



Developing Android
Applications

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Why are we here?

- o Learn a bit about the Android platform
- o Become familiar with the tools you'll build with
- o Build and run a simple application

Android

What is Android?

- o What comes to your mind?
- o Two things:
 - o Operating System for Mobile phones
 - o Open Source
(<http://source.android.com>)
- o Intersection of OSS and cool, easy to program gadgets

Architecture

Android Framework

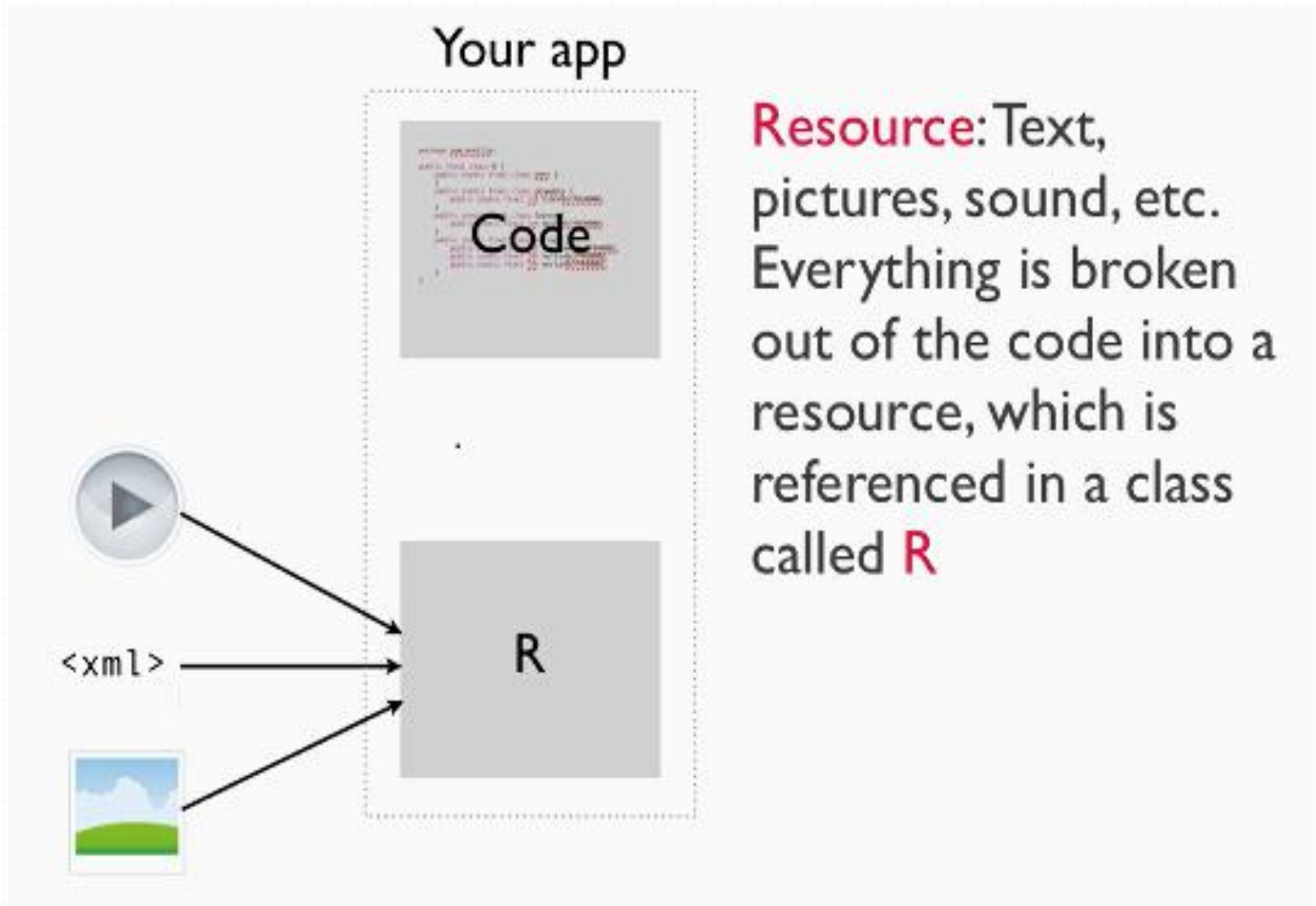
Dalvik VM

Native Libraries

Linux

Vocabulary

Resource



Activity

- A single screen in an android app
- An app is composed of one or more activities
- Changing an activity:
 - Hardware buttons
 - Software (Coding)

Intent

- Facilitates activity to activity communication
- Basically, it's a code to accomplish a verb like “take a pic” or “open contacts”

