Android Development

Lecture 1
Android SDK & Development Environment

Lecture Summary

- The Android Platform
- Android Environment Setup
  - SDK
  - Eclipse & ADT
  - SDK Manager
  - Android Emulator
  - ADT Additional Tools
- First Android Application

The Android Platform

- Android is a software stack for mobile devices that includes an operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the **Java** programming language.
- It is a Linux-based operating system for mobile devices such as smartphones and tablet computers. It is developed by the Open Handset Alliance led by Google.
- The Linux 2.6 kernel handles core system services and acts as hardware abstraction layer (HAL) between the physical hardware and the Android Software Stack.

- Kernel handles:
  - Application permissions and security
  - Low-level energy management
  - Process management and Threading
  - Networking
  - Display, keypad input, camera, Flash memory, audio and binder (IPC) driver access

Google
android

Source: Wikipedia, AWA, http://developer.android.com/guide/developing/tools/aidl.html

Android SDK

android developers Google Developers

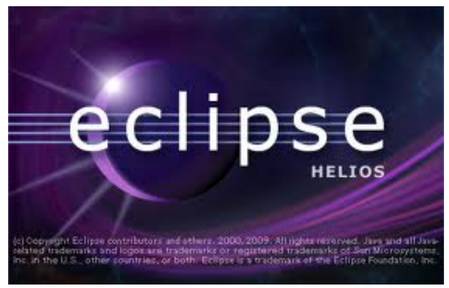
http://developer.android.com/sdk/index.html

The Android SDK has the tools, sample code, and docs needed to create Android Application.

Platform	Package
Windows	Android SDK r16
Mac Os X (Intel)	Android SDK r16
Linux (i386)	Android SDK r16

