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CMSC436: Programming Handheld Systems

Android Development Environment

The Android Platform

A multi-layered software stack for building and running mobile applications

The Android Development Environment

Starts with knowledge of the Android platform Your workbench for writing Android applications See:

https://developer.android.com/studio/intro/

Today's Topics

Downloading Android SDK Using the Android Studio IDE Using the Android emulator Debugging Android applications Other tools

Prerequisites

Supported Operating Systems: Microsoft Windows 8/10 (64-bit) Mac OS X 10.14 (Mojave) or higher Any 64-bit Linux that supports Gnome, KDE, Unity DE

General Prerequisites

8GB RAM min

8GB memory for Android SDK, emulator system images, and caches

1280 x 800 min screen resolution

Getting Started

Download & install Android Studio

See: https://developer.android.com/studio/

Android Studio

Android platform

Android Studio IDE

Key development tools

System image for emulator

HelloWorld



The Android Emulator

Runs virtual devices

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The Android Emulator

Pros

- Doesn't require an actual phone
- Hardware is reconfigurable
- Changes are non-destructive

The Android Emulator

Cons

Slower than an actual device

Some features unavailable

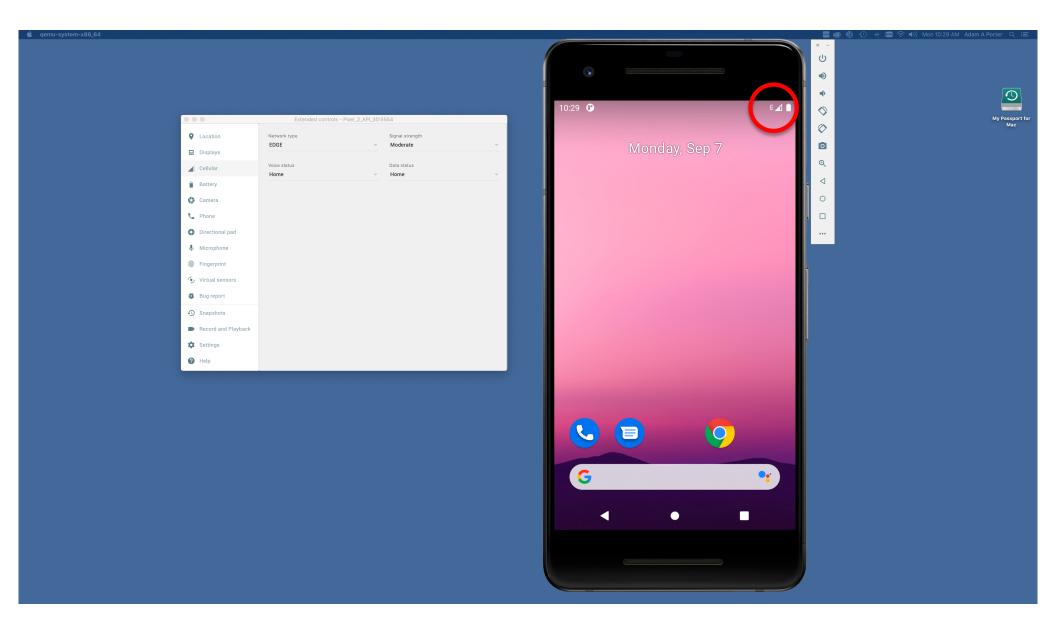
e.g., no support for NFC, SD card insert/eject, etc.

Performance / user experience can be misleading

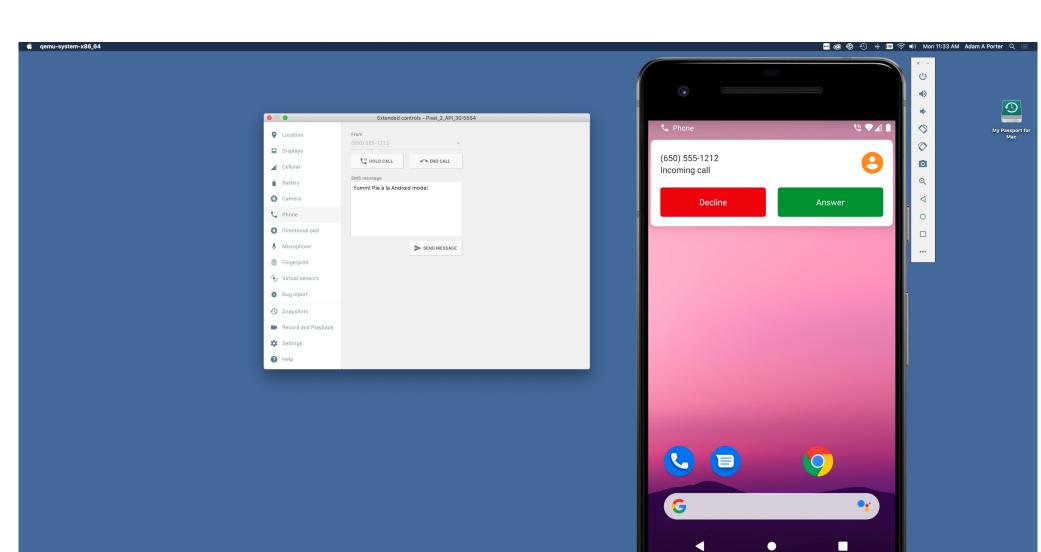
Can emulate many different device/user characteristics, such as:

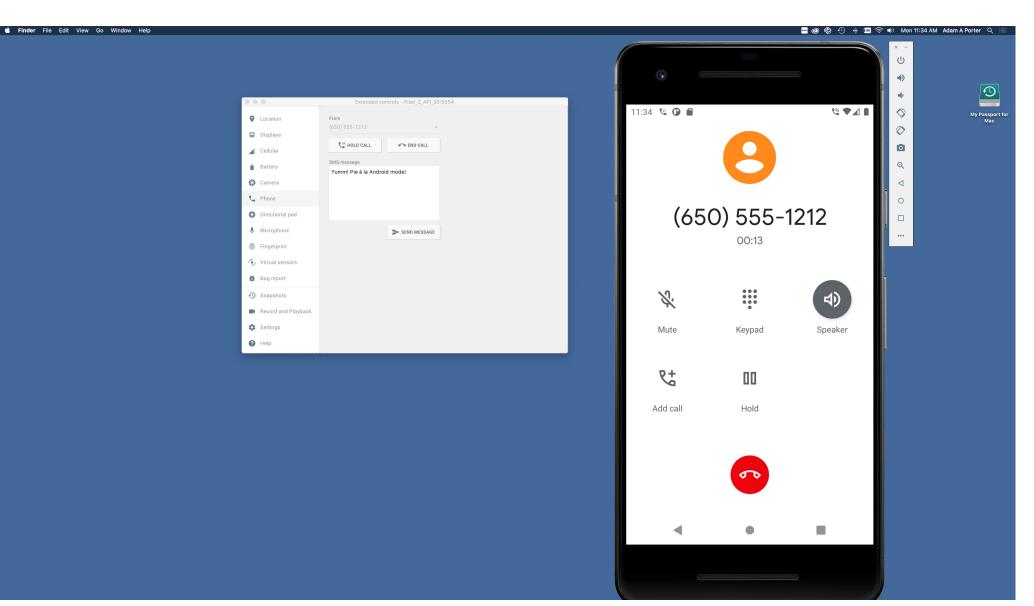
- Network speed/latencies
- **Battery power**
- Location coordinates
- Sensor readings

Ex: Change network speeds



Ex: Emulate incoming phone calls & SMS messages





Many more options

See:

https://developer.android.com/studio/run/emulator.html

Debugger

Tool for examining the internal state of a running application

TheAnswer



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Development Tools

Android Studio provides numerous tools for monitoring application behaviors

Example Tools

Device File Explorer

Logcat

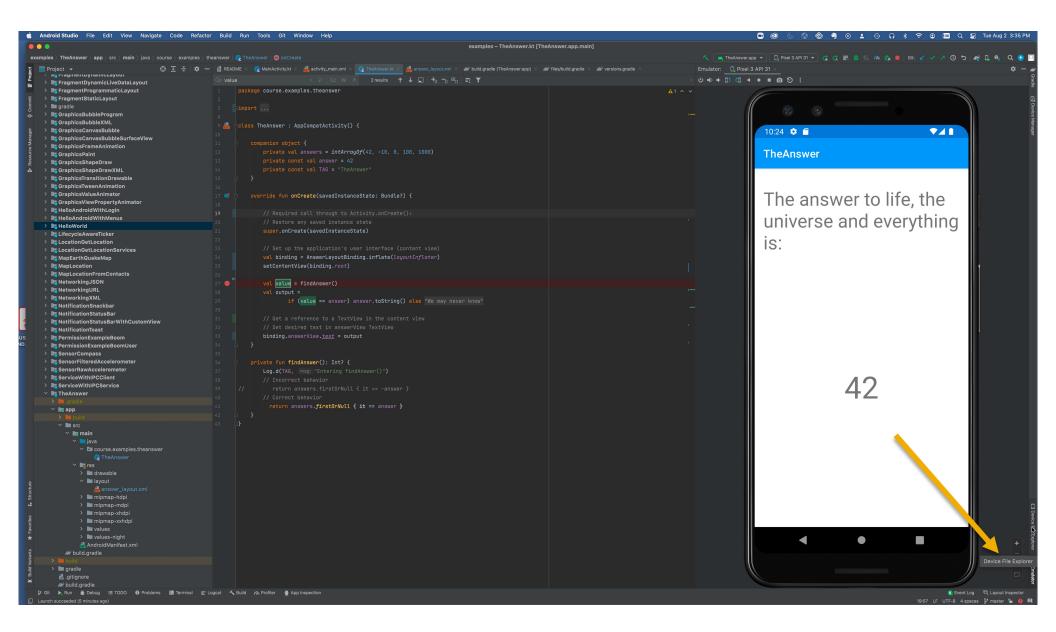
Layout Inspector

CPU Profiler

Device File Explorer

View, copy, and delete files on your device

Often used to examine and verify file creation and transfer



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Logcat

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Layout Inspector

Shows the runtime organization of the user interface

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Application Fundamentals

Example Applications

HelloWorld

TheAnswer