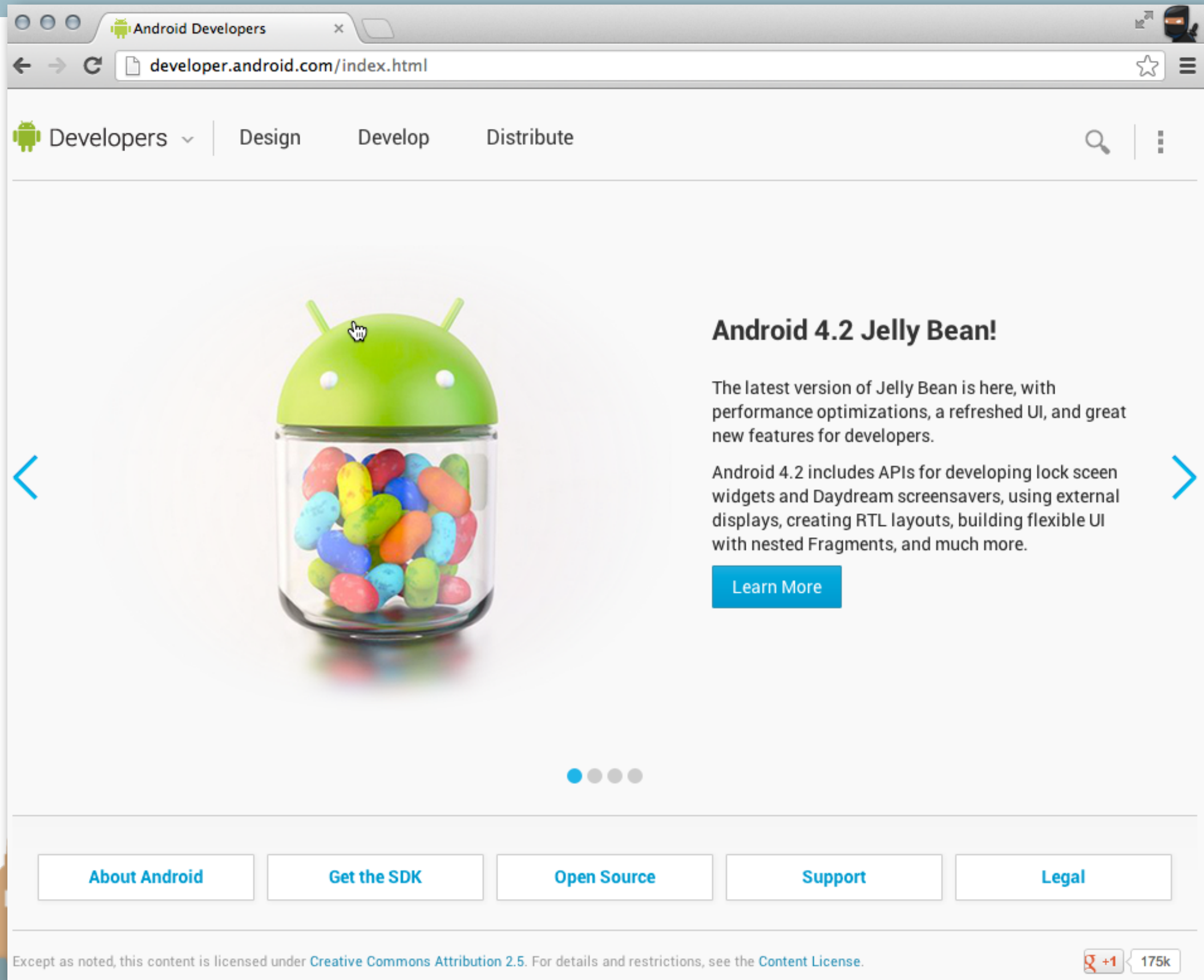


User Interaction: Intro to Android

Assoc. Professor Donald J. Patterson
INF 134 Fall 2012

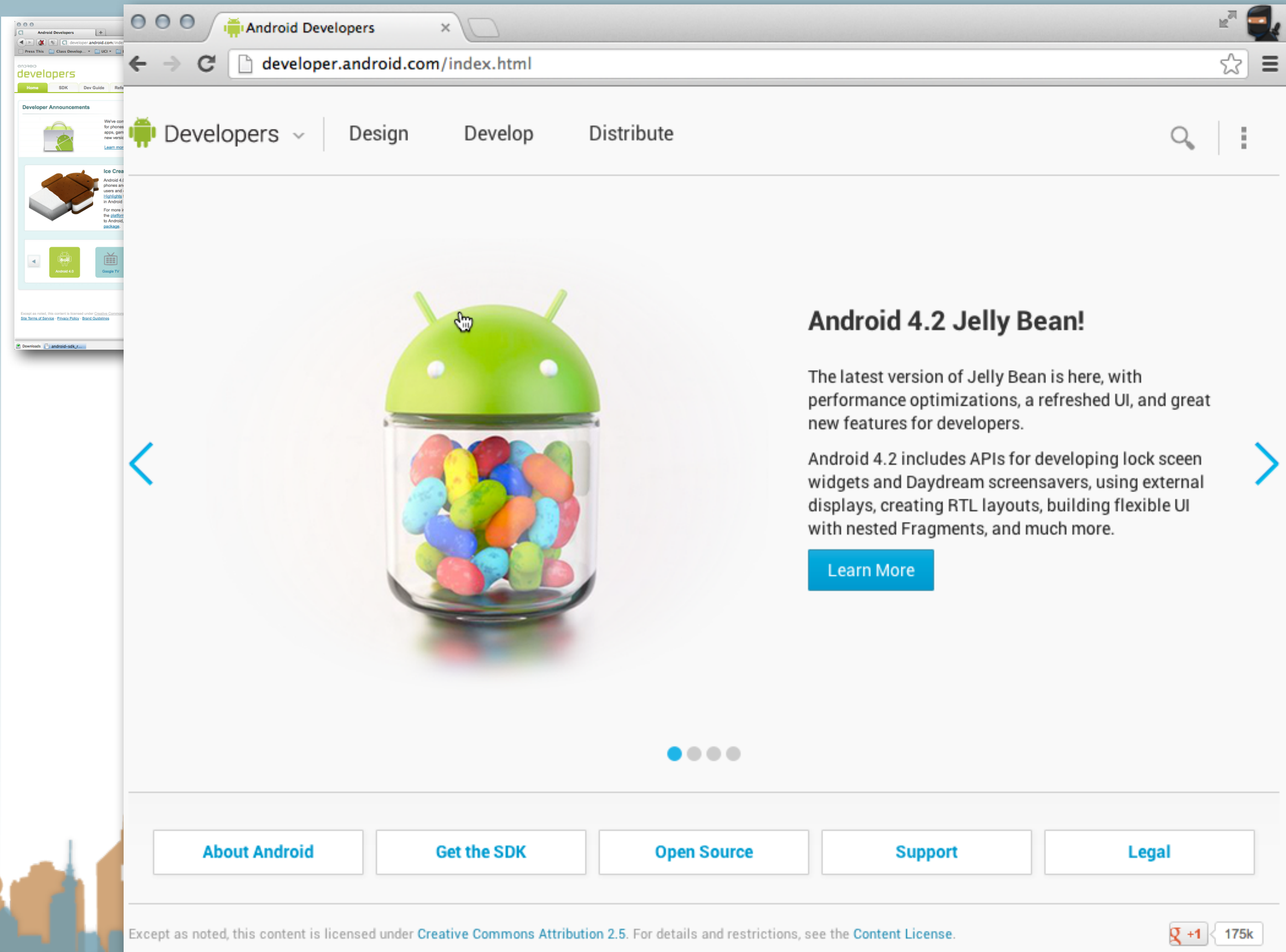


Intro to Android



<http://developer.android.com/guide/index.html>

Intro to Android



The screenshot shows a web browser window with the URL `developer.android.com/index.html`. The page features a navigation bar with links for **Design**, **Develop**, and **Distribute**. The main content area is titled **Android 4.2 Jelly Bean!** and includes a large image of the Android robot head inside a glass jar filled with colorful jelly beans. To the right of the image, the text reads: "The latest version of Jelly Bean is here, with performance optimizations, a refreshed UI, and great new features for developers." Below this, it states: "Android 4.2 includes APIs for developing lock screen widgets and Daydream screensavers, using external displays, creating RTL layouts, building flexible UI with nested Fragments, and much more." A blue **Learn More** button is positioned below the text. At the bottom of the page, there are five buttons: **About Android**, **Get the SDK**, **Open Source**, **Support**, and **Legal**. A footer note mentions the Creative Commons Attribution 2.5 license, and a Google+ badge shows 175k followers.

Android Developers

developer.android.com/index.html

Design Develop Distribute

Android 4.2 Jelly Bean!

The latest version of Jelly Bean is here, with performance optimizations, a refreshed UI, and great new features for developers.

Android 4.2 includes APIs for developing lock screen widgets and Daydream screensavers, using external displays, creating RTL layouts, building flexible UI with nested Fragments, and much more.

