I3350
Mobile Application Development

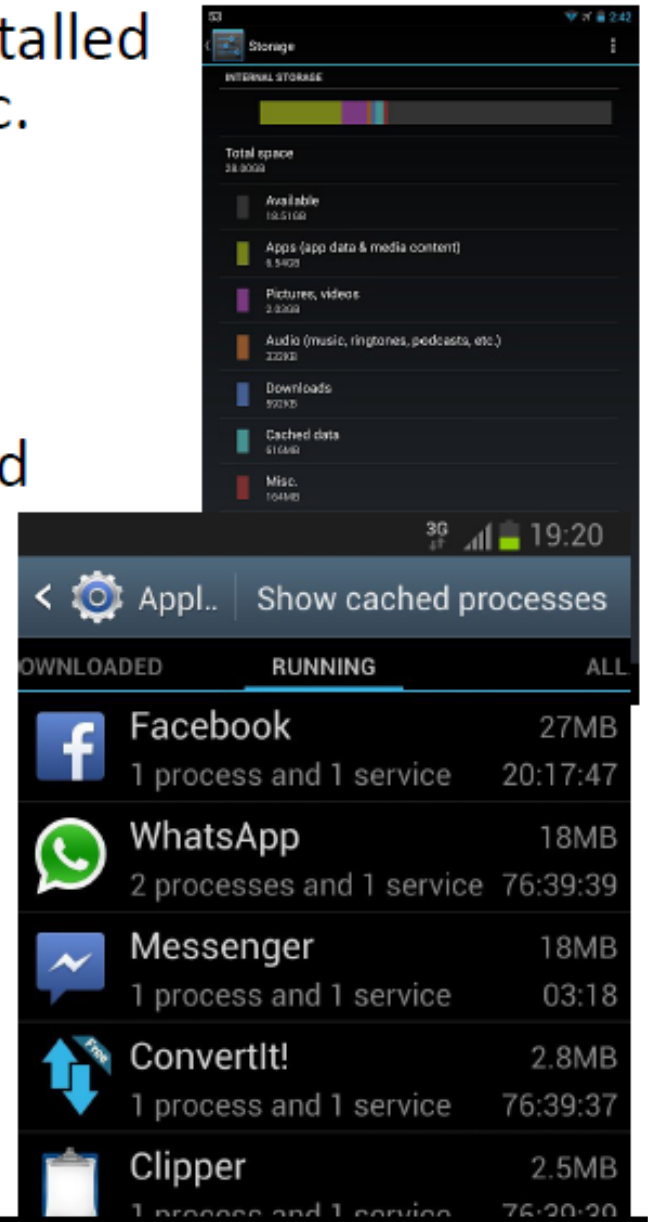
Chapter 5 – Activity LifeCycle

Reference : http://web.stanford.edu/class/cs193a/lectures.shtml

Apps, memory, and storage

- **storage**: Your device has apps and files installed and stored on its internal disk, SD card, etc.
  - **Settings → Storage**

- **memory**: Some subset of apps might be currently loaded into the device's RAM and are either running or ready to be run.
  - When the user loads an app, it is loaded from storage into memory.
  - When the user exits an app, it might be cleared from memory, or might remain in memory so you can go back to it later.
  - See which apps are in memory:
    - **Settings → Apps → Running**



