

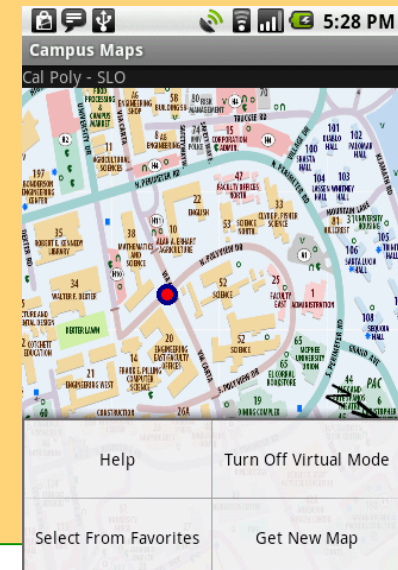
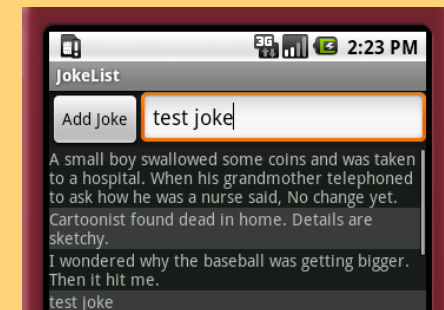
A Super-Brief History of Mobile Phones

- 1908 first patent
- 1947 first base stations (no cells)
- 1979 first cell phone system in Japan
- 1984 first hand-offs between cells
- 1993 first data service and SMS text messages
- 1998 first ringtones sold
- 1996 Telecommunications Act
 - new spectrum, pole space, zoning board restrictions
- 1999 first internet on phone

<http://www.buzzle.com/articles/history-of-mobile-phones.html>

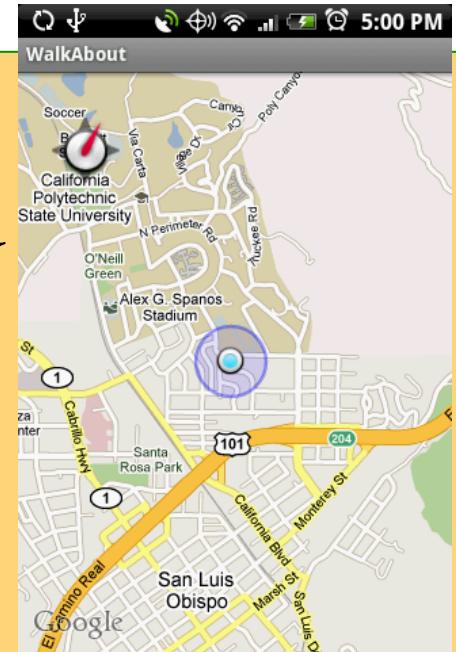
Quick Tour of Android

- Common features:
 - User Interface
 - IO widgets (buttons, textboxes, lists)
 - Images
 - 2D/3D drawing
 - Menus
 - Database
 - Application lifecycle



Quick Tour of Android

- Less common features:
 - Google Maps
 - Hardware APIs
 - GPS/Geo-location, calls, accelerometer, compass, bluetooth, camera
 - Multiple processes
 - Managed by Android Dalvik VM
 - Background Services
 - Interprocess communications (e.g. Intents)
 - No difference between third-party and native apps



