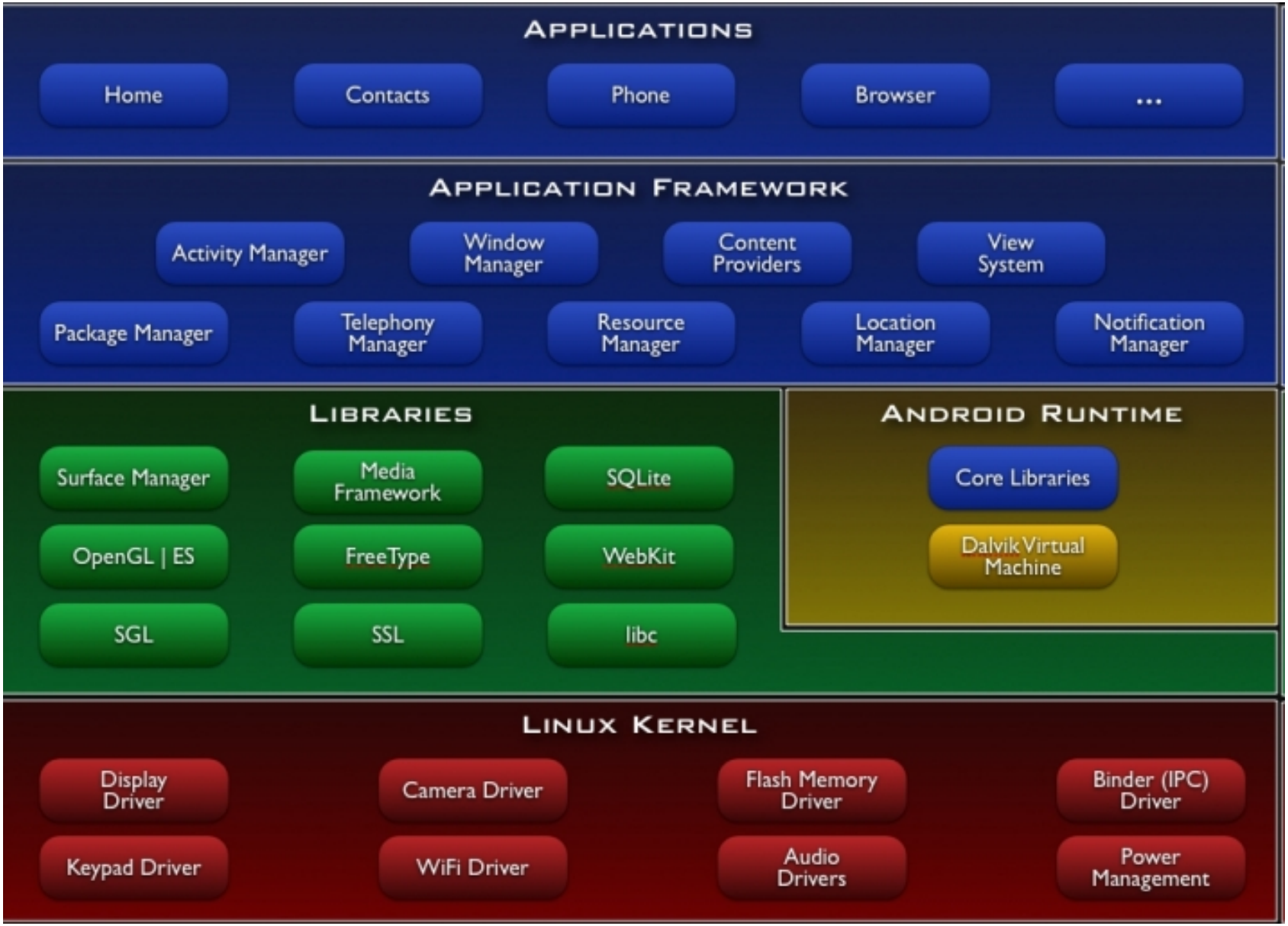
ANDROID

Android - Overview

- What is Android?
- Application Components
- Activity Life Cycles
- Homework Assignment #almost 1
  - Do the notepad tutorial (all 3 steps)
  - HW #1 assigned on Wednesday

What is Android?



