Lab Assignment #6&7

Due Date: Week 12.

Purpose: The purpose of this lab assignment is to:

- Develop Android apps that **consume web services**
- Develop Android apps with **Messaging capabilities**

References: Textbook, ppt slides. This material provides the necessary information that you need to complete the exercises.

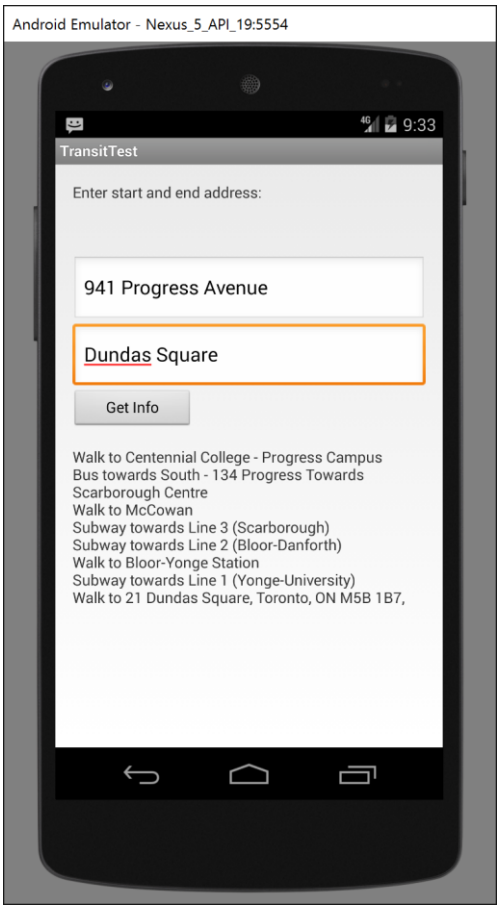
Be sure to read the following general instructions carefully:

- This assignment **can be completed in pairs using pair programming technique** (https://en.wikipedia.org/wiki/Pair_programming).
- You will have to **demonstrate your solution in a scheduled lab session** and upload the solution on eCentennial through the dropbox link

Exercise 1

Write an Android app that uses Google Transit API to display the TTC directions. First run my **TransitTest** application which displays the directions for a person who wants to go from Progress Campus to Dundas square. The current version uses geo coordinates as entries.

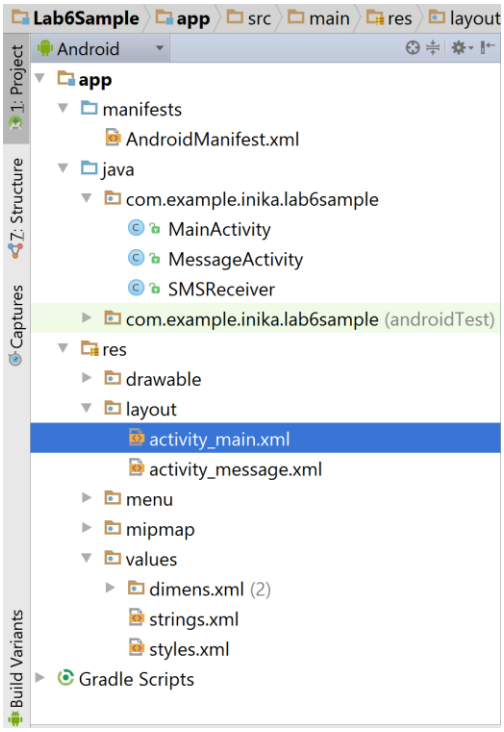
Then, allow the user to enter the **names of starting and destination points** in two edit text controls. Add the necessary code to achieve accurate results. Yu can use my commented code (lines 79-101) and **refine the results**. Run application again. The directions are displayed in a TextView as shown here:



(4 marks)

Exercise 2

Write an Android app that allows the user to send and receive a message. Allow the user to type the message in an EditText. Display the received message in a TextView. Create a new Android Studio project named Y**ourFullName_COMP304Lab6**. The project will have a structure similar to the following:



The manifest file is shown on the next page. Before you copy it to the project, change the package name by replacing it with your package name.

