임베디드 시스템 실습 lab10

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이번 exercise 는 android 의 activity 를 intent 와 service 등을 사용하여 구현해 보는 것입니다. 먼저 intent 를 활용하는 exercise 1 입니다.

Main Activity code 입니다.

```
activity_main.xml    © ResultActivity.java    © MainActivity.java    activity_result.xml
1     package com.example.week10;
2
3     import ...
18
19    public class MainActivity extends Activity {
20
21        // constant to determine which sub-activity returns
22        private static final int REQUEST_CODE = 10;
23
24        @Override
25        public void onCreate(Bundle savedInstanceState) {
26            super.onCreate(savedInstanceState);
27            setContentView(R.layout.activity_main);
28        }
29
30        public void onClick(View view) {
31            EditText text = (EditText) findViewById(R.id.inputforintent);
32            String string = text.getText().toString();
33            Intent i = new Intent(this, ResultActivity.class);
34            i.putExtra("yourkey", string);
35            startActivityForResult(i, REQUEST_CODE);
36        }
37
38        // TODO 3 Implement this method
39        // assumes that "returnkey" is used as key to return the result
40        @Override
41        protected void onActivityResult(int requestCode, int resultCode, Intent data) {
42            super.onActivityResult(requestCode, resultCode, data);
43            if (resultCode == RESULT_OK && requestCode == REQUEST_CODE) {
44                if (data.hasExtra("returnkey")) {
45                    String result = data.getExtras().getString("returnkey");
46                    if (result != null && result.length() > 0) {
47                        Toast.makeText(this, result, Toast.LENGTH_SHORT).show();
48                    }
49                }
50            }
51        }
52    }
```

main layout code 입니다.

```xml
<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"

    tools:context=".MainActivity" >

    <EditText
        android:id="@+id/inputforintent"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:minHeight="60dip"
        android:text="First Activity"
        android:textSize="20sp" >
    </EditText>

    <Button
        android:id="@+id/startintent"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/inputforintent"
        android:layout_below="@+id/inputforintent"
        android:onClick="onClick"
        android:text="Calling an intent" />

</RelativeLayout>
```

Result Activity code 입니다.

```java
package com.example.week10;

import ...

public class ResultActivity extends Activity {

    @Override
    public void onCreate(Bundle bundle) {
        super.onCreate(bundle);
        setContentView(R.layout.activity_result);
        Bundle extras = getIntent().getExtras();
        String inputString = extras.getString( key: "yourkey");
        TextView view = (TextView) findViewById(R.id.displayintentextra);
        view.setText(inputString);
    }

    @Override
    public void finish() {
        Intent intent = new Intent();
        EditText editText= (EditText) findViewById(R.id.returnValue);
        String string = editText.getText().toString();
        intent.putExtra( name: "returnkey", string);
        setResult(RESULT_OK, intent);
        super.finish();
    }
}
```

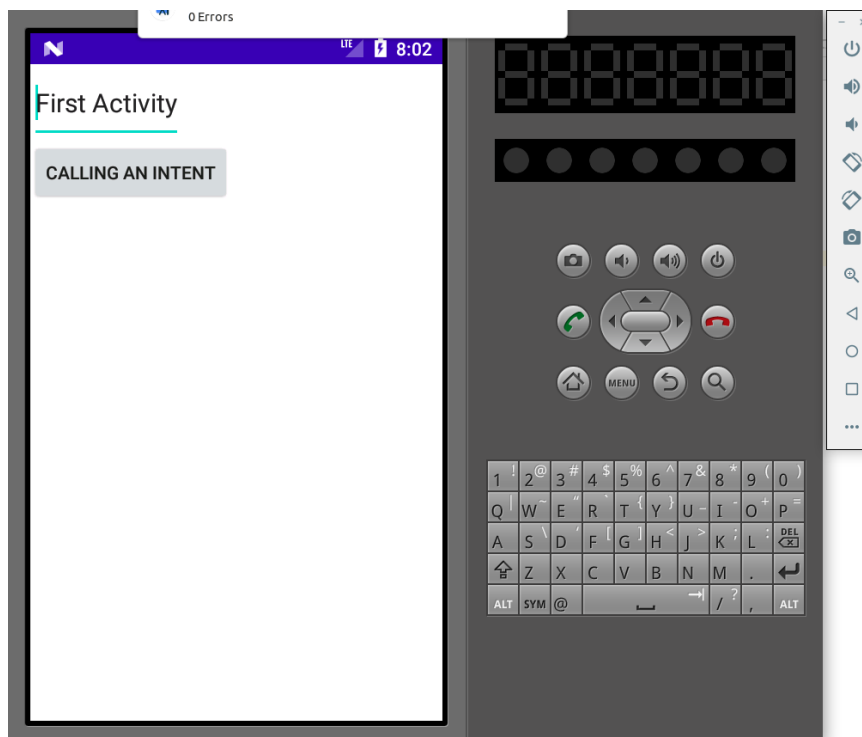Result layout code 입니다.

