Android Internals

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Android_Internals - Version: 1

🕐 5 days Course

Description:

The course describes in details the software layers of the Android operating system and their components, starting from the Linux kernel, continue with the native layer ending with the framework layer. A deep knowledge of the internal mechanisms of an operating system can help programmers write efficient applications and helps solving problems. It is also essential for those who intend to build a customized Android OS.

Intended audience:

Android programmers and support people who want better understanding of the operating system.

Prerequisites:

A previous knowledge of Android.
Basic knowledge of Linux.
Basic knowledge in C, C++ and Java.

Prerequisites:

Objectives:

Topics:

General OS Overview

- Operating system components
- Operation modes
- Android architecture

The Linux kernel

- Linux kernel overview
- Linux memory management
- Linux Process Management
- Linux I/O
- Android modified kernel

Android file systems

- Android partitions
- Mounts in Android

The native layer

- Native daemons
- Android Runtime (ART)
- External open-source libraries

The framework layer

- Application components

- Managers
- The view system
- Binder at framework layer
- System services

Android boot process

- The boot loader
- The kernel and initramfs
- The first stage init
- The second stage init
- Java level startup

Android Security

- Application sandboxing
- Trusted Execution Environment (TEE)
- Authentication
- Encryption
- Verified boot

Android Open-source Project (AOSP)

- Hardware requirements
- Download the AOSP source tree
- Building an Android image from the source

Modularization of the Android OS

- Project Treble

- The Generic Kernel Image (GKI) project
- Customizing Android
- Custom APIs
- Custom user interface
- Custom native code
- Adding device drivers