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.inika.lab6sample" >

    <uses-sdk android:minSdkVersion="18" />

    <uses-permission android:name="android.permission.SEND_SMS"/>

    <uses-permission android:name="android.permission.RECEIVE_SMS"/>

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:theme="@style/AppTheme" >
        <activity
            android:name=".MainActivity"
            android:launchMode="singleTask"
            android:label="@string/app_name" >

            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
```

```
        <activity
            android:name=".MessageActivity"
            android:label="@string/title_activity_message" >
        </activity>

        <receiver android:name=".SMSReceiver">
            <intent-filter android:priority="100">
                <action android:name=
                    "android.provider.Telephony.SMS_RECEIVED" />
            </intent-filter>
        </receiver>

    </application>

</manifest>
```

Then, copy the strings.xml file shown below. Change the app_name to "Messaging App V 1.0, developed by YourFullName".

```
<resources>
    <string name="app_name">My Messaging App V 1.0</string>

    <string name="hello_world">Welcome to Messaging page!</string>
    <string name="action_settings">Settings</string>
    <string name="title_activity_message">MessageActivity</string>

    <string-array name="contacts">
        <item>Larry Page</item>
        <item>Sergey Brin</item>
        <item>Eric Schmidt</item>
        <item>Andy Rubin</item>
        <item>James Gosling</item>
        <item>Anders Hejlsberg </item>
        <item>Bjarne Stroustrup</item>

    </string-array>

</resources>
```

In the layout folder, copy the following XML code to the *activity_main.xml* file:

```
<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:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin"
    android:paddingBottom="@dimen/activity_vertical_margin"
tools:context=".MainActivity">

    <ListView
        android:layout_height="wrap_content"
        android:layout_width="wrap_content"
        android:id="@+id/android_list"
        android:entries="@array/contacts"
        />
```

```
</RelativeLayout>
```

Add another activity named MessageActivity to your project.

Then copy the following XML code to *activity_message.xml* file. Make sure to replace the package name with your package name.

```
<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:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin"
    android:paddingBottom="@dimen/activity_vertical_margin"
    tools:context="com.example.inika.sampletest1f2015.MessageActivity">

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

    <ImageView
        android:layout_width="50dp"
        android:layout_height="50dp"
        android:id="@+id/imageView"
        android:layout_below="@+id/textView"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true" />

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="200dp"
        android:text=""
        android:id="@+id/textMessage"
        android:maxLines = "10"
        android:layout_marginTop="75dp"
        android:scrollbars = "vertical"
        />
    <LinearLayout
        android:orientation="horizontal"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_below="@+id/textView"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true"
        android:layout_marginTop="250dp">

        <EditText
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:id="@+id/editText"
            android:layout_weight="1"
            android:text="Enter message"
            android:typeface="sans"
```

```
            android:singleLine="false" />

        <Button
            style="?android:attr/buttonStyleSmall"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Send"
            android:id="@+id/button"
            android:layout_weight="1"
            android:width="50dp"
            android:onClick="sendMessage"/>

    </LinearLayout>


</RelativeLayout>
```

Download the contacts.png picture from dropbox and copy it to drawable folder.
Add a **new class named SMSReceiver** to your project. Replace the generated code with the code below. Make sure to keep your package name:

```
import android.content.BroadcastReceiver;
import android.content.Context;
import android.content.Intent;
import android.os.Bundle;
import android.telephony.SmsMessage;
import android.util.Log;
import android.widget.Toast;

public class SMSReceiver extends BroadcastReceiver
{
    @Override
    public void onReceive(Context context, Intent intent)
    {
        //---get the SMS message passed in---
        Bundle bundle = intent.getExtras();
        SmsMessage[] msgs = null;
        String str = "SMS from ";
        if (bundle != null)
        {
            //---retrieve the SMS message received---
            Object[] pdus = (Object[]) bundle.get("pdus");
            msgs = new SmsMessage[pdus.length];
            for (int i=0; i<msgs.length; i++){
                msgs[i] = SmsMessage.createFromPdu((byte[])pdus[i]);
                if (i==0) {
                   //---get the sender address/phone number---
                   str += msgs[i].getOriginatingAddress();
                   str += ": ";
                }
                //---get the message body---
                str += msgs[i].getMessageBody().toString();
            }

            //---display the new SMS message---
            Toast.makeText(context, str, Toast.LENGTH_SHORT).show();
```

