Mobile Software Development

DT228/3

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Developing in Android

Single Download

Android Studio

Android SDK

Java JDK

The "tool" or integrated development environment (IDE) for developing your apps

Libraries, API docs, debugger, emulators, sample code

Android uses Java so needs The Java JDK
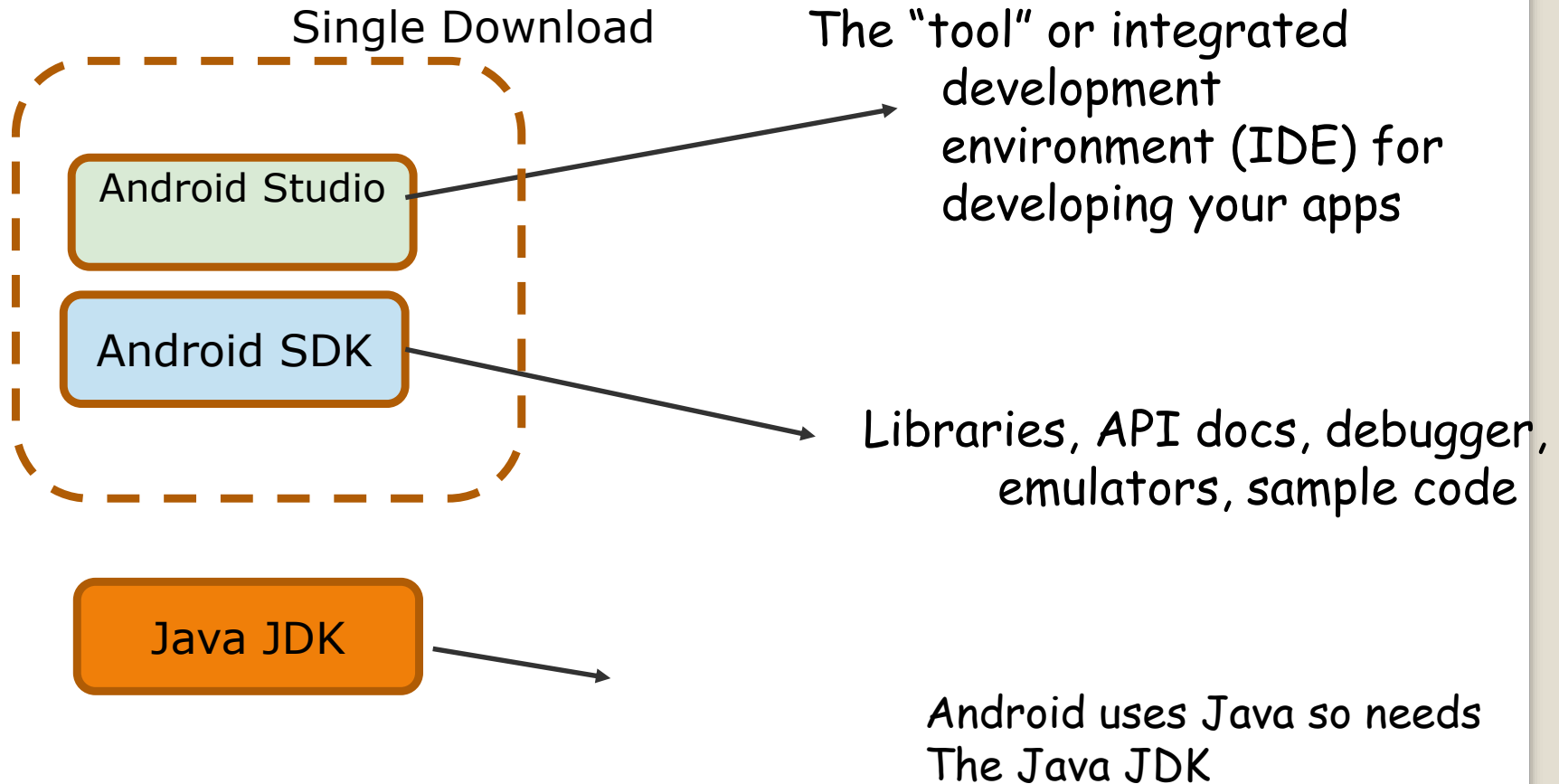
JDK = Java Development Kit
SDK = software development kit

To set up your own Android Dev environment:

- Android Studio (purpose built and recommended) is now the standard development tool for Android

- Note: Eclipse with Android (ADT) plug in still used a bit..
  OR any other one you prefer