[Learn More](#)

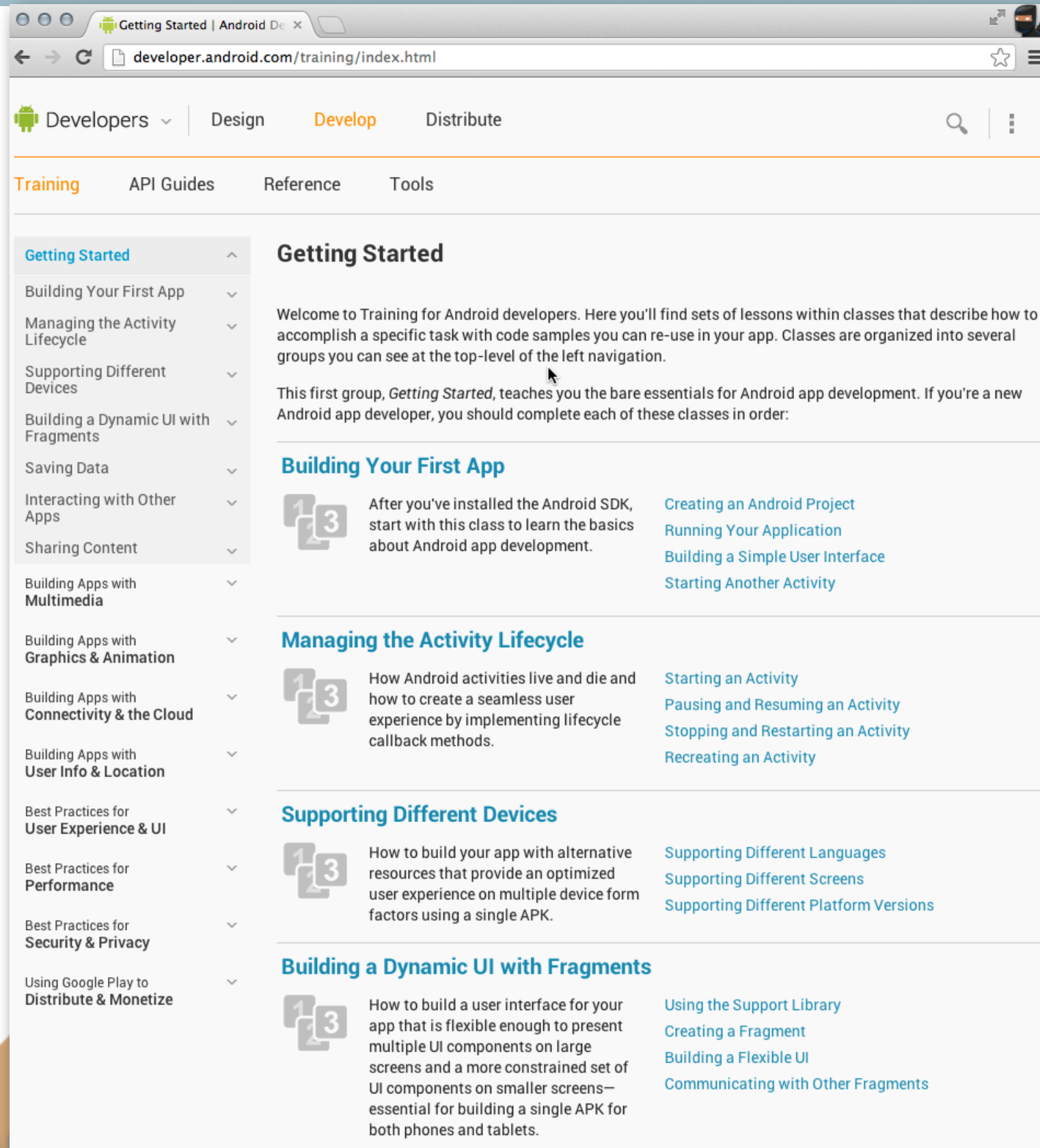
[About Android](#) [Get the SDK](#) [Open Source](#) [Support](#) [Legal](#)

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[+1](#) 175k

<http://developer.android.com/guide/index.html>

Intro to Android

A screenshot of a web browser displaying the 'Getting Started' page of the Android Developer Training Index. The browser's address bar shows 'developer.android.com/training/index.html'. The page has a navigation bar with 'Developers', 'Design', 'Develop', and 'Distribute'. Below this is a sub-navigation bar with 'Training', 'API Guides', 'Reference', and 'Tools'. The main content area is titled 'Getting Started' and includes a welcome message, a list of recommended classes for new developers, and a sidebar with a list of all training topics. The sidebar topics include 'Building Your First App', 'Managing the Activity Lifecycle', 'Supporting Different Devices', 'Building a Dynamic UI with Fragments', 'Saving Data', 'Interacting with Other Apps', 'Sharing Content', 'Building Apps with Multimedia', 'Building Apps with Graphics & Animation', 'Building Apps with Connectivity & the Cloud', 'Building Apps with User Info & Location', 'Best Practices for User Experience & UI', 'Best Practices for Performance', 'Best Practices for Security & Privacy', and 'Using Google Play to Distribute & Monetize'. The main content area lists the following classes: 'Building Your First App' (After you've installed the Android SDK, start with this class to learn the basics about Android app development.), 'Managing the Activity Lifecycle' (How Android activities live and die and how to create a seamless user experience by implementing lifecycle callback methods.), 'Supporting Different Devices' (How to build your app with alternative resources that provide an optimized user experience on multiple device form factors using a single APK.), and 'Building a Dynamic UI with Fragments' (How to build a user interface for your app that is flexible enough to present multiple UI components on large screens and a more constrained set of UI components on smaller screens—essential for building a single APK for both phones and tablets.). Each class has a list of sub-topics linked to it.

Getting Started | Android De x

developer.android.com/training/index.html

Developers Design Develop Distribute

Training API Guides Reference Tools

Getting Started

Welcome to Training for Android developers. Here you'll find sets of lessons within classes that describe how to accomplish a specific task with code samples you can re-use in your app. Classes are organized into several groups you can see at the top-level of the left navigation.

This first group, *Getting Started*, teaches you the bare essentials for Android app development. If you're a new Android app developer, you should complete each of these classes in order:

Building Your First App

After you've installed the Android SDK, start with this class to learn the basics about Android app development.

- Creating an Android Project
- Running Your Application
- Building a Simple User Interface
- Starting Another Activity

Managing the Activity Lifecycle

How Android activities live and die and how to create a seamless user experience by implementing lifecycle callback methods.

- Starting an Activity
- Pausing and Resuming an Activity
- Stopping and Restarting an Activity
- Recreating an Activity

Supporting Different Devices

How to build your app with alternative resources that provide an optimized user experience on multiple device form factors using a single APK.

- Supporting Different Languages
- Supporting Different Screens
- Supporting Different Platform Versions

Building a Dynamic UI with Fragments

How to build a user interface for your app that is flexible enough to present multiple UI components on large screens and a more constrained set of UI components on smaller screens—essential for building a single APK for both phones and tablets.

- Using the Support Library
- Creating a Fragment
- Building a Flexible UI
- Communicating with Other Fragments

Getting Started ^

Building Your First App v

Managing the Activity Lifecycle v

Supporting Different Devices v

Building a Dynamic UI with Fragments v

Saving Data v

Interacting with Other Apps v

Sharing Content v

Building Apps with Multimedia v

Building Apps with Graphics & Animation v

Building Apps with Connectivity & the Cloud v

Building Apps with User Info & Location v

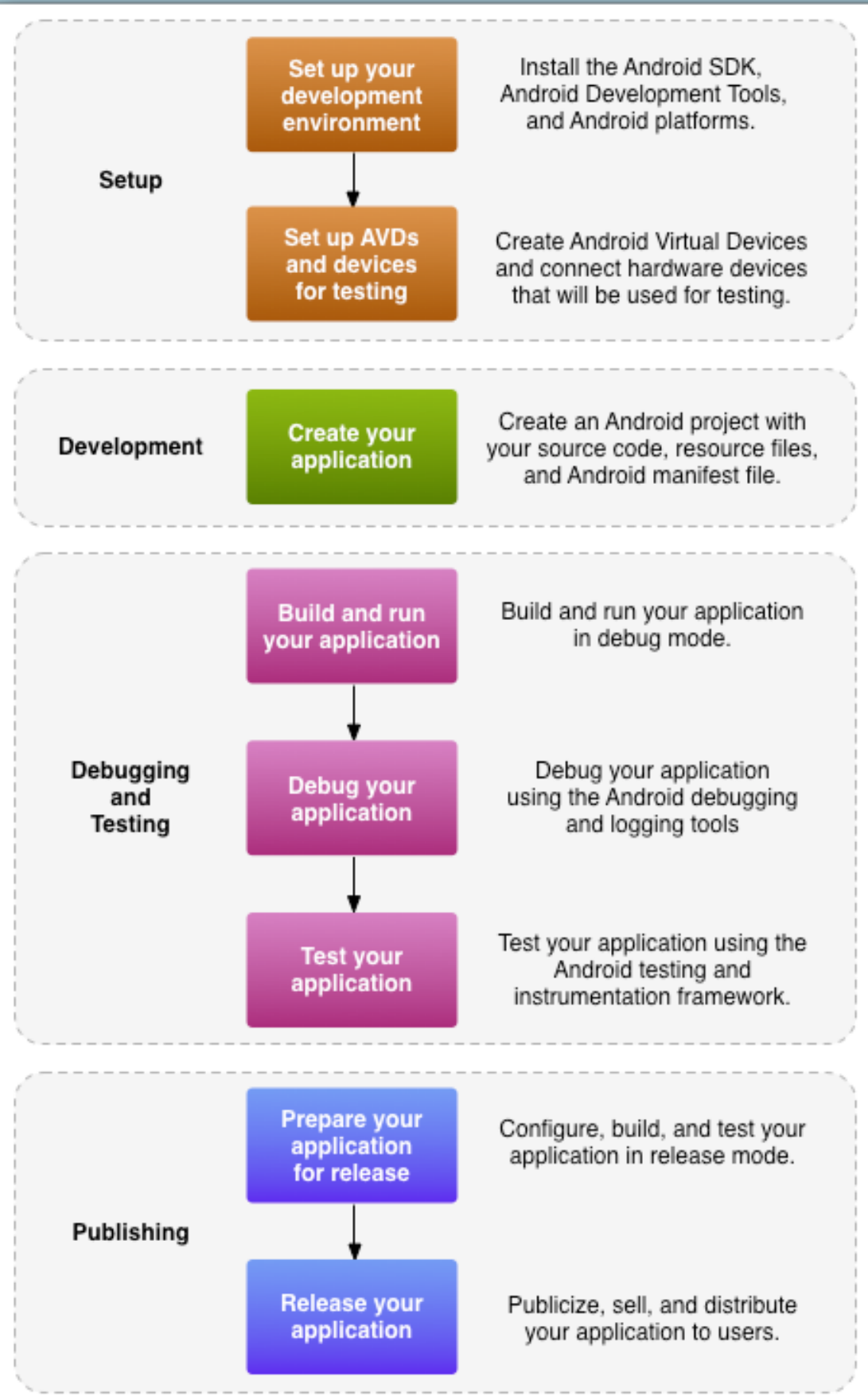
Best Practices for User Experience & UI v

Best Practices for Performance v

Best Practices for Security & Privacy v

Using Google Play to Distribute & Monetize v

<http://developer.android.com/training/index.html>



- SDK (Software development kit)
- AVD (Android Virtual Device)
- .apk (Android application package file)
- “platform”: Gingerbread v2.3.4 is our target (Release 10)
- ADT (Android Development Tools) Eclipse plug-ins plus command line tools

<http://developer.android.com/guide/index.html>

Actually Developing for Android 2.3.6

- Requirements
- SDK/AVD
- Eclipse Plug-in
- Hello World

A stylized illustration of a city skyline at the bottom of the slide. It features various buildings in shades of orange, blue, and green, with palm trees interspersed among them. The entire scene is set against a light green background.

