

# 1. Notification

## 1.1 Create a Simple Notification

1. Create the Android application with the following attributes.

- Application Name: **MyNotification**
- Project Name: **MyNotification**
- Package Name: **com.example.mynotification**

2. Modify the source file "**MainActivity.java**" as follow.

```
package com.example.mynotification;

import android.os.Bundle;
import android.app.Activity;
import android.view.Menu;
import android.app.Notification;
import android.app.NotificationManager;
import android.support.v4.app.NotificationCompat;

public class MainActivity extends Activity {

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        // Create a Notification Builder
        NotificationCompat.Builder mBuilder = new NotificationCompat.Builder(this)

            .setSmallIcon(R.drawable.ic_launcher)

            .setContentTitle("My notification")

            .setDefaults(Notification.DEFAULT_SOUND)

            .setContentText("Click to display the detail");

        // Sets an ID for the notification
        int mNotificationId = 001;

        // Gets an instance of the NotificationManager service
        NotificationManager mNotifyMgr =

            (NotificationManager) getSystemService(NOTIFICATION_SERVICE);
```

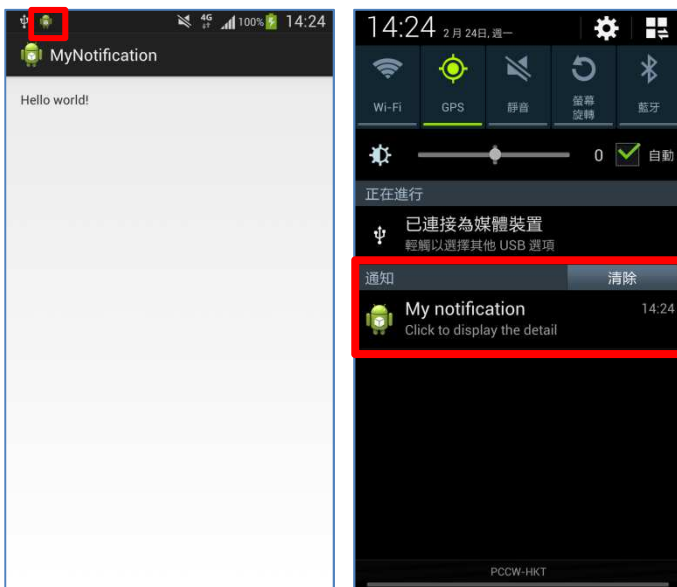
```

        // Builds the notification and issues it.
        mNotifyMgr.notify(mNotificationId, mBuilder.build());
    }

    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        // Inflate the menu; this adds items to the action bar if it is present.
        getMenuInflater().inflate(R.menu.main, menu);
        return true;
    }
}

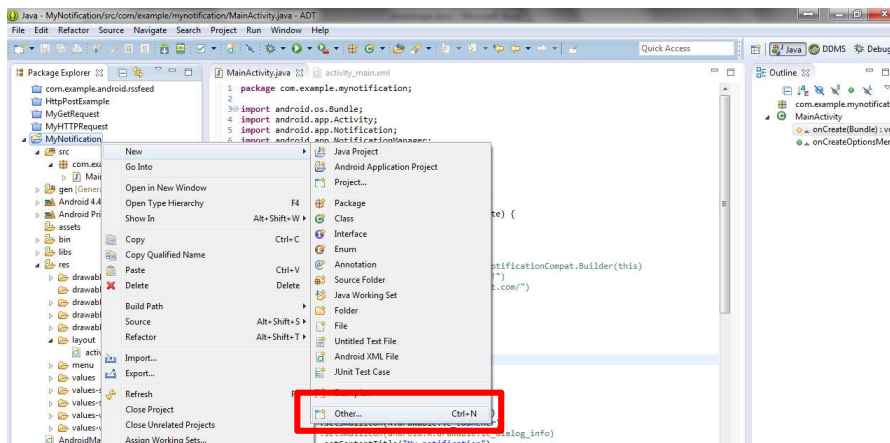
```