Setting Up The Environment

Java JDK

- Google Java JDK
- Go to the first link
- Download the latest version of Java JDK

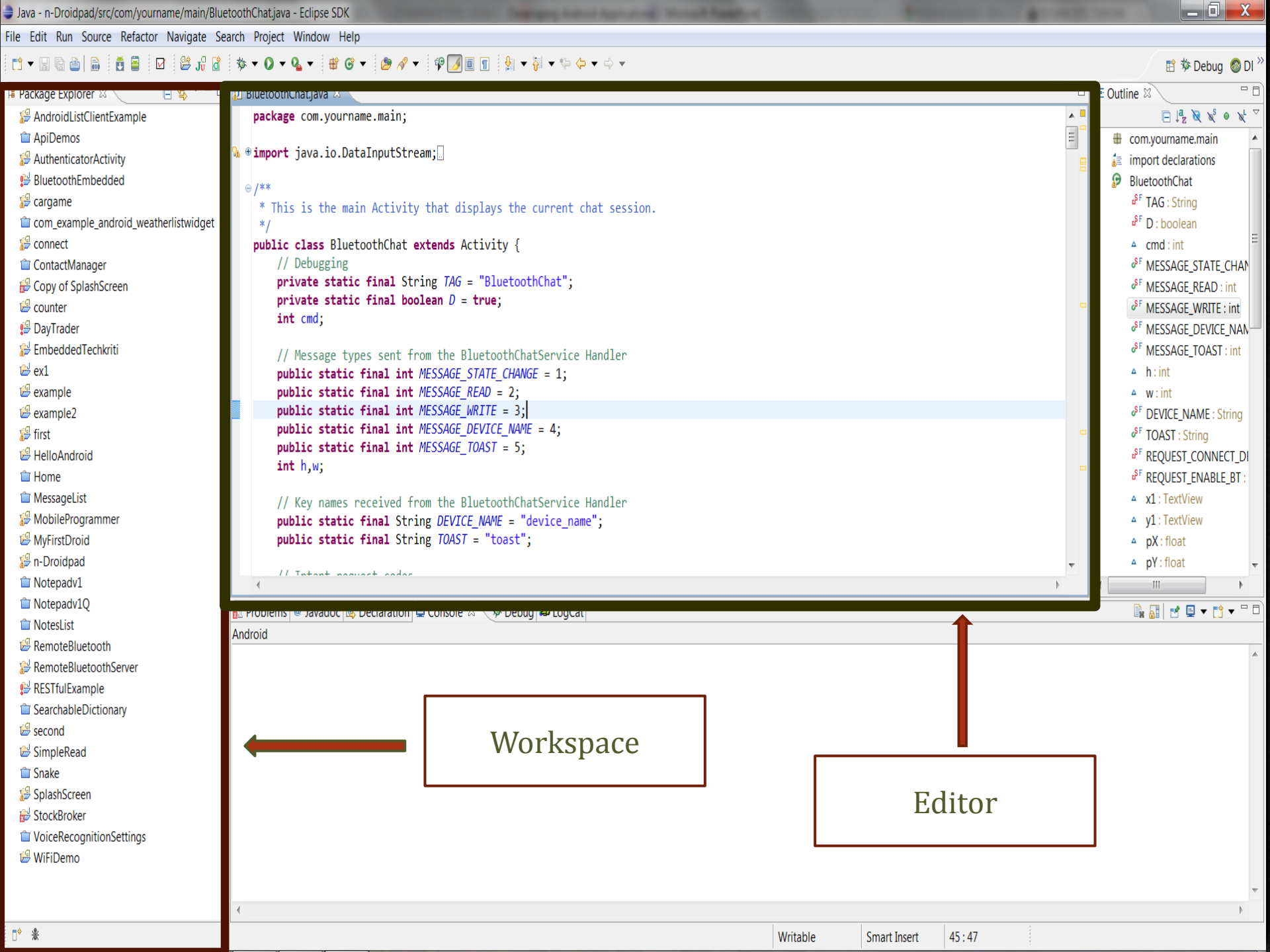
Eclipse IDE

- Google Eclipse
- Go to the first link and click on Downloads
- Download the latest version of Eclipse **Classic**

Android SDK

- o Google Android SDK
- o Go to the first link
- o Download Windows Installer (.exe file)
- o Set your default browser at no proxy
- o Run the above downloaded exe file and let it download the required components
- o Go to <http://developer.android.com/sdk/eclipse-adt.html> and follow the instructions to install ADT plugin

