MOBILE APP DEVELOPMENT - ANDROID

Introduction

Topics

- Introduction to Android
  - Installing Android Studio
  - Intro to the framework
  - Layouts , Activity
  - Basic UI elements

- UI Widgets
  - Text Views, Buttons ,
  - Check Boxes, Radio Buttons, etc.
  - Spinners
  - ListViews and Adapters

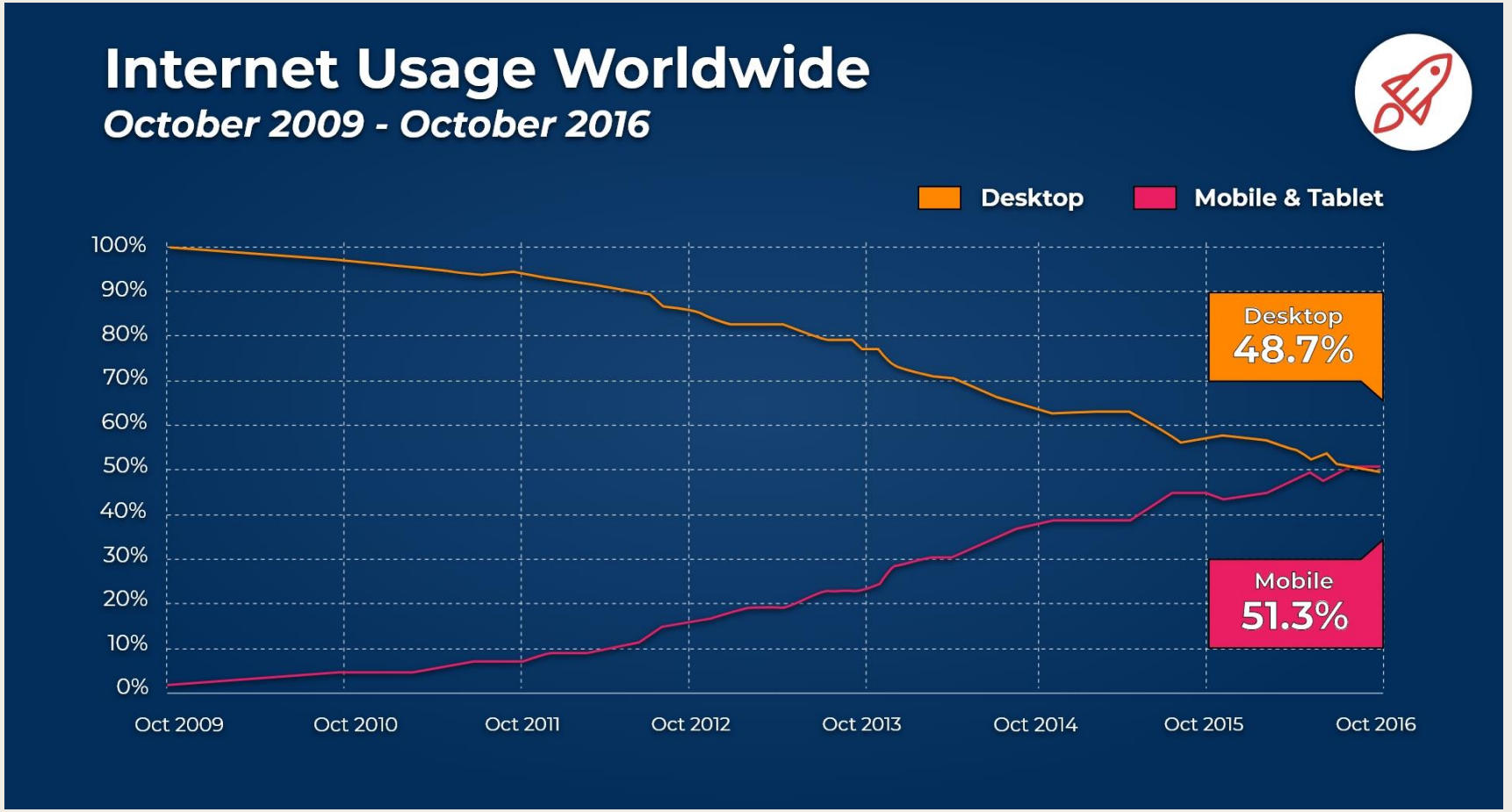
Topics

- Activities
  - Multiple Activities
  - Intents, Bundles
  - Alerts & Dialogs

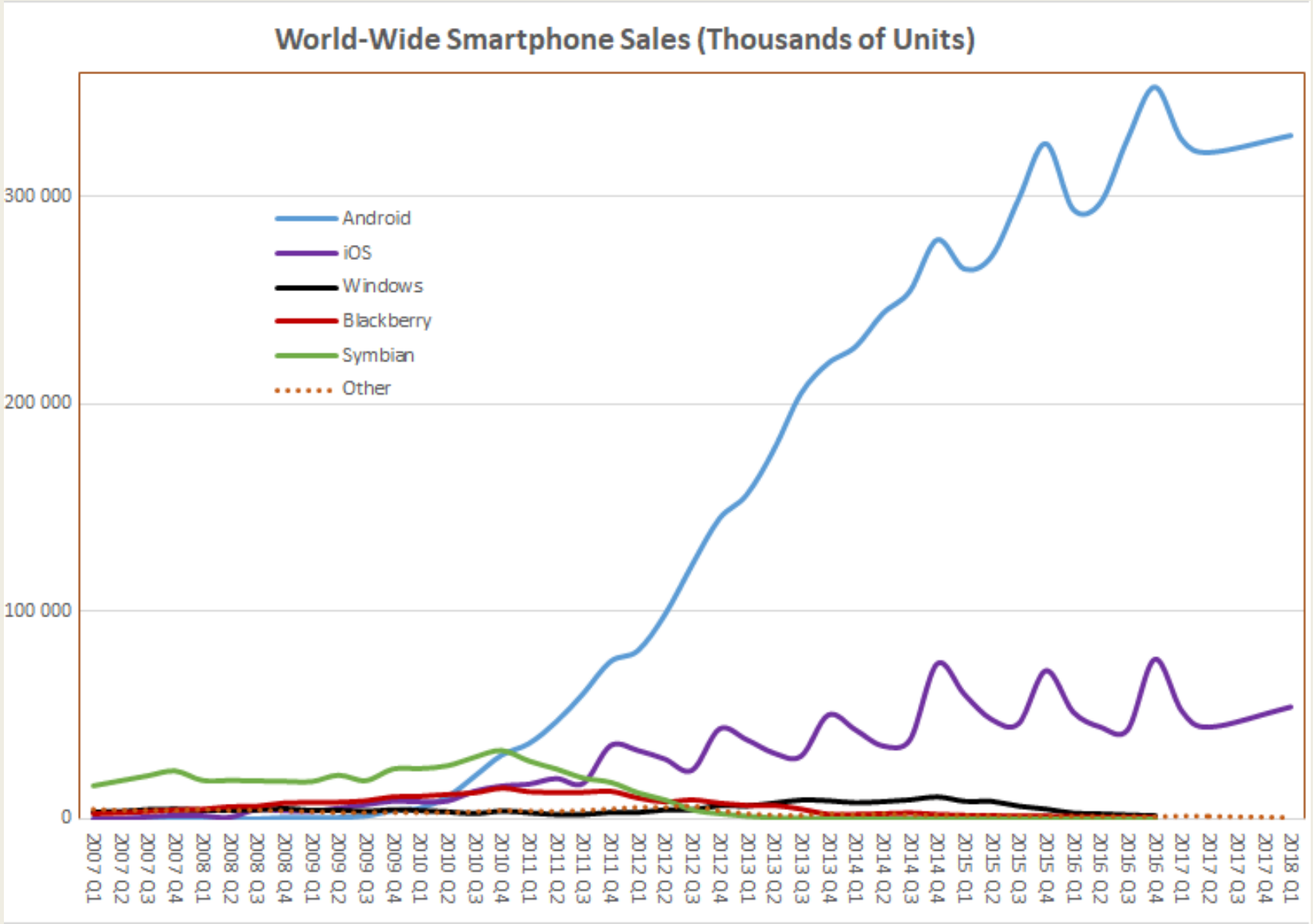
- Data Persistence in Android
  - Shared Preferences
  - Room databases
  - File I/O
  - And more