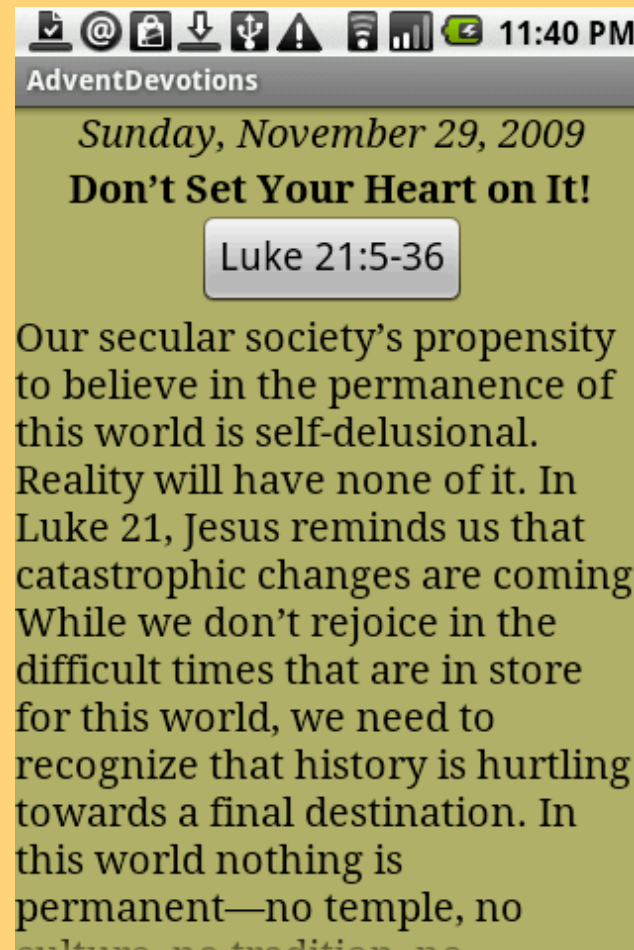
Android Design Philosophy

- Applications should be:
 - Fast
 - Resource constraints: <200MB RAM, slow processor
 - Responsive
 - Apps must respond to user actions within 5 seconds
 - Secure
 - Apps declare permissions in manifest
 - Seamless
 - Usability is key, persist data, suspend services
 - Android kills processes in background as needed

