Mobile Application Develpment

Background Tasks in Android

Service

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- Background Tasks in Android
  - Service Life Cycle
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  - Intent & Intent Filter
  - Broadcast Receiver

A service can essentially take two forms:

- **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**.
  - **Usually**, a started service performs a single operation and does not return a result to the caller.
  - **For example**,
    - it might **playing music**. When the operation is done, the service should stop itself.

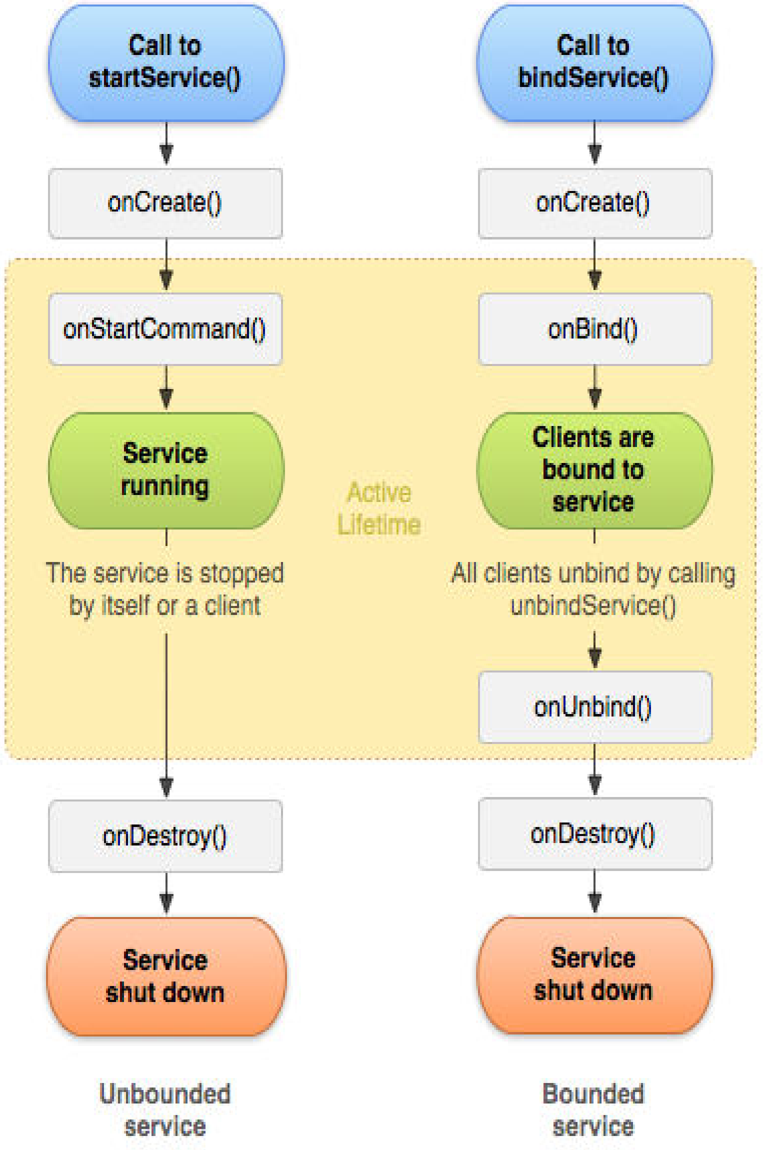
A service can essentially take two forms: (Cont.)

- **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 bound service** runs only as long as another application component is bound to it.
  - Multiple components can bind to the service at once, but when all of them unbind, the service is destroyed.

Service - Life Cycle

a service has lifecycle callback methods that you can implement to monitor changes in the service's state and perform work at the appropriate times.

- **The entire lifetime of a service:** happens between the time ***onCreate()*** is called and the time ***OnDestroy()*** returns.
- **The active lifetime of a service** begins with a call to either ***onStartCommand()*** or ***onBind()*** ends the same time that the entire lifetime Ends. If the service is bound, the active lifetime ends when ***onUnbind()*** returns.



Life Cycle methods are:

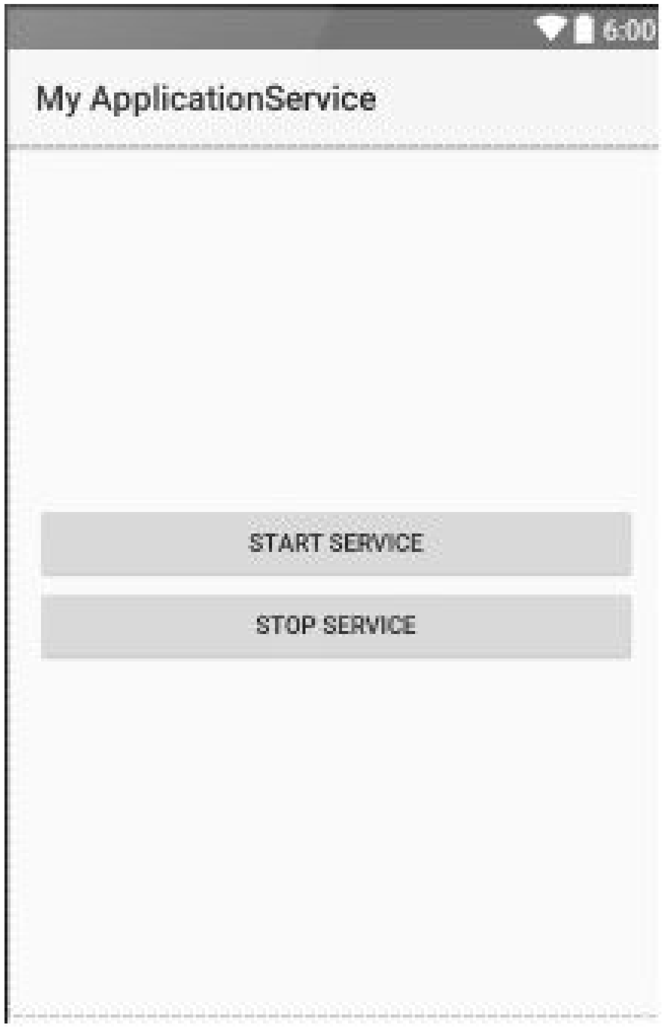
- **onStartCommand()** The system calls this method when another component, such as an **activity**, requests that the service be started, by calling ***startService()***. If you implement this method, it is your responsibility to stop the service when its work is done, by calling ***stopSelf()*** or ***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***.