3. Save and execute the app, you should able to see the notification.

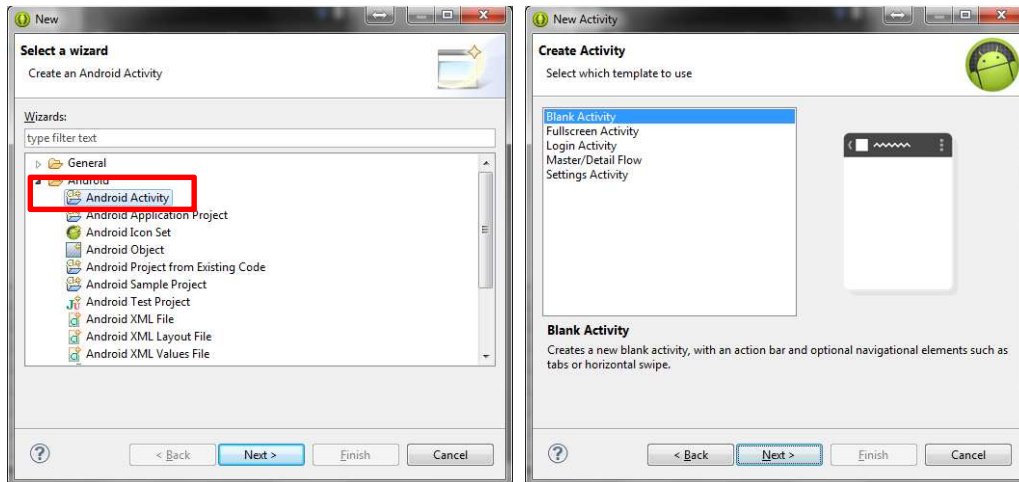


## 1.2 Display Notification Detail

1. Right click the project “MyNotification”, then select New → Other...

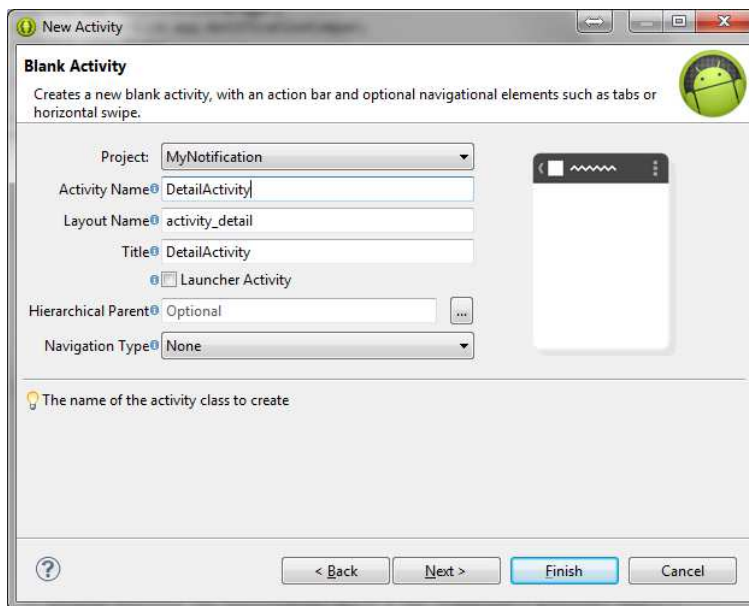


2. Select **Android** → **Android Activity** and press [**Next>**] to continue.

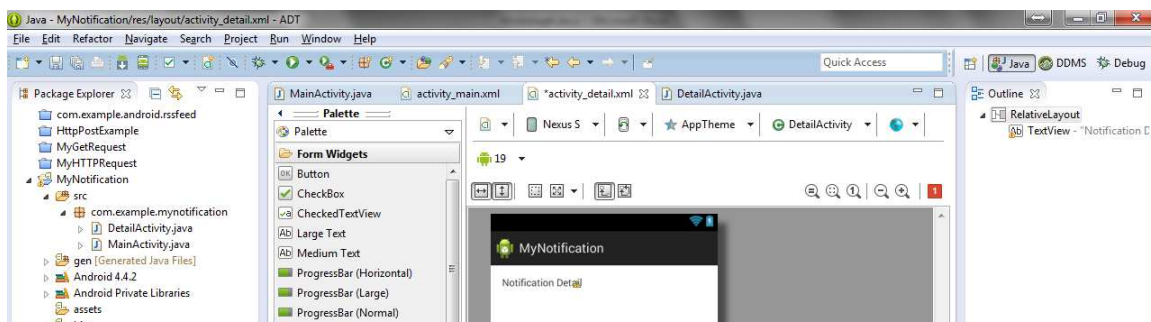


3. Input the following attributes for the new activity press [**Finish**] button:

- Project Name: **MyNotification**
- Activity Name: **DetailActivity**
- Layout Name: **activity\_detail**



4. Change the text for the default TextView of the layout "**activity\_detail.xml**" to “Notification Detail”.



5. Modify the source file "**MainActivity.java**" as follow.

```
package com.example.mynotification;

import android.os.Bundle;
import android.app.Activity;
import android.view.Menu;
import android.app.Notification;
import android.app.NotificationManager;
import android.app.PendingIntent;
import android.content.Intent;
import android.support.v4.app.NotificationCompat;

public class MainActivity extends Activity {

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

        // Construct the detail intent
        Intent detailIntent = new Intent(this, DetailActivity.class);

        // Because clicking the notification opens a new ("special") activity, there's
        // no need to create an artificial back stack.
        PendingIntent mPendingIntent =
            PendingIntent.getActivity(
                this,
                0,
                detailIntent,
                PendingIntent.FLAG_UPDATE_CURRENT
            );

        // Create a Notification Builder
        NotificationCompat.Builder mBuilder = new NotificationCompat.Builder(this)
            .setSmallIcon(R.drawable.ic_launcher)
            .setContentTitle("My notification")
            .setDefaults(Notification.DEFAULT_SOUND)
            .setContentIntent(mPendingIntent)
            .setContentText("Click to display the detail");
    }
}
```

