

## 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 x ResultActivity.java x MainActivity.java x 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.



```
1 <RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
2   xmlns:tools="http://schemas.android.com/tools"
3   android:layout_width="match_parent"
4   android:layout_height="match_parent"
5
6   tools:context=".MainActivity" >
7
8   <EditText
9       android:id="@+id/inputforintent"
10      android:layout_width="wrap_content"
11      android:layout_height="wrap_content"
12      android:minHeight="60dip"
13      android:text="First Activity"
14      android:textSize="20sp" >
15  </EditText>
16
17  <Button
18      android:id="@+id/startintent"
19      android:layout_width="wrap_content"
20      android:layout_height="wrap_content"
21      android:layout_alignLeft="@+id/inputforintent"
22      android:layout_below="@+id/inputforintent"
23      android:onClick="onClick"
24      android:text="Calling an intent" />
25
26 </RelativeLayout>
```

Result Activity code 입니다.

```
activity_main.xml × ResultActivity.java × MainActivity.java × activity_
1 package com.example.week10;
2
3
4 import ...
9
10 public class ResultActivity extends Activity {
11
12     @Override
13     public void onCreate(Bundle bundle) {
14         super.onCreate(bundle);
15         setContentView(R.layout.activity_result);
16         Bundle extras = getIntent().getExtras();
17         String inputString = extras.getString( key: "yourkey");
18         TextView view = (TextView) findViewById(R.id.displayintentextra);
19         view.setText(inputString);
20     }
21
22     @Override
23     public void finish() {
24         Intent intent = new Intent();
25         EditText editText= (EditText) findViewById(R.id.returnValue);
26         String string = editText.getText().toString();
27         intent.putExtra( name: "returnkey", string);
28         setResult(RESULT_OK, intent);
29         super.finish();
30     }
31 }
```

Result layout code 입니다.

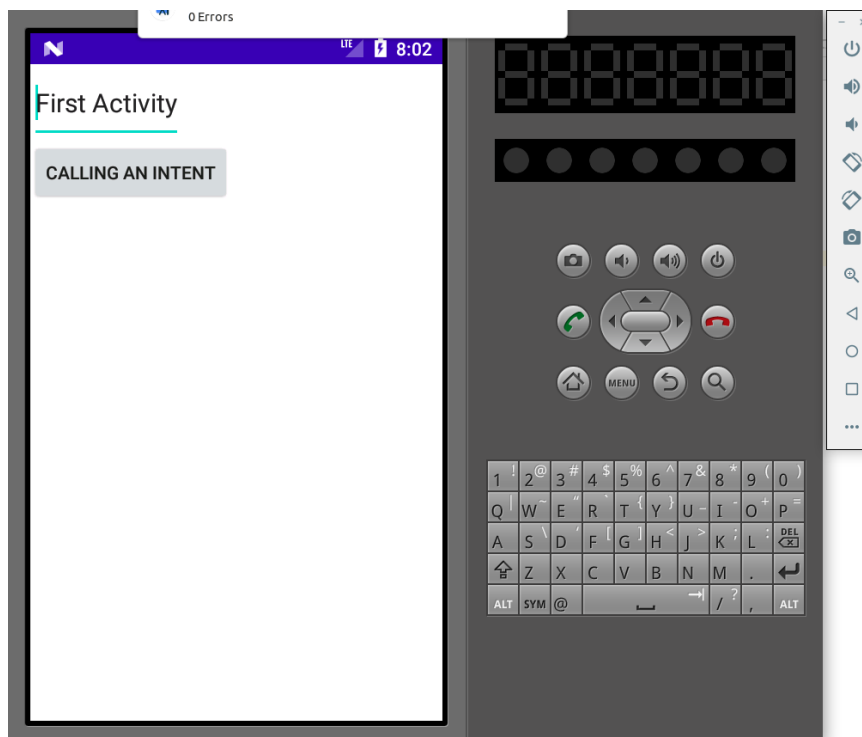
```
activity_main.xml × ResultActivity.java × MainActivity.java × activity_result.xml ×
1 <?xml version="1.0" encoding="utf-8"?>
2 <LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
3     android:layout_width="match_parent"
4     android:layout_height="match_parent"
5     android:orientation="vertical" >
6
7     <TextView
8         android:id="@+id/displayintentextra"
9         android:layout_width="wrap_content"
10        android:layout_height="wrap_content"
11        android:text="Input"
12    />
13
14    <EditText
15        android:id="@+id/returnValue"
16        android:layout_width="match_parent"
17        android:layout_height="wrap_content" >
18
19        <requestFocus />
20    </EditText>
21
22 </LinearLayout>
23
24
```

Manifest code 입니다.