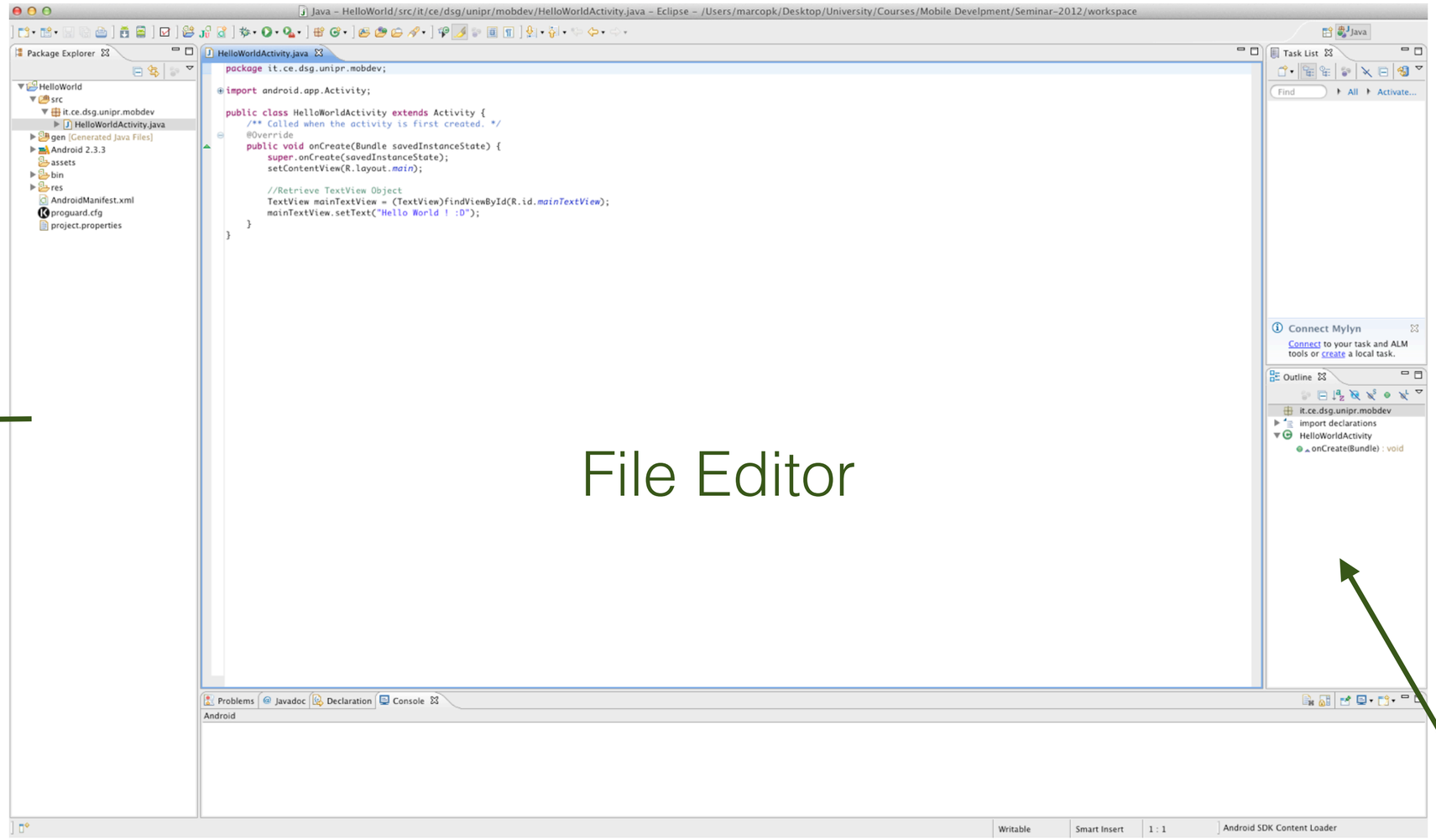
Prepare Your Development Computer

- Android SDK Supported OS:
  - Windows XP (32-bit), Vista (32- or 64-bit), or Windows 7 (32- or 64-bit)
  - Mac OS X 10.5.8 or later (x86 only)
  - Linux (tested on Ubuntu Linux, Lucid Lynx)
- Java Development Kit (JDK 5 - 6)
  - Not compatible with Gnu Compiler for Java (gcj)
- Eclipse IDE (3.6 Helios o greater)
  - part of the Eclipse Platform, it is a multi-language software development environment based on extensible plug-in system.
- Android Development Tools (ADT) is a plugin for the Eclipse IDE



