



# Android Introduction

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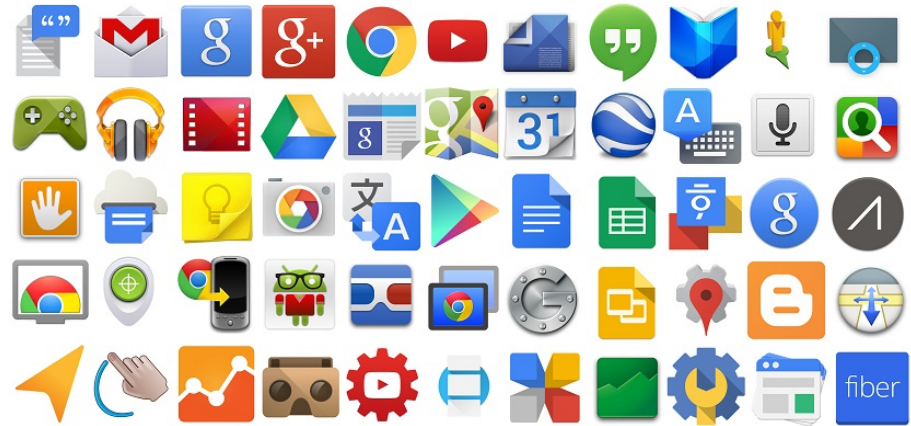
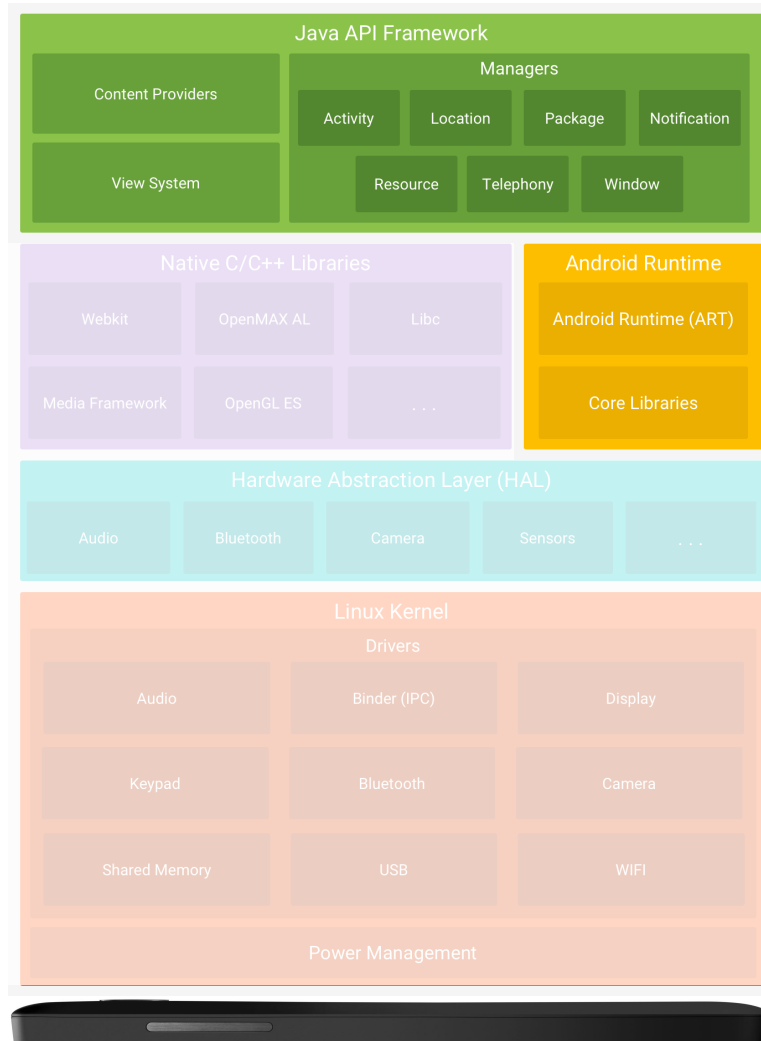
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# The Universe of Android Programming