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical" >

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

    <EditText
        android:id="@+id/returnValue"
        android:layout_width="match_parent"
        android:layout_height="wrap_content" >

        <requestFocus />
    </EditText>

</LinearLayout>
```
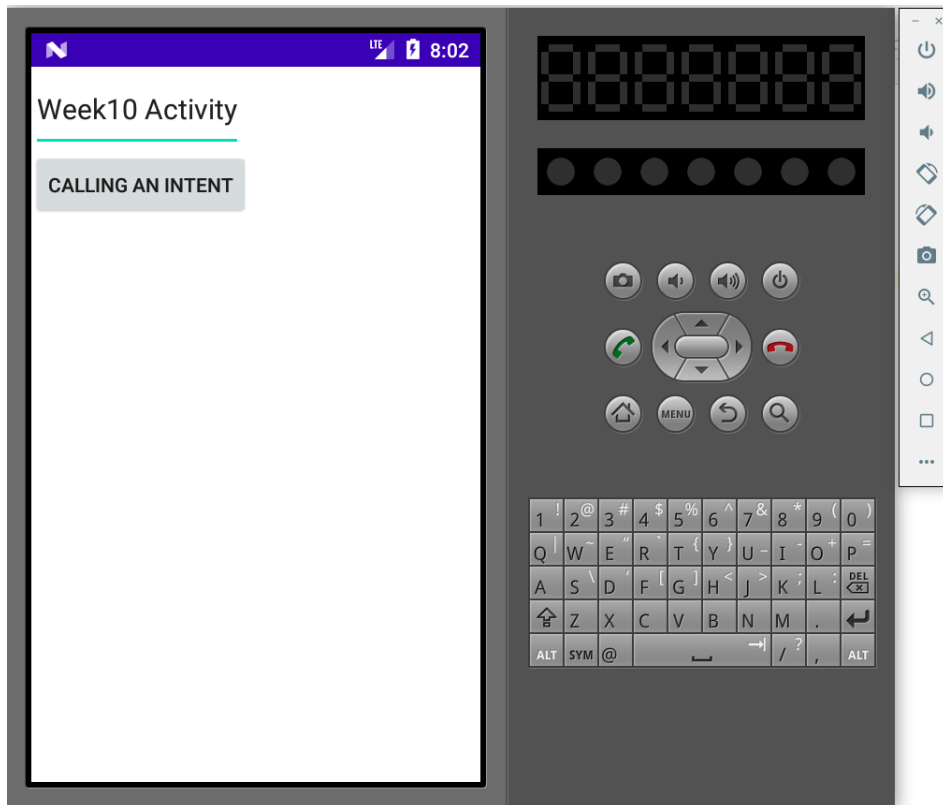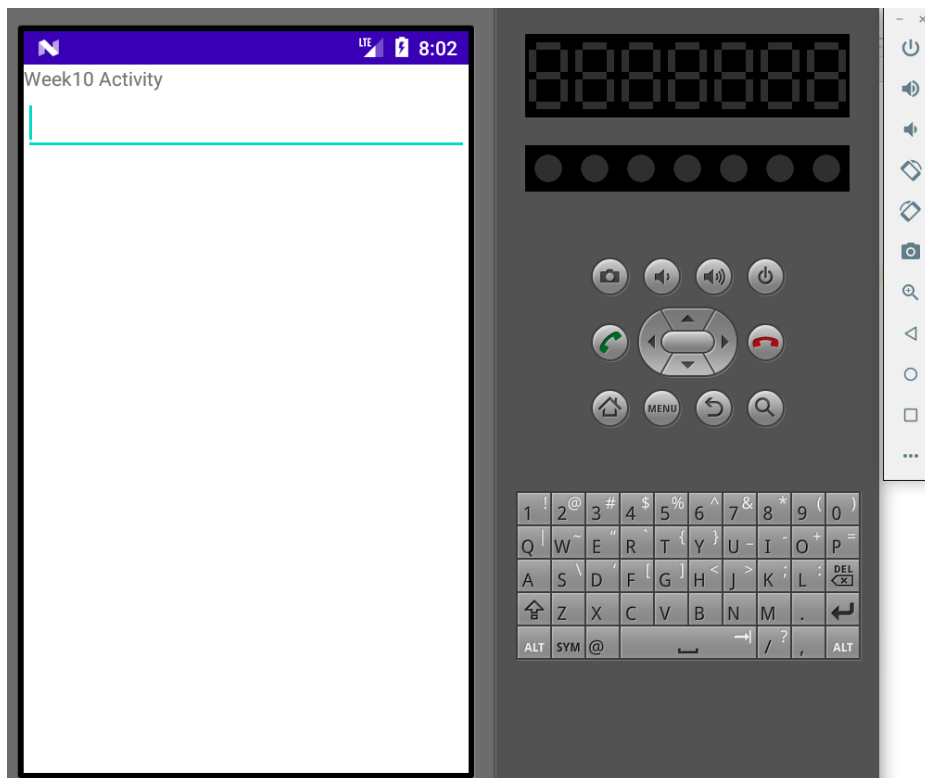
Manifest code 입니다.

실행 화면입니다.

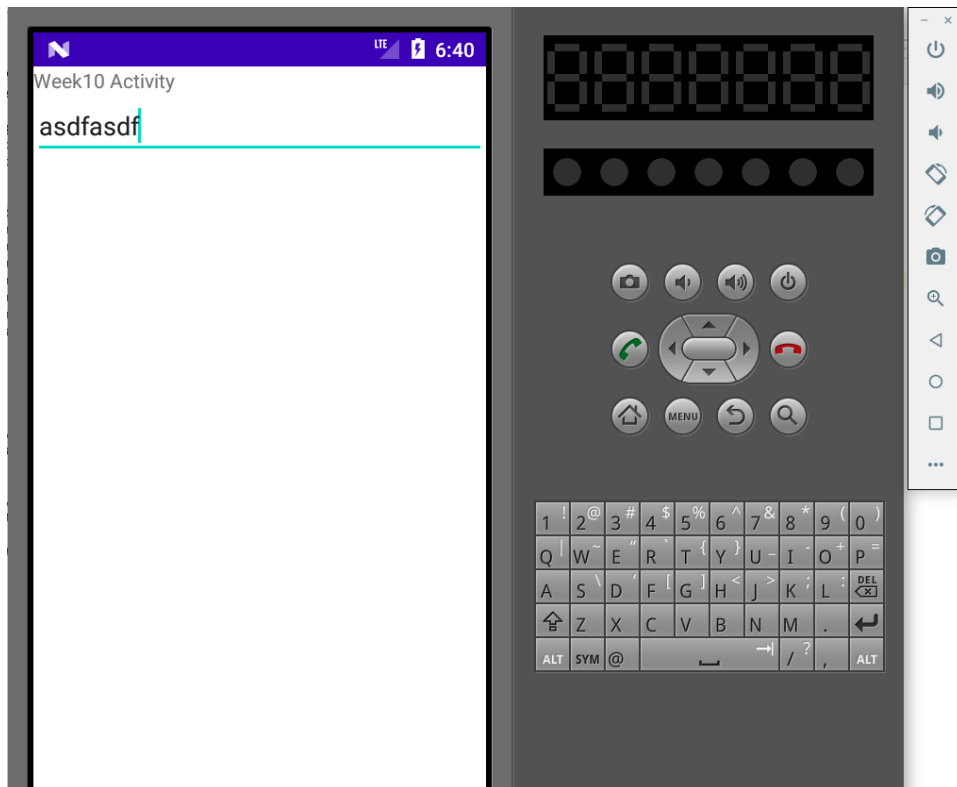앱을 실행하면 다음과 같이 First Activity 의 화면을 볼 수 있고,

