ICS 26011: APPLICATIONS DEVELOPMENT AND EMERGING TECHNOLOGIES 3 (MOBILE PROGRAMMING)

ANDROID PROGRAMMING OVERVIEW

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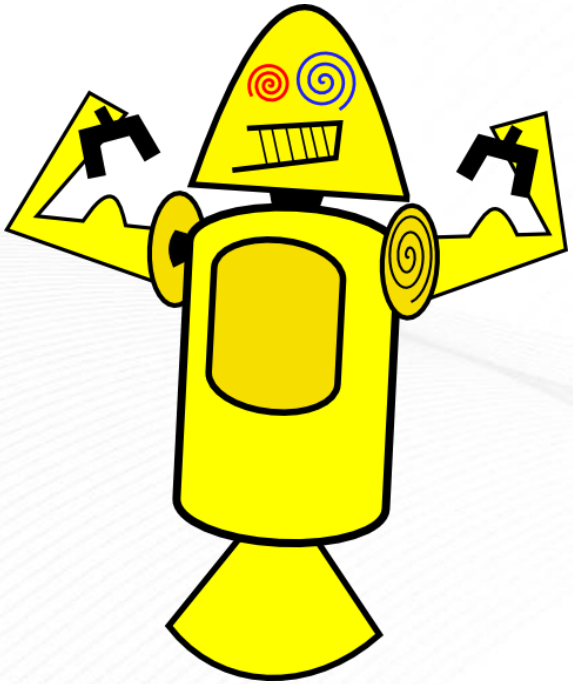
Module Outline

- What is Android?
- Background of Android OS
- Android Version
- Why Android?
- Android Architecture
- Activity Cycle
- Building your First Android App

What is Android?

- A mobile device operating system.
- Seen primary in tablets and Cellphones.
- Based on a **Linux kernel**. Applications are Java-Based
- **Open source** and given freely to both developers and cellular phones manufactures

What is Android?



Dan Morrill's
'Dandroids'

2008

2008

2014

2019

Background

- **Android Inc.** was founded in Palo Alto, California, in **October 2003** by **Andy Rubin**, **Rich Miner**, **Nick Sears**, and **Chris White**.
- The early intentions of the company were to develop an advanced operating system for **digital cameras**.
- The company then decided that the market for cameras was not large enough for its goals, and by five months later it had diverted its efforts and was pitching Android as a handset operating system that would rival Symbian and Microsoft Windows Mobile.

Background

- In **July 2005**, **Google** acquired Android Inc. for at least $50 million.
- Pre-commercial beta release of Android 1.0 was released on November 5, 2007.
- Google announces the **Open Handset Alliance** - a group of tech companies working together to develop “open standards” for mobile platforms.

Background

- The first commercial version, **Android 1.0**, was released in **September 2008**.
  - **HTC Dream (T-Mobile G1)**
    - February 2009 was the first time over-the-air (OTA) update was sent to devices for updating from Android 1.0 to 1.1 and the internal code name for 1.1 was “Petit Four”

Background

- In **2010**, First **Nexus** device is released: the Nexus One. These are Google-developed "**flagship**" devices, intended to show off the capabilities of the platform.
- In 2014, **Android Wear**, a version of Android for wearable devices (watches) is announced.
- In **2016**, Daydream, a virtual reality (VR) platform for Android is announced.

What is Android?

- Android is a **software stack** for mobile devices that includes an operating system, middleware and key applications.
- Android has it's own virtual machine called **DVM (Dalvik Virtual Machine)** – used for executing android applications

Android Versions

https://www.temok.com/blog/android-version-list/

Why Android Versions are “**SWEET**”?

- Google operating systems are always named after a sweet, like Cupcake, Donut, KitKat or Nougat. A Google spokesperson once said:

"**Android powers over one billion smartphones and tablets. Since these devices make our lives so sweet, each Android version is named after a dessert**".

