Android Module1

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What is Android?

- An open source Linux-based operating system intended for mobile computing platforms

- Includes a Java API for developing applications

- It is **not** a device or product

APPLICATIONS

| Home | Contacts | Phone | Browser | ... |

APPLICATION FRAMEWORK

| Activity Manager | Window Manager | Content Providers | View System | Notification Manager |
| Package Manager | Telephony Manager | Resource Manager | Location Manager | GTalk Service |

LIBRARIES

Surface Manager	Media Framework	SQLite
OpenGL	ES	FreeType	WebKit
SGL	SSL	libc

ANDROID RUNTIME

Core Libraries

Dalvik Virtual Machine

LINUX KERNEL

| Display Driver | Camera Driver | Bluetooth Driver | Flash Memory Driver | Binder (IPC) Driver |
| USB Driver | Keypad Driver | WiFi Driver | Audio Drivers | Power Management |

What Should Students Already Know?

- Java!

  - inheritance, method overriding

  - interfaces, casting

  - exceptions

  - debugging

  - reading API documentation

- Eclipse

  - easy to pick up quickly, though

Do I Need Phones?

- The emulator that is part of the Android toolset for Eclipse is quite good (though a bit slow)

- You may be able to get free "developer phones" from Google

Online Resources

- developer.android.com

- code.google.com/p/apps-for-android/

- stackoverflow.com

- videos from Google I/O conferences

"Hello, Android"

Creating Your First(?) Android App

1. Set up your development environment

2. Create a new Android project in Eclipse

3. Run it in the emulator

1. Set Up Your Android Environment

- http://developer.android.com/sdk

- Install Eclipse

- Install Android SDK (Android libraries)

- Install ADT plugin (Android development tools)

- Create AVD (Android virtual device)

- We've already done this for you!!

2. Create an Android Project in Eclipse

- File → New → Project

- Select "Android Project"

- Fill in Project details...

3. Run the Android Application

- Run → Run (or click the "Run" button)
- Select "Android Application"

- The emulator may take a few minutes to start, so be patient!