- Android Studio (with SDK as an option) at:

  https://developer.android.com/studio/install.html
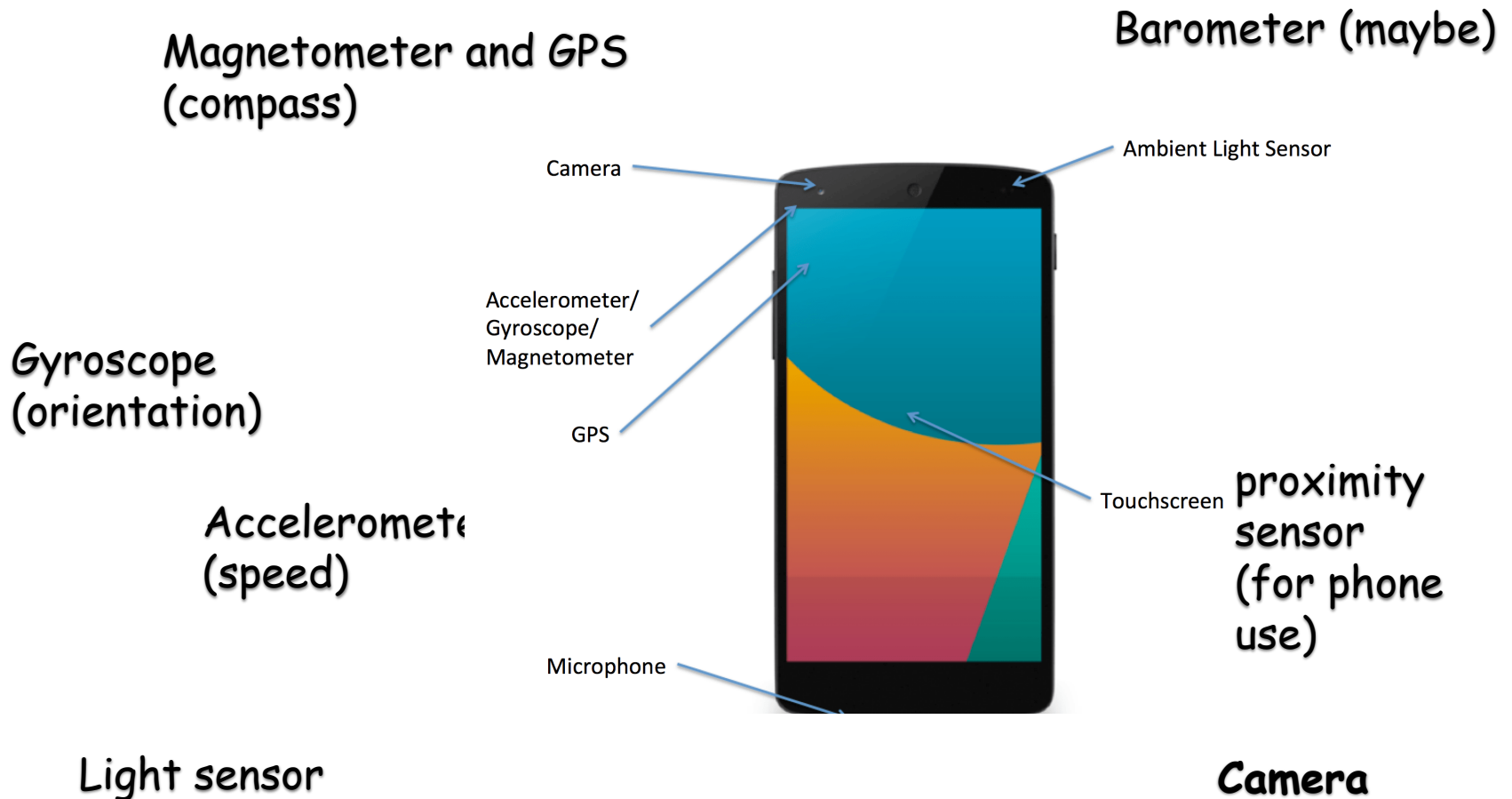
API levels and versions

A complicating factor!

Code name	Version number	Initial release date	API level
Ice Cream Sandwich	4.0 – 4.0.4	18 October 2011	14–15
Jelly Bean	4.1 – 4.3.1	9 July 2012	16–18
KitKat	4.4 – 4.4.4	31 October 2013	19–20
Lollipop	5.0 – 5.1.1	12 November 2014	21–22
Marshmallow	6.0 – 6.0.1	5 October 2015	23
Nougat	7.0 – 7.1	22 August 2016	24 - 25
Oreo	8.0.0	2017	26
Pie[16]	**9.0**	4.4.107, 4.9.84, and 4.14.42	August 6, 2018

Android smartphone – Hardware and sensors

Android versus Apple iOS

Different approaches to phone/ software

Android smartphone – hardware and sensors

Magnetometer and GPS (compass)

Barometer (maybe)

Camera

Ambient Light Sensor

Accelerometer/
Gyroscope/
Magnetometer

Gyroscope
(orientation)

GPS

Touchscreen

proximity sensor (for phone use)

Accelerometer (speed)

Microphone

Light sensor

Camera

Android API Documentation

https://developer.android.com/reference/packages.html

Running your app

Hello, Android

G 5:53 AM

Hello, Android

Need to use a real phone
(USB driver may be needed)

OR

an Android Virtual Device
-   Built into Android Studio

OR
Alternative Android emulators are
available online e.g. nox
https://downloadnox.com/
Genymotion etc.