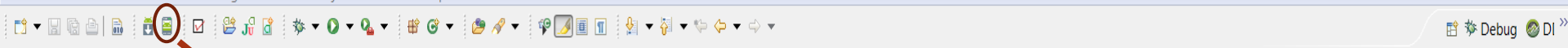
Introduction to Eclipse



Workspace

Editor





AVD Manager

```
package com.yourname.main;  
  
import java.io.DataInputStream;  
  
/**  
 * This is the main Activity that displays the current chat session.  
 */  
public class MainActivity extends AppCompatActivity {  
    // Debugging  
    private static final boolean DEBUG = true;  
    private static final String TAG = "BluetoothChat";  
    int cmd;  
  
    // Messages  
    public static final String MESSAGE_READ = "read";  
    public static final String MESSAGE_WRITE = "write";  
    public static final String MESSAGE_DEVICE_NAME = "Device name: ";  
    public static final String TOAST = "toast";  
    int h, w;  
  
    // KeyCodes  
    public static final String REQUEST_CONNECT_DEVICE = "connect";  
    public static final String REQUEST_ENABLE_BT = "enable";  
    TextView x1, y1;  
    float pX, pY;  
  
    // Test  
}
```

Android Virtual Device Manager

List of existing Android Virtual Devices located at C:\Users\Nikhil\android\avd

AVD Name	Target Name	Platform	API Level	CPU/ABI	
✓ BluetoothCh...	Android 2.0.1	2.0.1	6	ARM (armeabi)	New...
✓ MyFirstAndr...	Android 2.1	2.1	7	ARM (armeabi)	Edit...
✓ bluetoothAV...	Android 2.2	2.2	8	ARM (armeabi)	Delete...
✓ electronics	Android 2.2	2.2	8	ARM (armeabi)	Repair...
✓ weatherAVD	Android 3.0	3.0	11	ARM (armeabi)	Details...
					Start...
					Refresh

✓ A valid Android Virtual Device. ✗ A repairable Android Virtual Device.
✗ An Android Virtual Device that failed to load. Click 'Details' to see the error.

Outline

- com.yourname.main
 - import declarations
 - BluetoothChat
 - TAG : String
 - D : boolean
 - cmd : int
 - MESSAGE_STATE_CHAN
 - MESSAGE_READ : int
 - MESSAGE_WRITE : int
 - MESSAGE_DEVICE_NAN
 - MESSAGE_TOAST : int
 - h : int
 - w : int
 - DEVICE_NAME : String
 - TOAST : String
 - REQUEST_CONNECT_DI
 - REQUEST_ENABLE_BT :
 - x1 : TextView
 - y1 : TextView
 - pX : float
 - pY : float

Problems @ Java

Android

```
[2012-03-31 17:39:33 - SDK Manager] Fetched Add-ons List successfully  
[2012-03-31 17:39:33 - SDK Manager] Fetching URL: https://dl-ssl.google.com/android/repository/repository-5.xml  
[2012-03-31 17:39:33 - SDK Manager] ERROR: Failed to fetch URL https://dl-ssl.google.com/android/repository/repository-5.xml, reason: hostname in certificate didn't match:  
[2012-03-31 17:39:33 - SDK Manager] Done loading packages.  
[2012-03-31 17:39:41 - SDK Manager] Warning: Ignoring platform 'android-1.1_r1-windows': build.prop is missing.
```

Introduction to JAVA

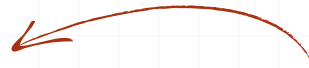
Comparison(Java and C)

C

- VIM (Popular Ubuntu Editor)
- GCC (Compiles to a .out file)
- Code needs to be changed for different platform (runs directly on OS)

JAVA

- Eclipse (Popular Java Editor)
- JAVAC (Compiles to a .class file)
- Code is platform independent (runs in a VM)



Java on Android

- VM used is optimized for Android (Dalvik VM)
- Java files are compiled to .dex file (compatible with Dalvik VM)
- The entire project is packaged into a .apk file (Similar to .jar for default VM)

Java Basics

- Java is composed of classes.
- All the classes in a project are in a single package declared at the top.
 - `package com.example.first;`
 - `public class Example 1{`
`}`
- Activity and Intent are classes existing already in Android Architecture.

Java Basics

- Use **extends Activity** keyword to make an Activity (Automatically generated)
- Every class that extend activity must start with **onCreate()** function (This is also automatically generated).

Building Your First App

You will...

- Learn how to work with Eclipse
- Learn your way around an android project
- Get familiar with activities and intents
- Make a flashlight app

Steps

- o Make the background red and bring a label red at the center
- o Make a green button
- o Make a second activity
- o Make an intent