```
            Log.d("SMSReceiver", str);

            //---stop the SMS message from being broadcasted---
            this.abortBroadcast();


            //---send a broadcast intent to update the SMS received in the
activity
            Intent broadcastIntent = new Intent();
            broadcastIntent.setAction("SMS_RECEIVED_ACTION");
            broadcastIntent.putExtra("sms", str);
            context.sendBroadcast(broadcastIntent);
        }
    }
}
```

Replace MessageActivity code with the code below. Make sure you keep your package name:

```
import android.app.Activity;
import android.app.PendingIntent;
import android.content.BroadcastReceiver;
import android.content.Context;
import android.content.Intent;
import android.content.IntentFilter;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.telephony.SmsManager;
import android.text.method.ScrollingMovementMethod;
import android.view.Menu;
import android.view.MenuItem;
import android.view.View;
import android.widget.EditText;
import android.widget.ImageView;
import android.widget.TextView;
import android.widget.Toast;

public class MessageActivity extends Activity {

    private EditText eText;
    private TextView SMSes;
    private TextView textMessage;
    //
    String SENT = "SMS_SENT";
    String DELIVERED = "SMS_DELIVERED";
    //
    PendingIntent sentPI, deliveredPI;
    BroadcastReceiver smsSentReceiver, smsDeliveredReceiver;
    IntentFilter intentFilter;
    //
    // receive intents sent by sendBroadcast()
    private BroadcastReceiver intentReceiver = new BroadcastReceiver() {
        @Override
        public void onReceive(Context context, Intent intent) {
            //display the SMS received in the TextView
            textMessage = (TextView) findViewById(R.id.textMessage);
```

```
            //display the content of the received message in text view
            //SMSes.setText(intent.getExtras().getString("sms"));
            textMessage.setText(textMessage.getText()+"\n"+
                    intent.getExtras().getString("sms"));
        }
    };

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

        Bundle extras = getIntent().getExtras();
        String contactName="";
        if(extras != null)
            contactName = extras.getString("contactName");

        textMessage = (TextView) findViewById(R.id.textMessage);
        textMessage.setMovementMethod(ScrollingMovementMethod.getInstance());
        TextView tView = (TextView) findViewById(R.id.textView);
        tView.setText(contactName);
        //this.getSupportActionBar().setTitle(contactName);
        ImageView imgView = (ImageView) findViewById(R.id.imageView);
        imgView.setImageResource(R.drawable.contacts);
        //
        eText = (EditText) findViewById(R.id.editText);
        eText.setOnClickListener(new View.OnClickListener() {

            @Override
            public void onClick(View v) {
                // clear text in edit text when user clicks on it
                eText.setText("");

            }
        });
        //
        //an action to take in the future with same permission
        //as your application
        sentPI = PendingIntent.getBroadcast(this, 0, new Intent(SENT), 0);

        deliveredPI = PendingIntent.getBroadcast(this, 0, new
Intent(DELIVERED), 0);

        //intent to filter the action for SMS messages received
        intentFilter = new IntentFilter();
        intentFilter.addAction("SMS_RECEIVED_ACTION");

        //---register the receiver---
        registerReceiver(intentReceiver, intentFilter);
        //

    }
    //
    @Override
    public void onResume() {
        super.onResume();
```

```
        //---create the BroadcastReceiver when the SMS is sent---
        smsSentReceiver = new BroadcastReceiver(){
            @Override
            public void onReceive(Context arg0, Intent arg1) {
                switch (getResultCode()) //Retrieve the current result code,
as set by the previous receiver
                {
                    case Activity.RESULT_OK:
                        Toast.makeText(getBaseContext(), "SMS sent",
                                Toast.LENGTH_LONG).show();
                        break;
                    case SmsManager.RESULT_ERROR_GENERIC_FAILURE:
                        Toast.makeText(getBaseContext(), "Generic failure",
                                Toast.LENGTH_SHORT).show();
                        break;
                    case SmsManager.RESULT_ERROR_NO_SERVICE:
                        Toast.makeText(getBaseContext(), "No service",
                                Toast.LENGTH_SHORT).show();
                        break;
                    case SmsManager.RESULT_ERROR_NULL_PDU:
                        Toast.makeText(getBaseContext(), "Null PDU",
                                Toast.LENGTH_SHORT).show();
                        break;
                    case SmsManager.RESULT_ERROR_RADIO_OFF:
                        Toast.makeText(getBaseContext(), "Radio off",
                                Toast.LENGTH_SHORT).show();
                        break;
                }
            }
        };