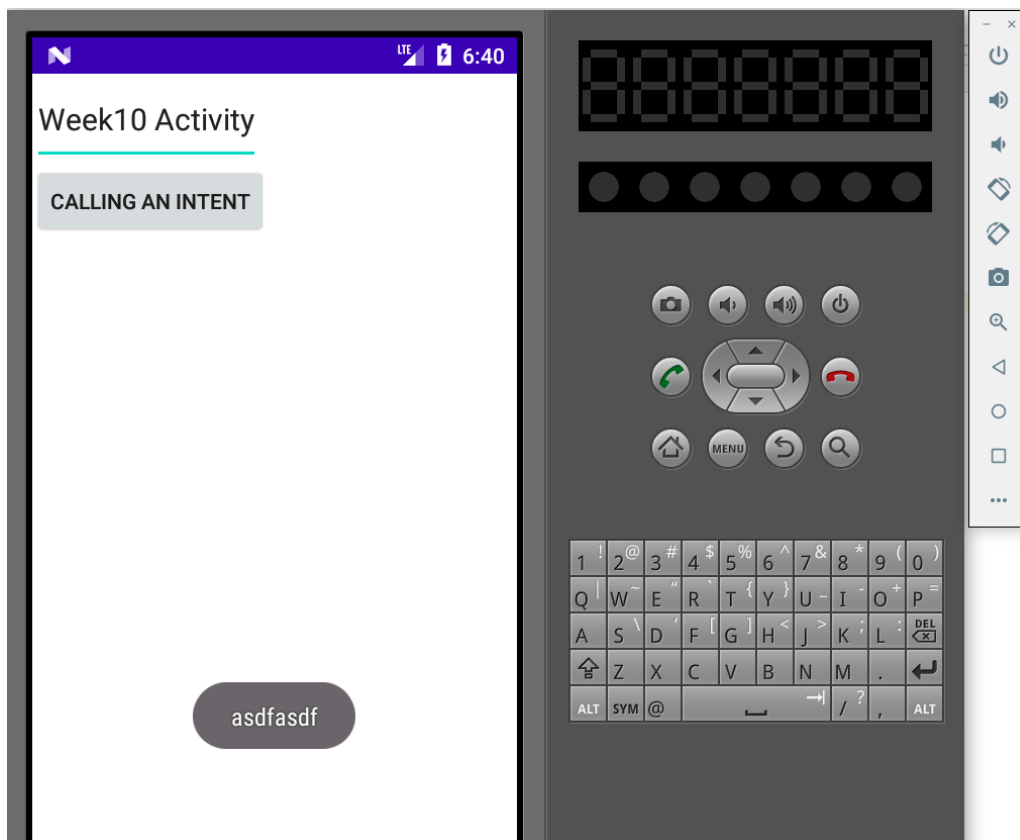위에 Input data 부분을 수정하여 'CALLING AN INTENT' 버튼을 누르면

아래와 같이 위에 이전에 입력한 Input data 를 위에 띄우고 result activity 화면을 띄우는 것을 볼 수 있습니다.

이 화면에서 아무 문자를 입력한 후 뒤로가기 버튼을 누르면

아래와 같이 이전 화면으로 돌아가면서 입력했던 문자가 화면 아래에 표시됩니다.

다음으로 download-service 를 활용한 exercise2 입니다.

Main Activity code 입니다.