<http://developer.android.com/guide/index.html>

Actually Developing for Android 2.3.6

- Requirements
- SDK/AVD
- Eclipse Plug-in
- Hello World

A stylized illustration of a city skyline at the bottom of the slide. It features various buildings in shades of orange, brown, and blue, with green palm trees and foliage in the foreground. The URL is overlaid on this graphic.

<http://developer.android.com/guide/index.html>

Actually Developing for Android 2.3.6

- Requirements
- SDK/AVD
- Eclipse Plug-in
- Hello World

A stylized illustration of a city skyline with various buildings in shades of orange, blue, and green, set against a light background. The buildings are simplified shapes, some with palm trees in front of them.

<http://developer.android.com/guide/index.html>

Intro to Android: Requirements

- OS
 - Windows XP (32), Vista (32/64) or Windows 7 (32/64)
 - Mac OS 10.5.8 or later (Leopard, x86 only)
 - Linux (e.g., Ubuntu Lucid Lynx (32))
- IDE
 - Eclipse 3.5 or greater
 - “Eclipse IDE for Java Developers” (for example)
- Java
 - JDK 5 or 6 (1.5 or 1.6 (not just JRE!))



<http://developer.android.com/guide/index.html>

Actually Developing for Android

- Requirements
- SDK/AVD
- Eclipse Plug-in
- Hello World

A stylized illustration of a city skyline at the bottom of the slide. It features various buildings in shades of orange, brown, and blue, with green palm trees and foliage in the foreground. The URL is overlaid on this graphic.

<http://developer.android.com/guide/index.html>

Actually Developing for Android

- Requirements
- SDK/AVD
- Eclipse Plug-in
- Hello World

<http://developer.android.com/guide/index.html>

- Option 1: Download and unpack the appropriate “Android SDK /ADT bundle”

ADT Bundle			
Platform	Package	Size	MD5 Checksum
Windows 32-bit	adt-bundle-windows-x86.zip	417851015 bytes	42d9a6c15113d405a97eed05e6d42e2b
Windows 64-bit	adt-bundle-windows-x86_64.zip	417851515 bytes	73bdd1168fce0e36a27255a4335c865d
Mac OS X 64-bit	adt-bundle-mac-x86_64.zip	382957959 bytes	a320f8bbaee8572a36e68c434564bdd0
Linux 32-bit	adt-bundle-linux-x86.zip	411065882 bytes	39687b06fedfea7487ff0824a4d32ee8
Linux 64-bit	adt-bundle-linux-x86_64.zip	411217430 bytes	b0590fe9c1533da9b20ea65525b77677

- This is the SDK and a version of eclipse all set up and ready to go

<http://developer.android.com/sdk/index.html>

- Option 2: Download and unpack the appropriate “Android SDK”

SDK Tools Only

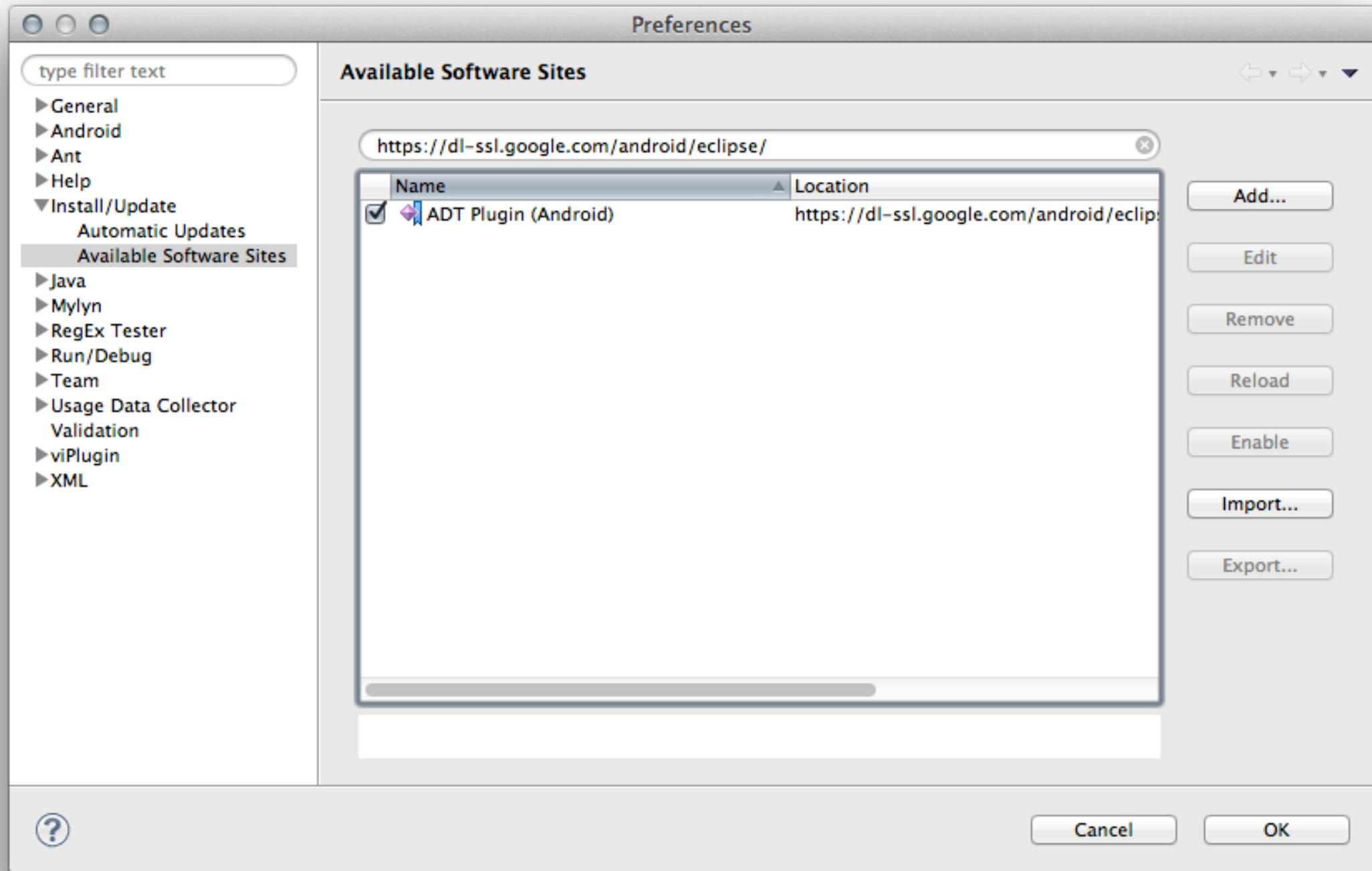
Platform	Package	Size	MD5 Checksum
Windows	android-sdk_r21-windows.zip	99093893 bytes	7311452823470365f7975a545f8a2be4
	installer_r21-windows.exe (Recommended)	77523031 bytes	29ca8cb8f0bc8db627fa2adc2139a3cc
Mac OS X	android-sdk_r21-macosx.zip	65792626 bytes	67e46adca90dd18d7291443f6c15d6af
Linux	android-sdk_r21-linux.tgz	91378351 bytes	7f8d73b629f808cdcf9f9900bbd7580

- This is just the SDK if you want to add Android to an existing Eclipse IDE installation

