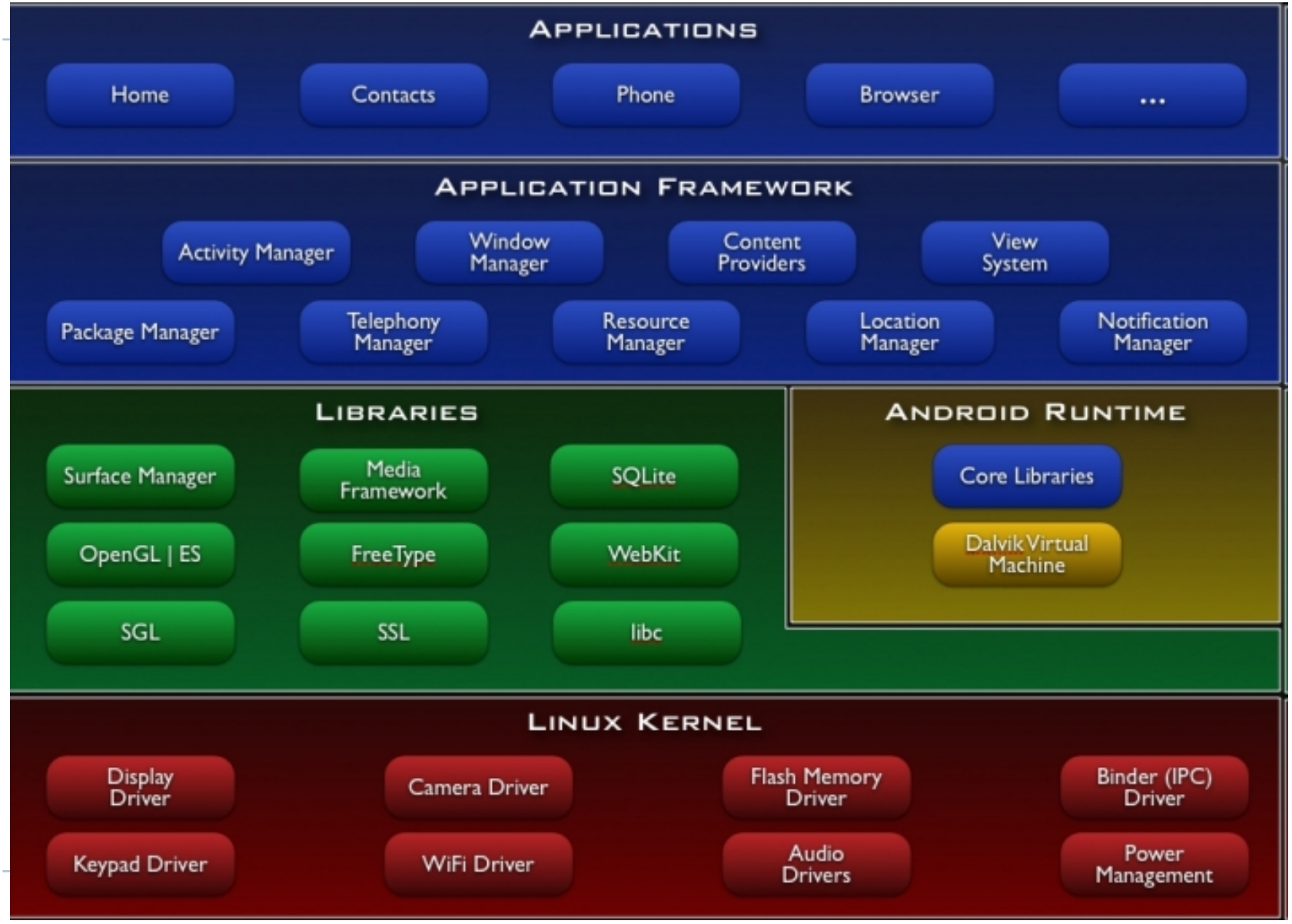
ANDROID

Android - Overview

- What is different about Android?
- Application Components
- Inter Application Communication
- Activity Life Cycles

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.