Eclipse IDE

Project and File Explorer



File Editor

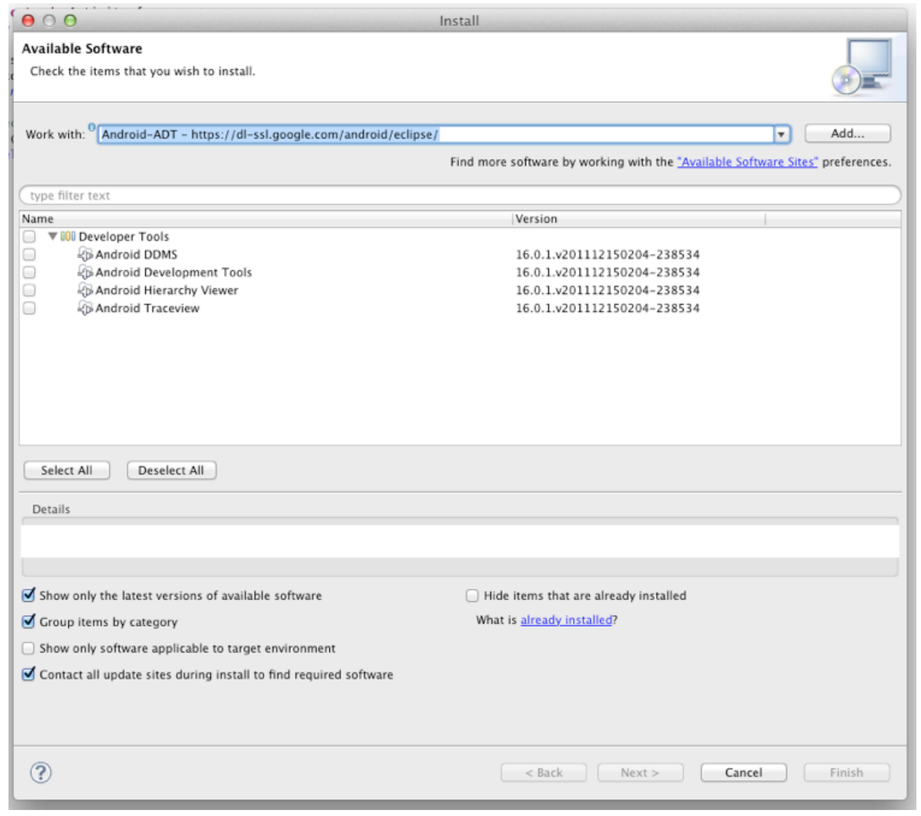
Console and additional Views

Android Developer Toolkit - ADT

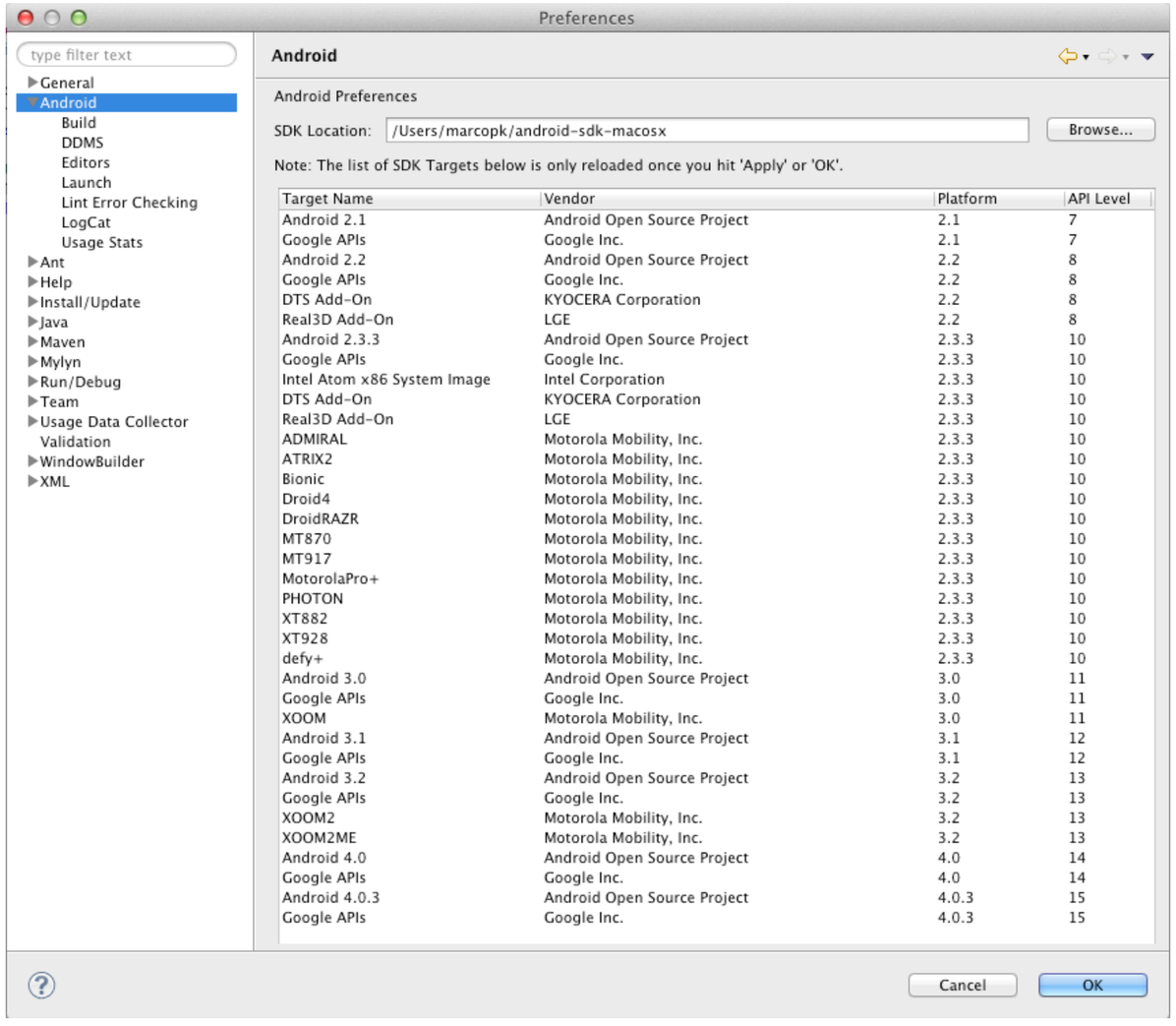
- Android Development Tools (ADT) is a plugin for the Eclipse IDE that is designed to give you a powerful, integrated environment in which to build Android applications.
- ADT extends the capabilities of Eclipse to let you:
  - quickly set up new Android projects
  - create an application UI
  - add components based on the Android Framework API
  - create Android emulator with multiple options and available configurations
  - test applications on real or emulated devices
  - debug your applications using the Android SDK tools
  - export signed (or unsigned) .apk files in order to distribute your application.