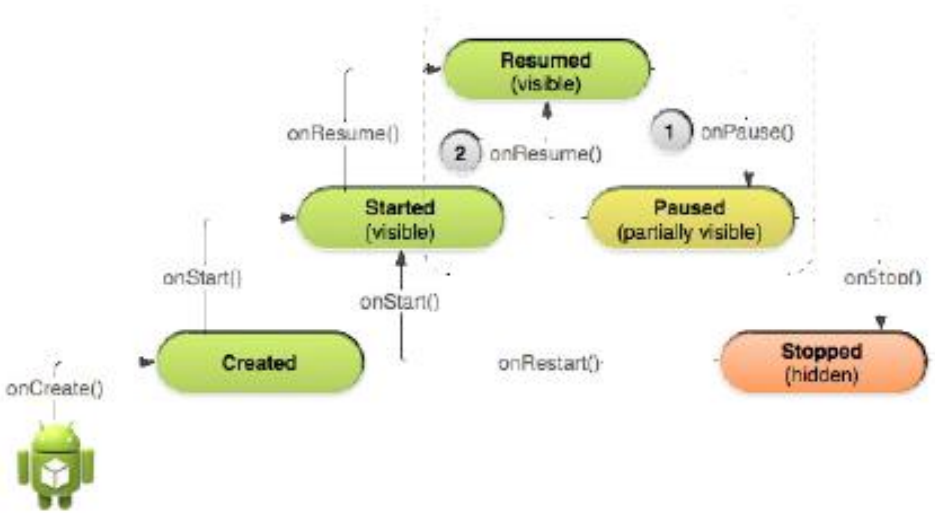
Activity state

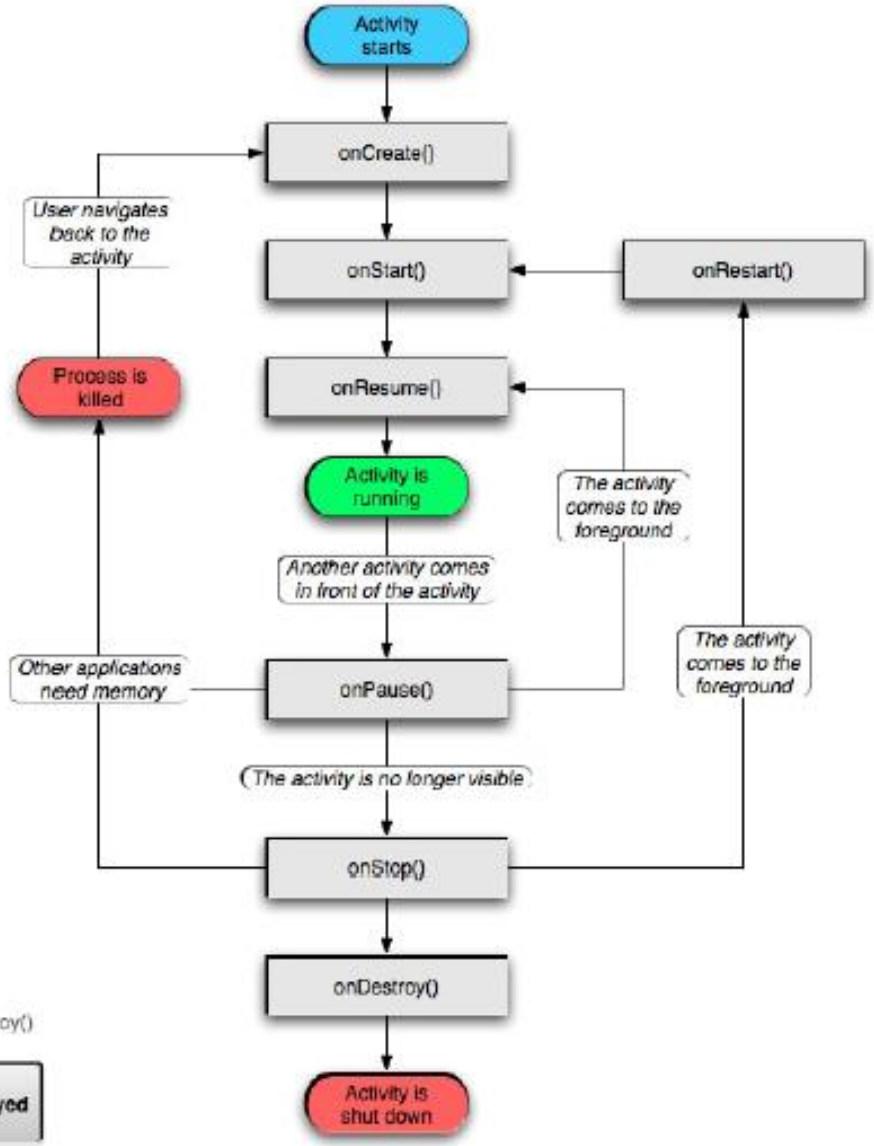
- An activity can be thought of as being in one of several states:
  - **starting**: In process of loading up, but not fully loaded.
  - **running**: Done loading and now visible on the screen.
  - **paused**: Partially obscured or out of focus, but not shut down.
  - **stopped**: No longer active, but still in the device's active memory.
  - **destroyed**: Shut down and no longer currently loaded in memory.

- Transitions between these states are represented by **events** that you can listen to in your activity code.
  - onCreate, onPause, onResume, onStop, onDestroy, ...