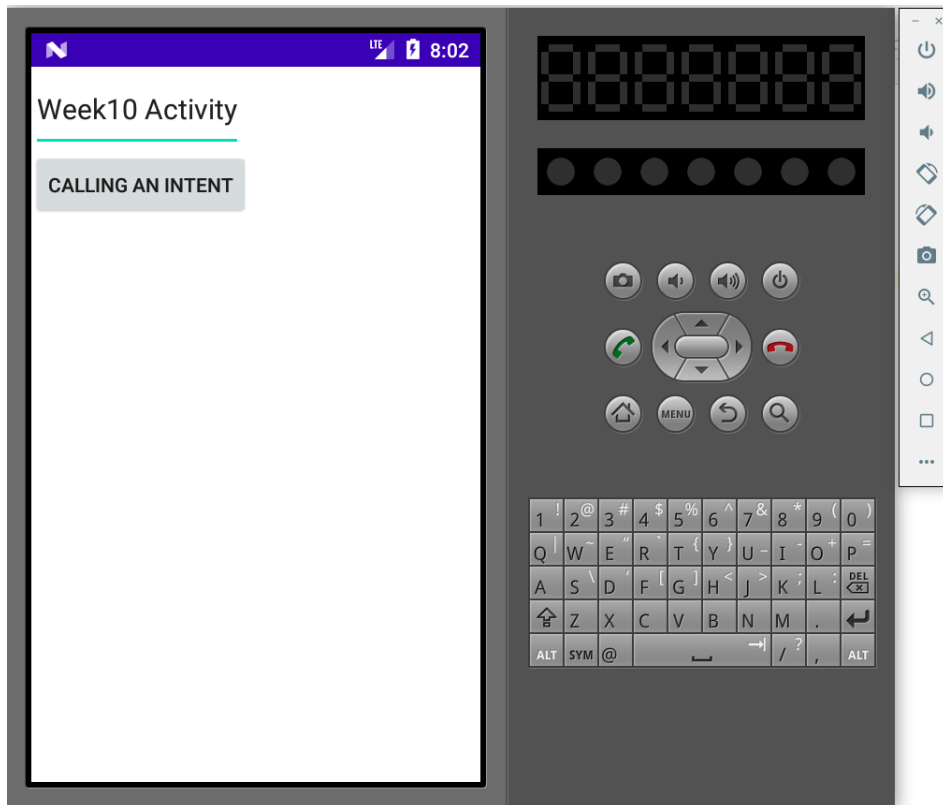
```
activity_main.xml x MainActivity.java x activity_result.xml x AndroidManifest.xml x
1 <?xml version="1.0" encoding="utf-8"?>
2 <manifest xmlns:android="http://schemas.android.com/apk/res/android"
3     package="com.example.week10"
4     android:versionCode="1"
5     android:versionName="1.0" >
6
7
8     <application
9         android:allowBackup="true"
10        android:icon="@mipmap/ic_launcher"
11        android:label="Week10"
12        android:roundIcon="@mipmap/ic_launcher_round"
13        android:supportsRtl="true"
14        android:theme="@style/Theme.Week10">
15        <activity android:name=".MainActivity">
16            <intent-filter >
17                <action android:name="android.intent.action.MAIN" />
18
19                <category android:name="android.intent.category.LAUNCHER" />
20            </intent-filter>
21        </activity>
22        <activity
23            android:label="Result Activity"
24            android:name=".ResultActivity" >
25        </activity>
26    </application>
27
28 </manifest>
```

실행 화면입니다.