        //---create the BroadcastReceiver when the SMS is delivered---
        smsDeliveredReceiver = new BroadcastReceiver(){
            @Override
            public void onReceive(Context arg0, Intent arg1) {
                switch (getResultCode())
                {
                    case Activity.RESULT_OK:
                        Toast.makeText(getBaseContext(), "SMS delivered",
                                Toast.LENGTH_LONG).show();
                        break;
                    case Activity.RESULT_CANCELED:
                        Toast.makeText(getBaseContext(), "SMS not delivered",
                                Toast.LENGTH_LONG).show();
                        break;
                }
            }
        };

        //---register the two BroadcastReceivers---
        registerReceiver(smsDeliveredReceiver, new IntentFilter(DELIVERED));
        registerReceiver(smsSentReceiver, new IntentFilter(SENT));
    }

    @Override
```

```
    public void onPause() {
        super.onPause();

        //---unregister the two BroadcastReceivers---
        unregisterReceiver(smsSentReceiver);
        unregisterReceiver(smsDeliveredReceiver);
    }

    @Override
    protected void onDestroy() {
        super.onDestroy();

        //---unregister the receiver---
        unregisterReceiver(intentReceiver);
    }

    //
    public void sendMessage(View v)
    {
        eText = (EditText) findViewById(R.id.editText);
        sendSMS("5556", eText.getText().toString());
        textMessage.setText(textMessage.getText()+"\n"+ eText.getText());

    }
    //sends an SMS message to another device
    private void sendSMS(String phoneNumber, String message)
    {
        SmsManager sms = SmsManager.getDefault();
        sms.sendTextMessage(phoneNumber, null, message, sentPI, deliveredPI);
    }

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

    @Override
    public boolean onOptionsItemSelected(MenuItem item) {
        // Handle action bar item clicks here. The action bar will
        // automatically handle clicks on the Home/Up button, so long
        // as you specify a parent activity in AndroidManifest.xml.
        int id = item.getItemId();

        //noinspection SimplifiableIfStatement
        if (id == R.id.action_settings) {
            return true;
        }

        return super.onOptionsItemSelected(item);
    }
}
```

Copy the code below to MainActivity file. Make sure you keep your package name.

```
import android.app.Activity;
import android.app.ListActivity;
import android.content.Intent;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.Menu;
import android.view.MenuItem;
import android.view.View;
import android.widget.AdapterView;
import android.widget.ArrayAdapter;
import android.widget.ListAdapter;
import android.widget.ListView;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity {
    String[] contacts;
    ListView lstView;
    //
    Intent intent;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        this.getSupportActionBar().setTitle("My Messaging App");
        //ListView lstView = getListView();
        lstView = (ListView)findViewById(R.id.android_list);
        TextView textView = new TextView(getApplicationContext());
        textView.setText("My Contacts");

        lstView.addHeaderView(textView);
        lstView.setChoiceMode(ListView.CHOICE_MODE_NONE);
        lstView.setTextFilterEnabled(true);

        contacts = getResources().getStringArray(R.array.contacts);
        ArrayAdapter<String> adapter = new ArrayAdapter<String>(this,
                android.R.layout.simple_list_item_1, android.R.id.text1,
contacts);
        // Assign adapter to ListView
        lstView.setAdapter(adapter);
        intent = new Intent(this, MessageActivity.class);
        // ListView Item Click Listener
        lstView.setOnItemClickListener(new AdapterView.OnItemClickListener()
{
            @Override
            public void onItemClick(AdapterView<?> parent, View view,
                                    int position, long id) {

                // ListView Clicked item index
                int itemPosition = position;

                // ListView Clicked item value
                String item = (String) lstView.getItemAtPosition(position);

                // Show Alert
                intent.putExtra("contactName",item);
                startActivity(intent);
```

```
            }

        });