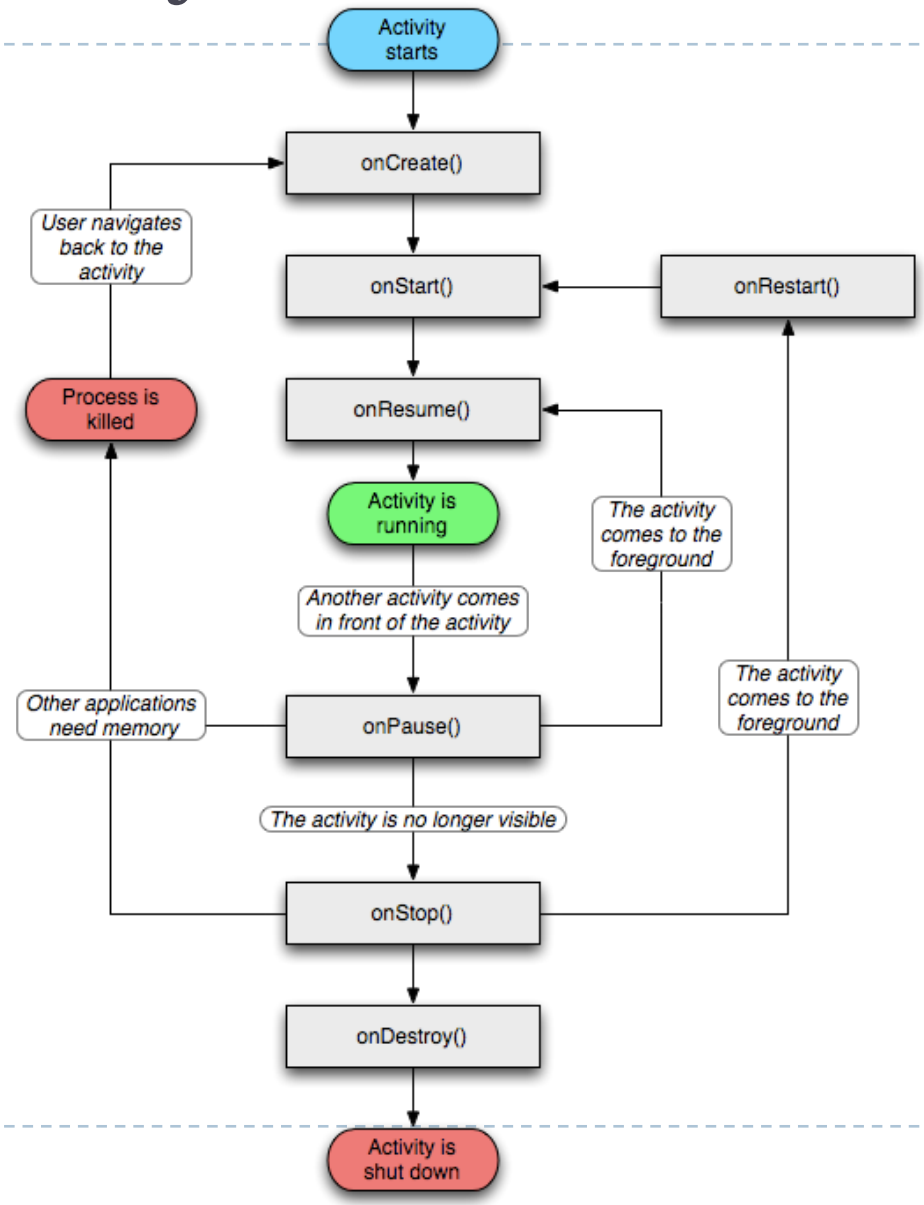
Example intent

```
Intent i = new Intent(android.provider.MediaStore.Audio.Media.RECORD_SOUND_ACTION);

i.putExtra(android.provider.MediaStore.EXTRA_OUTPUT, "/sdcard/odk/sounds");

startActivityForResult(i, AUDIO_RECORDING);



protected void onActivityResult(int requestCode, int resultCode, Intent intent) {
      super.onActivityResult(requestCode, resultCode, intent);

      switch (requestCode) {
         case AUDIO_RECORDING:
            .....
}
```

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.

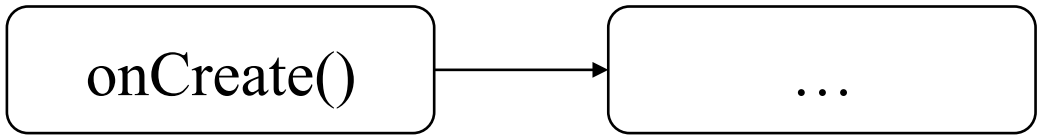
Activity Lifecycle



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

```
<?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;
      }
    });
```

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;
      }
    });
```

Important things…

- Lots o' java
  - Though, there is an NDK
- Intents
  - Applications can call other applications
- Activities
  - Can get garbage collected whenever not showing
  - Need to manage own state
  - Can run within another application

Tons more…

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