ADT Installation

- Start Eclipse, then select Help > Install New Software....
- Click Add, in the top-right corner.
- In the Add Repository dialog that appears, enter "ADT Plugin" for the Name and the following URL for the Location:https://dl-ssl.google.com/android/eclipse/
- Select and install “Developer Tools” packages



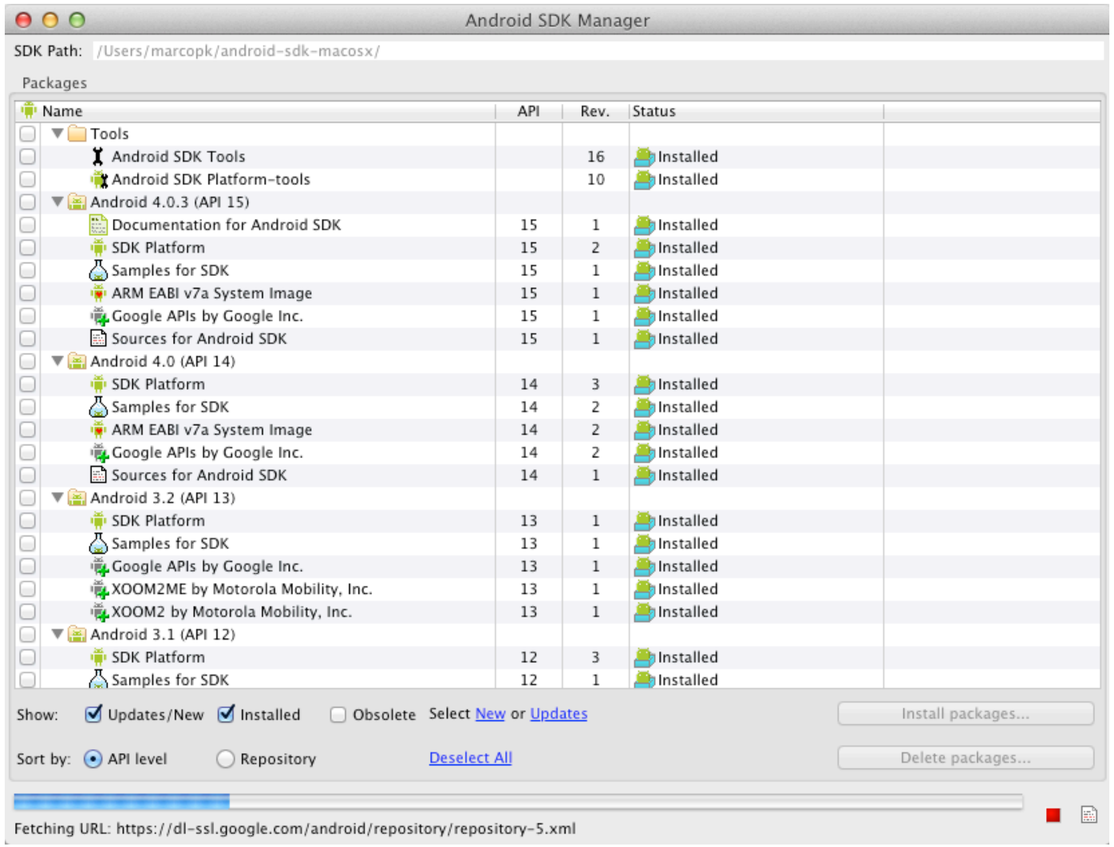
ADT Configuration



Eclipse -> Preferences -> Set SDK Location to SDK folder previously downloaded

Android SDK Manager

- Before you can build an Android application, or even create a project you must install one ore more building target.
- By clicking on Android SDK Manager Button you can select platforms' components that you would like to install on you development machine.
- There are several packages related to different API levels.
- In our course we will use API level 4.x and 2.3.x in order to see latest platform release and compile developed application for available real devices.



