UNIT – VIII

Services

Services in Android is a component that runs in the background without any user interaction or interface. Unlike Activities services does not have any graphical interface. Services run invisibly performing long running tasks - doing Internet look ups, playing music, triggering notifications etc.,

Services run with a higher priority than inactive or invisible activities and therefore it is less likely that the Android system terminates them for resource management. The only reason Android will stop a Service prematurely is to provide additional resources for a foreground component usually an Activity. When this happens, your Service can be configured to restart automatically.

Creating a Service

Create a new class that extends Service. Below is the code snippet.

```
importandroid.app.Service;
importandroid.content.Intent;
importandroid.os.IBinder;

publicclassMyServiceextends Service {
publicvoidonCreate() {
super.onCreate();
 // This method is invoked when the service is called.
 }
publicIBinderonBind() {
super.onCreate();
 // A client or activity is binded to service
 }
}
```

Services takes Two Forms

Started

A Service is started when a application component such as an activity invokes it by calling startService(). Once started, a service can run in the background indefinitely, even if the component that started it is destroyed

Bound

A service is "bound" when an application component binds to it by calling bindService(). A bound service offers a client-server interface that allows components to

interact with the service, send requests, get results, and even do so across processes with inter-process communication.

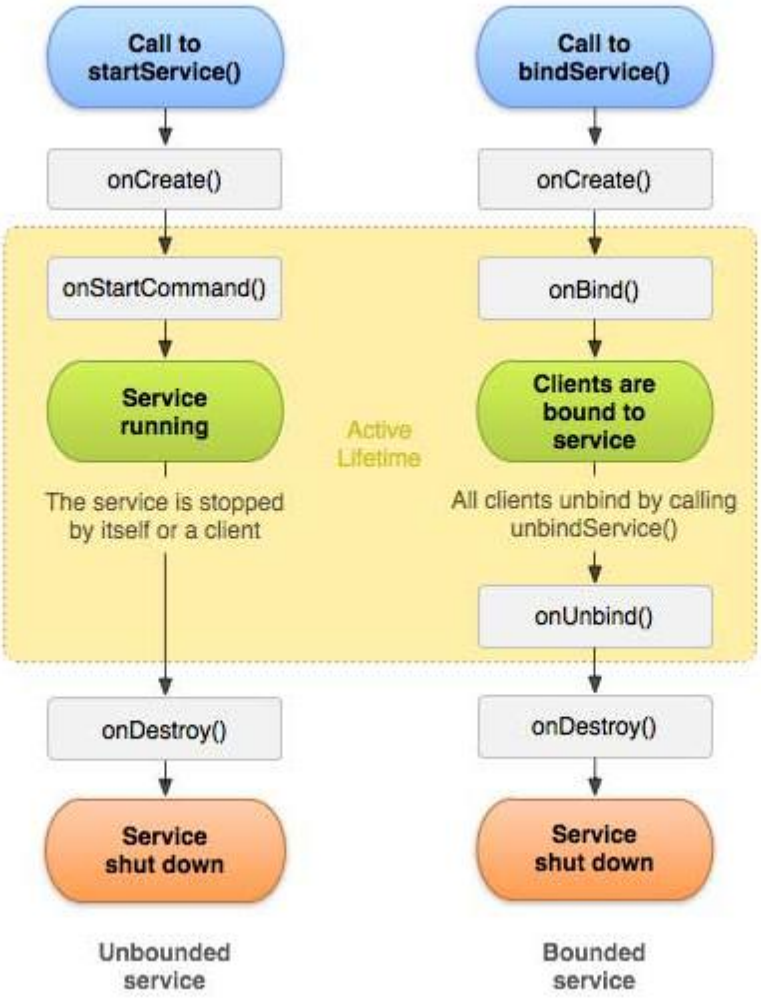
AndroidManifest.xml

```
<service
android:name=".MyService"
android:enabled="true"/>
```

A service is a component that runs in the background to perform long-running operations without needing to interact with the user. For example, a service might play music in the background while the user is in a different application, or it might fetch data over the network without blocking user interaction with an activity. A service can essentially take two states:

State	Description
Started	A service is **started** when an application component, such as an activity, starts it by calling *startService()*. Once started, a service can run in the background indefinitely, even if the component that started it is destroyed.
Bound	A service is **bound** when an application component binds to it by calling bindService(). A bound service offers a client-server interface that allows components to interact with the service, send requests, get results, and even do so across processes with interprocess communication (IPC).

A service has lifecycle callback methods that you can implement to monitor changes in the service's state and you can perform work at the appropriate stage. The following diagram on the left shows the lifecycle when the service is created with startService() and the diagram on the right shows the lifecycle when the service is created with bindService(): *(*image courtesy : android.com)



To create an service, you create a Java class that extends the Service base class or one of its existing subclasses. The **Service** base class defines various callback methods and the most important are given below. You don't need to implement all the callbacks methods. However, it's important that you understand each one and implement those that ensure your app behaves the way users expect.