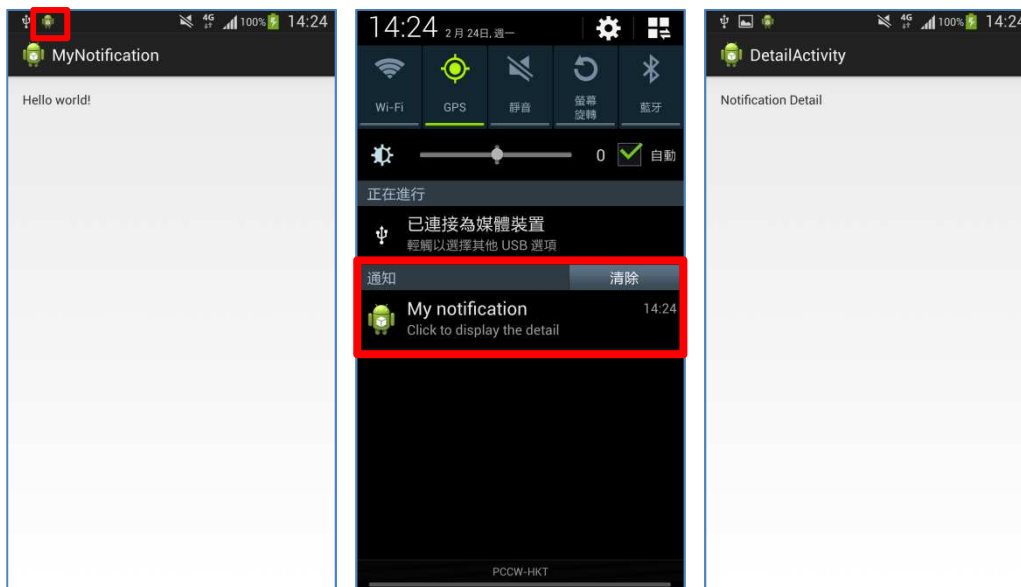
```
// Sets an ID for the notification
int mNotificationId = 001;

// Gets an instance of the NotificationManager service
NotificationManager mNotifyMgr =
    (NotificationManager) getSystemService(NOTIFICATION_SERVICE);

// Builds the notification and issues it.
mNotifyMgr.notify(mNotificationId, mBuilder.build());
}

@Override
public boolean onCreateOptionsMenu(Menu menu) {
    // Inflate the menu; this adds items to the action bar if it is present.
    getMenuInflater().inflate(R.menu.main, menu);
    return true;
}
}
```

6. Save and execute the app, you should be able to see the notification on the top. The notification detail will be displayed after you click on the notification.



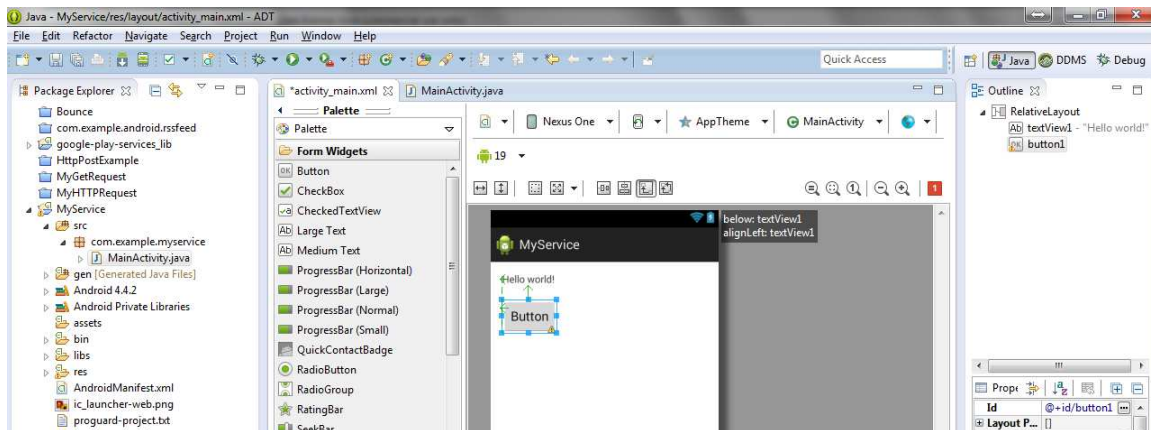
## 2. Services

### 2.1 Create a Background Services

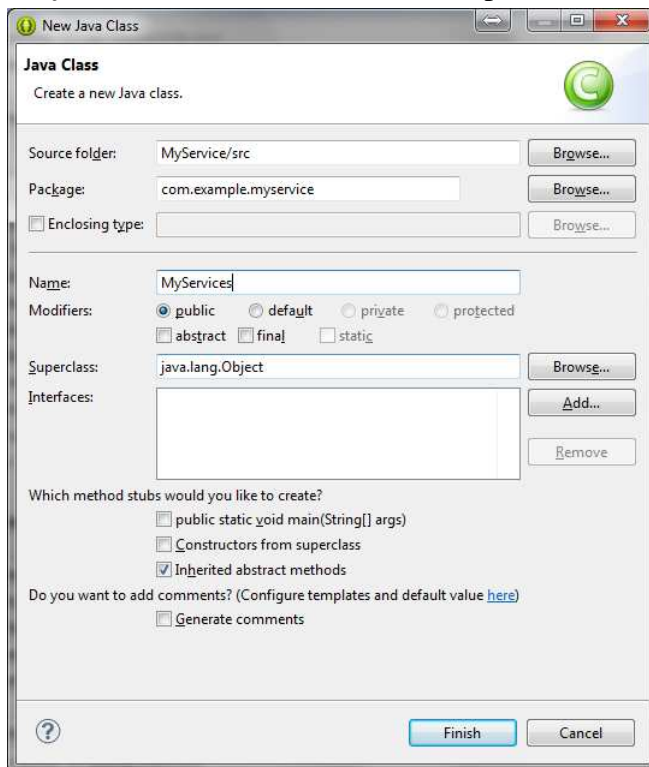
1. Create the Android application with the following attributes.

- Application Name: **MyService**
- Project Name: **MyService**
- Package Name: **com.example.myservice**

2. Drag a buttons to the layout.



3. Right click the package **src/com.example.myservice**, and select **New → Class**. Input “**MyServices**” as the class name and press **[Finish]** button.