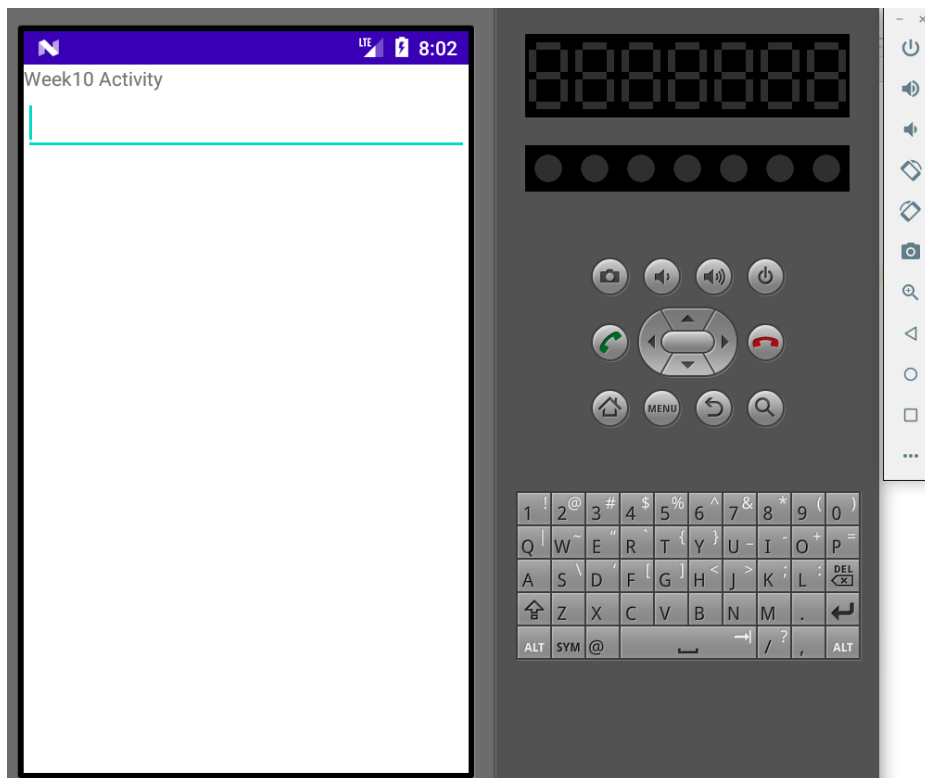
앱을 실행하면 다음과 같이 First Activity 의 화면을 볼 수 있고,



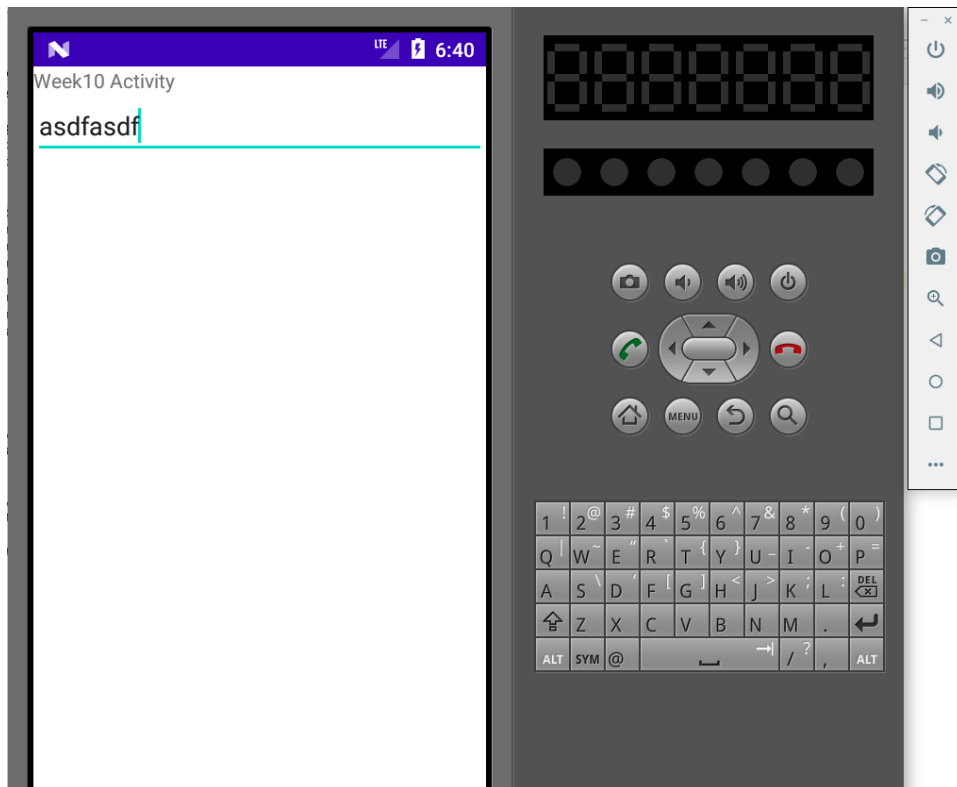
위에 Input data 부분을 수정하여 'CALLING AN INTENT' 버튼을 누르면