    }

}
```

Check your module gradle. Here is mine:

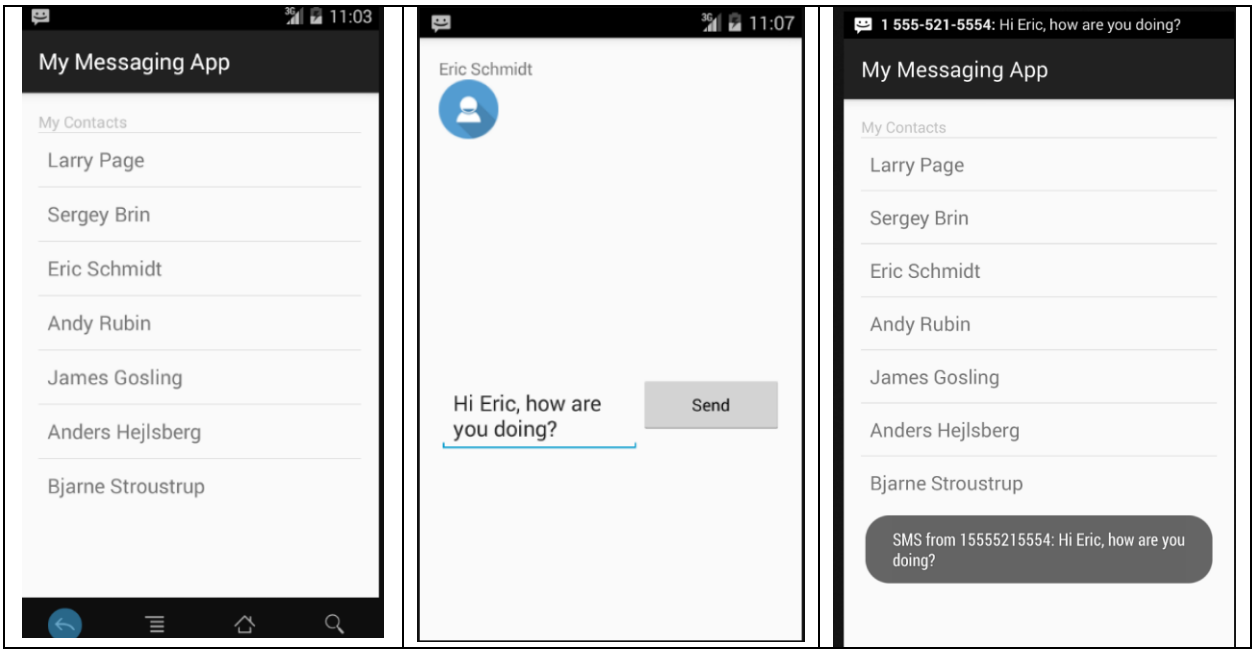
```
apply plugin: 'com.android.application'

android {
    compileSdkVersion 23
    buildToolsVersion "23.0.3"

    defaultConfig {
        applicationId "com.example.inika.lab6sample"
        minSdkVersion 19
        targetSdkVersion 19
        versionCode 1
        versionName "1.0"
    }
    buildTypes {
        release {
            minifyEnabled false
            proguardFiles getDefaultProguardFile('proguard-android.txt'),
'proguard-rules.pro'
        }
    }
}

dependencies {
    compile fileTree(dir: 'libs', include: ['*.jar'])
    compile 'com.android.support:appcompat-v7:23.0.0'
}
```

To test this messaging app, **run it separately** in two different emulators. I used a Nexus 5 API 19 emulator and a Nexus 5 API 23 emulator. This will install the app in both emulators. Then run both emulators. Run the app in both. Select Eric Shmidt and type a message for him. Click send. Check the display in the second emulator as shown below:



(6 marks)

Exercise 2

Evaluation:

Functionality:	85%
Friendliness:	10%
Innovation:	5%
Total:	10 marks

Android Project Naming rules:

You must name your Eclipse project according to the following rule:
yourfullname_COMP304Labnumber.

Example: **johnsmith_COMP304Lab6**

If there are two exercises, add to the file name: _Ex1 or _Ex2.

Example: **johnsmith_COMP304Lab6_Ex1**

Submission rules:

Submit your assignment in a **zip file** that is named according to the following rule:
yourfullname_COMP304Labnumber.zip

Example: **johnsmith_COMP304Lab6.zip**