<http://developer.android.com/sdk/index.html>

Intro to Android: SDK

- Option 2: Install the Eclipse Android ADT tools



<http://developer.android.com/sdk/installing/installing-adt.html>

Intro to Android: Eclipse Plug-in

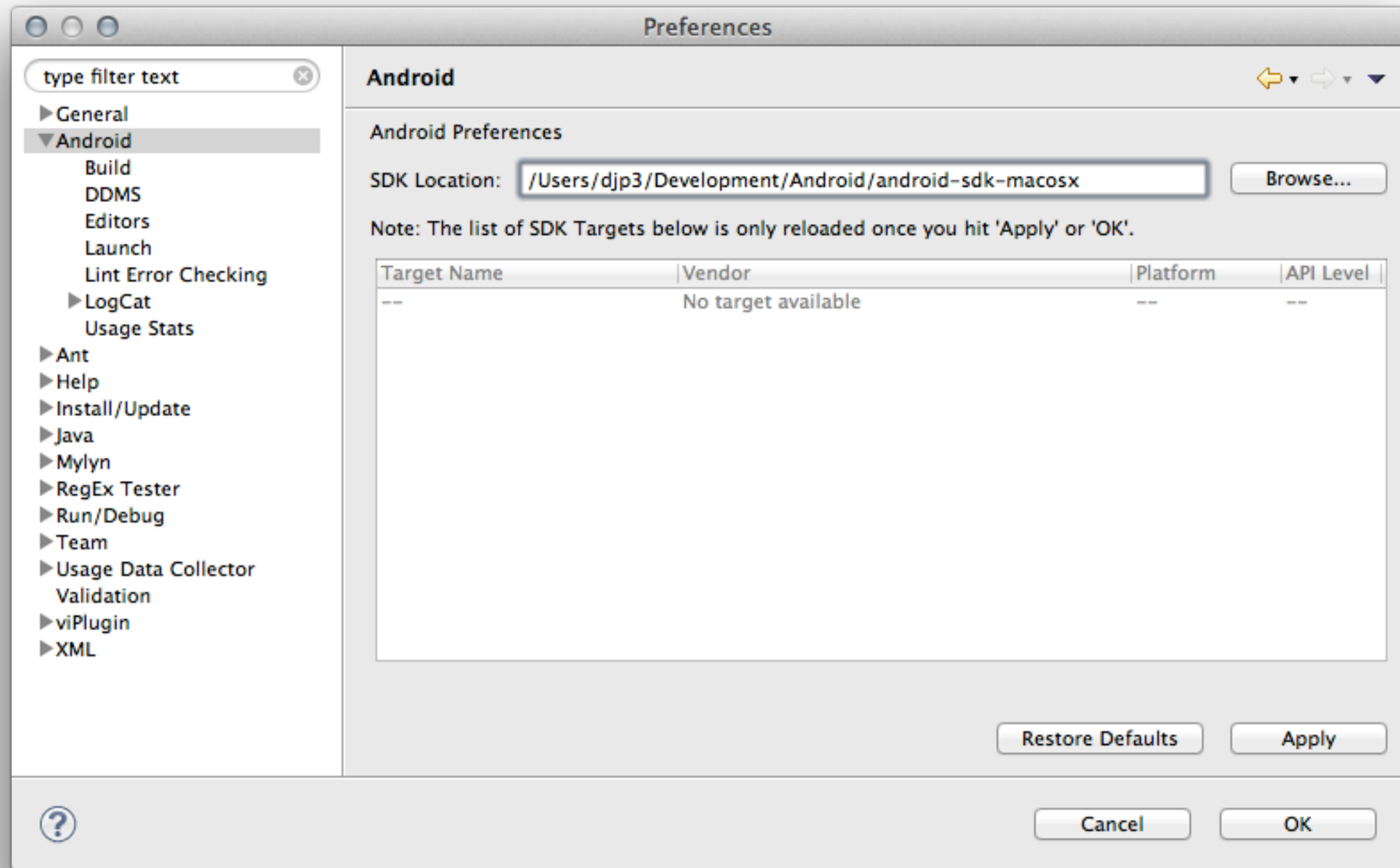
- The Eclipse Plug-in is called the “ADT”
 - Android Development Tools
 - Support for menu options in Eclipse which support
 - Automatically building Android projects
 - User-Interface building for Android
 - Debugging support for Android
 - Packaging files for the Android Market (.apk files)
- The ADT is installed from within Eclipse

A stylized, colorful illustration of a city skyline with various buildings, palm trees, and greenery in shades of orange, blue, and green.

<http://developer.android.com/sdk/eclipse-adt.html>

Intro to Android: SDK

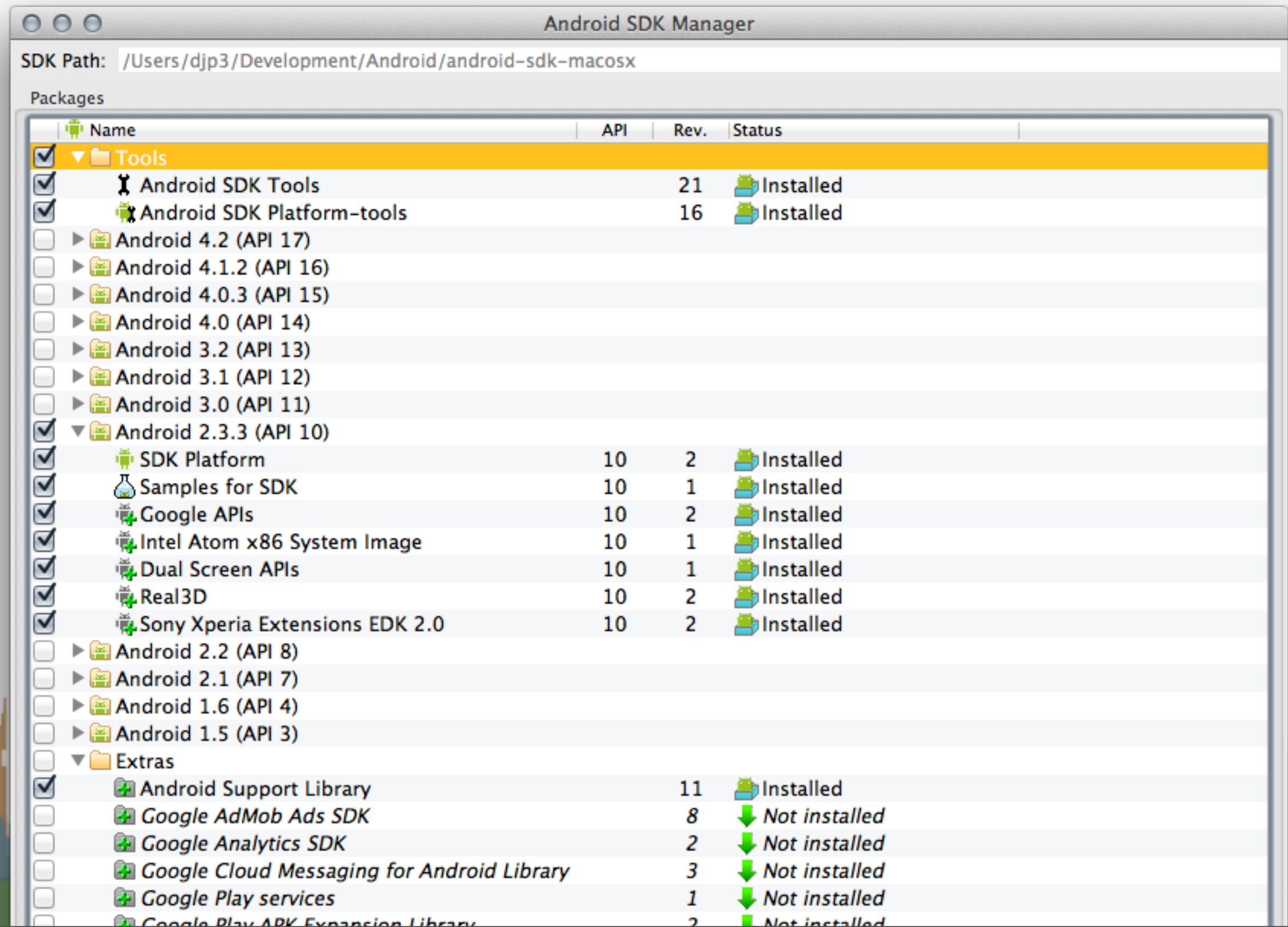
- Option 2: Restart Eclipse and load the SDK location



<http://developer.android.com/sdk/installing/installing-adt.html>

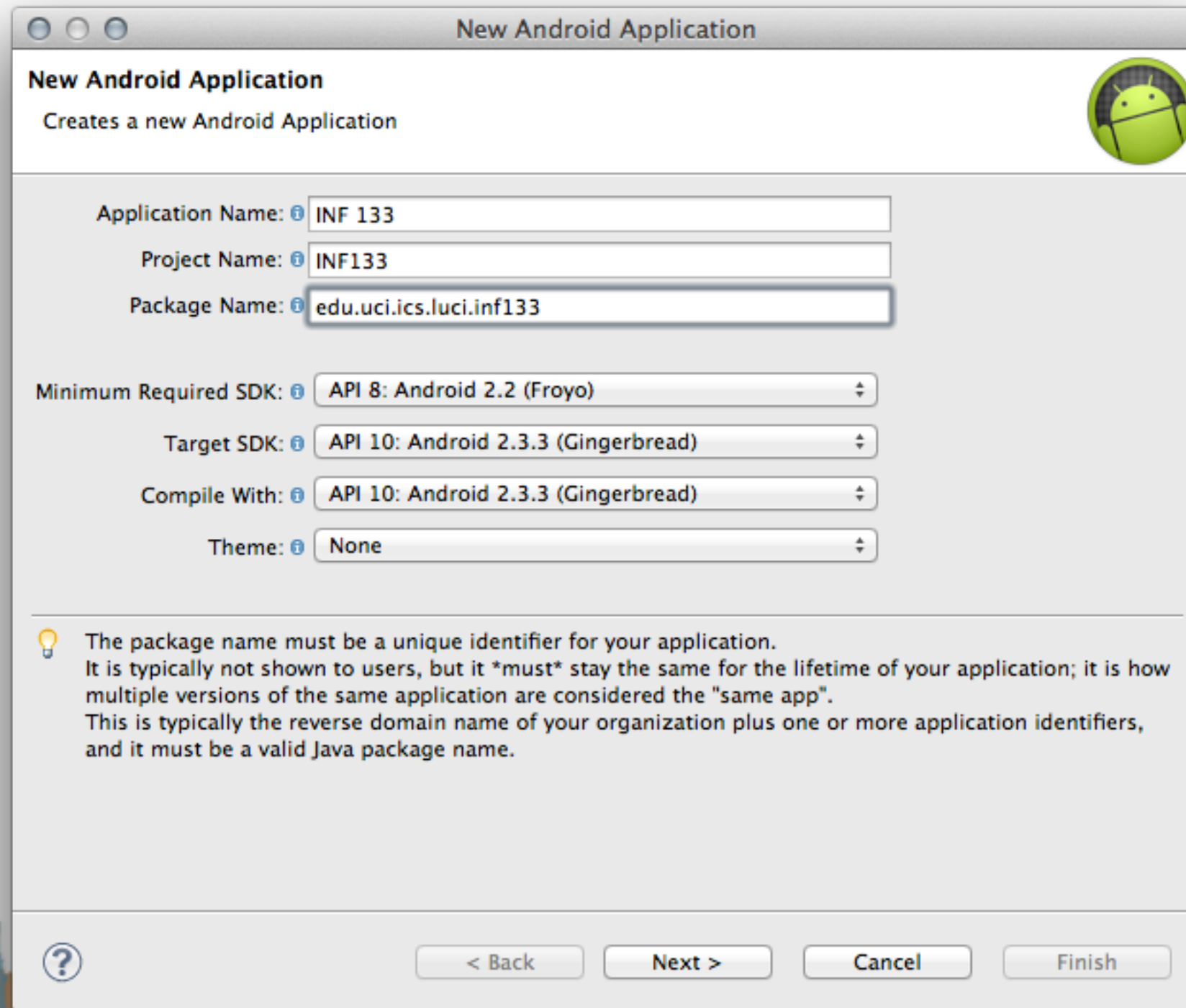
Intro to Android: SDK

- Option 2: Pick which platform you are developing for



Intro to Android:

- Set up a project



New Android Application
Creates a new Android Application

Application Name:

Project Name:

Package Name:

Minimum Required SDK:

Target SDK:

Compile With:

Theme:

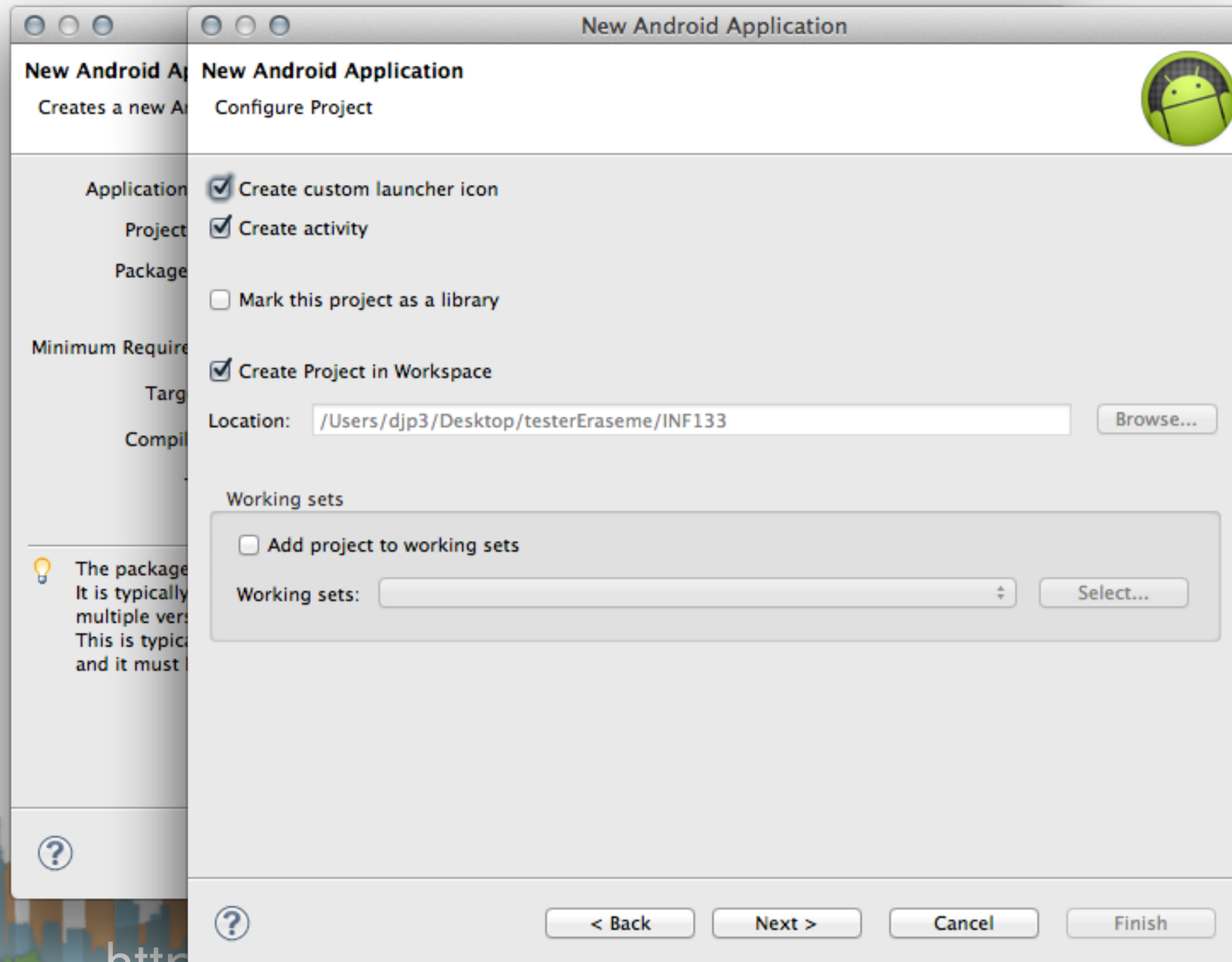
 The package name must be a unique identifier for your application. It is typically not shown to users, but it **must** stay the same for the lifetime of your application; it is how multiple versions of the same application are considered the "same app". This is typically the reverse domain name of your organization plus one or more application identifiers, and it must be a valid Java package name.



<http://developer.android.com/sdk/installing/installing-adb.html>

Intro to Android:

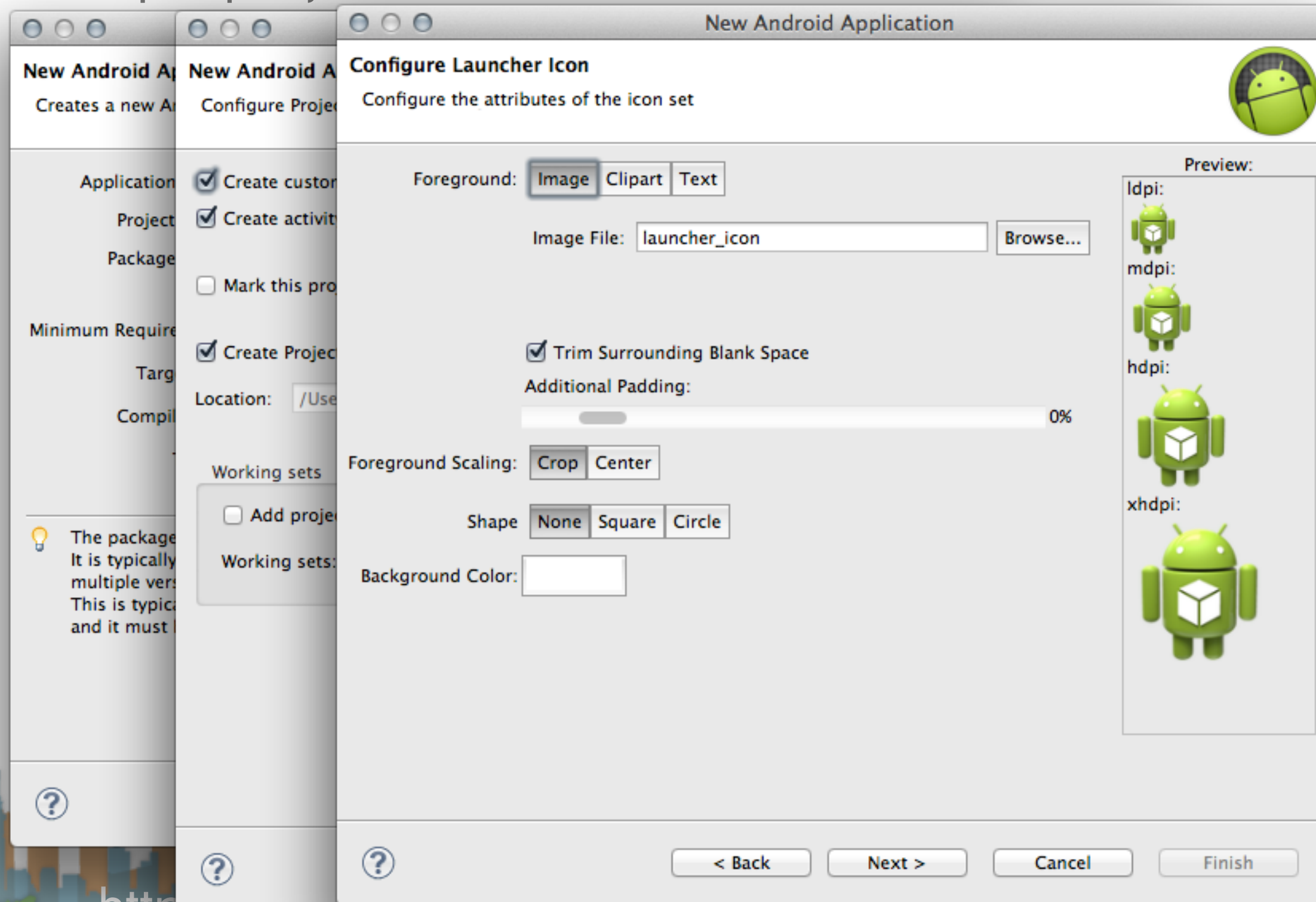
- Set up a project



<http://developer.android.com/sdk/installing-adt.html>

Intro to Android:

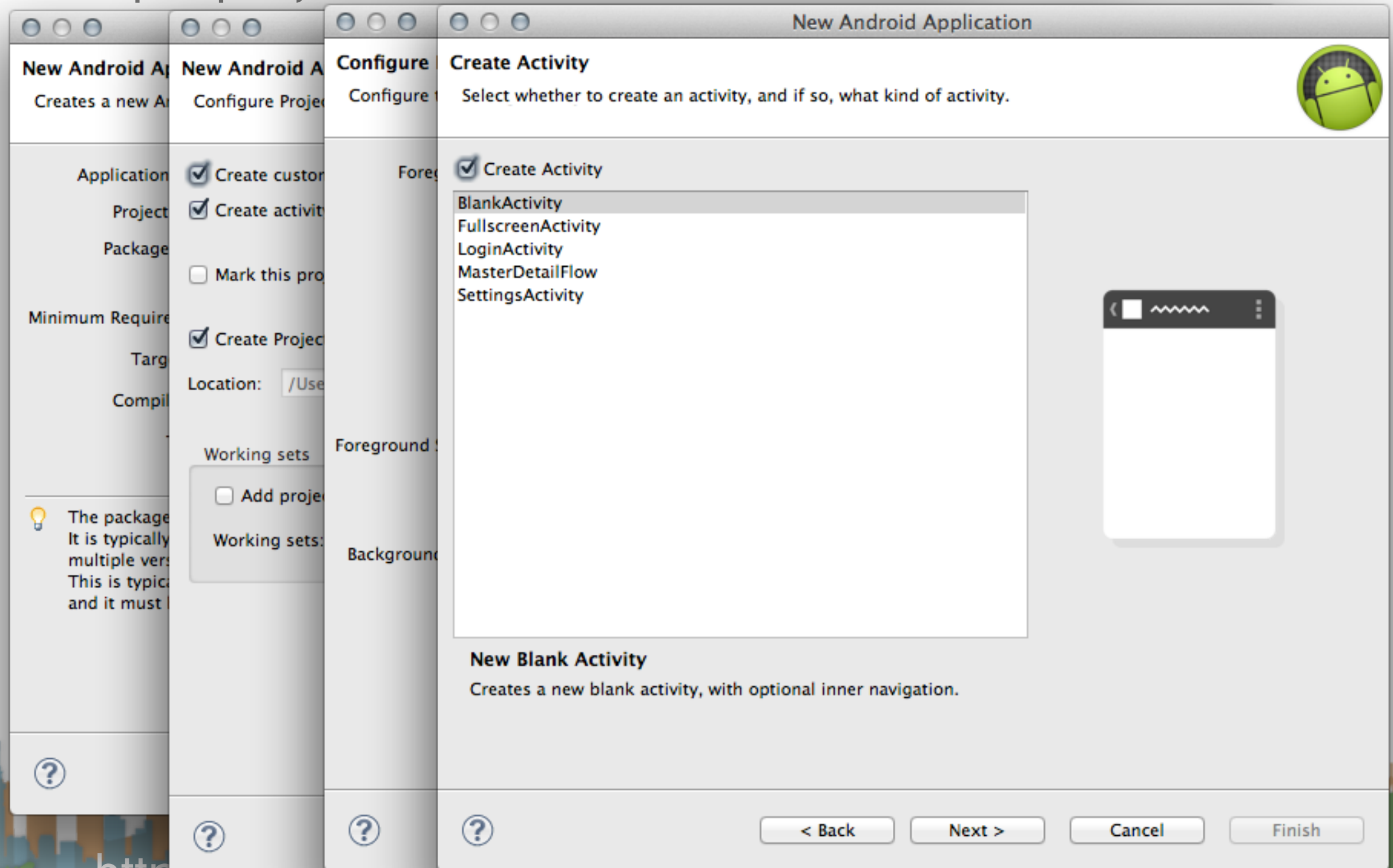
- Set up a project



<http://developer.android.com/sdk/installing/installing-adb.html>

Intro to Android:

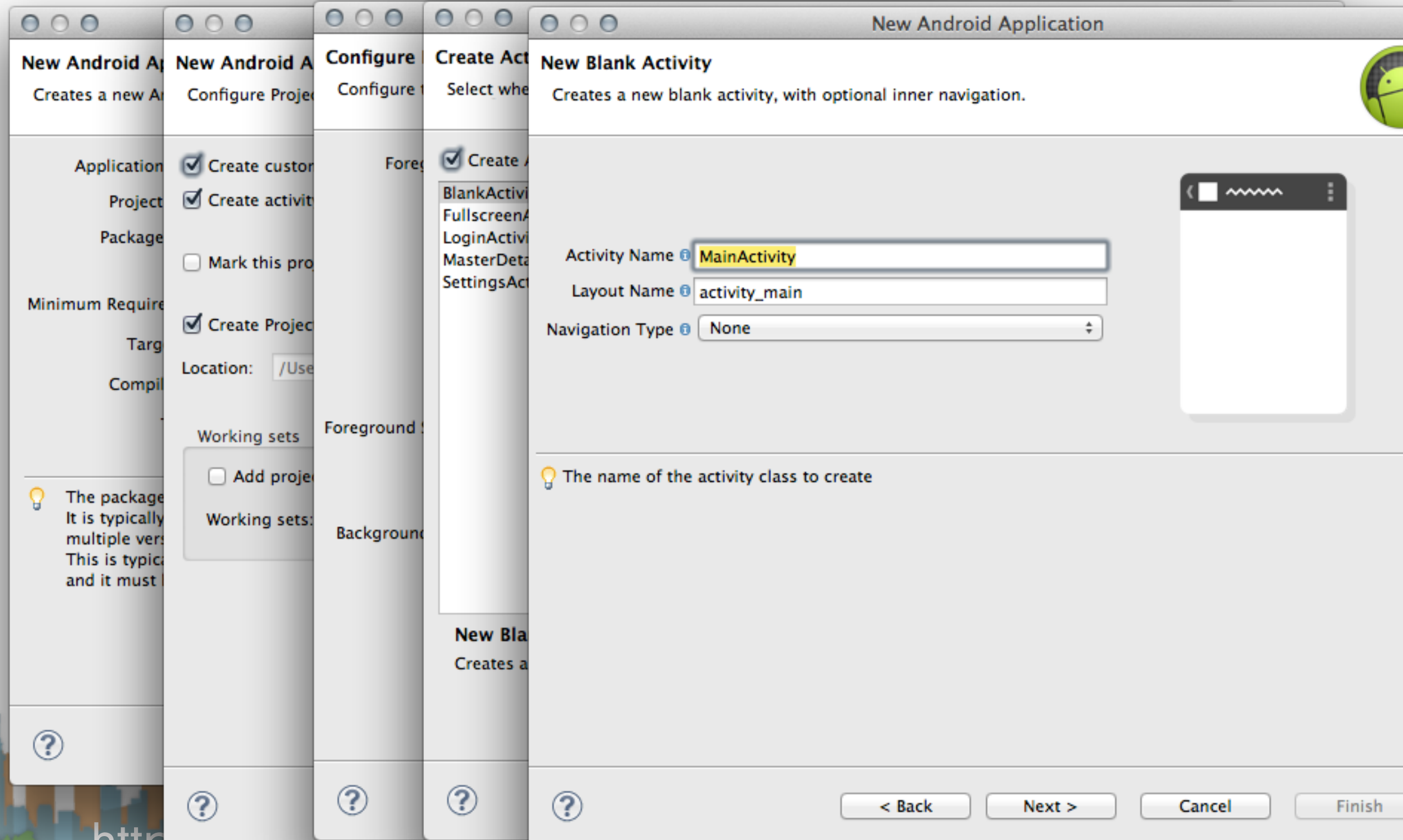
- Set up a project



<http://developer.android.com/sdk/installing/installing-adt.html>

Intro to Android:

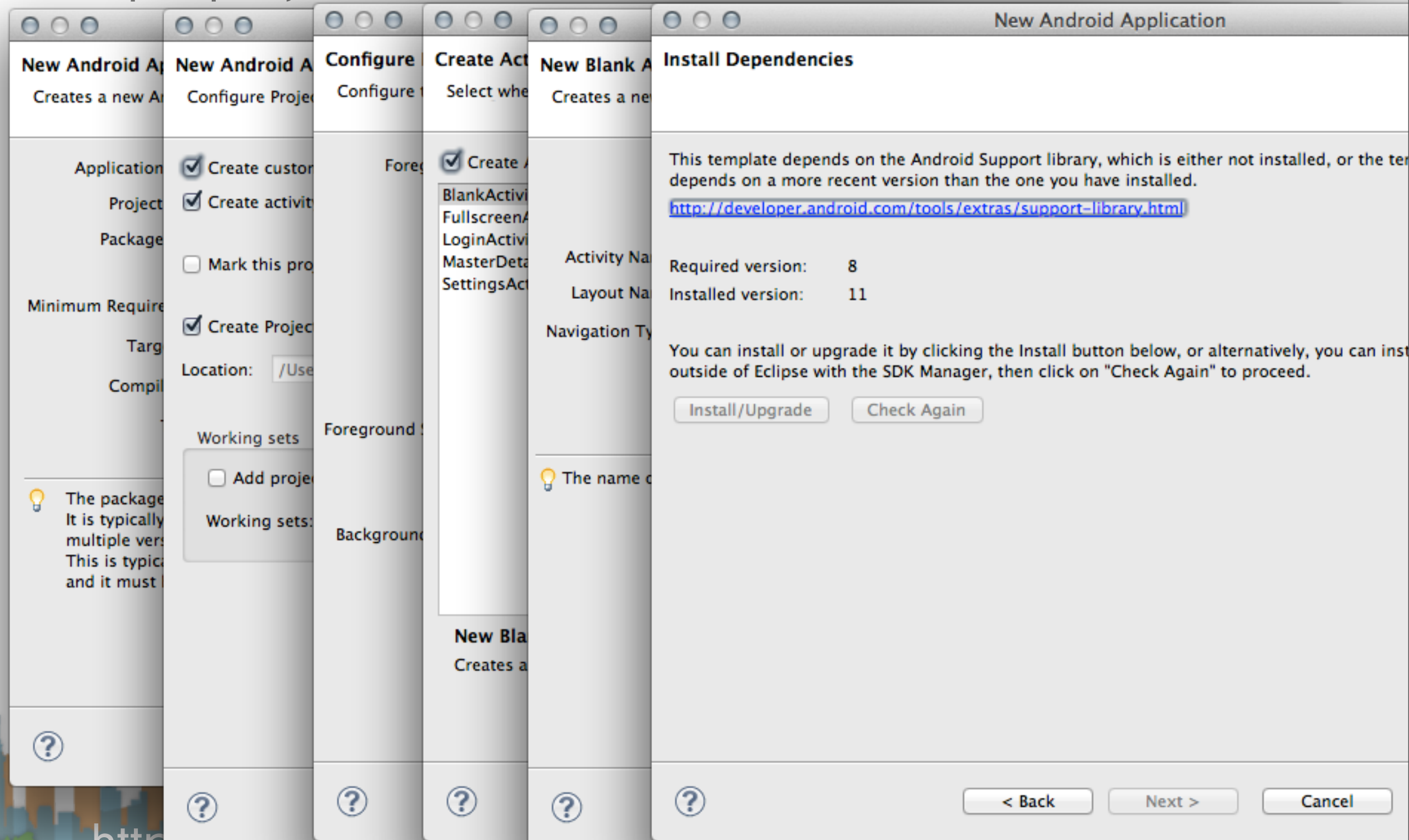
- Set up a project



<http://developer.android.com/sdk/installing/indexing.html>

Intro to Android:

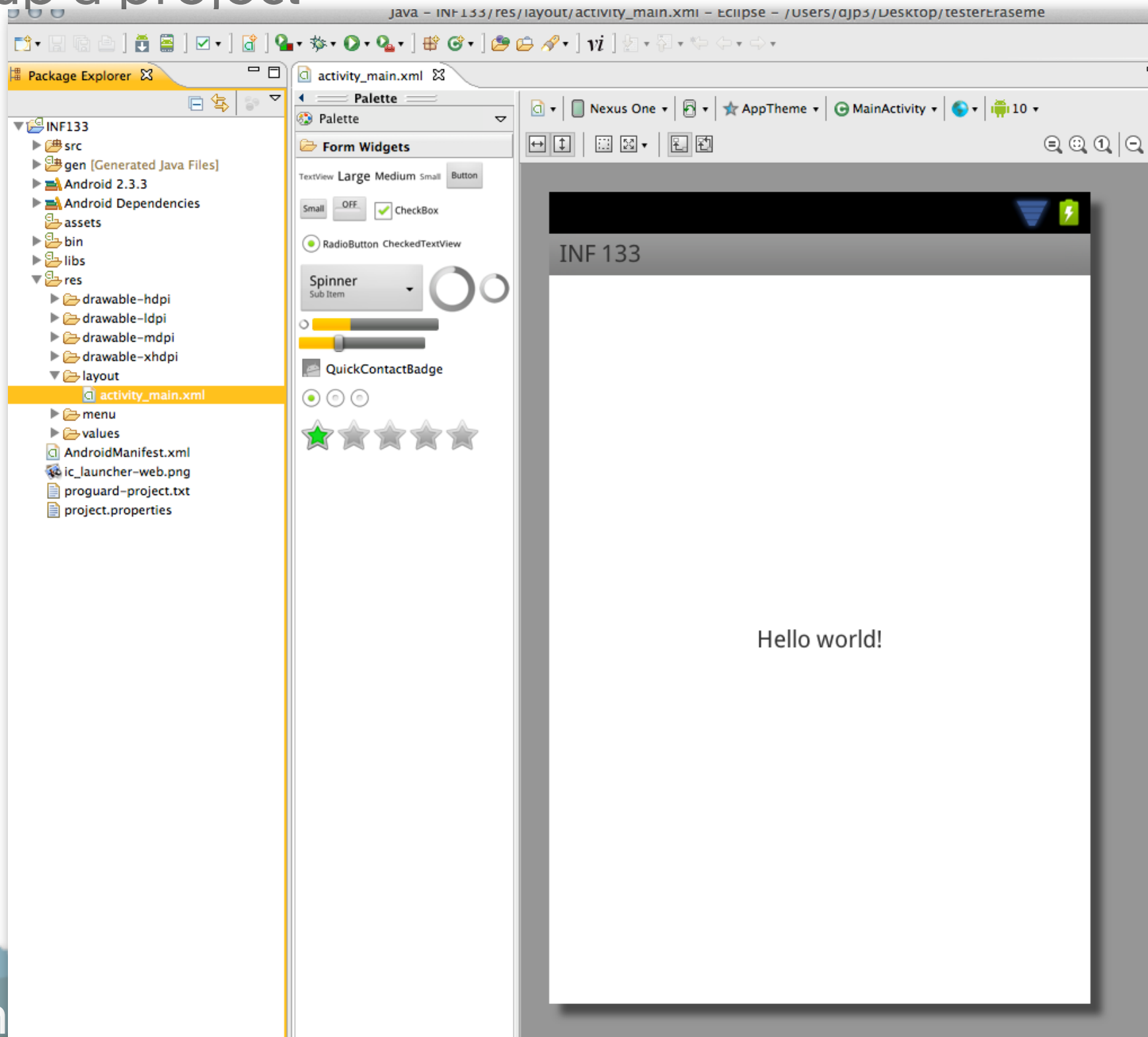
- Set up a project



<http://developer.android.com/tools/extras/support-library.html>

Intro to Android:

- Set up a project



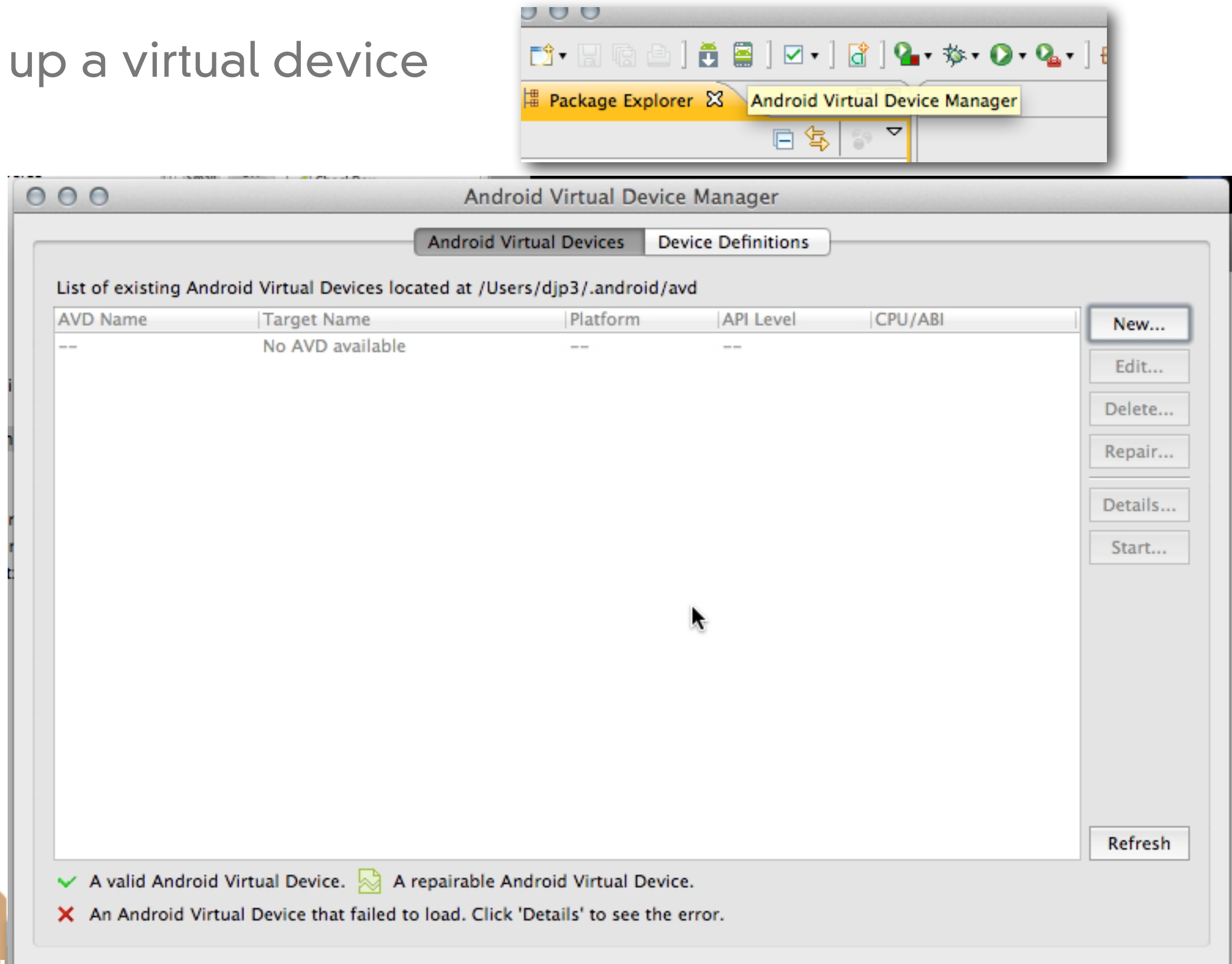
h

adt.html

installing-

Intro to Android: AVD

- Set up a virtual device



<http://developer.android.com/tools/devices/managing-avds.html>

Actually Developing for Android

- Requirements
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Actually Developing for Android

- Requirements
- SDK/AVD
- Eclipse Plug-in
- Hello World

A stylized illustration of a city skyline with various buildings in shades of orange, blue, and green, set against a white background. The buildings are simplified geometric shapes, and there are some green trees interspersed among them.