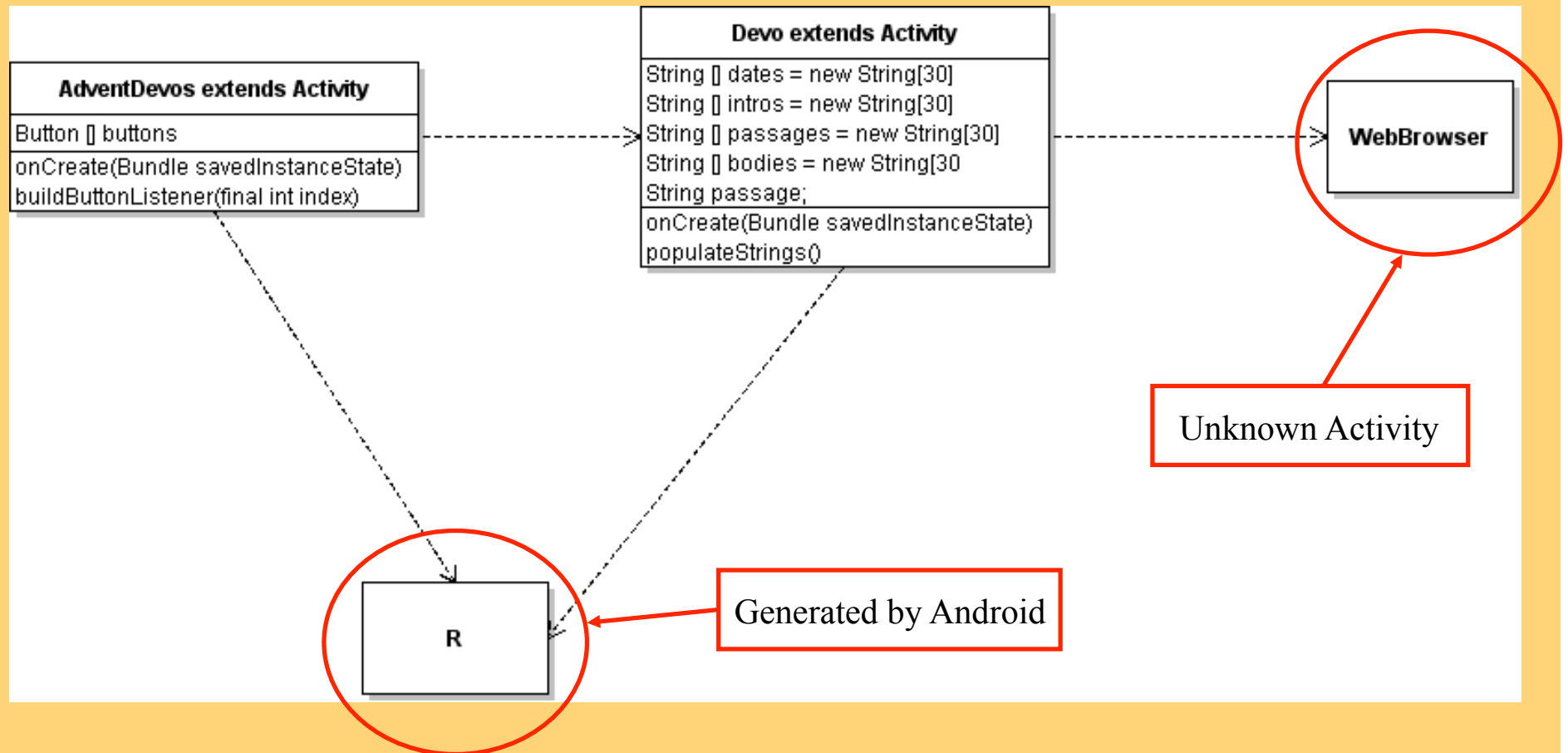
Leveraging the web

- To keep your apps fast and responsive, consider how you can leverage the web
 - What _____ can be _____ on a server or in the cloud?
 - Tasks/performed
 - Data/persisted
 - Data/retrieved
 - Beware, data transfer is also expensive and can be slow

A First Example: Advent Devotions

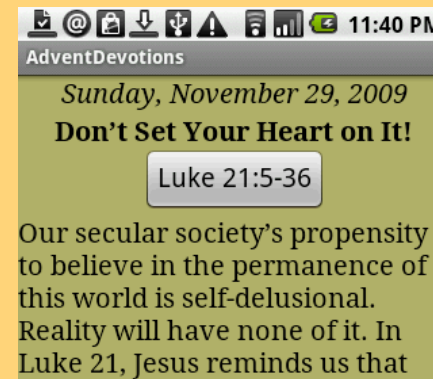
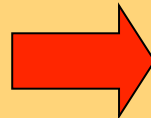


UML Class Diagram



Two Activities in Advent Devotions

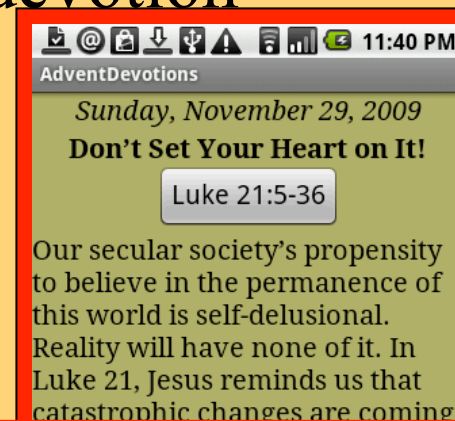
- AdventDevos displays the calendar of dates
- Devo displays a single devotion



```
Intent myIntent = new Intent(AdventDevos.this, Devo.class);  
myIntent.putExtra("ButtonNum", ""+index);  
startActivity(myIntent);
```


Two Activities in Advent Devotions

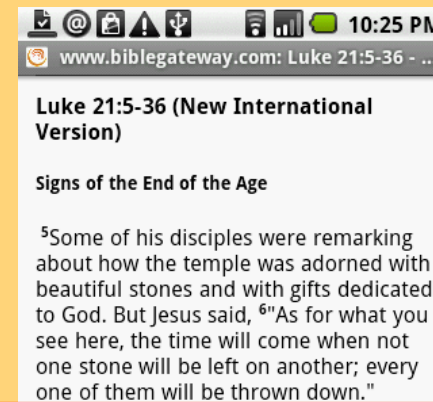
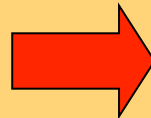
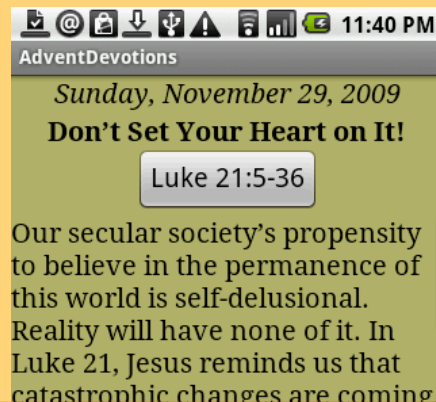
- AdventDevos displays the calendar of dates
- Devo displays a single devotion



```
Bundle extras = getIntent().getExtras();  
String value = extras.getString("ButtonNum");  
Integer buttonNum = Integer.valueOf(value);
```