## 4. Modify the source file “MyServices.java” as follow.

```
package com.example.myservice;

import android.app.Service;
import android.content.Intent;
import android.os.IBinder;
import android.widget.Toast;

public class MyServices extends Service {

    @Override
    public IBinder onBind(Intent intent) {
        // TODO: Return the communication channel to the service.
        throw new UnsupportedOperationException("Not yet implemented");
    }

    @Override
    public void onCreate() {
        // TODO Auto-generated method stub
        Toast.makeText(getApplicationContext(), "Service Created",
            Toast.LENGTH_LONG).show();

        super.onCreate();
    }

    @Override
    public void onDestroy() {
        // TODO Auto-generated method stub
        Toast.makeText(getApplicationContext(), "Service Destroy",
            Toast.LENGTH_LONG).show();

        super.onDestroy();
    }

    @Override
    public int onStartCommand(Intent intent, int flags, int startId) {
        // TODO Auto-generated method stub
        Toast.makeText(getApplicationContext(), "Service Running ",
            Toast.LENGTH_LONG).show();

        return super.onStartCommand(intent, flags, startId);
    }
}
```

## 5. Modify the source file "MainActivity.java" as follow:

```
package com.example.myservice;

import android.os.Bundle;
import android.app.Activity;
import android.view.Menu;
import android.app.AlarmManager;
import android.app.PendingIntent;
import android.content.Context;
import android.content.Intent;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import java.util.Calendar;

public class MainActivity extends Activity {

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

        // Start service using AlarmManager
        Calendar cal = Calendar.getInstance();
        cal.add(Calendar.SECOND, 10);

        Intent intent = new Intent(this, MyServices.class);
        PendingIntent pintent = PendingIntent.getService(this, 0, intent, 0);
        AlarmManager alarm = (AlarmManager)
            getSystemService(Context.ALARM_SERVICE);
        alarm.setRepeating(AlarmManager.RTC_WAKEUP, cal.getTimeInMillis(),
            10*1000, pintent);

        // Start the service and execute in background
        startService(new Intent(getBaseContext(), MyServices.class));

        Button stopBtn = (Button) findViewById(R.id.button2);
        stopBtn.setOnClickListener(new OnClickListener() {

            @Override
            public void onClick(View v) {
```



```

        // TODO Auto-generated method stub
        stopService(new Intent(getApplicationContext(), MyServices.class));
        finish();
    }
});
}

@Override
public boolean onCreateOptionsMenu(Menu menu) {
    // Inflate the menu; this adds items to the action bar if it is present.
    getMenuInflater().inflate(R.menu.main, menu);
    return true;
}
}

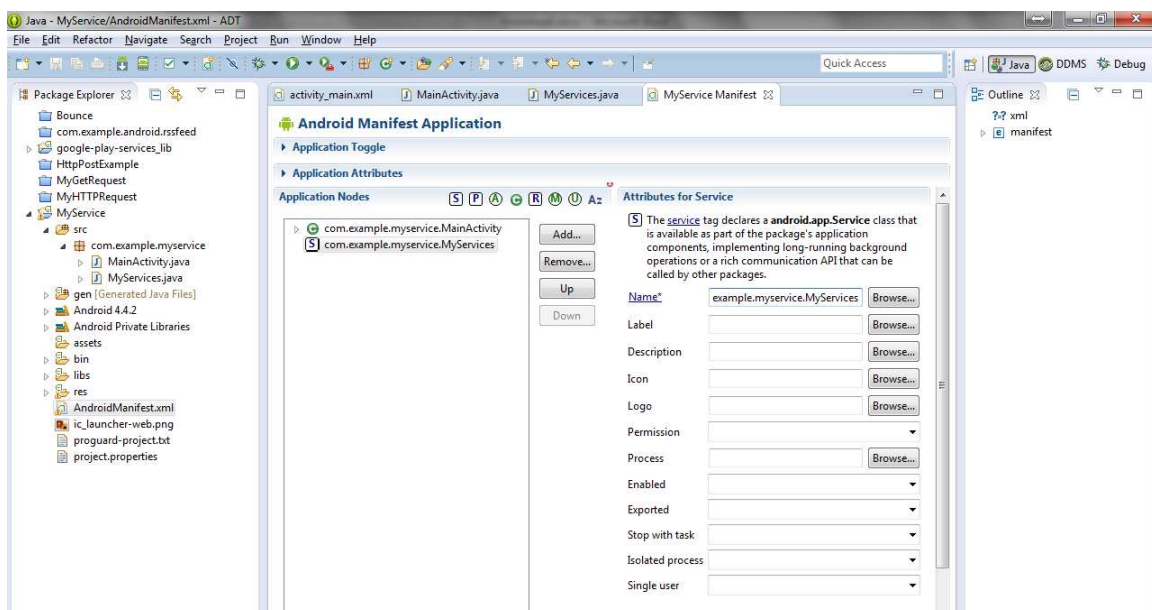
```

6. Add the following Uses Permission in "AndroidManifest.xml":

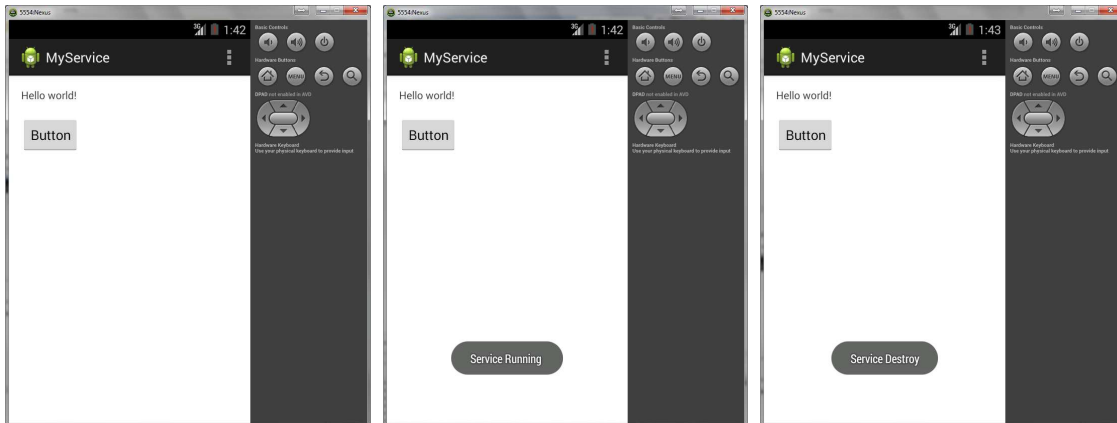
- android.permission.WAKE\_LOCK
- com.android.alarm.permission.SET\_ALARM