Application Components

- Activities
  - Visual user interface
  - Hierarchy of Views
- Services
  - Background processes (playing music, etc..)
- Broadcast Receivers
  - Low battery, time zone change, etc..
- Content Providers
  - Allows data sharing between applications

Activating Components

- ContentProvider
  - Activated when targeted by a ContentResolver
- Intents
  - Start: Activities, Services, BroadcastReceivers
  - Activities, services: names the action and the data
  - BroadcastReceivers: names the action being announced.

AndroidManifest.xml

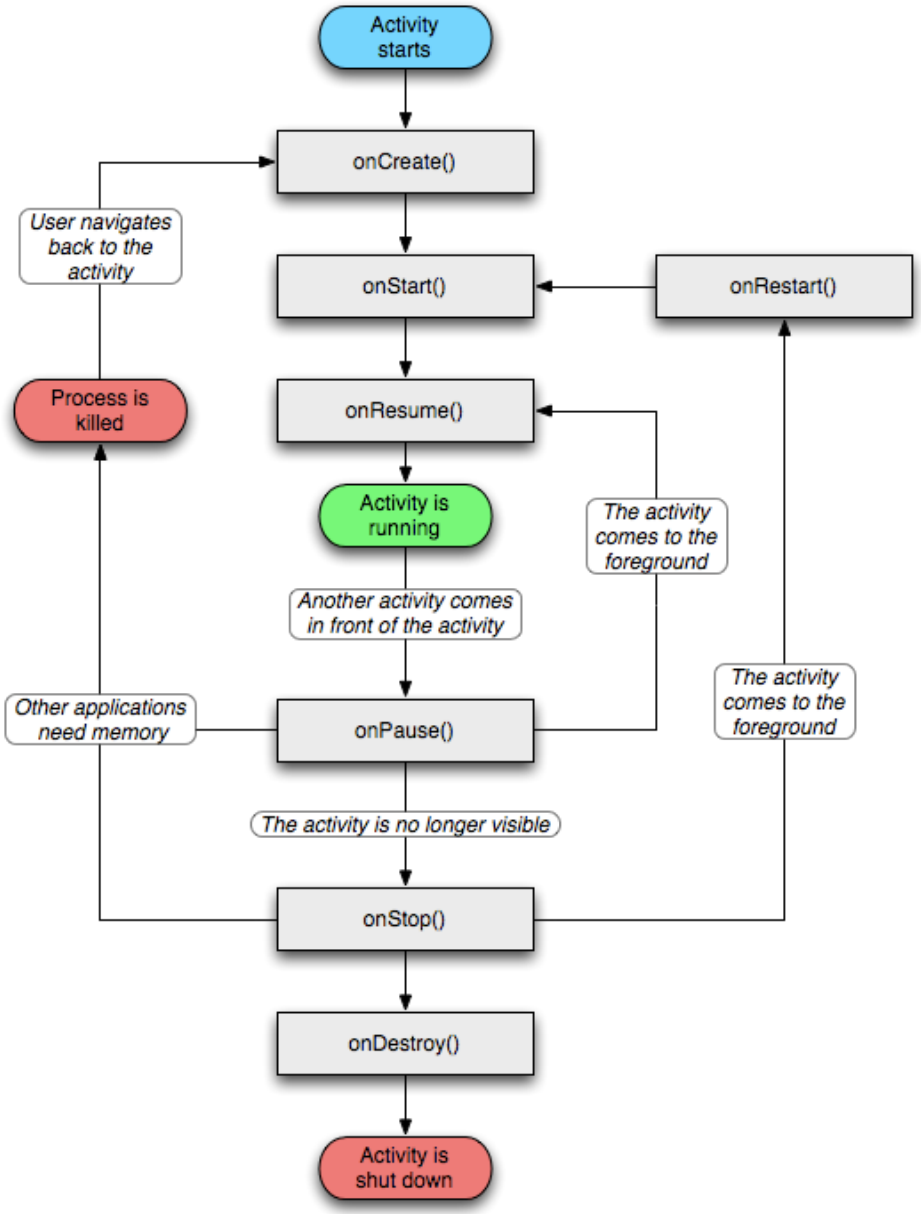
```
<?xml version="1.0" encoding="utf-8"?>
  <manifest . . . >
    <application . . . >
      <activity
       android:name="com.example.project.FreneticActivity"
       android:icon="@drawable/small_pic.png"
       android:label="@string/freneticLabel" . . .>
     </activity> . . .
   </application>

  </manifest>
```