Android Emulator

- The Android SDK includes a virtual mobile device emulator that runs on your computer. The emulator lets you prototype, develop, and test Android applications without using a physical device.
- The Android emulator emulates all of the hardware and software features of a typical mobile device, except that it cannot place actual phone calls. It provides a variety of navigation and control keys, which you can "press" using your mouse or keyboard to generate events for your application. It also provides a screen in which your application is displayed, together with any other Android applications running.
- To let you model and test your application more easily, the emulator utilizes Android Virtual Device (AVD) configurations. AVDs let you define certain hardware aspects of your emulated phone and allow you to create many configurations to test many Android platforms and hardware permutations. Once your application is running on the emulator, it can use the services of the Android platform to invoke other applications, access the network, play audio and video, store and retrieve data, notify the user, and render graphical transitions and themes.
- The emulator also includes a variety of debug capabilities, such as a console from which you can log kernel output, simulate application interrupts (such as arriving SMS messages or phone calls), and simulate latency effects and dropouts on the data channel.

Source: http://developer.android.com/guide/developing/devices/emulator.html

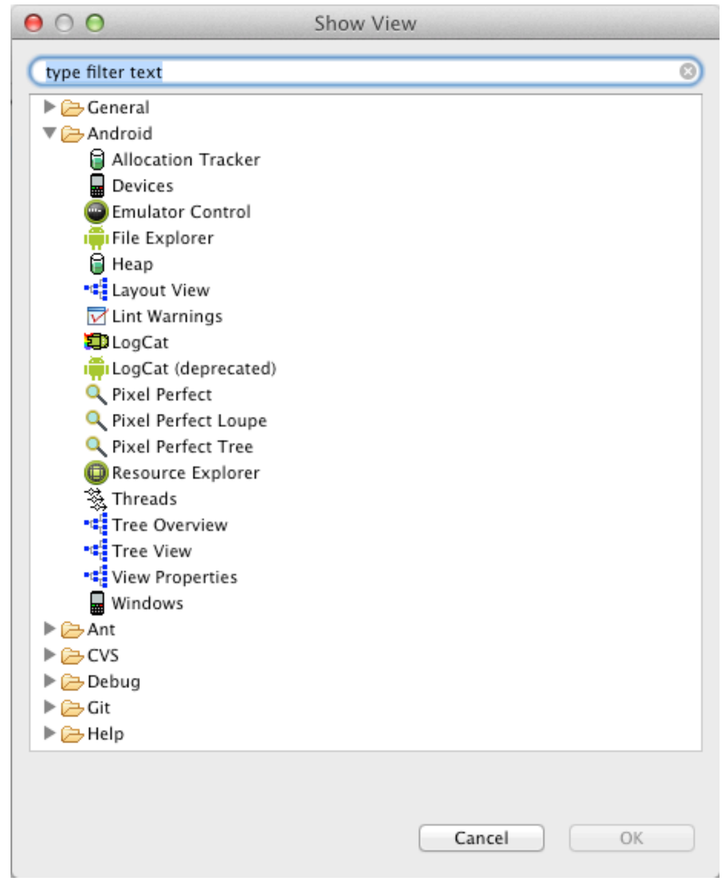
Android Emulator

- Android emulator supports many hardware features likely to be found on mobile devices, including:
  - An ARMv5 CPU and the corresponding memory-management unit (MMU)
  - A 16-bit LCD display
  - One or more keyboards (a Qwerty-based keyboard and associated Dpad/Phone buttons)
  - A sound chip with output and input capabilities
  - Flash memory partitions (emulated through disk image files on the development machine)
  - A GSM modem, including a simulated SIM Card
  - The sections below provide more information about the emulator and how to use it for developing Android applications.

Source: http://developer.android.com/guide/developing/devices/emulator.html

ADT Additional Tools

- ADT Plugin provides several useful tools to develop, control and profile Android applications, emulators and real devices
- Relevant ADT Views are:
  - Devices
  - LogCat
  - Emulator Control
  - Resource Explorer
  - Threads



Coming Up

- Next Lecture
  - Android Platform
- Homework
  - Install Android SDK & ADT
  - Create First Android Project
  - Create a Virtual Device
  - Run the Application on a real or Virtual Device