- Weekly Schedule

MOBILE APPLICATION DEVELOPMENT ?



Src: https://www.broadbandsearch.net/blog/mobile-desktop-internet-usage-statistics#post-navigation-5



Src: https://en.wikipedia.org/wiki/Usage_share_of_operating_systems#/media/File:World_Wide_Smartphone_Sales.png

Mobile OS market share

Source	Method	Quarter/month	Android (including forks)	iOS	Windows (all versions)	BlackBerry (all versions)	Symbian	Others
StatCounter Global Stats[102]	Browsing (page view)	2020, Oct	72.93%	26.53%	0.03%	N/A	N/A	0.51%
StatCounter Global Stats	Browsing (page view)	2019, Sep	76.24%	22.48%	0.17%	0.02%	0.02%	1.07%
Gartner[103]	Units sold in quarter	2017 Q1	86.1%	13.7%	N/A	N/A	N/A	0.2%
Gartner[104]	Units sold in quarter	2016 Q4	81.7%	17.9%	0.3%	0.0%	N/A	0.1%
Gartner[105]	Units sold in quarter	2016 Q3	87.8%	11.5%	0.4%	0.1%	N/A	0.2%
Gartner[106]	Units sold in quarter	2016 Q2	86.2%	12.9%	0.6%	0.1%	N/A	0.2%
Gartner[107]	Units sold in quarter	2016 Q1	84.1%	14.8%	0.7%	0.2%	N/A	0.2%
comScore[108] (US only)	US subscribers	2016, Jan	52.8%	43.6%	2.7%	0.8%	N/A	N/A

Src: https://en.wikipedia.org/wiki/Usage_share_of_operating_systems

Mobile Applications types

- We have three types of mobile app

- 1- Native app

specific to a given mobile platform (Java android , Objective-C IOS)

