Intro to Android

Reading/Exercise: https://developer.android.com/training/basics/firstapp

Overview

- An introduction to Android

- Introduce the Android development environment

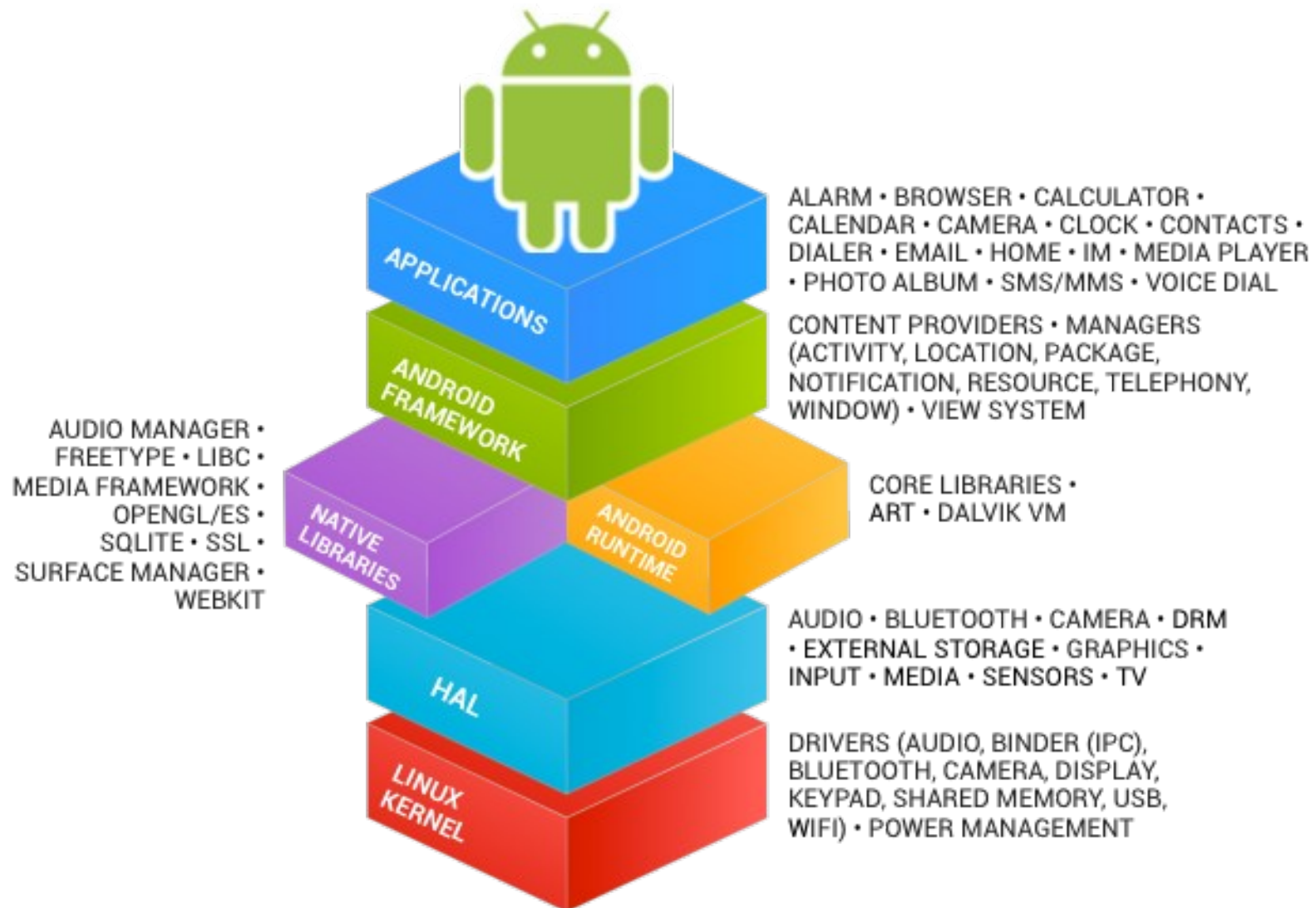- Explore setting up and running Android Studio, SDKs, and Virtual Devices

What is Android?

- Android is a (mobile) operating system developed by Google

- It is based on the Linux kernel

- It uses Kotlin and Java as its main development languages

How do you create Android applications?