Activity lifecycle

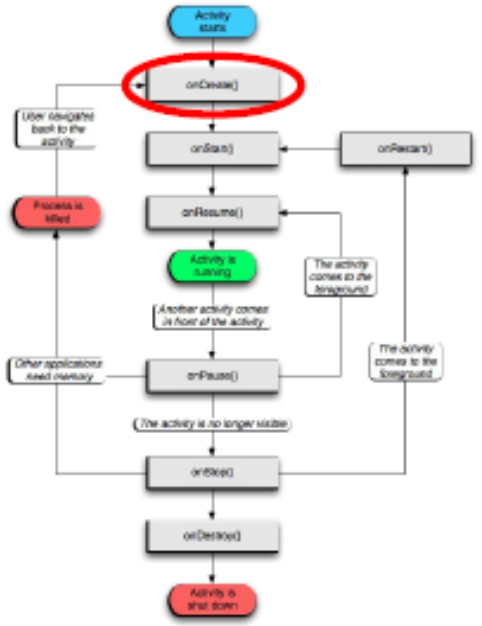
Other diagrams





The onCreate method

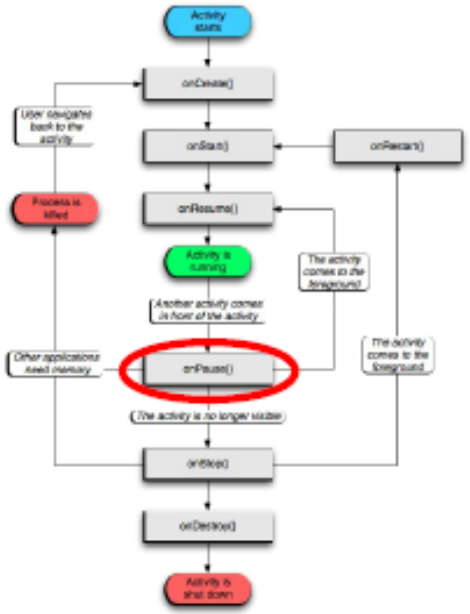
- In **onCreate**, you create and set up the activity object, load any static resources like images, layouts, set up menus etc.
  - after this, the Activity object exists
  - think of this as the "constructor" of the activity




```
public class FooActivity extends Activity {
    ...
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);    // always call super
        setContentView(R.layout.activity_foo); // set up layout
        any other initialization code;   // anything else you need
    }
}
```

The onPause method

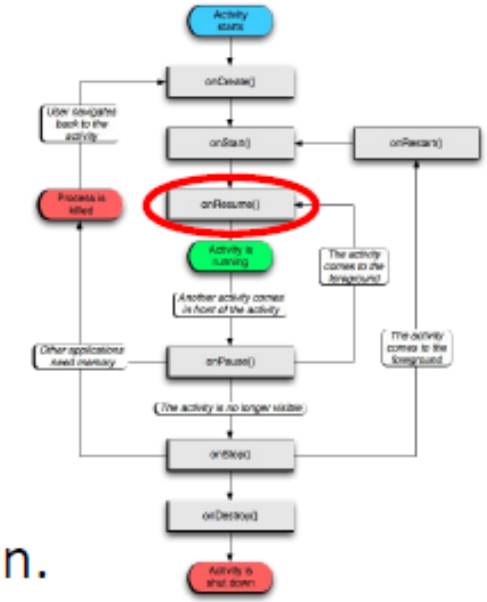
- When **onPause** is called, your activity is still partially visible.
- May be temporary, or on way to termination.
  - **Stop animations** or other actions that consume CPU.
  - **Commit unsaved changes** (e.g. draft email).
  - **Release system resources** that affect battery life.




```
public void onPause() {
    super.onPause();              // always call super
    if (myConnection != null) {
        myConnection.close();     // release resources
        myConnection = null;
    }
}
```