Launching an Intent you didn't write

- Devos has button to URL
- Browser launched



```
Intent i = new Intent(Intent.ACTION_VIEW,  
    Uri.parse("http://www.biblegateway.com/passage/?search="+  
    passage+"&version=NIV"));  
startActivity(i);
```

Android Activity

- “An activity is a single, focused thing that the user can do. Almost all activities interact with the user, so the Activity class takes care of creating a window for you in which you can place your UI with setContentView (View).”

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

AndroidManifest.xml

`<?xml version="1.0" encoding="utf-8"?>` Each upload to Market requires versionCode increment

`<manifest xmlns:android="http://schemas.android.com/apk/res/android"
package="com.simexusa.adventdevotions"`

`android:versionCode="2"`

`android:versionName="1.0">`

Specifies icon for launching app

`<application android:icon="@drawable/star" android:label="@string/app_name" android:debuggable`

`<activity android:name=".AdventDevos"
android:label="@string/app_name">`

Specifies name for launching app

`<intent-filter>`

`<action android:name="android.intent.action.MAIN" />`

`<category android:name="android.intent.category.LAUNCHER" />`

`</intent-filter>`

`</activity>`

`<activity android:name=".Devo"/>`

`</application>`

Specifies activity to be launched at startup

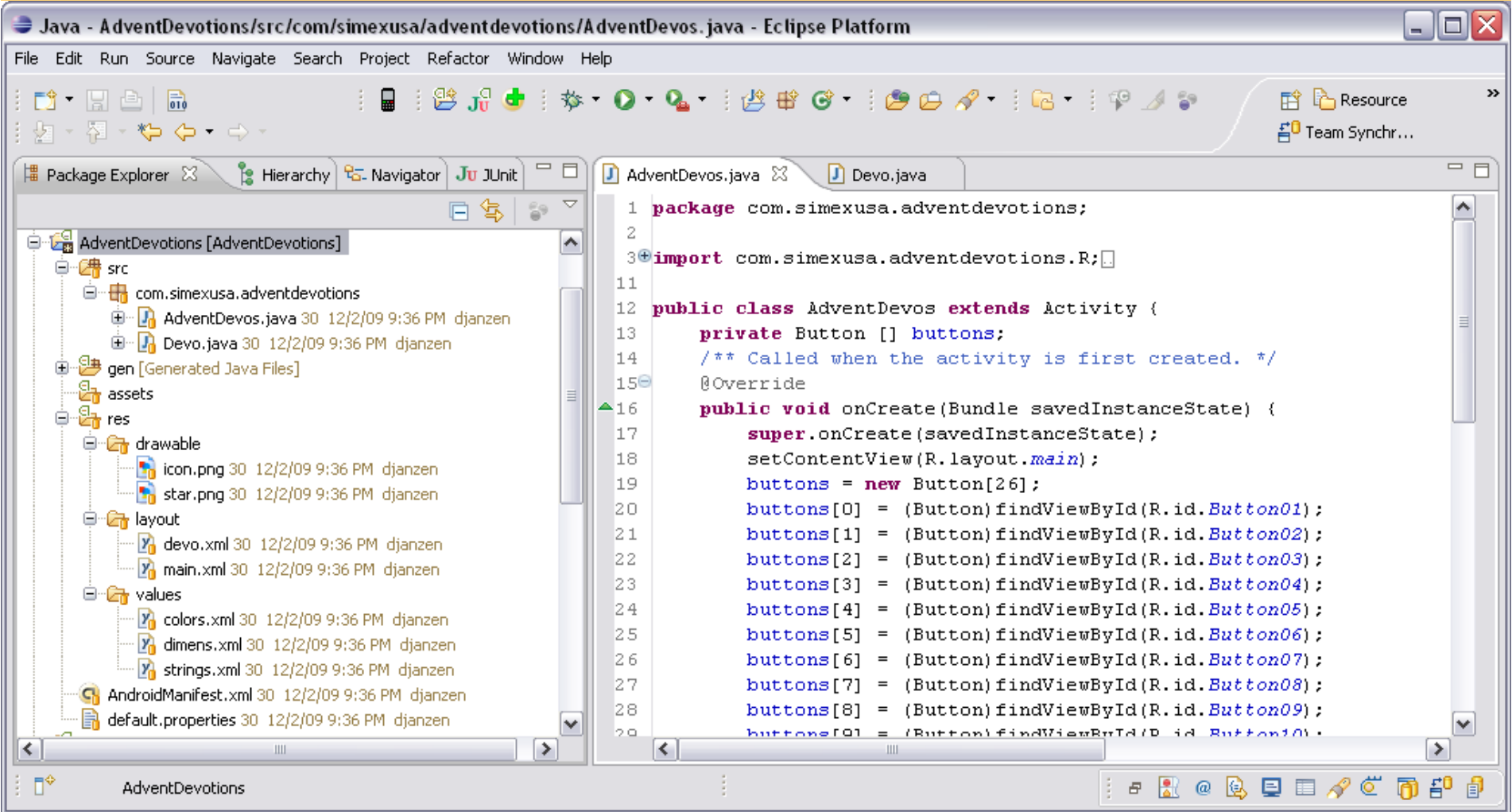
`<uses-sdk android:minSdkVersion="3" />`