- You don't need to restart the emulator when you have a new version of your application
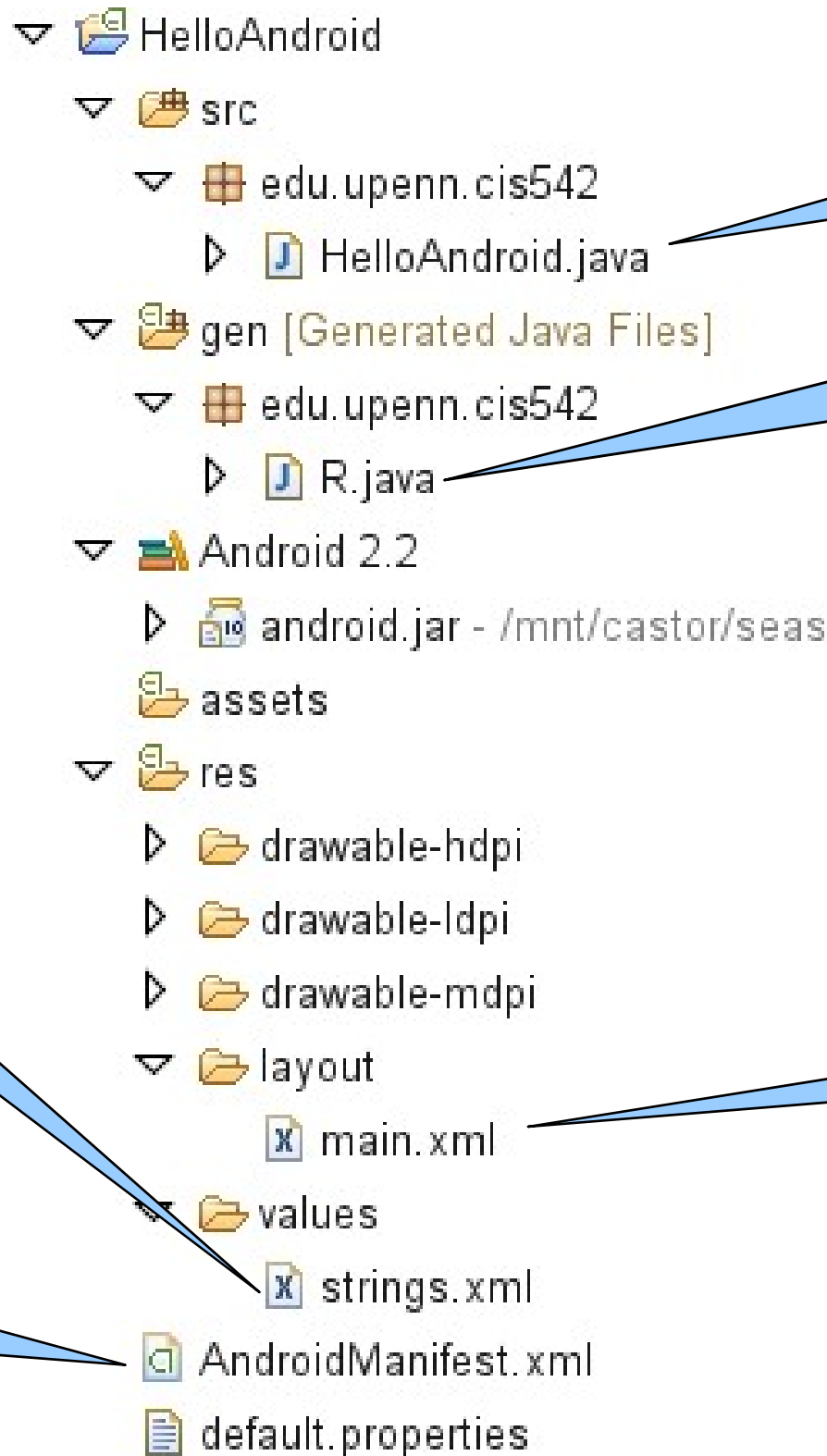
▽ 🗁 HelloAndroid
   ▽ 📦 src
      ▽ ⊞ edu.upenn.cis542
         ▷ 🇯 HelloAndroid.java ◄ **Source code**
   ▽ 📦 gen [Generated Java Files]
      ▽ ⊞ edu.upenn.cis542
         ▷ 🇯 R.java ◄ **Auto-generated code**
   ▽ 📚 Android 2.2
      ▷ 📦 android.jar - /mnt/castor/seas
      🗁 assets
   ▽ 🗁 res
      ▷ 📁 drawable-hdpi
      ▷ 📁 drawable-ldpi
      ▷ 📁 drawable-mdpi
      ▽ 📁 layout
         X main.xml ◄ **UI layout**
      ▽ 📁 values
         X strings.xml ◄ **String constants**
   📄 AndroidManifest.xml ◄ **Configuration**
   📄 default.properties

HelloAndroid.java

```java
1  public class HelloAndroid extends Activity {
2   /** Called when the activity is first created. */
3    @Override
4    public void onCreate(Bundle savedInstanceState)
5    {
6         super.onCreate(savedInstanceState);
7         setContentView(R.layout.main);
8    }
9  }
```

main.xml

```xml
1  <?xml version="1.0" encoding="utf-8"?>
2  <LinearLayout
3   xmlns:android="http://schemas.android.com/apk/res/android"
4     android:orientation="vertical"
5     android:layout_width="fill_parent"
6     android:layout_height="fill_parent"
7  >
8     <TextView
9       android:layout_width="fill_parent"
10      android:layout_height="wrap_content"
11      android:text="@string/hello "
12      />
13 </LinearLayout>
```

strings.xml

```xml
1  <?xml version="1.0" encoding="utf-8"?>
2  <resources>
3    <string name="hello">Hello World, HelloAndroid!
4    </string>
5    <string name="app_name">Hello, Android</string>
6  </resources>
```

AndroidManifest.xml

```xml
1 <?xml version="1.0" encoding="utf-8"?>
2 <manifest
3     xmlns:android="http://schemas.android.com/apk/res/android"
4     package="edu.upenn.cis542"
5     android:versionCode="1"
6     android:versionName="1.0">
7     <application android:icon="@drawable/icon"
8                  android:label="@string/app_name">
9         <activity android:name=".HelloAndroid"
10                   android:label="@string/app_name">
11             <intent-filter>
12                 <action
13                   android:name="android.intent.action.MAIN" />
14                 <category
15                   android:name="android.intent.category.LAUNCHER"/>
16             </intent-filter>
17         </activity>
18     </application>
19 </manifest>
```