Callback	Description
onStartCommand()	The system calls this method when another component, such as an activity, requests that the service be started, by calling startService(). If you implement this method, it is your responsibility to stop the service when its work is done, by calling stopSelf*()* or stopService() methods.
onBind()	The system calls this method when another component wants to bind with the service by calling bindService(). If you implement this method, you must provide an interface that clients use to communicate with the service, by returning an *IBinder* object. You must always implement this method, but if you don't want to allow binding, then you should return

	null.
onUnbind()	The system calls this method when all clients have disconnected from a particular interface published by the service.
onRebind()	The system calls this method when new clients have connected to the service, after it had previously been notified that all had disconnected in its onUnbind(Intent*)*.
onCreate()	The system calls this method when the service is first created using onStartCommand() or *onBind()*. This call is required to perform one-time setup.
onDestroy()	The system calls this method when the service is no longer used and is being destroyed. Your service should implement this to clean up any resources such as threads, registered listeners, receivers, etc.

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Service Overview

We already know that Android Activity can be started, stopped, destroyed if the system resources become too low and maybe can be recreated, **a Service are designed to have a longer life. A Service in Android can be started from an Activity, from a Broadcast receiver and other services too.**

We have to notice that using Service we don't create automatically new threads, so if we implement a simple logic inside our Service, that doesn't require long time processing we don't need to run it a separate thread, but if we have to implement complex logic, with long time processing, we have to take care of creating a new thread, otherwise the service runs on the main thread and it could cause ANR problem.

In Android a Service is used for two main reason:

- Implement multi-task
- Enable Inter-Process-Communication (IPC)

A typical example of the first case is an app that required to download data from a remote server, in this case we can have Activity that interacts with a user and starts a service that accomplishes the work in background while the user can use the app and maybe when the service finishes sends a message to the user.

In the second case, we want to "share" some common functions so that different app can re-use them. For example, we can suppose we have a service that sends an email and we want to share this service among several apps so that we don't have to rewrite the same code. In this

case we can use IPC so that the service exposes a “remote” interface that can be called by other app.

JSON

JSON stands for JavaScript Object Notation.It is an independent data exchange format and is the best alternative for XML. This chapter explains how to parse the JSON file and extract necessary information from it.

Android provides four differnet classes to manipulate JSON data. These classes are **JSONArray,JSONObject,JSONStringer and JSONTokenizer.**

In the JSON given below we interested in getting temperature only.

{

“sys":

{
"country":"GB",
"sunrise":1381107633,
"sunset":1381149604
},
"weather":[
{
"id":711,
"main":"Smoke",
"description":"smoke",
"icon":"50n"
}
],
"main":
{
"temp":304.15,
"pressure":1009,
}
}

JSON - Elements

An JSON file consist of many components. Here is the table defining the compoents of an JSON file and their description:

Sr.No	Component & description
1	**Array([)** In a JSON file , square bracket ([) represents a JSON array
2	**Objects({)** In a JSON file, curly bracket ({) represents a JSON object
3	**Key** A JSON object contains a key that is just a string. Pairs of key/value make up a JSON object
4	**Value** Each key has a value that could be string , integer or double e.t.c

JSON - Parsing

For parsing a JSON object, we will create an object of class JSONObject and specify a string containing JSON data to it. Its syntax is:

```
Stringin;
JSONObject reader =newJSONObject(in);
```

The last step is to parse the JSON. An JSON file consist of different object with different key/value pair e.t.c. So JSONObject has a seperate function for parsing each of the component of JSON file. Its syntax is given below:

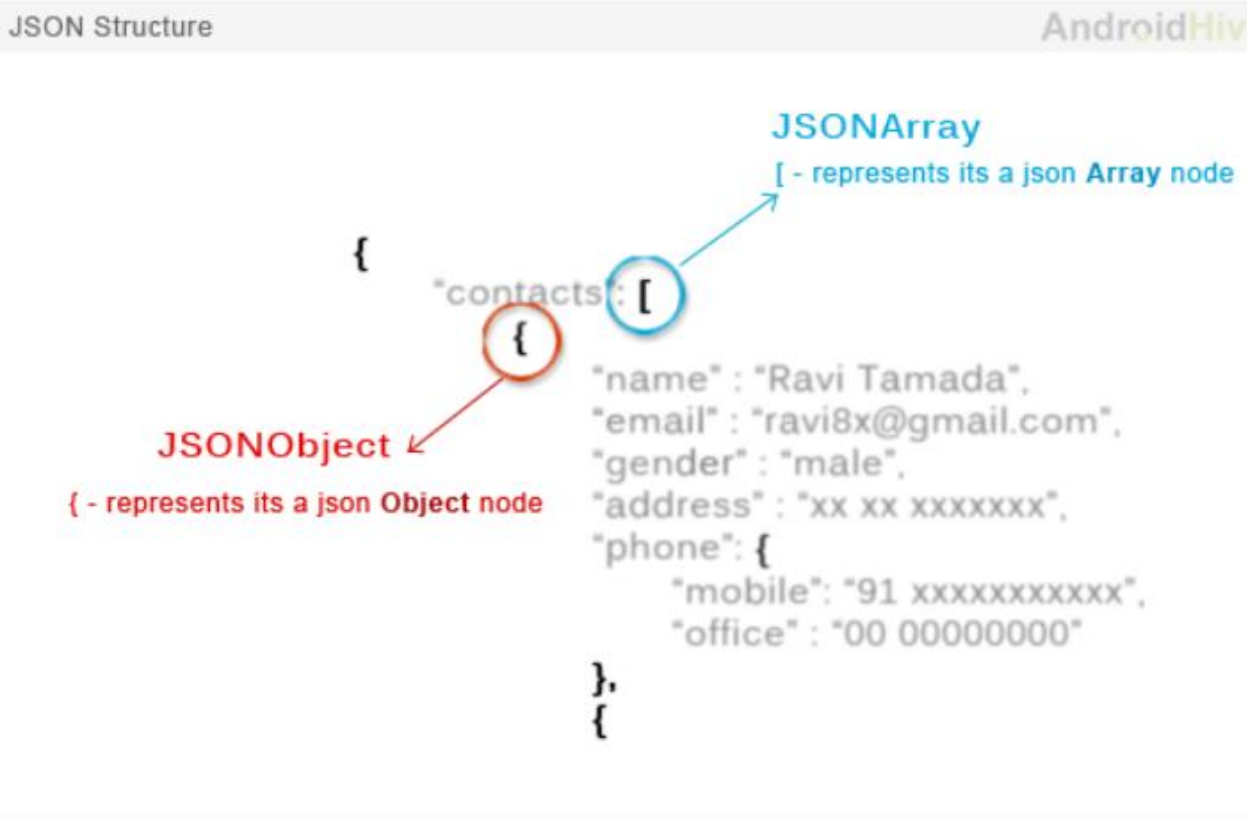
```
JSONObjectsys  =reader.getJSONObject("sys");
country=sys.getString("country");

JSONObjectmain  =reader.getJSONObject("main");
temperature=main.getString("temp");
```

The method **getJSONObject** returns the JSON object. The method **getString** returns the string value of the specified key.

The difference between [and { - (Square brackets and Curly brackets)

In general all the JSON nodes will start with a square bracket or with a curly bracket. The difference between [and { is, the square bracket ([) represents starting of an **JSONArray** node whereas curly bracket ({) represents **JSONObject**. So while accessing these nodes we need to call appropriate method to access the data.

If your JSON node starts with *[*, then we should use getJSONArray() method. Same as if the node starts with *{*, then we should use getJSONObject() method.




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

JSON (Javascript Object Notation) is a programming language . It is minimal, textual, and a subset of JavaScript. It is an alternative to XML.

Android provides support to parse the JSON object and array.

Advantage of JSON over XML

1) JSON is faster and easier than xml for AJAX applications.

2) Unlike XML, it is shorter and quicker to read and write.

3) It uses array.

json object

A JSON object contains key/value pairs like map. The keys are strings and the values are the JSON types. Keys and values are separated by comma. The { (curly brace) represents the json object.

```
{
   "employee": {
      "name":       "sachin",
      "salary":      56000,
      "married":    true
   }
}
```

json array

The [(square bracket) represents the json array.

```
["Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday"]
{ "Employee" :
   [
    {"id":"101","name":"Sonoo Jaiswal","salary":"50000"},
    {"id":"102","name":"Vimal Jaiswal","salary":"60000"}
   ]
}
```

activity_main.xml

```
<RelativeLayout xmlns:androclass="http://schemas.android.com/apk/res/android"
   xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity" >

    <TextView
        android:id="@+id/textView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentLeft="true"
        android:layout_alignParentTop="true"
        android:layout_marginLeft="75dp"
        android:layout_marginTop="46dp"
        android:text="TextView" />

</RelativeLayout>
```

Activity.java

```
package com.javatpoint.jsonparsing;

import org.json.JSONException;
import org.json.JSONObject;
```

```
import android.app.Activity;
import android.os.Bundle;
import android.widget.TextView;

public class MainActivity extends Activity {
public static final String JSON_STRING="{\"employee\":{\"name\":\"Sachin\",\"salary\":56000
}}";

@Override
public void onCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_main);

TextView textView1=(TextView)findViewById(R.id.textView1);

try{
JSONObject emp=(new JSONObject(JSON_STRING)).getJSONObject("employee");
String empname=emp.getString("name");
int empsalary=emp.getInt("salary");

String str="Employee Name:"+empname+"\n"+"Employee Salary:"+empsalary;
textView1.setText(str);

}catch (Exception e) {e.printStackTrace();}

}

        }
```