```java
activity_main.xml ×    MainActivity.java ×    DownloadService.java ×    AndroidManifest.xml
1        package com.example.week10_2;
2
3        import ...
12
13       public class MainActivity extends Activity {
14
15           private TextView textView;
16 @        private BroadcastReceiver receiver = (context, intent) → {
20               Bundle bundle = intent.getExtras();
21               if (bundle != null) {
22                   String string = bundle.getString(DownloadService.FILEPATH);
23                   int resultCode = bundle.getInt(DownloadService.RESULT);
24                   if (resultCode == RESULT_OK) {
25                       Toast.makeText( context: MainActivity.this,
26                           text: "Download complete. Download URI: " + string,
27                           Toast.LENGTH_LONG).show();
28                       textView.setText("Download done");
29                   } else {
30                       Toast.makeText( context: MainActivity.this,  text: "Download failed",
31                           Toast.LENGTH_LONG).show();
32                       textView.setText("Download failed");
33                   }
34               }
35           };
37
38           @Override
39           public void onCreate(Bundle savedInstanceState) {
40               super.onCreate(savedInstanceState);
41               setContentView(R.layout.activity_main);
42               textView = (TextView) findViewById(R.id.status);
43
44
45           }

47           @Override
48           protected void onResume() {
49               super.onResume();
50               registerReceiver(receiver, new IntentFilter(
51                   DownloadService.NOTIFICATION));
52           }
53           @Override
54           protected void onPause() {
55               super.onPause();
56               unregisterReceiver(receiver);
57           }
58
59           public void onClick(View view) {
60
61               Intent intent = new Intent( packageContext: this, DownloadService.class);
62               // add infos for the service which file to download and where to store
63               intent.putExtra(DownloadService.FILENAME,  value: "index.html");
64               intent.putExtra(DownloadService.URL,
65                   value: "https://www.vogella.com/index.html");
66               startService(intent);
67               textView.setText("Service started");
68           }
69       }
```

Main layout code 입니다.

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical" >

    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:onClick="onClick"
        android:text="Download" />

    <LinearLayout
        android:layout_width="wrap_content"
        android:layout_height="wrap_content" >

        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Status: " />

        <TextView
            android:id="@+id/status"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Not started" />
    </LinearLayout>

</LinearLayout>
```

Manifest code 입니다.

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.week10_2"
    android:versionCode="1"
    android:versionName="1.0" >

    <uses-sdk
        android:minSdkVersion="17"
        android:targetSdkVersion="18" />

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

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="Week10_2"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.Week10_2" >
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

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

        <service android:name=".DownloadService" >
        </service>
    </application>

</manifest>
```
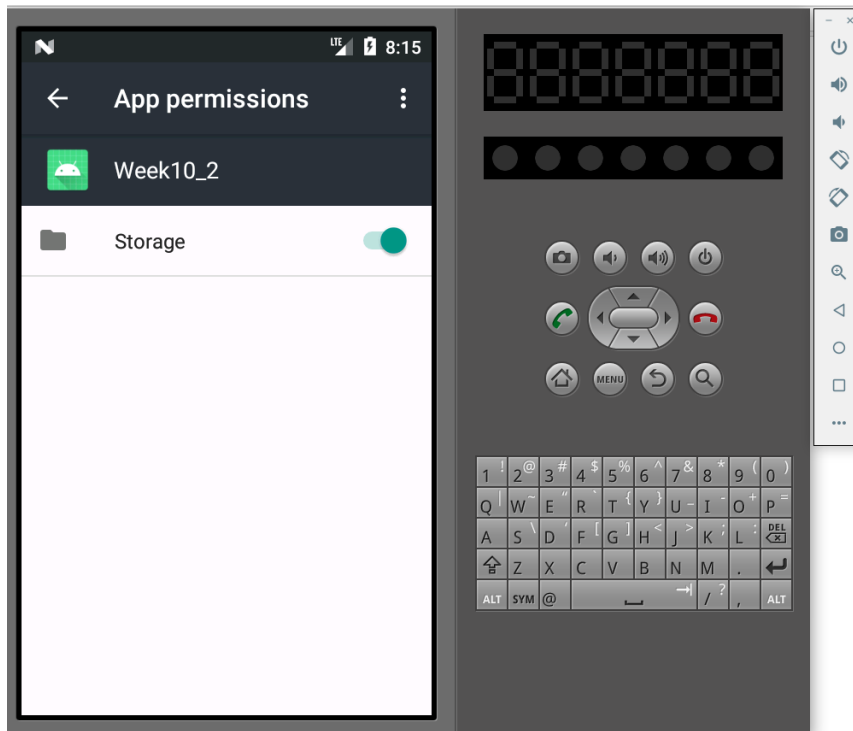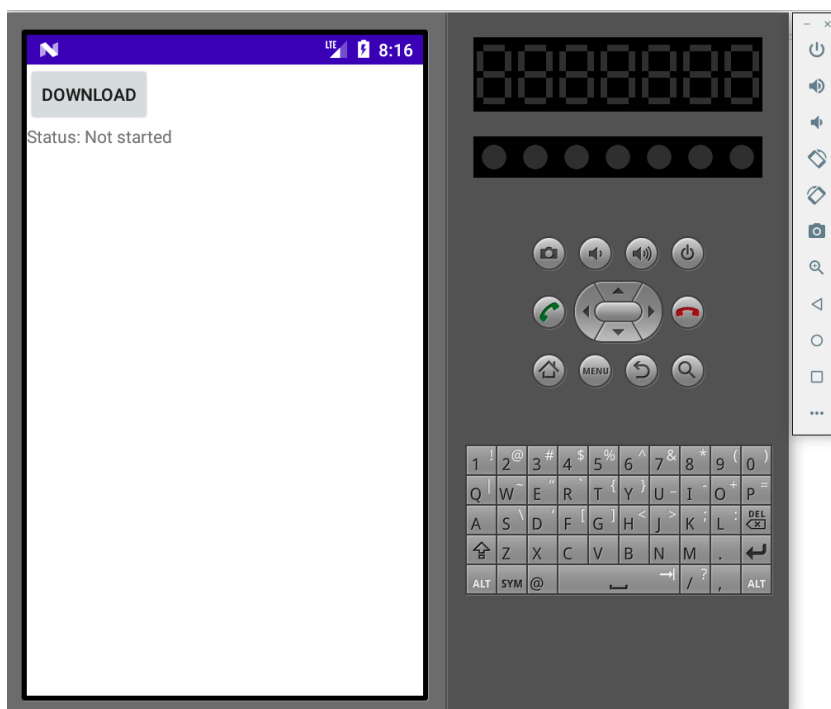
Download Service activity code 입니다.