Life Cycle methods (Cont.)

- **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 set-up.
- **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.

Example:

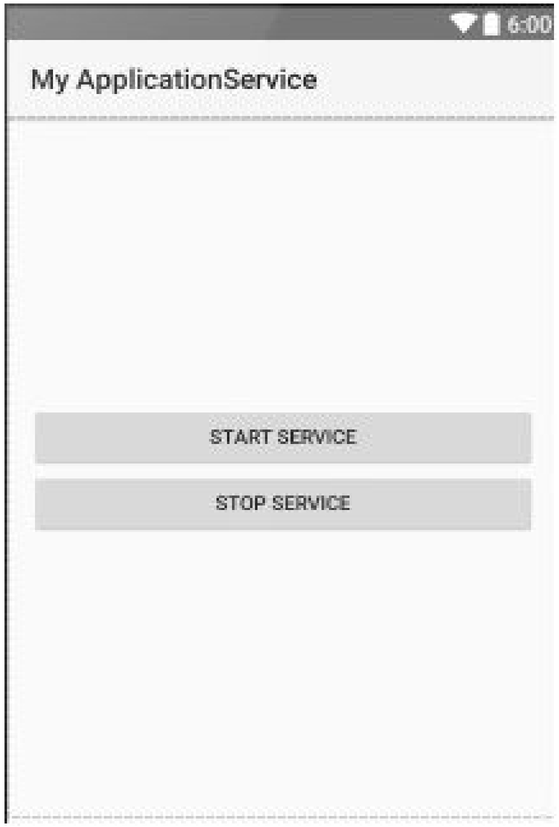
- **Start a Service that explicitly performs the following:**
  - Continuously playing a ringtone.
  - Stops playing a ringtone.



Creating User Interface

- Once the project is loaded come inside **activity_main.xml** and create the following layout.

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayoutxmlns:android="http://schemas.android.com/apk/res/android"
   ….
      <Button
        android:id="@+id/buttonStart"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="Start Service" />
      <Button
        android:id="@+id/buttonStop"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="Stop Service" />
    </LinearLayout>
 </RelativeLayout>
```



MainActivity.java

```
package com.example.hp1000.myapplicationservice;

import …;

public class MainActivity extends AppCompatActivity implements View.OnClickListener {

     private Button buttonStart;
     private Button buttonStop;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        buttonStart = (Button) findViewById(R.id.buttonStart);
        buttonStop = (Button) findViewById(R.id.buttonStop);
        buttonStart.setOnClickListener(this);  //attaching onclicklistener to buttons
        buttonStop.setOnClickListener(this);
    }
```

MainActivity.java

```
    @Override
    public void onClick(View view) {
        if (view == buttonStart) {
                    startService(new Intent(this, MyService.class));    //starting service
        } else if (view == buttonStop) {
                    stopService(new Intent(this, MyService.class));    //stopping service
        }
    }
}
```

Creating Service

```
package com.example.hp1000.myapplicationservice;
import …;
 public class MyService extends Service {
                private MediaPlayer player;  //creating a mediaplayer object
                @Override
                public Ibinder onBind(Intent intent) {
                                return null;
                 }
                @Override
                public int onStartCommand(Intent intent, int flags, int startId) {
                        player = MediaPlayer.create(this,Settings.System.DEFAULT_RINGTONE_URI ) ;
                                                                        //getting systems default ringtone
                        player.setLooping(true);  //this will make the ringtone continuously playing
                        player.start();                 //staring the player
                        return START_STICKY; //start sticky means service explicitly started and stopped
                }
                @Override
                public void onDestroy() {
                                super.onDestroy();
                                player.stop(); //stopping the player when service is destroyed
                }
}
```

Defining Service in Manifest

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="net.simplifiedcoding.androidserviceexample">
     <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <!-- defining the service class here -->
        <service android:name=".MyService" />
    </application>
</manifest>
```

Reference

- Services | Android Developers
  - https://developer.android.com/guide/components/services.html
- Implementing an Android Started Service in Android Studio
  - http://www.techotopia.com/index.php/Implementing_an_Android_Started_Service_in_Android_Studio
- Android - Services
  - https://www.tutorialspoint.com/android/android_services.htm