- You write applications for Android using the SDK which is built in Java

  – Writing Android applications require knowledge of Kotlin and/or Java and an understanding of Object Oriented Development principles

  – There is also an NDK that allows you to write applications in C

  – Many parties are constantly exploring extending Android's available development languages

- Java's SDK is essentially a **framework** that packages the main facets of an Android application

  – You create apps by tying together and extending various components of the framework

The Android OS

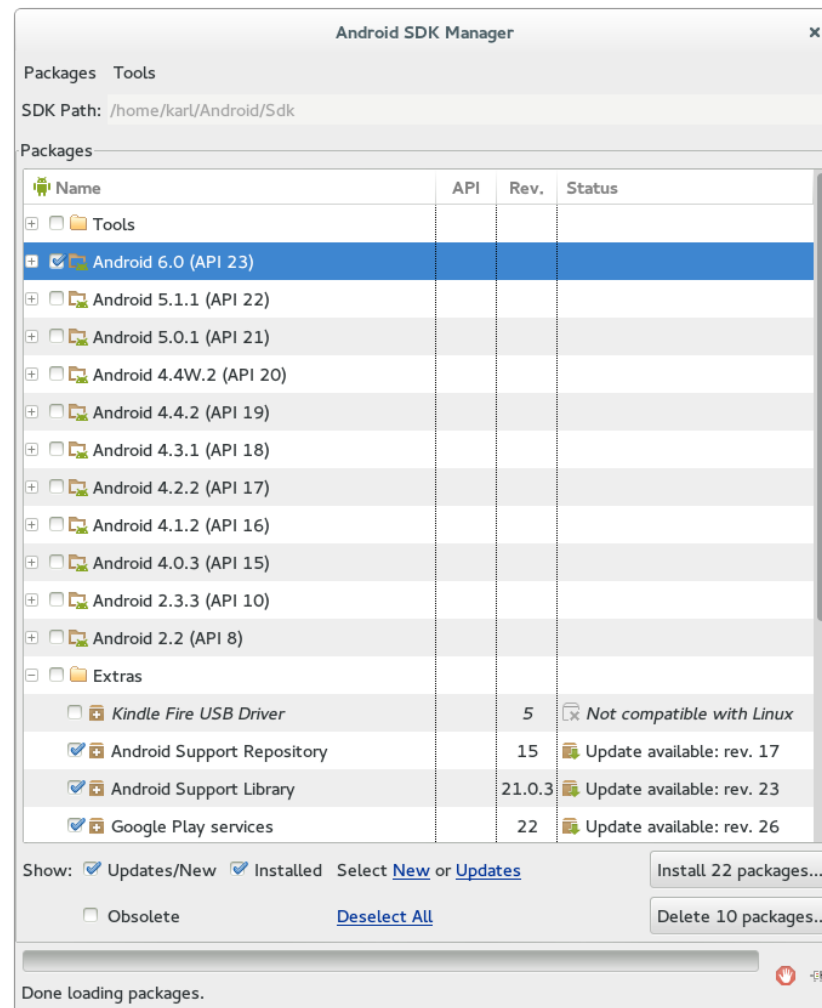ALARM • BROWSER • CALCULATOR • CALENDAR • CAMERA • CLOCK • CONTACTS • DIALER • EMAIL • HOME • IM • MEDIA PLAYER • PHOTO ALBUM • SMS/MMS • VOICE DIAL