```java
package com.example.week10_2;

import ...

public class DownloadService extends IntentService {

    private int result = Activity.RESULT_CANCELED;
    public static final String URL = "urlpath";
    public static final String FILENAME = "filename";
    public static final String FILEPATH = "filepath";
    public static final String RESULT = "result";
    public static final String NOTIFICATION = "com.vogella.android.service.receiver";

    public DownloadService() { super( name: "DownloadService"); }

    // will be called asynchronously by Android
    @Override
    protected void onHandleIntent(Intent intent) {
        String urlPath = intent.getStringExtra(URL);
        String fileName = intent.getStringExtra(FILENAME);
        File output = new File(Environment.getExternalStorageDirectory(),
                fileName);
        if (output.exists()) {
            output.delete();
        }

        InputStream stream = null;
        FileOutputStream fos = null;
        try {

            URL url = new URL(urlPath);
            stream = url.openConnection().getInputStream();
            InputStreamReader reader = new InputStreamReader(stream);
            fos = new FileOutputStream(output.getPath());
            int next = -1;
            while ((next = reader.read()) != -1) {
                fos.write(next);
            }
            // successfully finished
            result = Activity.RESULT_OK;

        } catch (Exception e) {
            e.printStackTrace();
        } finally {
            if (stream != null) {
                try {
                    stream.close();
                } catch (IOException e) {
                    e.printStackTrace();
                }
            }
            if (fos != null) {
                try {
                    fos.close();
                } catch (IOException e) {
                    e.printStackTrace();
                }
            }
        }
        publishResults(output.getAbsolutePath(), result);
    }