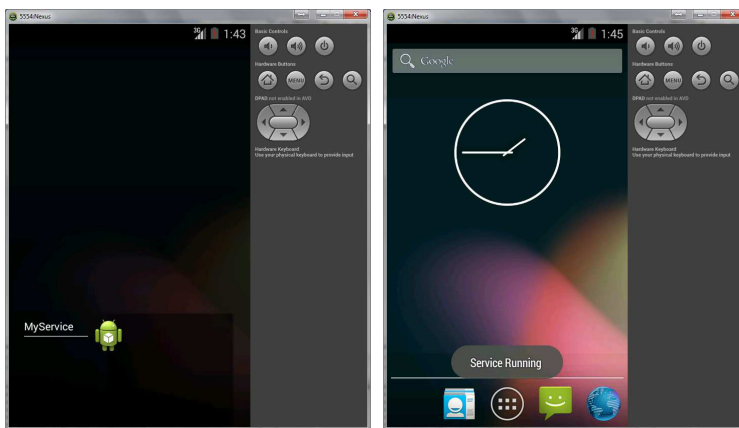
7. Add the service "com.example.myservice.MyServices" in "AndroidManifest.xml":



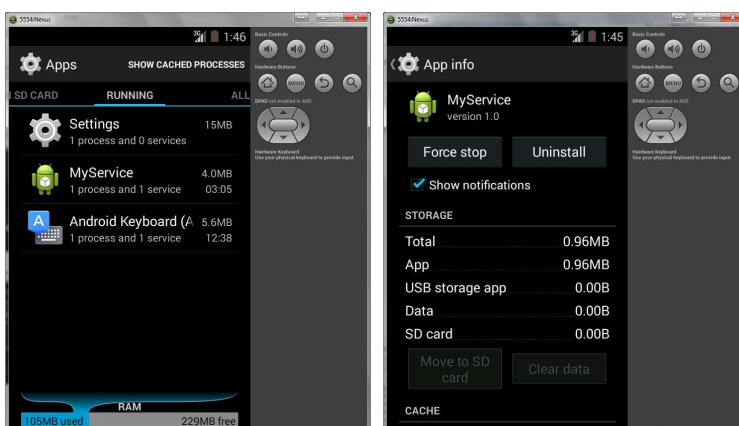
- Save and execute the app. The service automatically execute when the app start, press the button to kill the service.



- Kill the app and return to home, you will find that the app still running.



- You can find this app under **Setting** → **Application** → **Running**. You can use [**Force Stop**] to kill it.



## 3. Web Services

### 3.1 Create a JSON Web Services

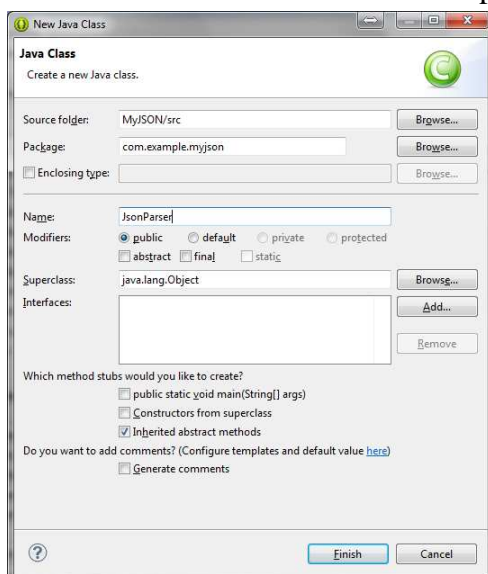
1. Create the Android application with the following attributes.
  - Application Name: **MyJSON**
  - Project Name: **MyJSON**
  - Package Name: **com.example.myjson**
2. Check the layout file “**activity\_main.xml**”, enclose that the id for textView1 is exist.

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/LinearLayout1"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity" >

    <TextView
        android:id="@+id/textView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="TextView" />

</LinearLayout>
```

3. Right click the package **src/com.example.myjson**, and select **New → Class**. Input “**JsonParser**” as the class name and press [**Finish**] button.



4. Modify the source file "**JsonParser.java**" as follow.