- 2 web App

use standard web technologies—typically HTML5, JavaScript and CSS

- 3- hybrid app

HTML5 apps inside a thin native container

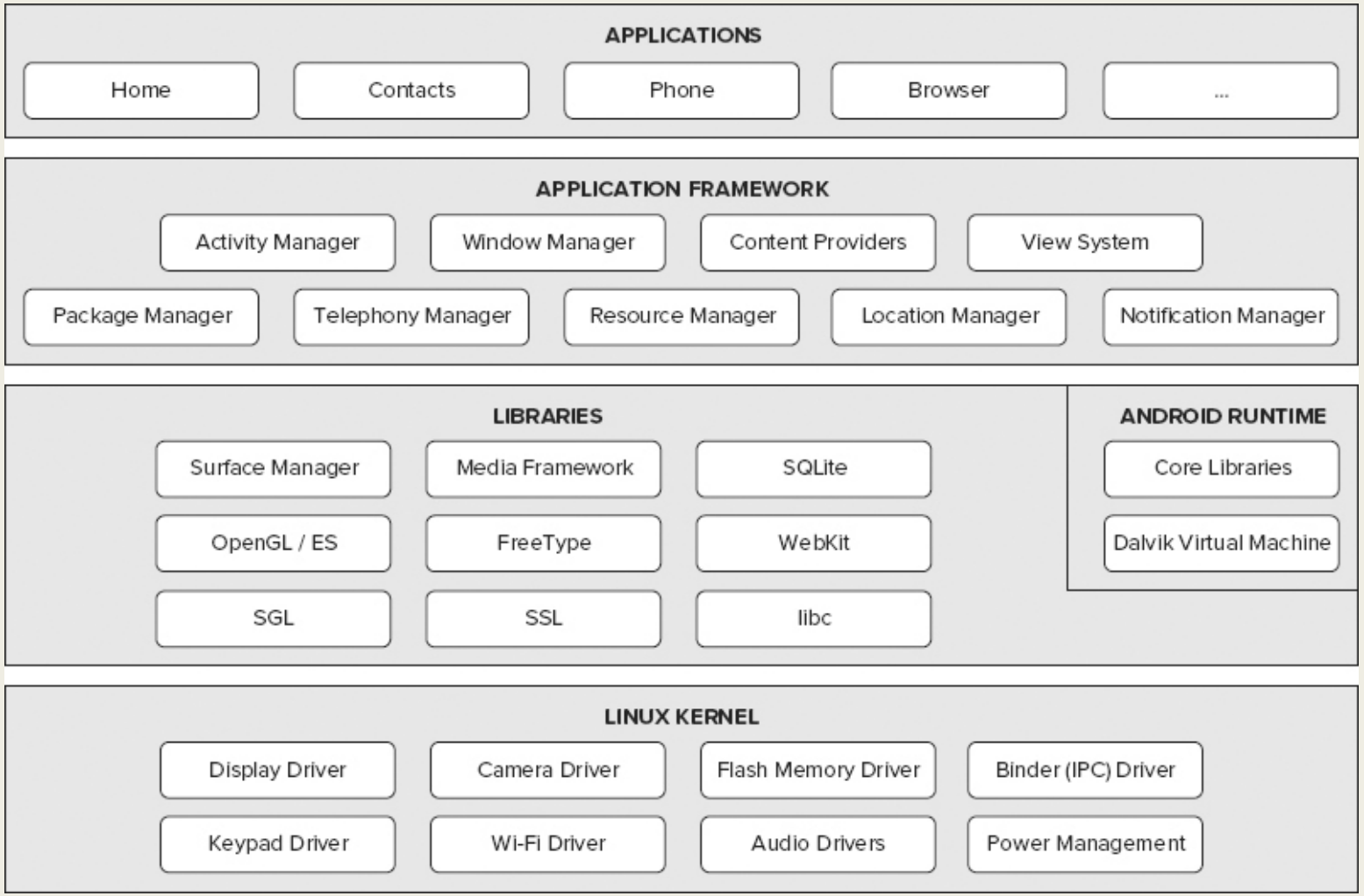
Our Focus In this class

- Will be learning android native app development using Android Software development kit (Android SDK)
- The following tools will be used
  - *1- Android Studio (as development IDE)*
  - *2- Java as programming language*

What is Android[1]

- “Android is a mobile operating system that is based on a modified version of Linux
- It was originally developed by a startup of the same name, Android, Inc.
- Google purchased Android and took over its development work”