    private void publishResults(String outputPath, int result) {
        Intent intent = new Intent(NOTIFICATION);
        intent.putExtra(FILEPATH, outputPath);
        intent.putExtra(RESULT, result);
        sendBroadcast(intent);
    }
}
```
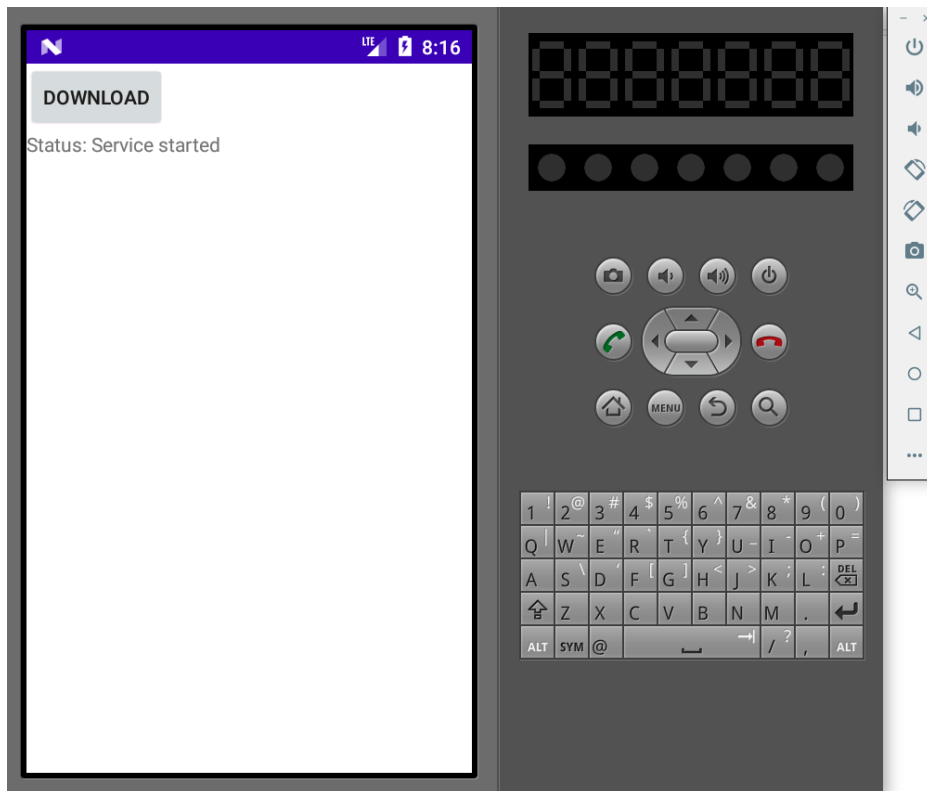
실행 화면입니다.

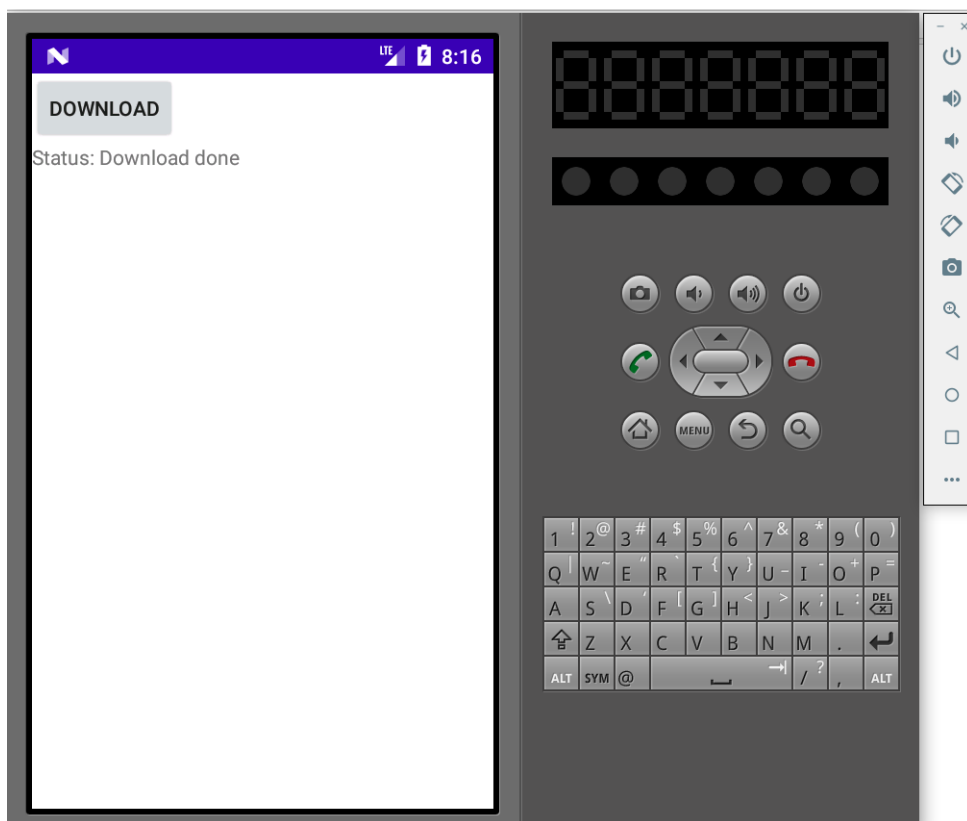우선 웹페이지를 다운받아야 하기 때문에 저장소를 사용할 수 있도록 permission 을 줍니다.