```
package com.example.myjson;

import java.io.BufferedReader;
import java.io.InputStream;
import java.io.InputStreamReader;
import org.apache.http.HttpEntity;
import org.apache.http.HttpResponse;
import org.apache.http.client.methods.HttpPost;
import org.apache.http.impl.client.DefaultHttpClient;

public class JsonParser {

    public String json;

    public String getJSONFromUrl(String url) {
        try {
            // Construct the HTTP client
            DefaultHttpClient httpClient = new DefaultHttpClient();

            // Use POST to request the specified URL
            HttpPost httpPost = new HttpPost(url);

            // Obtain the HTTP Response from the POST request
            HttpResponse httpResponse = httpClient.execute(httpPost);

            // Obtain the HTTP entity from the HTTP response
            HttpEntity httpEntity = httpResponse.getEntity();

            // Obtain the content into Input Stream
            InputStream is = httpEntity.getContent();

            // Use the input stream reader to read the input
            InputStreamReader isr = new InputStreamReader(is, "UTF-8");

            // Read the data from input stream reader to buffer reader
            BufferedReader reader = new BufferedReader(isr, 8);

            // Construct the string builder
            StringBuilder sb = new StringBuilder();
```

```
        // Read the data and append to string builder
        String line = null;
        while ((line = reader.readLine()) != null) {
            sb.append(line + "\n");
        }

        // Convert the content to string
        json = sb.toString();

        // Close the input stream
        is.close();
    } catch (Exception e) {
        e.printStackTrace();
    }

    // return JSON String
    return json;
}
}
```

5. Modify the source file "MainActivity.java" as follow.

```
package com.example.myjson;

import android.os.Bundle;
import android.app.Activity;
import android.view.Menu;
import android.widget.TextView;
import android.os.AsyncTask;
import org.json.JSONArray;
import org.json.JSONObject;

public class MainActivity extends Activity {

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

        // Using AsyncTask during parsing
    }
}
```

```
        new AsyncTaskParseJson().execute();
    }

    public class AsyncTaskParseJson extends AsyncTask<String, String, String> {
        public String mJSONstring = null;

        @Override
        protected String doInBackground(String... arg0) {
            try {
                // Instantiate the JSON parser
                JsonParser jParser = new JsonParser();

                // Get JSON string from URL
                mJSONstring = jParser.getJSONFromUrl(
                    "http://api.openweathermap.org/data/2.5/weather?q=HongKong");
            } catch (Exception e) {
                e.printStackTrace();
            }

            return mJSONstring;
        }

        @Override
        protected void onPreExecute() {}

        @Override
        protected void onPostExecute(String strFromDoInBg) {
            try {
                // instantiate the JSON Parser
                JSONObject jsonObj = new JSONObject(mJSONstring);

                // Get JSON string from JSON variable
                JSONObject mJSONObject1 = new JSONObject(jsonObj.getString("main"));
                String mTemperature = mJSONObject1.getString("temp");

                //Get JSON string from JSON array
                JSONArray mJSONArray = jsonObj.getJSONArray("weather");
                for (int i = 0; i < mJSONArray.length(); i++) {
```

```

        JSONObject mJSONObject2 = mJSONArray.getJSONObject(i);

        // Storing each JSON item in variable
        String mWeather = mJSONObject2.getString("description");

        // Display the weather on Screen
        TextView textView1 = (TextView) findViewById(R.id.textView1);
        textView1.setText(mTemperature + "F\n" + mWeather);
    }
} catch (Exception e) {
    e.printStackTrace();
}
}
}

@Override
public boolean onCreateOptionsMenu(Menu menu) {
    // Inflate the menu; this adds items to the action bar if it is present.
    getMenuInflater().inflate(R.menu.main, menu);
    return true;
}
}
}

```

6. Using the same method, add the following uses permission in "**AndroidManifest.xml**":

- android.permission.INTERNET

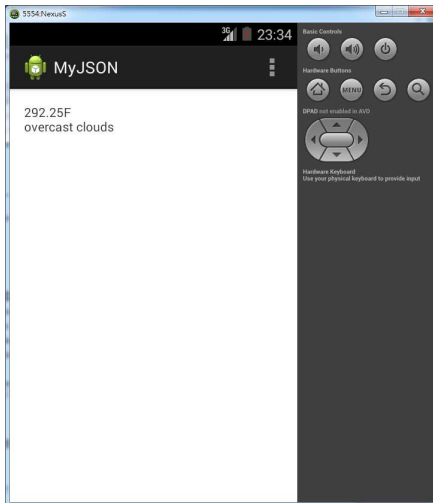
7. If you execute the web service directly, you should able to obtain the following JSON file.

```

{"coord":{"lon":114.16,"lat":22.28},
"sys":{"message":0.1527,"country":"Hong Kong","sunrise":1394577273,"sunset":1394620292},
"weather":[{"id":500,"main":"Rain","description":"light rain","icon":"10d"}],
"base":"cmc stations",
"main":{"temp":294.23,"humidity":83,"pressure":1011,"temp_min":293.15,"temp_max":295.93},
"wind":{"speed":3.08,"deg":30},
"rain":{"3h":0.25},
"clouds":{"all":92},
"dt":1394614698,
"id":1819729,
"name":"",
"cod":200}

```

8. Save and execute the app. Can you obtain the weather for Hong Kong?



### 3.2 Create a SOAP Web Services

1. Create the Android application with the following attributes.
  - Application Name: **MySOAP**
  - Project Name: **MySOAP**
  - Package Name: **com.example.mysoap**
2. Check the layout file “**activity\_main.xml**”, enclose that the id for textView1 is exist.

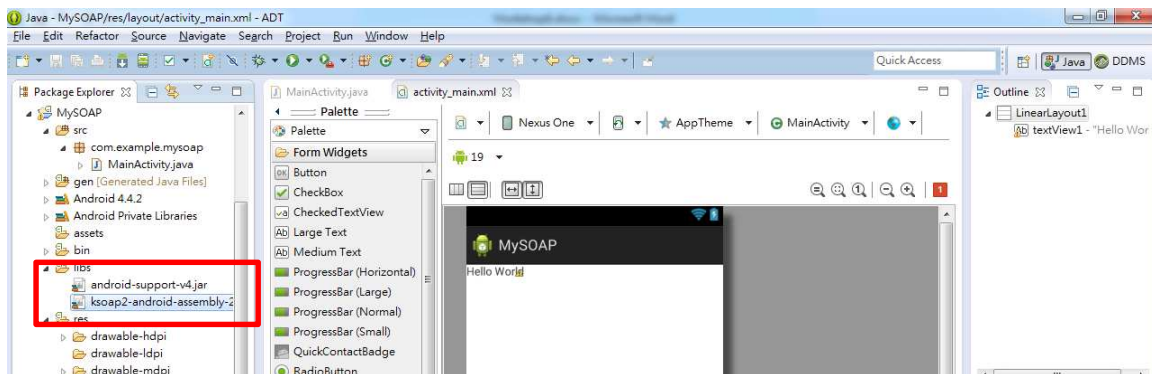
```
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:paddingBottom="@dimen/activity_vertical_margin"
    android:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin"
    tools:context=".MainActivity" >