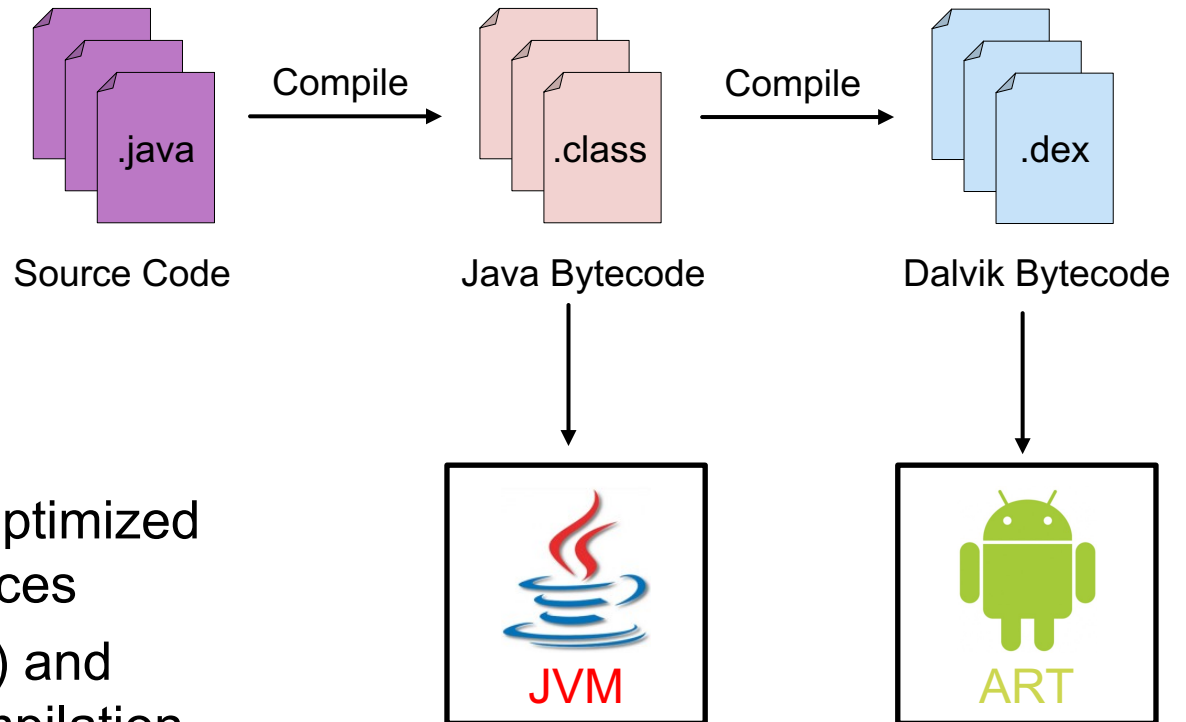


# Platform Architecture



- **Linux kernel**
  - Use key security features of linux
  - Hardware drivers for well-known kernel
- **Android Runtime**
  - Similar to Java virtual machine

# Android Runtime



- ART and DEX files optimized for low-memory devices
- Ahead-of-time (AOT) and just-in-time (JIT) compilation
- Optimized garbage collection

# Android Framework

Hardware API

App Components

Resources

Sensor Manager

Activities

Strings

Location Manager

Services

Media

Bluetooth Manager

Intents

Layout

...

...

...

# Android Key Terms

- «Activity»
  - Logical unit of a user activity  
(like window in a computer program)
  - Usually full-screen
- «View»
  - Hierarchical UI element
  - Combined in layouts and  
extended to Widgets with more functionality
- «Service»
  - Background activity without UI, e.g., music player or FTP server

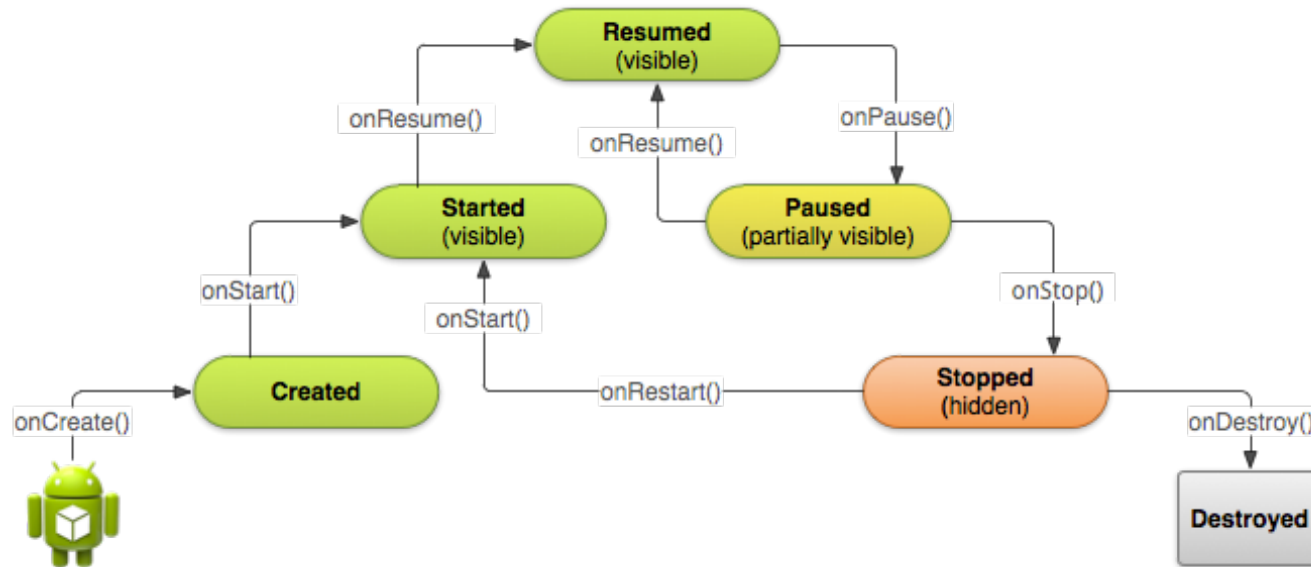


# Android Key Terms

- «Intent»
  - Asynchronous message to bind components
  - Starts or switches between «Activities»
  - Intent Filters are used to only act on specific Intents
- «BroadcastReceiver»
  - Listens for global events (Intents)  
e.g., «headphones were plugged» sent by the system
  - Can be used to pass system events for further processing
  - Can inform the user about system events



# Activity Lifecycle



- Multi-Tasking
  - OS keeps apps alive as long as possible
  - On memory shortage, processes are killed according to their priority
- Essential states of an activity
  - Running (resumed)
  - Paused
  - Stopped
  - Finished/killed



# Development Tools

- SDK Tools
  - Development and debug tools, emulator, etc.
- SDK Platforms
  - APIs for target platforms
- Build Tools
- Support libraries
  - Libraries to support backward compatibility



# Now: Android Live Hacking