Activities vs. Tasks

- Activity is a screen
- Task is a group of Activities
  - Not necessarily defined in the same Application.
  - Stack of activities. Activities can only be pushed and popped.
  - All activities in a task move as one, i.e. all go to background and or all to foreground at once.

Activity Lifecycle



Activities Lifecycle

- Screen rotation will completely kill and restart your program.

A new instance of your application is created

Activities – Saving State

- Primitives, parcelables, serialized objects
  - onSaveInstanceState(Bundle *outState*)
  - onRestoreInstanceState() or manually in onCreate(Bundle *savedInstanceState*)
- Objects
  - onRetainNonConfigurationInstance()
  - getLastNonConfigurationInstance()

Activities - Threads

- UI thread
  - Must be quick. Respond in less than 9 seconds.
- Background Threads
  - For long activities, downloading, etc..
  - Use AsyncTask

Views

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
android:layout_width="fill_parent"
android:layout_height="fill_parent">

    <Button
    android:id="@+id/add_button"
    android:text="@string/add_file"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentBottom="true"
    android:padding="15px"
    android:textSize="8pt"
    android:layout_weight="1"/>

    <ListView
    android:id="@android:id/list"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:layout_above="@id/upload_button"
    android:layout_alignParentTop="true" />
</RelativeLayout>
```

Views

```
onCreate() {
  setContentView(R.layout.myLayout);
  // where myLayout is in {project}/res/layout/myLayout.xml

  Button b = (Button) findViewById(R.id.add_button);
  b.setOnClickListener(new OnClickListener() {
      public void onClick(View v) {
        // do something interesting;
      }
    });
```

Activities – Dialogs

- Managed (Android)
  - onCreateDialog()
  - showDialog()
  - onPrepareDialog() - broken
- Self-Managed
  - Dialog m = new Dialog()
  - m.showDialog();
  - m.dismissDialog();

adb - your new best friend.

- adb {-d or –e}
  - devices – shows connected devices/emulators
  - shell – opens shell on device
  - push – push files to device
  - pull – pull files from device
  - logcat – display log output
    - Log.e(“tag”, “log entry”);

Faking it on your local emulator

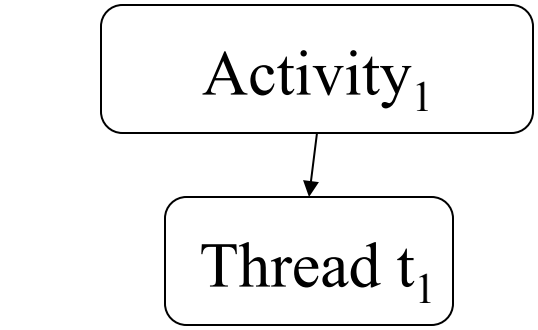
- adb devices
  - emulator-5554 (or similar)
- telnet localhost 5554
  - geo fix 1 2
  - help

Random tips

- Emulator not always seen by adb – restart
- Activity started by eclipse not same as Activity started from launch menu
- API Demos has examples of most of what you want to do
- Not everything works how you think it will (taking pictures). It's a work in progress.

Threading Caveats