APPLICATIONS

CONTENT PROVIDERS • MANAGERS (ACTIVITY, LOCATION, PACKAGE, NOTIFICATION, RESOURCE, TELEPHONY, WINDOW) • VIEW SYSTEM

ANDROID FRAMEWORK

AUDIO MANAGER • FREETYPE • LIBC • MEDIA FRAMEWORK • OPENGL/ES • SQLITE • SSL • SURFACE MANAGER • WEBKIT

NATIVE LIBRARIES

ANDROID RUNTIME

CORE LIBRARIES • ART • DALVIK VM

HAL

AUDIO • BLUETOOTH • CAMERA • DRM • EXTERNAL STORAGE • GRAPHICS • INPUT • MEDIA • SENSORS • TV

LINUX KERNEL

DRIVERS (AUDIO, BINDER (IPC), BLUETOOTH, CAMERA, DISPLAY, KEYPAD, SHARED MEMORY, USB, WIFI) • POWER MANAGEMENT

The Android Studio IDE

- Based on IDEA by JetBrains

- Uses the Gradle build system

- Allows maintaining multiple builds simultaneously

AS Integrated Features and Tools

- SDK and AVD Manager

- Memory and CPU monitor

- Android Lint - Resource bug finder

- Multi-view layout display

- Logcat and ADB messages

SDK Manager