    <TextView
        android:id="@+id/textView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/hello_world" />

</RelativeLayout>
```



3. KSOAP client library is being used in Android to make WebService calls. You can download this library from <http://ksoap2.sourceforge.net>. Then add the library to the **lib** folder of Android project



4. Modify the source file "**MainActivity.java**" as follow.

```

package com.example.mysoap;

import android.os.Bundle;
import android.app.Activity;
import android.view.Menu;
import android.widget.TextView;
import android.os.AsyncTask;
import org.ksoap2.SoapEnvelope;
import org.ksoap2.serialization.PropertyInfo;
import org.ksoap2.serialization.SoapObject;
import org.ksoap2.serialization.SoapPrimitive;
import org.ksoap2.serialization.SoapSerializationEnvelope;
import org.ksoap2.transport.HttpTransportSE;

public class MainActivity extends Activity {

    private final String NAMESPACE = "http://www.w3schools.com/webservices/";
    private final String URL =
        "http://www.w3schools.com/webservices/tempconvert.asmx";
    private final String SOAP_ACTION =
        "http://www.w3schools.com/webservices/CelsiusToFahrenheit";
    private final String METHOD_NAME = "CelsiusToFahrenheit";
    private static String celcius = "100";
    private static String fahren;
    TextView mTextView ;

    @Override

```

```
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);

    // Output text
    mTextView = (TextView) findViewById(R.id.textView1);

    // Create instance for AsyncCallWS
    AsyncCallWS task = new AsyncCallWS();

    // Call execute
    task.execute();
}

private class AsyncCallWS extends AsyncTask<String, Void, Void> {
    @Override
    protected Void doInBackground(String... arg0) {
        getFahrenheit(celcius);
        return null;
    }

    @Override
    protected void onPostExecute(Void result) {
        mTextView.setText(fahren + "° F");
    }

    @Override
    protected void onPreExecute() {
        mTextView.setText("Calculating...");
    }

    @Override
    protected void onProgressUpdate(Void... values) {}
}

public void getFahrenheit(String celcius) {
    // Create request
    SoapObject request = new SoapObject(NAMESPACE, METHOD_NAME);
```

```
// Property which holds input parameters
PropertyInfo celsiusPI = new PropertyInfo();

// Set Name
celsiusPI.setName("Celsius");

// Set Value
celsiusPI.setValue(celsius);

// Set dataType
celsiusPI.setType(double.class);

// Add the property to request object
request.addProperty(celsiusPI);

// Create envelope
SoapSerializationEnvelope envelope = new
    SoapSerializationEnvelope(SoapEnvelope.VER11);
envelope.dotNet = true;

// Set output SOAP object
envelope.setOutputSoapObject(request);

// Create HTTP call object
HttpTransportSE androidHttpTransport = new HttpTransportSE(URL);

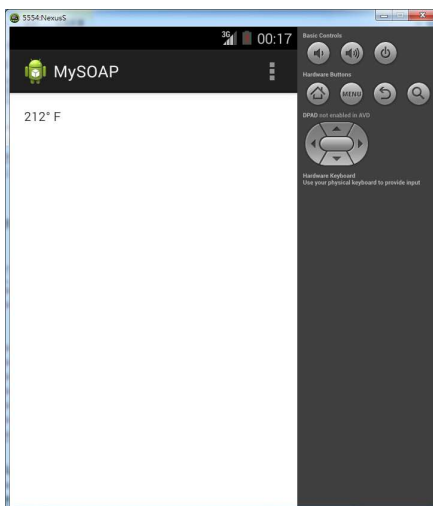
try {
    // Invoke web service
    androidHttpTransport.call(SOAP_ACTION, envelope);

    // Get the response
    SoapPrimitive response = (SoapPrimitive) envelope.getResponse();

    // Assign it to Fahrenheit static variable
    fahren = response.toString();
} catch (Exception e) {
    e.printStackTrace();
}
}
```