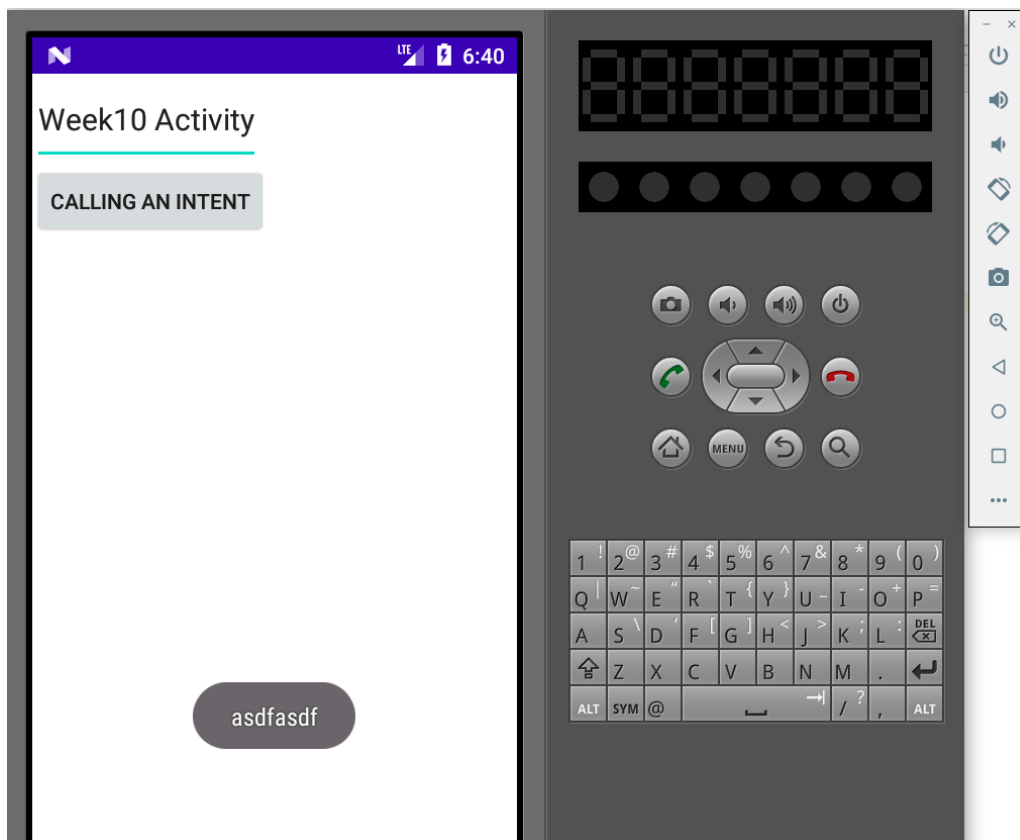
아래와 같이 위에 이전에 입력한 Input data 를 위에 띄우고 result activity 화면을 띄우는 것을 볼 수 있습니다.



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.

```
activity_main.xml x MainActivity.java x DownloadService.java x 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) -> {
17         Bundle bundle = intent.getExtras();
20         if (bundle != null) {
21             String string = bundle.getString(DownloadService.FILEPATH);
22             int resultCode = bundle.getInt(DownloadService.RESULT);
23             if (resultCode == RESULT_OK) {
24                 Toast.makeText(context: MainActivity.this,
25                     text: "Download complete. Download URI: " + string,
26                     Toast.LENGTH_LONG).show();
27                 textView.setText("Download done");
28             } else {
29                 Toast.makeText(context: MainActivity.this, text: "Download failed",
30                     Toast.LENGTH_LONG).show();
31                 textView.setText("Download failed");
32             }
33         }
34     };
35
36
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
46
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.