`<uses-permission android:name="android.permission.INTERNET" />`

`</manifest>`

Security permissions requested from user on install

Look around the files



The screenshot displays the Eclipse IDE interface. The Package Explorer on the left shows the project structure for 'AdventDevotions'. The main editor window shows the code for 'AdventDevos.java'.

```
Java - AdventDevotions/src/com/simexusa/adventdevotions/AdventDevos.java - Eclipse Platform
File Edit Run Source Navigate Search Project Refactor Window Help
Resource
Team Synchron...
Package Explorer Hierarchy Navigator JUnit
AdventDevotions [AdventDevotions]
  src
    com.simexusa.adventdevotions
      AdventDevos.java 30 12/2/09 9:36 PM djanzen
      Devo.java 30 12/2/09 9:36 PM djanzen
    gen [Generated Java Files]
    assets
    res
      drawable
        icon.png 30 12/2/09 9:36 PM djanzen
        star.png 30 12/2/09 9:36 PM djanzen
      layout
        devo.xml 30 12/2/09 9:36 PM djanzen
        main.xml 30 12/2/09 9:36 PM djanzen
      values
        colors.xml 30 12/2/09 9:36 PM djanzen
        dims.xml 30 12/2/09 9:36 PM djanzen
        strings.xml 30 12/2/09 9:36 PM djanzen
    AndroidManifest.xml 30 12/2/09 9:36 PM djanzen
    default.properties 30 12/2/09 9:36 PM djanzen
AdventDevos
  AdventDevos.java
  Devo.java
1 package com.simexusa.adventdevotions;
2
3 import com.simexusa.adventdevotions.R;
11
12 public class AdventDevos extends Activity {
13     private Button [] buttons;
14     /** Called when the activity is first created. */
15     @Override
16     public void onCreate(Bundle savedInstanceState) {
17         super.onCreate(savedInstanceState);
18         setContentView(R.layout.main);
19         buttons = new Button[26];
20         buttons[0] = (Button) findViewById(R.id.Button01);
21         buttons[1] = (Button) findViewById(R.id.Button02);
22         buttons[2] = (Button) findViewById(R.id.Button03);
23         buttons[3] = (Button) findViewById(R.id.Button04);
24         buttons[4] = (Button) findViewById(R.id.Button05);
25         buttons[5] = (Button) findViewById(R.id.Button06);
26         buttons[6] = (Button) findViewById(R.id.Button07);
27         buttons[7] = (Button) findViewById(R.id.Button08);
28         buttons[8] = (Button) findViewById(R.id.Button09);
29         buttons[9] = (Button) findViewById(R.id.Button10);
```

Layouts and Resources

- See main.xml and devo.xml
 - Activity associates layout xml file with `setContentView(R.layout.main);` or `setContentView(R.layout.devo);` in `onCreate()`
 - Note `TableLayout` and `TableRow` similar to `<table>` and `<tr>` in html
 - Note use of `dimen` (see `values/dimens.xml`) and `color` (see `values/colors.xml`)
 - Also see `strings.xml`