

## Android Overview

### Course Summary

#### Description

The Android Overview course is designed to give you a high level overview of Android as a development platform. It is a gentle introduction to what the Android operating system is, how we got here, what makes it fundamentally different than any other platform, and how to take advantage of its uniqueness. Android Overview is designed for both technical managers seeking a high-level understanding of the platform as well as developers warming up for a deep dive into programming for Android. By the end of this course, you will have a complete understanding of the entire operating system, at a high level.

#### Objectives

By the end of this course, students will be able to:

- Gain a solid understanding of the entire Android operating system
- Understand the big picture of how Android is put together, the SDK tools, security and other considerations
- Know what it takes to architect Android apps and what goes into testing and which debugging tools are available and best practices

#### Topics

- History of Android
- Android Stack
- Hello, Android
- Architecting Android Apps
- System Services
- Debugging and Testing
- Android Security

#### Audience

Android Overview is designed for both technical managers and team leads looking to manage Android projects, as well as experienced developers looking to jump-start their skills with Android.

#### Prerequisites

Android Overview is the most gentle introduction to the platform. As such, you do not need to have any prior experience with Android, or programming for that matter. This course is the prerequisite for most of our more advanced Android courses.

#### Duration

One day

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### Course Outline

#### I. History of Android

This module focuses on how we got here. The goal of the module is to give us an idea of design philosophy behind Android, and what it may say about the future of the platform. At this high level, we explore both technical and business choices that effect the platform for a long time. We'll look at how and Android operating system gets put together by various parties involved, from Google to carriers. Topics in this module include:

- A. Vision for Android
- B. History overview
- C. Android Open Source Project (AOSP) versions
- D. OEM add-ons
- E. Third Party Android add-ons
- F. Carrier Bloatware
- G. Android fragmentation

#### II. Android Stack

Understanding how the entire Android operating system is put together is important in order to understand how to leverage everything it has to offer. This module provides an overview of each layer of the stack and its role. We'll look at both the business and the technical design choices.

Topics in this module include:

- A. Design philosophy
- B. Open Source licenses
- C. Linux kernel space
- D. Native layer
- E. Dalvik VM
- F. Application layer
- G. Apps

#### III. Hello Android

The goal of this module is to have you write a simple Hello, World application. By the end of this module, you should be able to identify main parts of an Android app. You should also be able to verify that your tools are setup properly and that you can run the application on an Android device, either physical or emulated.

Topics covered include:

- A. Android SDK: How to set it up and what it consists of
- B. About Eclipse: The power of the tools
- C. Creating a new Android project
- D. Anatomy of a project: What are all the moving parts
- E. Running the app: Emulator, real device, tools to monitor them both

#### IV. Architecting Android Apps

Android framework provides some new and different concepts for developing an app. The goal of this module is to introduce you to main components used to create Android apps. By the end of this module, you should have a good idea what Android app building blocks are, and their key properties. For each building block, we'll explore its typical usage, the life-cycle, and gotchas related to the implementation. Most of the focus of this module is on the conceptual understanding at the lines-and-circles level of the design. Topics covered include:

- A. What makes up an Android app
- B. Activities and Android UI
- C. Fragments and best practices for reusable UI
- D. Intents, Action Bar, and More
- E. Services, IntentServices, Remote Service
- F. Content Providers and Loaders
- G. Lists and Adapters
- H. Broadcast Receivers
- I. App Widgets
- J. Federation of apps design model

#### V. Debugging and Testing Android Apps

This module provides an overview of some of the tools available in Android SDK that can help you with debugging and testing your apps. By the end of this module you should have a general knowledge of what tools are available and how to use them. The tools we'll explore include:

- A. Logcat
- B. Debugger
- C. Traceview

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### Course Outline (cont'd)

- D. HierarchyViewer
- E. Syslog
- F. Exercise Monkey
- G. Monkey Runner
- H. UIAutomator

#### VI. Android Security Overview

The goal of this module is to provide high level overview of how Android security is architected. By the end of this module, you should know how the apps are sandboxed how the security is enforced. Topics covered include:

- A. Security design overview
- B. Application sandboxing
- C. Using permissions
- D. Declaring permissions
- E. Granting and enforcing of permissions
- F. Social vectors of attack
- G. Top 10 Bad Permissions

#### VII. Android System Services Overview

The goal of this module is to give you an overview of various system services that Android framework offers to developers. We'll explore what services are there, and how to use them. Out of 60+ services, we'll pick a handful of common ones and look at their usage. Primary focus is to understand the patterns that are common for all of them so that you can deduct usage of the other services simply by following the documentation. Topics include:

- A. What are the System Services
- B. How to get a system service
- C. Pattern for using system service APIs
- D. Pattern for subscribing to service notifications
- E. Common issues with using system services
- F. Using the documentation to learn more
- G. Google Cloud Services overview