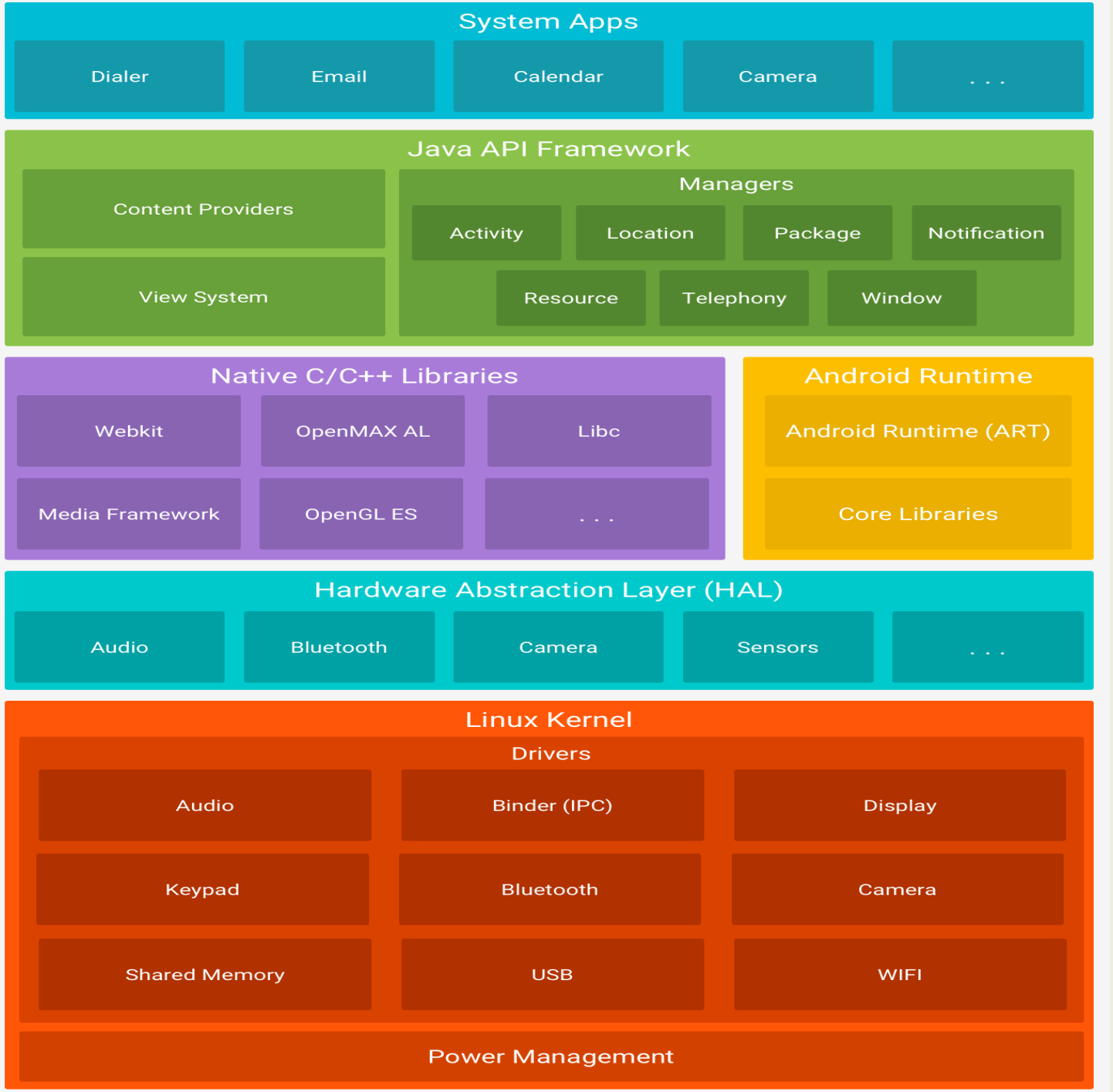
Architecture of Android[1]