```
1 <?xml version="1.0" encoding="utf-8"?>
2 <LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
3     android:layout_width="match_parent"
4     android:layout_height="match_parent"
5     android:orientation="vertical" >
6
7     <Button
8         android:id="@+id/button1"
9         android:layout_width="wrap_content"
10        android:layout_height="wrap_content"
11        android:onClick="onClick"
12        android:text="Download" />
13
14    <LinearLayout
15        android:layout_width="wrap_content"
16        android:layout_height="wrap_content" >
17
18        <TextView
19            android:layout_width="wrap_content"
20            android:layout_height="wrap_content"
21            android:text="Status: " />
22
23        <TextView
24            android:id="@+id/status"
25            android:layout_width="wrap_content"
26            android:layout_height="wrap_content"
27            android:text="Not started" />
28    </LinearLayout>
29
30</LinearLayout>
```

Manifest code 입니다.



```
1 <?xml version="1.0" encoding="utf-8"?>
2 <manifest xmlns:android="http://schemas.android.com/apk/res/android"
3     package="com.example.week10_2"
4     android:versionCode="1"
5     android:versionName="1.0" >
6
7     <uses-sdk
8         android:minSdkVersion="17"
9         android:targetSdkVersion="18" />
10
11    <uses-permission android:name="android.permission.INTERNET" />
12    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE" />
13
14    <application
15        android:allowBackup="true"
16        android:icon="@mipmap/ic_launcher"
17        android:label="Week10_2"
18        android:roundIcon="@mipmap/ic_launcher_round"