```
@Override
public boolean onCreateOptionsMenu(Menu menu) {
    // Inflate the menu; this adds items to the action bar if it is present.
    getMenuInflater().inflate(R.menu.main, menu);
    return true;
}
}
```

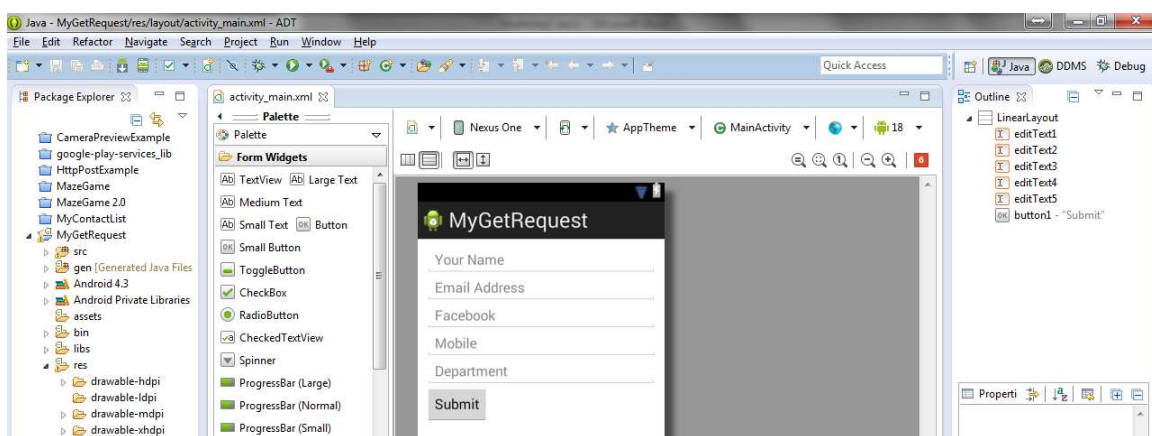
5. Using the same method, add the following uses permission in "**AndroidManifest.xml**":
  - android.permission.INTERNET
6. Save and execute the app, the temperature for 100C is convert to Fahrenheit



## 4. HTTP Request

### 4.1 Get Request

1. Create the Android application with the following attributes.
  - Application Name: **MyGetRequest**
  - Project Name: **MyGetRequest**
  - Package Name: **com.myexample.mygetrequest**
2. Add 5 text field for Name, Email, Facebook, Mobile and Department input, and then add a button for submit.



3. The XML for the layout look like:

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:padding="10dip" >

    <EditText
        android:id="@+id/editText1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Your Name" />

    <EditText
        android:id="@+id/editText2"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Email Address"
```

```
        android:inputType="textEmailAddress" />

<EditText
    android:id="@+id/editText3"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Facebook" />

<EditText
    android:id="@+id/editText4"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Mobile"
    android:inputType="number" />

<EditText
    android:id="@+id/editText5"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Department" />

<Button
    android:id="@+id/button1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Submit" />
</LinearLayout>
```

4. Modify the source file "**MainActivity.java**" as follow:

```
package com.example.mygetrequest;

import android.os.Bundle;
import android.app.Activity;
import android.view.Menu;
import android.os.StrictMode;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.widget.EditText;
```

```
import android.widget.Toast;
import java.net.URLEncoder;
import org.apache.http.client.HttpClient;
import org.apache.http.client.ResponseHandler;
import org.apache.http.client.methods.HttpGet;
import org.apache.http.impl.client.BasicResponseHandler;
import org.apache.http.impl.client.DefaultHttpClient;

public class MainActivity extends Activity {

    private EditText fullname, email, facebook, mobile, department;
    private Button button1;

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

        // Force Android to allow HTTP Request
        if (android.os.Build.VERSION.SDK_INT > 9) {
            StrictMode.ThreadPolicy policy = new
                StrictMode.ThreadPolicy.Builder().permitAll().build();
            StrictMode.setThreadPolicy(policy);
        }

        // Add the listener to button
        button1 = (Button) findViewById(R.id.button1);
        button1.setOnClickListener(new OnClickListener() {
            public void onClick(View arg0) {
                sendData();
            }
        });
    }

    public void sendData() {

        // Define the text field
        fullname = (EditText) findViewById(R.id.editText1);
        email = (EditText) findViewById(R.id.editText2);
        facebook = (EditText) findViewById(R.id.editText3);
        mobile = (EditText) findViewById(R.id.editText4);
    }
}
```

```
department = (EditText) findViewById(R.id.editText5);

try{
    // URLEncode user defined data
    String fullnameValue = URLEncoder.encode(
        fullname.getText().toString(), "UTF-8");
    String emailValue = URLEncoder.encode(
        email.getText().toString(), "UTF-8");
    String facebookValue = URLEncoder.encode(
        facebook.getText().toString(), "UTF-8");
    String mobileValue = URLEncoder.encode(
        mobile.getText().toString(), "UTF-8");
    String departmentValue = URLEncoder.encode(
        department.getText().toString(), "UTF-8");

    // Create HTTP client object to send request to server
    HttpClient Client = new DefaultHttpClient();

    // Construct URL string
    String URL = "http://www.peter-lo.com/Demo/InsertAndroid.php?fullname=" +
        fullnameValue + "&email=" + emailValue + "&facebook=" +
        facebookValue + "&mobile=" + mobileValue + "&depart=" +
        departmentValue;

    // Create Request to server and get response
    HttpGet httpget = new HttpGet(URL);
    ResponseHandler<String> responseHandler = new BasicResponseHandler();
    String SetServerString = Client.execute(httpget, responseHandler);

    // Show response on activity
    Toast.makeText(MainActivity.this, SetServerString,
        Toast.LENGTH_LONG).show();
} catch(Exception e) {
    // writing error to Log
    e.printStackTrace();
}
}
```

@Override



```
public boolean onCreateOptionsMenu(Menu menu) {  
    // Inflate the menu; this adds items to the action bar if it is present.  
    getMenuInflater().inflate(R.menu.main, menu);  
    return true;  
}  
}
```

5. Using the same method, add the following uses permission in "**AndroidManifest.xml**":
  - android.permission.INTERNET
6. Save and execute the app again, input your contact information and press the **[Submit]** button. Then you can obtain the contact for all classmates from the Contact List.