<http://developer.android.com/guide/index.html>

Making the phone work

- Charge the phone to 100%
 - USB to computer
 - USB to wall plug
- Wipe the phone
 - “menu” -> “settings” -> “privacy” -> “factory data reset”
 - erase the SD card too
- If necessary, go through on-phone tutorial



<http://www.google.com/support/android/bin/topic.py?hl=en&topic=28930>

Making the phone work

- Go through on-phone tutorial
 - You do not need a SIM card (no phone calls)
 - You should connect to WiFi
 - Do not sync to your Google (skip it)
 - Enable Location reporting
 - Set Date and Time to automatic



<http://www.google.com/support/android/bin/topic.py?hl=en&topic=28930>

Making the phone work

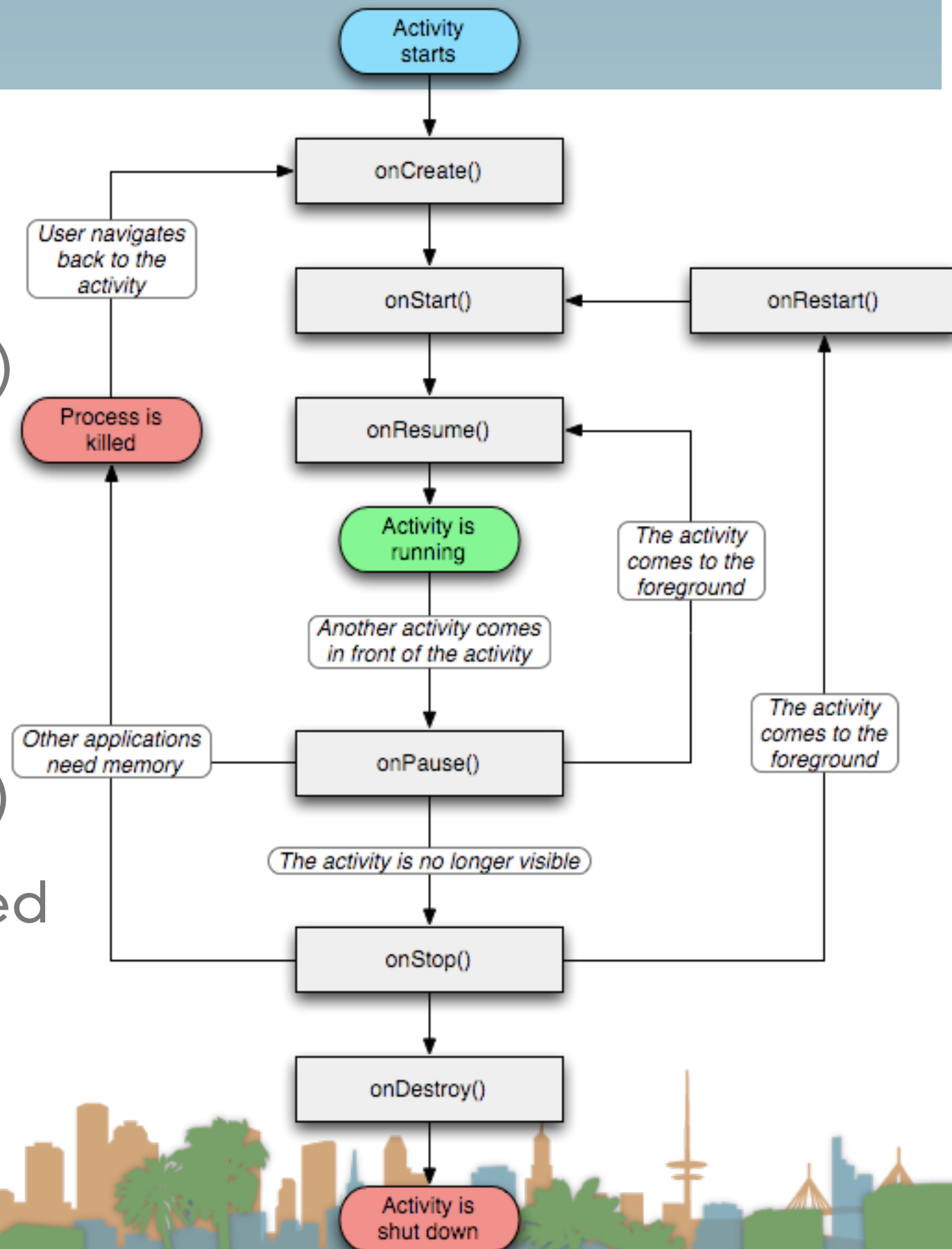
- Turn on developer mode
 - “home”->“menu”->“settings”->“applications”->“Development”
 - “USB debugging” on
 - “Stay awake” on
 - “Allow mock locations” on
 - Dial ***##*#CHECKIN#*##***
 - to update phone software



<http://www.google.com/support/android/bin/topic.py?hl=en&topic=28930>

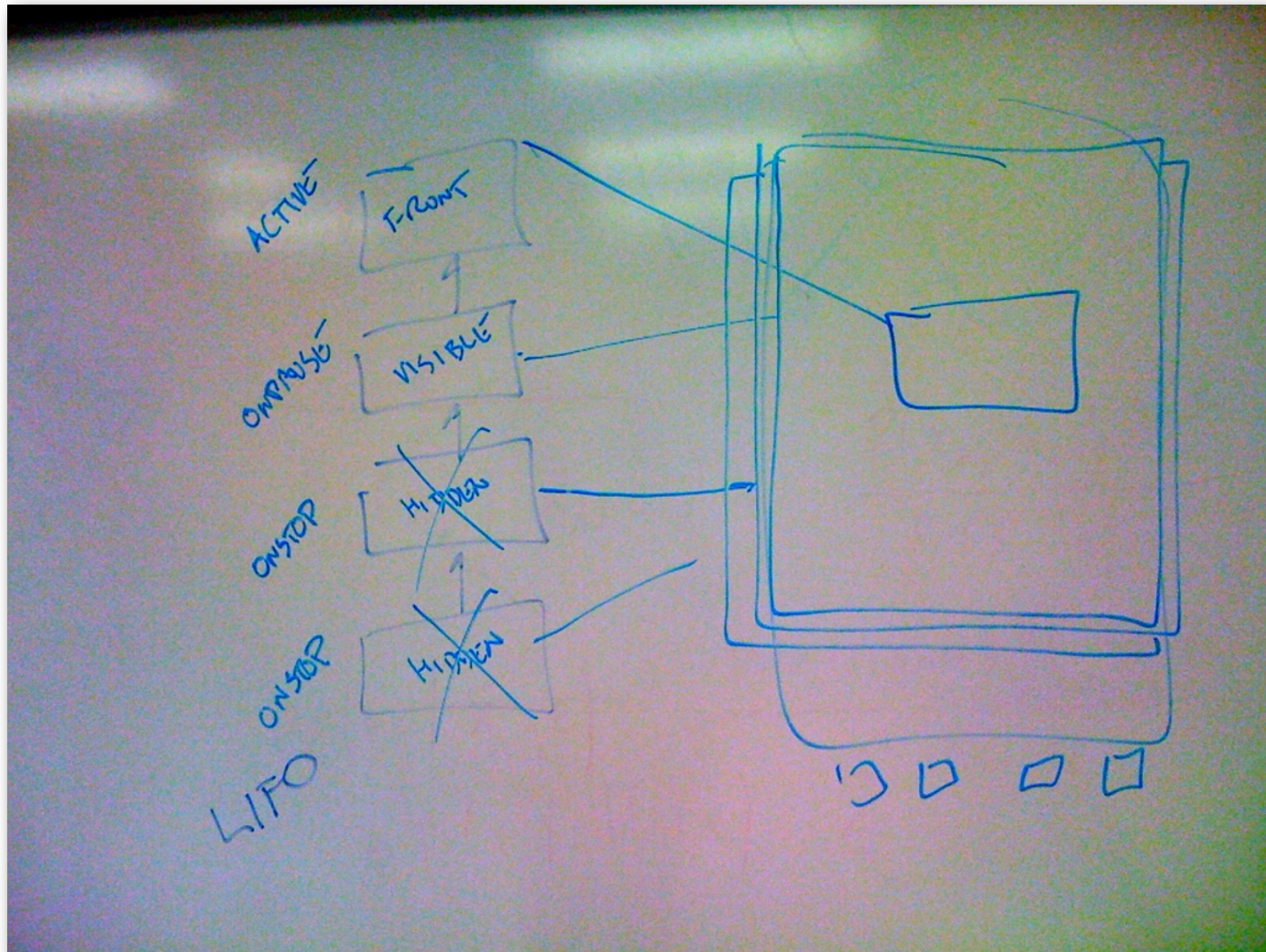
Activity Lifecycle

- Key loops
 - Entire Lifetime
 - onCreate()- onDestroy()
 - Visible Lifetime
 - onStart() - onStop()
 - Foreground Lifetime
 - onResume() - onPause()
 - onPause() may be followed by kill



<http://developer.android.com/reference/android/app/Activity.html>

Activity Stack



Intents

- Activities, Services and Broadcast Receivers are activated through messages, called **Intents**.
- What do I mean by “messages”?
 - Late-run time binding between components in the same or different applications.
 - An abstract method call
 - Sent between apps on the phone
- An **Intent** is actually an object holding data about the message



<http://developer.android.com/guide/components/intents-filters.html>

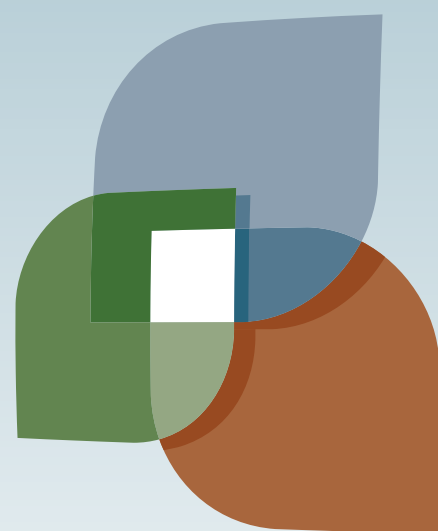
Intents

- Examples:

- If you want to send an Intent you might do the following:
 - `startActivity(new Intent(Intent.ACTION_DIAL,"tel:5555555555"));`
- If you want to be notified when the user has disconnected the power cord you might create a BroadcastReceiver that registers for the "ACTION_POWER_DISCONNECTED" Intent.
- (Look at all of the Intents)



<http://developer.android.com/reference/android/content/Intent.html>



L U C I

