduction to Android
- Platform Architecture
- UI Overview
- Platform Versions
- Supporting Different Platform Versions
- Android Studio User's Guide

END