그 후 앱을 실행하면 다음과 같이 Download 버튼이 있고, 밑에 'Nost started'라는 status 를 띄운 화면이 보여집니다.

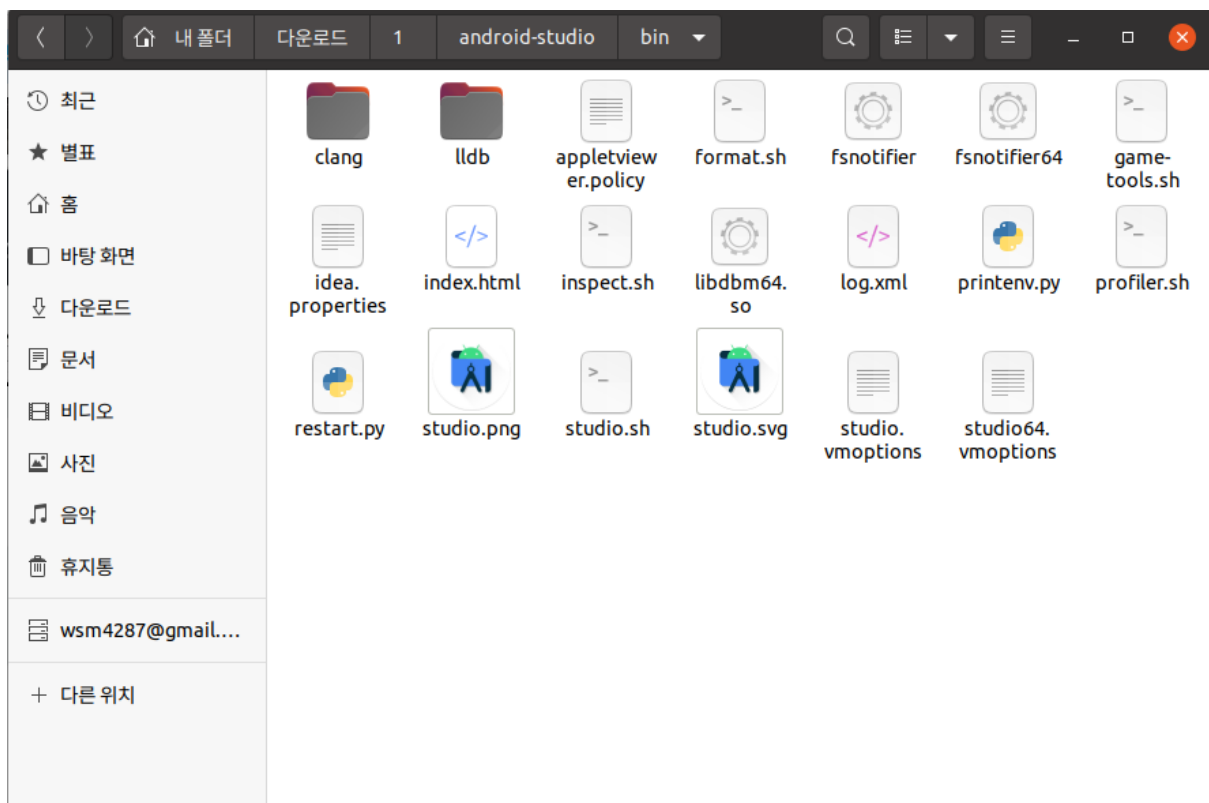Download 버튼을 누르면, 다음과 같이 status 가 'Service started'로 변경됩니다.

다운이 완료되면 아래와 같이 'Download done'으로 status 가 변경됩니다.

그 후 다운받은 파일을 확인하기 위해 PC 로 파일을 옮기는 adb pull 명령어를 수행합니다.

폴더를 보면 아래에 'index.html' 파일이 생긴 것을 확인할 수 있습니다.

'index.html' 파일을 실행하면 code 에 입력해 주었던 사이트 주소가 열리게 됩니다.