Src: https://developer.android.com/guide/platform

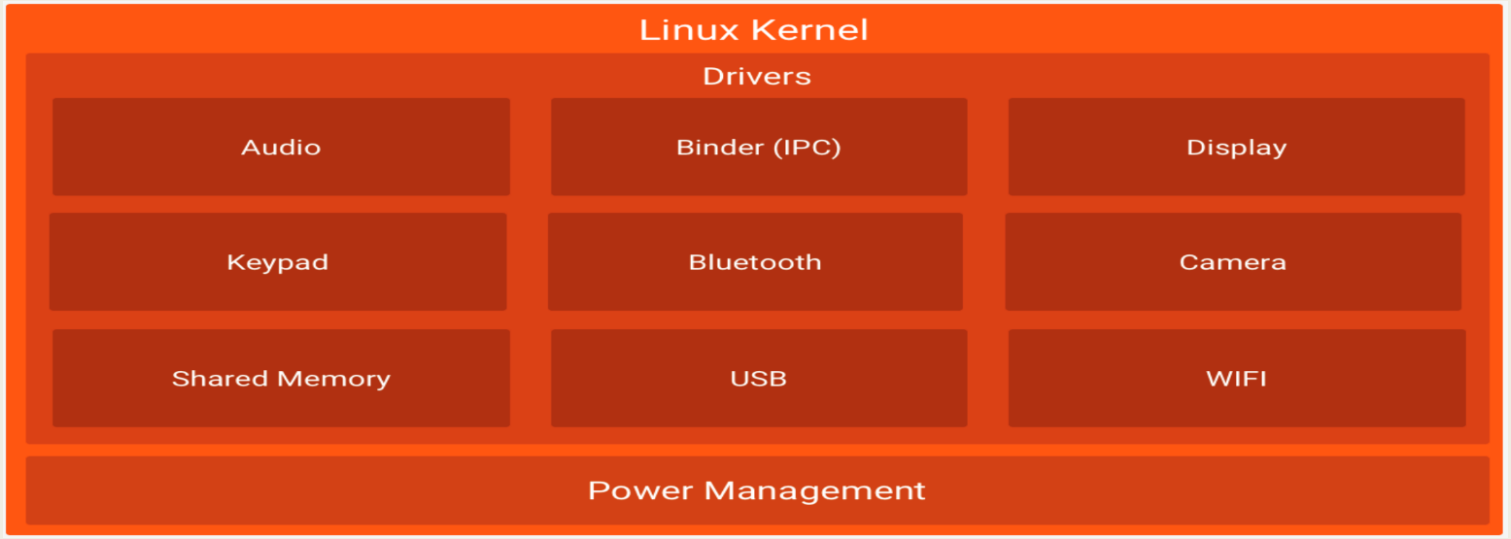
Android Architecture

- Src: https://developer.android.com/guide/platform



The Linux kernel

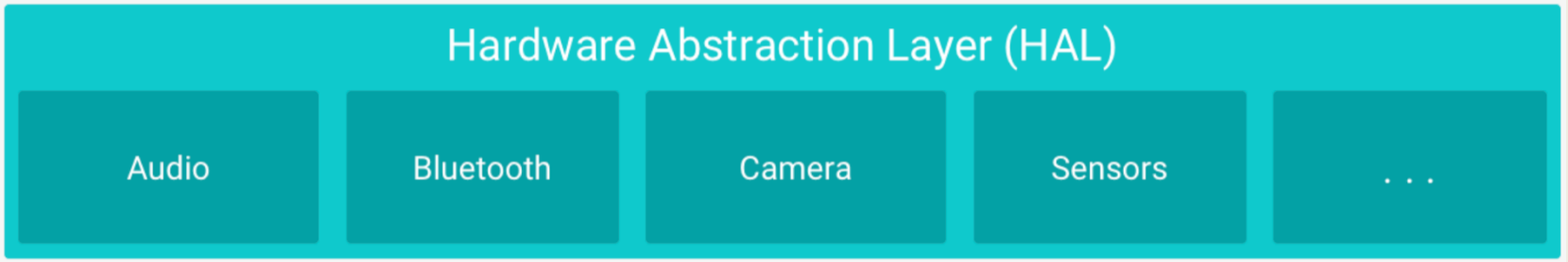
- The foundation of the Android platform is the Linux kernel.
- Android Runtime (ART) relies on the Linux kernel for underlying functionalities such as threading and low-level memory management.



src: https://developer.android.com/guide/platform

Hardware Abstraction Layer (HAL)