- Allows installation and removal of Android SDK versions, source code, tools, and extras
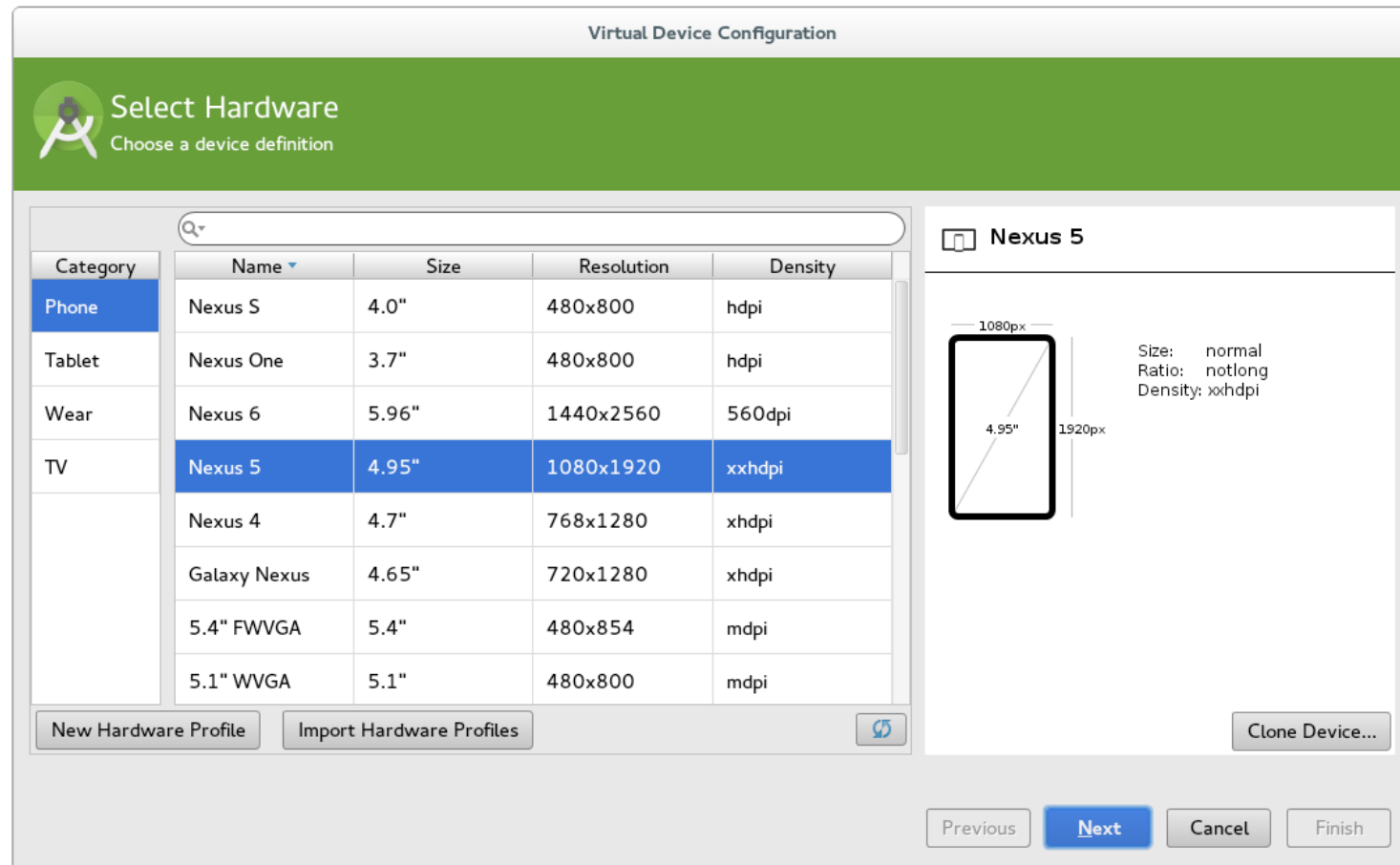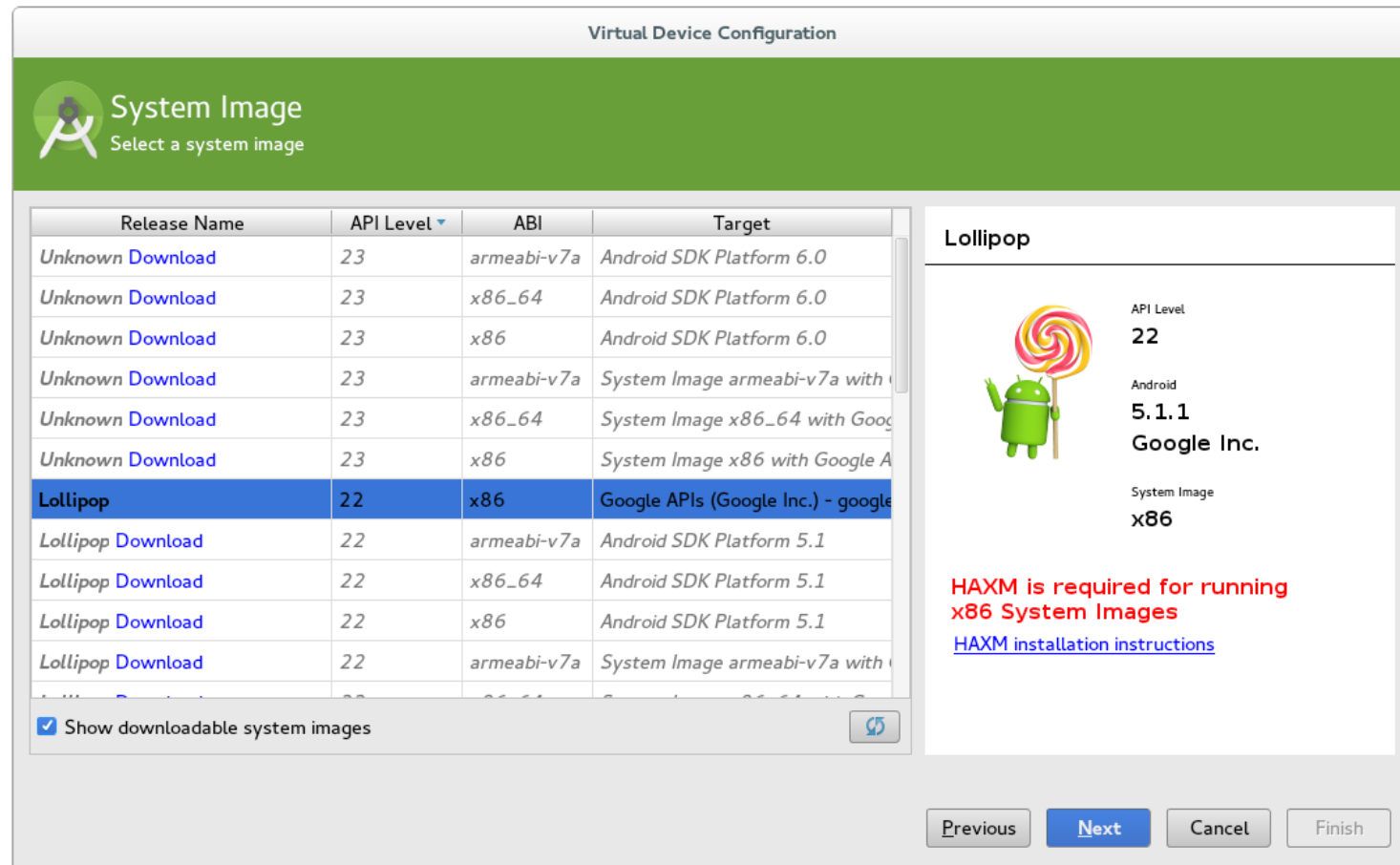
AVD Manager

- Allows the creation and management of virtual devices for use with the Android emulator

- You can utilize predefined images based on real world devices, or create your own

- Allows mapping of virtual device hardware to system hardware (camera, keyboard)

AVD Manager

AVD Manager

AVD Manager

Using Logcat

- View log messages from applications
- Severity level filter
  - Verbose
  - Debug
  - Info
  - Warn
  - Error
- Works in tandem with Logger in application

Android Device Manager and DDMS

- Houses the Dalvik Debug Monitor Server which allows
    - View threads and heap
    - Inspect object memory allocation
    - File explorer
    - Phone emulator controls
        - Calls and SMS
        - GPS location
    - System stats
    - Screen Capture
    - etc.