```
int mResult;  Thread mThread;
Handler mhandler = new Handler();
onCreate() {
  mThread = new Thread() {
    public void run() {
      mResult = doSomethingExpensive();
      mHandler.post(results);
    }
  }
 mThread.start();
}
```



Orientation Change

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Activity$_2$

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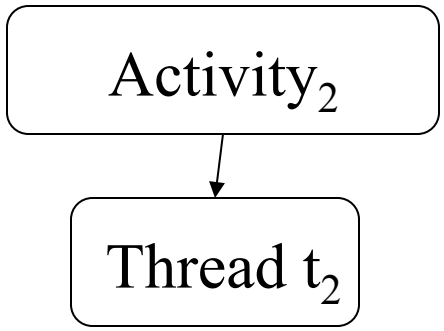
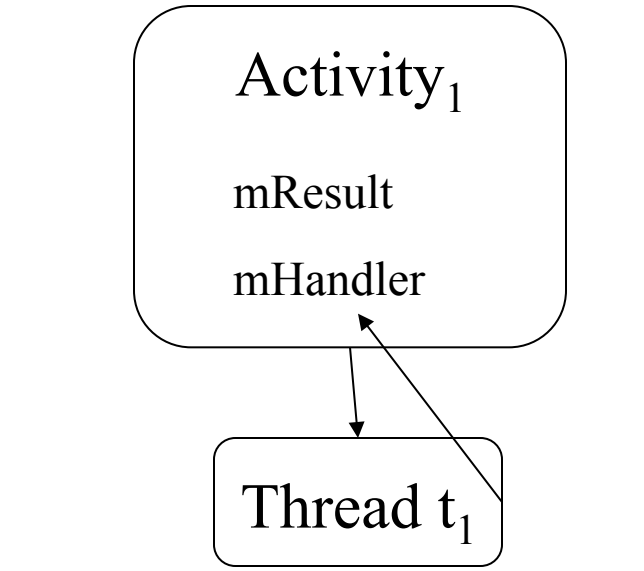


Threading Caveats

```
onRetainNonConfigurationInstance() {
  return mThread;
}

onCreate() {
…
  mThread =
    (Thread) getLastNonConfigurationInstance();
  if (mThread == null) {
      mThread = new Thread();
      mThread.run();
  }
}
```



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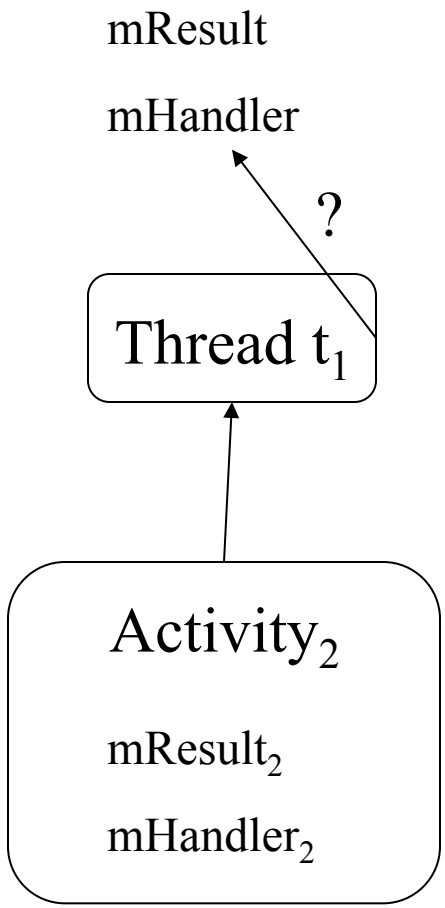

Threading Caveats

```
public class MyActivity implements myListener {
  onResume() {
    mThread.setListener(this);
  }
  onDestroy() {
    mThread.setListener(null);
    t.start();
  }
  threadComplete() {
    // thread is done, display result
  }
}
```

```
Thread {
  myListener mListener;
  run () {
    // do stuff
    mListener.threadComplete();
  }
}
```