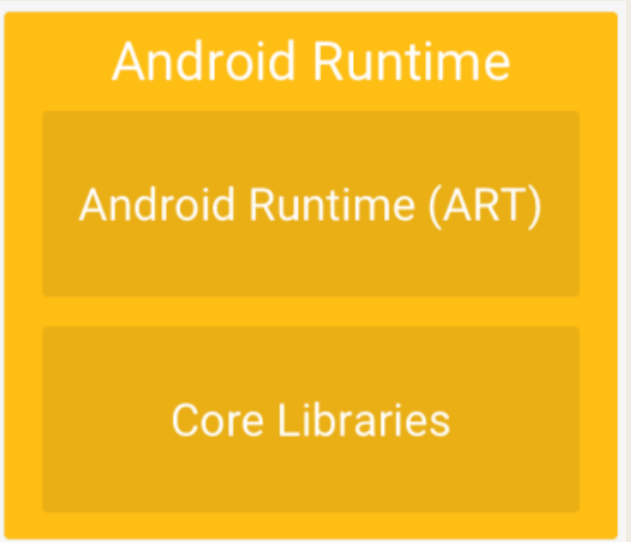
- The hardware abstraction layer (HAL) provides standard interfaces that expose device hardware capabilities to the higher-level Java API framework.
- The HAL consists of multiple library modules, each of which implements an interface for a specific type of hardware component, e.g. camera or bluetooth module.
- When a framework API makes a call to access device hardware, the Android system loads the library module for that hardware component.



Src:: https://developer.android.com/guide/platform

Android Runtime (ART)

- For devices running Android version 5.0 (API level 21) or higher, each app runs in its own process and with its own instance of the Android Runtime (ART).
- ART is written to run multiple virtual machines on low-memory devices by executing DEX files, a bytecode format designed specially for Android that's optimized for minimal memory footprint.



src: https://developer.android.com/guide/platform

Android Version History

Codename	Version	API level/NDK release
R	11	API level 30
Q	10	API level 29
Pie	9	API level 28
Oreo	8.1.0	API level 27
Oreo	8.0.0	API level 26
Nougat	7.1	API level 25
Nougat	7.0	API level 24
Marshmallow	6.0	API level 23
Lollipop	5.1	API level 22
Lollipop	5.0	API level 21
KitKat	4.4 - 4.4.4	API level 19
… JellyBean, IceCream Sandwich, Honeycomb, Froyo, Éclair, Donut,		

Features of Android[1]

- **Storage** — Uses SQLite, a lightweight relational database, for data storage
- **Connectivity** — Supports GSM/EDGE, IDEN, CDMA, EV-DO, UMTS, Bluetooth (includes A2DP and AVRCP), Wi-Fi, LTE, and WiMAX..
- **Messaging** — Supports both SMS and MMS .
- **Web browser** — Based on the open source WebKit, together with Chrome's V8 JavaScript engine
- **Media support** — Includes support for the following media: H.263, H.264 (in 3GP or MP4 container), MPEG-4 SP, AMR, AMR-WB (in 3GP container), AAC, HE-AAC (in MP4 or 3GP container), MP3, MIDI, Ogg Vorbis, WAV, JPEG, PNG, GIF, and BMP
- **Hardware support** — Accelerometer Sensor, Camera, Digital Compass, Proximity Sensor, and GPS
- **Multi-touch** — Supports multi-touch screens
- **Multi-tasking** — Supports multi-tasking applications
- **Tethering** — Supports sharing of Internet connections as a wired/wireless hotspot

Android Studio Steps[2]

Before you set up Android Studio, be sure you have installed JDK 8 or higher,

To check if you have JDK installed (and which version)

open a terminal and type javac –version

You can download JDK 8 (Java Development Kit) from here

https://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html

Android Studio Installation

- **Android Studio Installation info.**

  https://developer.android.com/studio
- Android Studio Installation instructions

References

- http://developer.android.com/index.html