Android Virtual Devices

Emulation or Mock up of a real phone

Most of the AVDs require hardware acceleration – enable this OR
choose an AVD that runs using CPU ARM
Tip: SD Card > 9Mb (but not much)

Resource heavy: Keep to the physically smaller emulators

Notes:
In Studio: Tools/ Android/ AVD manager to access OR
just click "RUN" to initiate

"System Image" is the enabling underlying files for AVDs

Advantages of Android Virtual Devices?

Disadvantages of Android Virtual Devices?

Advantages of Android Virtual Devices?

       Can test different API version
       Phone skins
       Layouts
       "Free"
       Can easily get at underlying database e.g. dB for the app
       Full debugging environment

Disadvantages of Android Virtual Devices?
       Slow
       Can't easily test real world scenarios such as:

           - mobile/ location based real world
           - Sensors e.g. microphone, etc

Getting your first project going..

Install
(Android studio
(includes
Android sdk)
java etc

Android
Studio:
Create an
app/ project

Create an
emulator to
test the app

Run the app/
project
On emulator

Warning!

Android in-built
Emulators are
slow to run
especially the
FIRST time

Android Platform - layers

| System Apps | (and your apps) | • Contacts
• Phone Dialer
• E-mail
• Web Browser |

| Android Framework | • Activity Manager
• Content Provider
• Location Manager
• Notification Manager |

| Runtime + Dalvik VM | • Lightweight Java VM
• Efficient Bytecode |

| Native Libraries | • Surface Manager
• 2D+3D Graphics (OpenGL) + Media
• SQLite
• Browser (webkit) |

| Linux |

Inside a project

Java

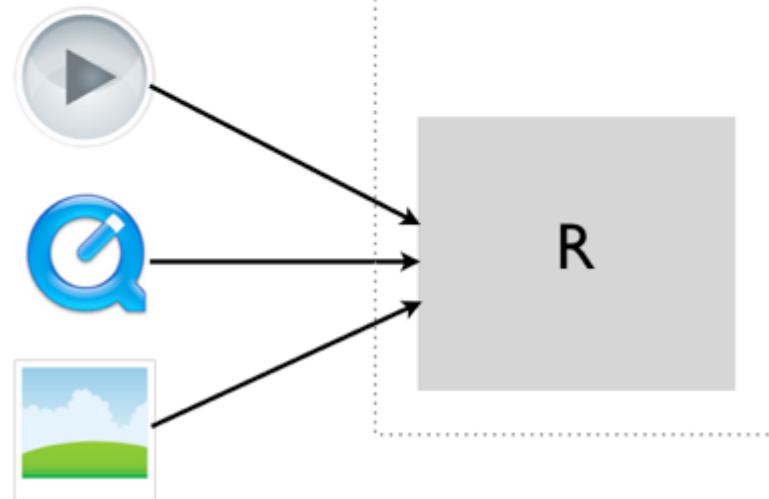Res -- Layouts (design versus text views)

Manifest

Android – "vocabulary"

Resource:

R class

R. java is a critical file in each project
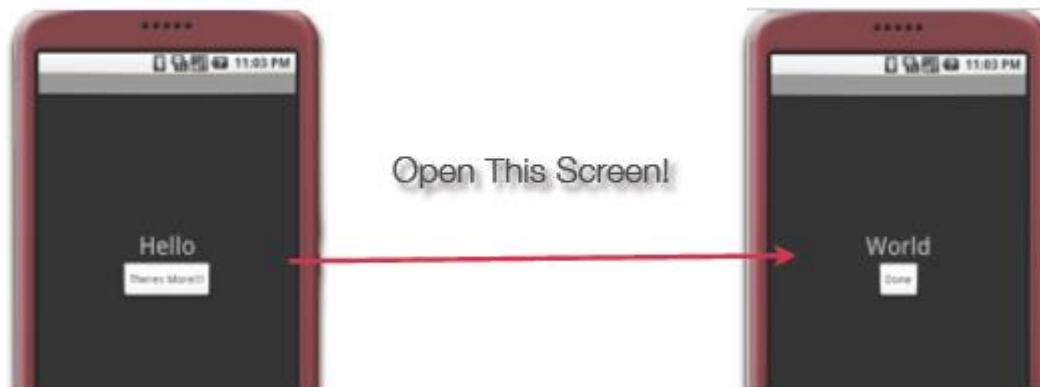
Android – "vocabulary"

Activity

Layout file

XMl files

Android – "vocabulary"

Intent:

Code to accomplish a verb, like "Call this number" or "Open the contacts list" .

Android – Project

- Every Android app created via an Android Project

- Project holds all source code, resources etc

- "Building" project turns it into an APK file

- Specific tree structure

Android application files

An **.apk** = Android Package (APK) file.

A variant of the Jar format

Used for the distribution and installation

An .apk file can be opened and inspected using common archive tools such as 7Zip, WinZip

Labs this week

Laptops   https://developer.android.com/studio/install.html

Download

Cable (for your phone)