The onResume method

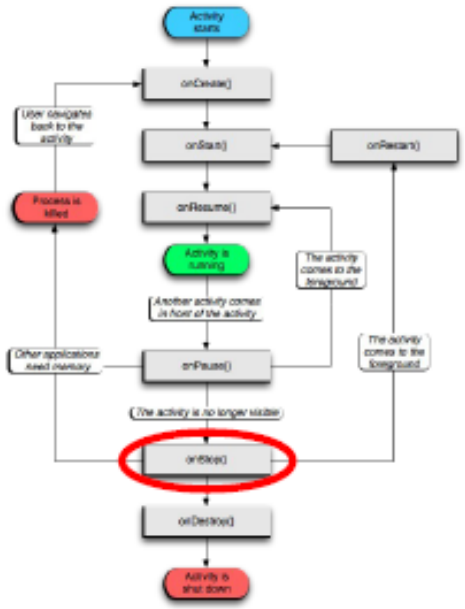
- When **onResume** is called, your activity is coming out of the Paused state and into the Running state again.
- Also called when activity is first created/loaded!
  - **Initialize resources** that you will release in onPause.
  - **Start/resume animations** or other ongoing actions that should only run when activity is visible on screen.




```
public void onResume() {
    super.onPause();              // always call super
    if (myConnection == null) {
        myConnection = new ExampleConnect();  // init.resources
        myConnection.connect();
    }
}
```

The onStop method

- When **onStop** is called, your activity is no longer visible on the screen:
  - User chose another app from **Recent Apps** window.
  - User starts a **different activity** in your app.
  - User receives a **phone call** while in your app.

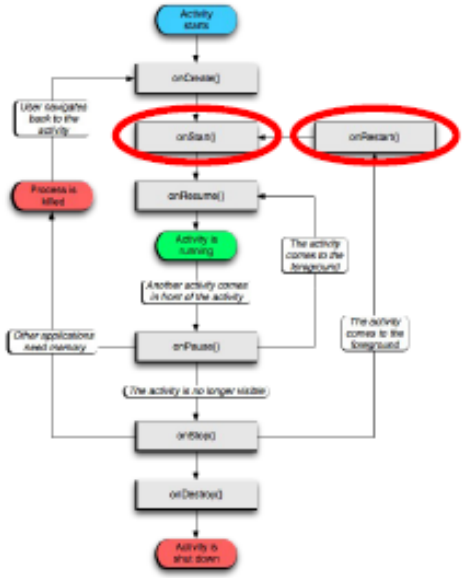


- Your app might still be running, but that activity is not.
  - onPause is always called before onStop.
  - onStop performs heavy-duty shutdown tasks like writing to a database.

```
public void onStop() {
    super.onStop();          // always call super
    ...
}
```

onStart and onRestart

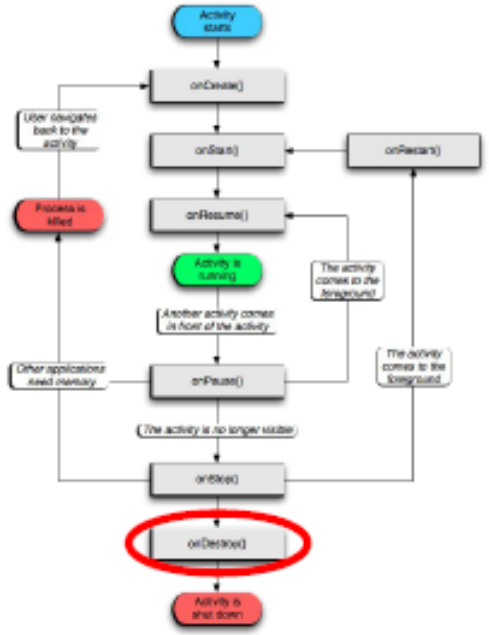
- **onStart** is called every time the activity begins.
- **onRestart** is called when activity *was* stopped but is started again later (all but the first start).
  - Not as commonly used; favor onResume.
  - Re-open any resources that onStop closed.




```
public void onStart() {
    super.onStart();            // always call super
    ...
}
public void onRestart() {
    super.onRestart();            // always call super
    ...
}
```

The onDestroy method

- When **onDestroy** is called, your entire app is being shut down and unloaded from memory.
  - Unpredictable exactly when/if it will be called.
  - Can be called whenever the system wants to reclaim the memory used by your app.
  - Generally favor onPause or onStop because they are called in a predictable and timely manner.




```
public void onDestroy() {
    super.onDestroy();              // always call super
    ...
}
```

Testing activity states (link)

- Use the LogCat system for logging messages when your app changes states:
  - analogous to System.out.println debugging for Android apps
  - appears in the LogCat console in Android Studio

```
public void onStart() {
    super.onStart();
    Log.v("testing", "onStart was called!");
}
```