Andy Rubin

- Android is developed by the "**Andy Rubin**", the brains behind the Android. Before working for Google, Andy Rubin worked for Apple, where, a couple of his coworkers gave him the nickname **Android** back in 1989 because of his love for robots.
- In year 2012 Andy Rubin handed the ropes of Android to **Sundar Pichai**.

Android's Legal Battle

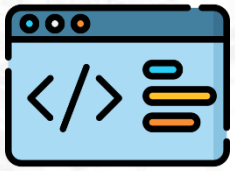
- In a nutshell, **Oracle claims that the Java API is copyrighted** (that the method signatures themselves and how they work are protected), so because **Google uses that API in Android**, Google is violating the copyright. In 2012 a California federal judge decided in Google favor (that one can't copyright an API).
- Ruling: **Google's use of the API was fair use.**

Why Android?

Open Source

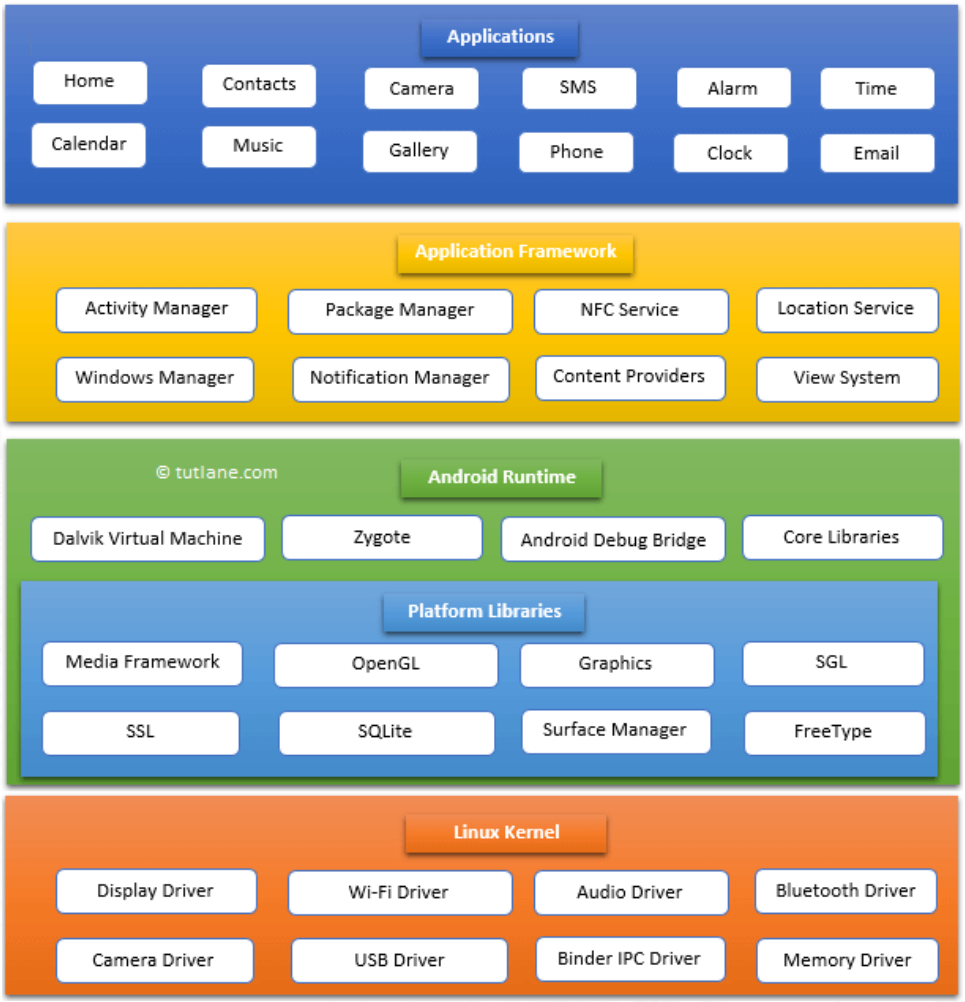
Community

Integration



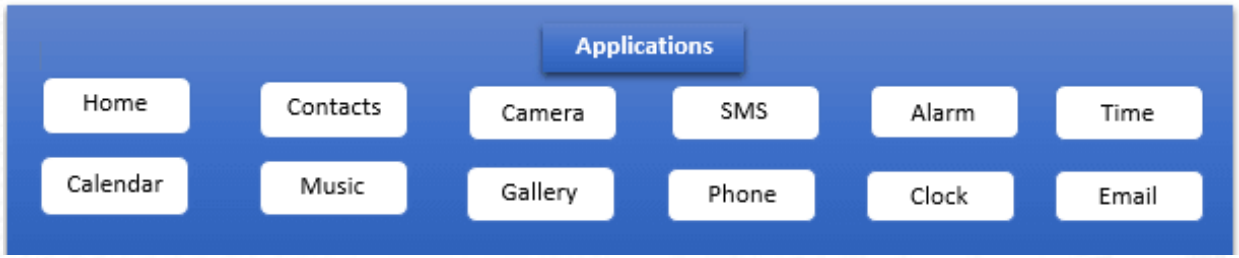
Rich Development Environment

Android Architecture



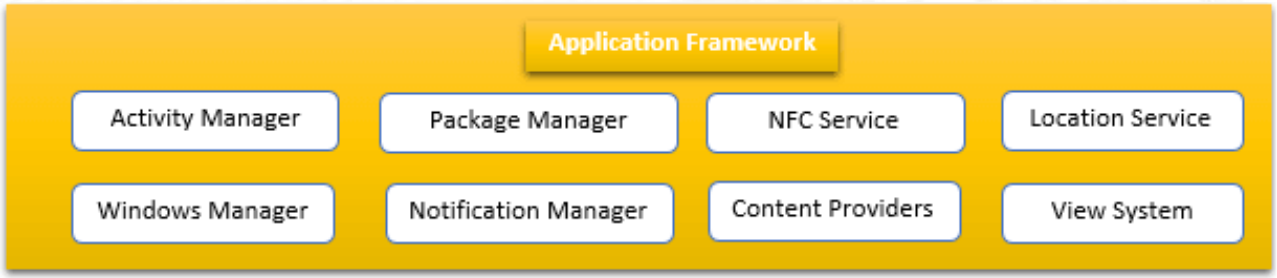
Applications

The top layer of the android architecture. The native and third-party applications like contacts, email, music, gallery, clock, games, etc. whatever is built will be installed on this layer only.



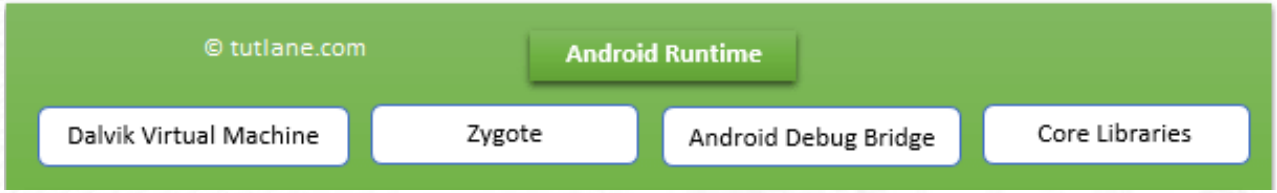
Applications Framework

The Application Framework provides the classes used to create Android applications. It also provides a generic abstraction for hardware access and manages the user interface and application resources. It basically provides the services through which we can create a particular class and make that class helpful for the Application creation.



