Android Applications
What exactly is Android?

Answer: A software stack for mobile devices that includes:

- an OS
- middleware – software that connects applications or software components
- key applications – email client, browser, phone, contacts, calendar, maps, ..., all written in Java
Features

- Application Framework
- Dalvik Virtual Machine
- Integrated Browser
- Optimized Graphics – 2D & 3D graphics with OpenGL ES 1.0 (OpenGL for Embedded Systems is a subset of the OpenGL 3D graphics API)
- SQLite
- Media Support for audio, video, still images
- GSM Telephony
- Bluetooth, EDGE, 3G, WiFi
- Camera, GPS, compass, accelerometer
Android Architecture

Creating Applications & Activities

Android applications consist of six possible components:

– Activities
– Services
– Content Providers
– Intents
– Broadcast Receivers
– Notifications

The project manifest describes component specifics and component interaction
Application Manifest

Each Android project has an AndroidManifest.xml (manifest file)

The manifest defines the applications components and structure as well as having metadata for specifying things like themes, icons used, ...

The manifest specifies application permissions and determines component interaction among other things
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="edu.pacificu.cs.HelloWorld"
    android:versionCode="1"
    android:versionName="1.0">
    <application android:icon="@drawable/icon"
        android:label="@string/app_name">
        <activity android:name="HelloWorld"
            android:label="@string/app_name">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
    <uses-sdk android:minSdkVersion="2" />
</manifest>
AndroidManifest.xml

Application Tab

The `application` tag describes application-level components contained in the package, as well as general application attributes.

- Define an `<application>` tag in the AndroidManifest.xml

**Application Attributes**
Defines the attributes specific to the application.

- Name
  - Browse...
  - Allow task reparenting
- Theme
  - Browse...
  - Has code
- Label
  - @string/app_name
  - Browse...
  - Persistent
- Icon
  - @drawable/icon
  - Browse...
  - Enabled
- Description
  - Browse...
  - Debuggable
- Permission
  - Manage space activity
  - Browse...
- Process
  - Browse...
  - Allow clear user data
- Task affinity
  - Browse...

**Application Nodes**

- A, HelloWorld (Activity)
Let’s go to:


and examine

<manifest>
<application>
<activity>
<intent-filter>
Activity Lifecycle

Activity – a process that performs some specific action

- Every Android application is made up of one or more activities managed on an Activity Stack (AS).

- A new activity is always placed on top of the AS and then becomes the running activity.

- The older activity always remains below the running activity on the stack and will not come to the foreground until the current activity stops.
Activity Lifecycle

Import
05.code/ActivityLifeCycleDemo
Activity States

An activity has essentially four states:

• running – in the foreground of the screen
• paused – lost focus but still visible with all state maintained
  – How? A new activity that is transparent or not full sized is running on top of the stack
• stopped – a new activity completely obscures another activity
  – The stopped activity is no longer visible
  – State is maintained
• destroyed – the activity must be completely restarted and the state information must be