19        android:supportRtl="true"
20        android:theme="@style/Theme.Week10_2" >
21        <activity android:name=".MainActivity">
22            <intent-filter>
23                <action android:name="android.intent.action.MAIN" />
24
25                <category android:name="android.intent.category.LAUNCHER" />
26            </intent-filter>
27        </activity>
28
29        <service android:name=".DownloadService" >
30        </service>
31    </application>
32
33</manifest>
```

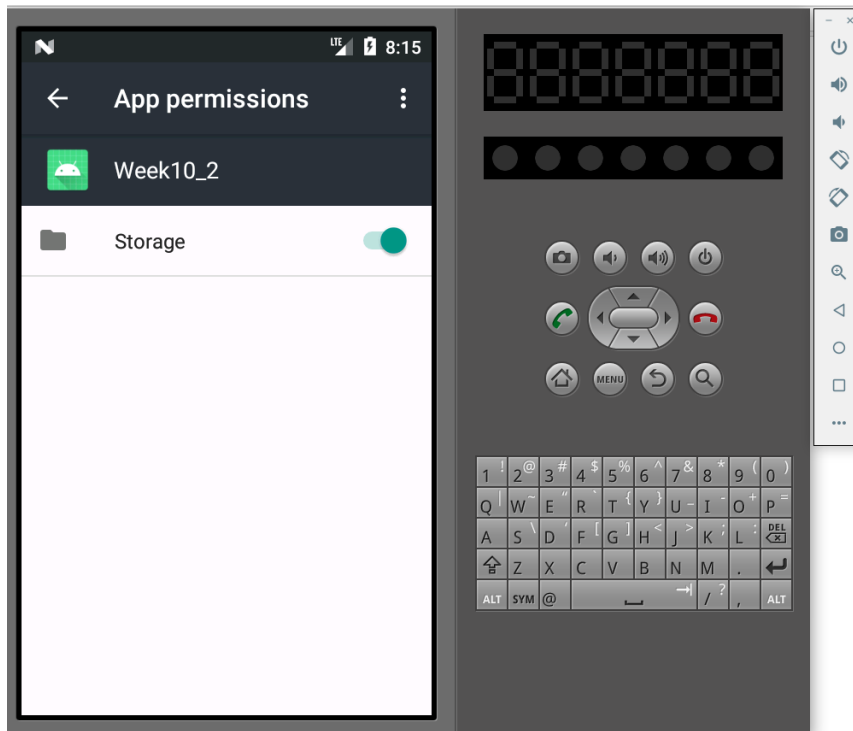


Download Service activity code 입니다.

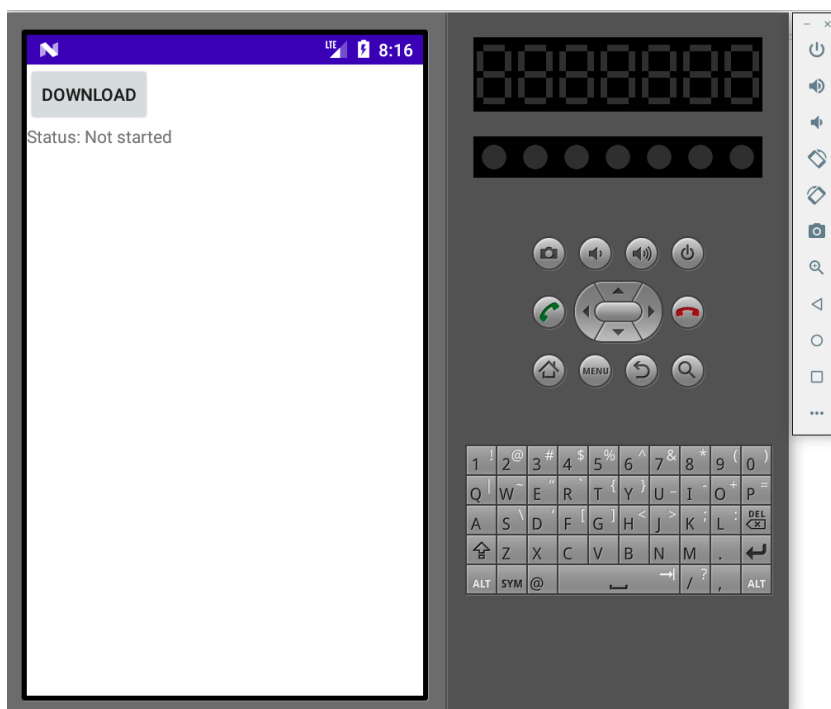
```
activity_main.xml x MainActivity.java x DownloadService.java x AndroidManifest
1 package com.example.week10_2;
2
3 import ...
14
15 public class DownloadService extends IntentService {
16
17     private int result = Activity.RESULT_CANCELED;
18     public static final String URL = "urlpath";
19     public static final String FILENAME = "filename";
20     public static final String FILEPATH = "filepath";
21     public static final String RESULT = "result";
22     public static final String NOTIFICATION = "com.vogella.android.service.receiver";
23
24     public DownloadService() { super( name: "DownloadService"); }
27
28     // will be called asynchronously by Android
29     @Override
30     protected void onHandleIntent(Intent intent) {
31         String urlPath = intent.getStringExtra(URL);
32         String fileName = intent.getStringExtra(FILENAME);
33         File output = new File(Environment.getExternalStorageDirectory(),
34                                 fileName);
35         if (output.exists()) {
36             output.delete();