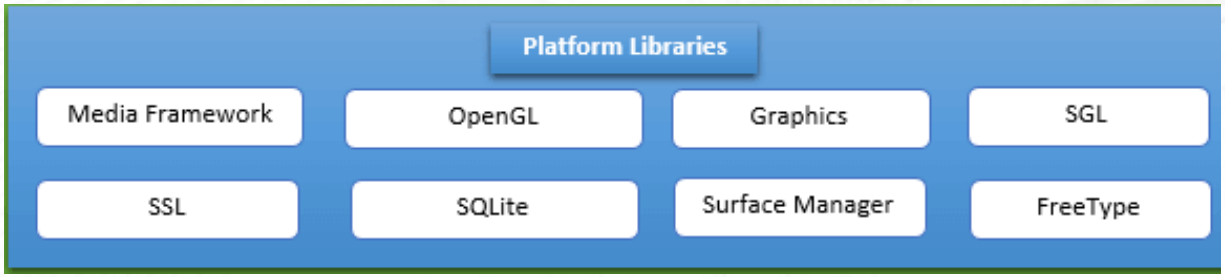
Android Runtime

Android Runtime environment is an important part of Android rather than an internal part and it contains components like core libraries and the Dalvik virtual machine. The Android run time is **the engine that powers applications** along with the libraries and it forms the basis for the application framework.



Platform Libraries

The Platform Libraries includes various C/C++ core libraries and Java-based libraries such as SSL, libc, Graphics, SQLite, Webkit, Media, Surface Manger, OpenGL, etc. to provide support for Android development.

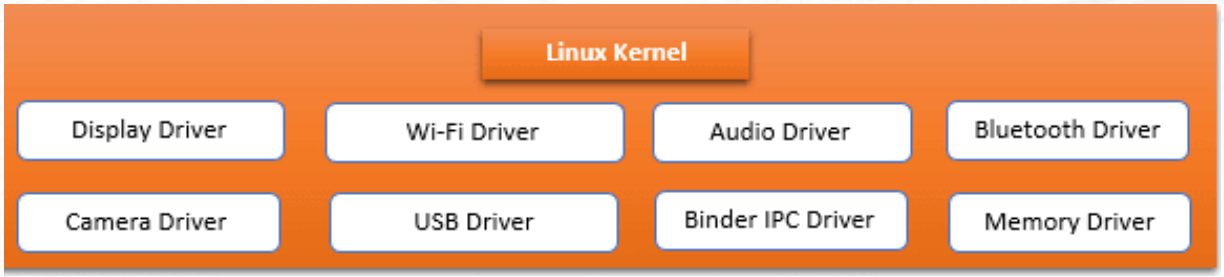


Platform Libraries

- The following are the summary details of some core android libraries available for android development.
  - **Media library** for playing and recording audio and video formats
  - The **Surface manager** library to provide a display management
  - **SGL** and **OpenGL** Graphics libraries for 2D and 3D graphics
  - **SQLite** is for database support and FreeType for font support
  - **Web-Kit** for web browser support and SSL for Internet security.

Linux Kernel

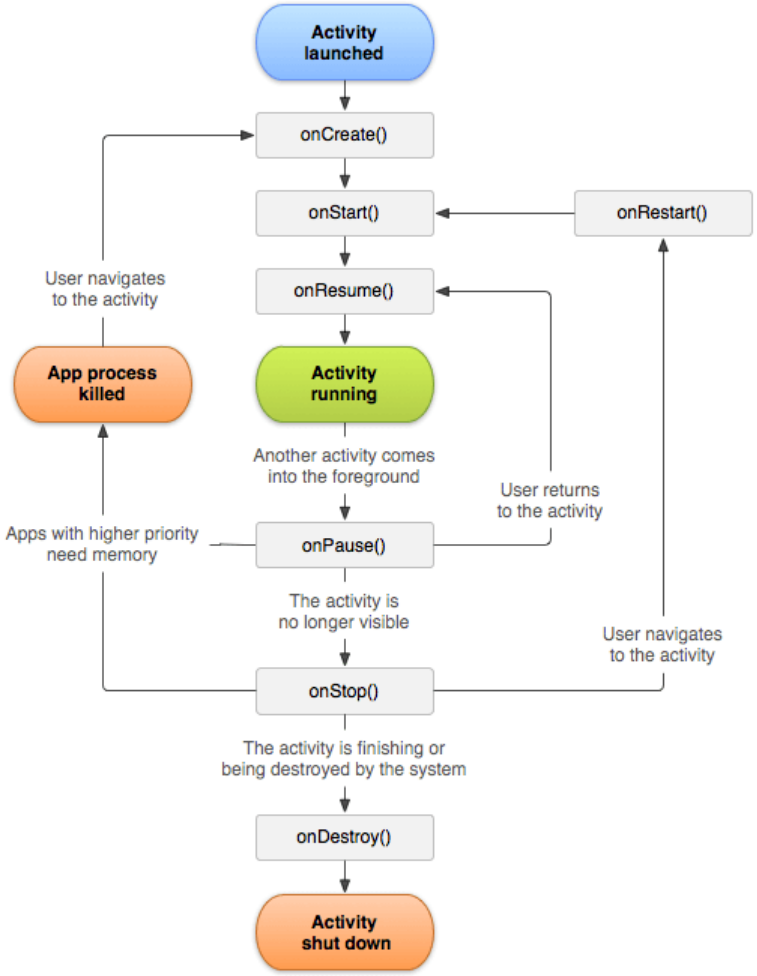
Linux Kernel is a bottom layer and heart of the android architecture. It **manages all the drivers** such as display drivers, camera drivers, Bluetooth drivers, audio drivers, memory drivers, etc. which are mainly required for the android device during the runtime.

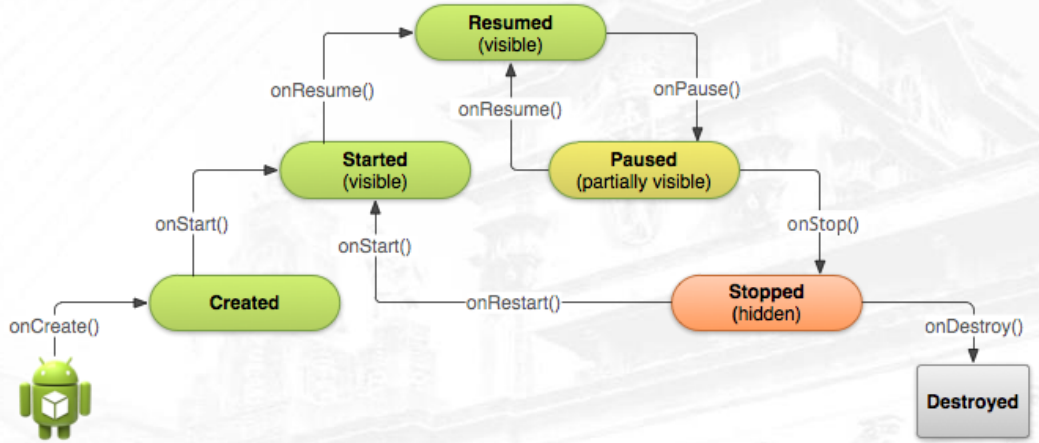


Linux Kernel

- The features of Linux kernel are:
  - **Security:** The Linux kernel handles the security between the application and the system.
  - **Memory Management**: It efficiently handles the memory management thereby providing the freedom to develop our apps.
  - **Process Management**: It manages the process well, allocates resources to processes whenever they need them.
  - **Network Stack**: It effectively handles the network communication.
  - **Driver Model**: It ensures that the application works properly on the device and hardware manufacturers responsible for building their drivers into the Linux build.

Android Activity Life Cycle





Android Activity Life Cycle

Method	Description
onCreate()	called when activity is first created.
onStart()	called when activity is becoming visible to the user.
onResume()	called when activity will start interacting with the user.
onPause()	called when activity is not visible to the user.
onStop()	called when activity is no longer visible to the user.
onRestart()	called after your activity is stopped, prior to start.
onDestroy()	called before the activity is destroyed.

Let’s start building your first Android Mobile Application!

Thank You!

Resources and Acknowledgements

- Android Developer Fundamentals. https://google-developer-training.github.io/android-developer-fundamentals-course-concepts-v2/
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