37         }
38
39         InputStream stream = null;
40         FileOutputStream fos = null;
41
42         try {
43             URL url = new URL(urlPath);
44             stream = url.openConnection().getInputStream();
45             InputStreamReader reader = new InputStreamReader(stream);
46             fos = new FileOutputStream(output.getPath());
47             int next = -1;
48             while ((next = reader.read()) != -1) {
49                 fos.write(next);
50             }
51             // successfully finished
52             result = Activity.RESULT_OK;
53         } catch (Exception e) {
54             e.printStackTrace();
55         } finally {
56             if (stream != null) {
57                 try {
58                     stream.close();
59                 } catch (IOException e) {
60                     e.printStackTrace();
61                 }
62             }
63             if (fos != null) {
64                 try {
65                     fos.close();
66                 } catch (IOException e) {
67                     e.printStackTrace();
68                 }
69             }
70         }
71         publishResults(output.getAbsolutePath(), result);
72     }
73
74     private void publishResults(String outputPath, int result) {
75         Intent intent = new Intent(NOTIFICATION);
76         intent.putExtra(FILEPATH, outputPath);
77         intent.putExtra(RESULT, result);
78         sendBroadcast(intent);
79     }
80 }
```

실행 화면입니다.

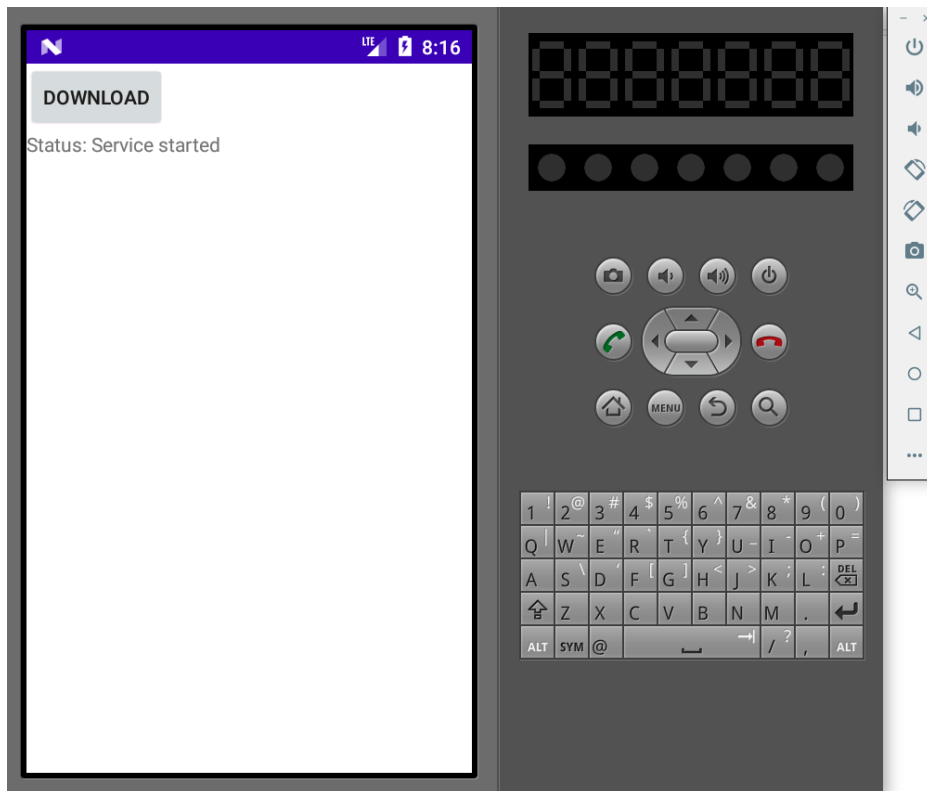
우선 웹페이지를 다운받아야 하기 때문에 저장소를 사용할 수 있도록 permission 을 줍니다.



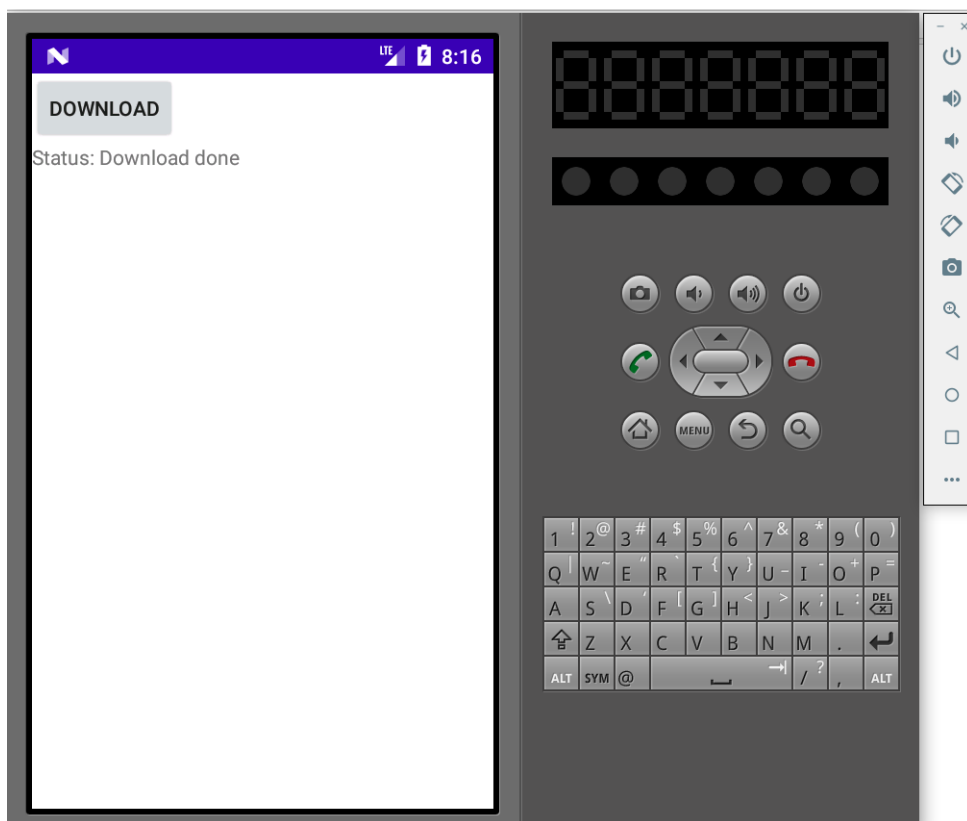
그 후 앱을 실행하면 다음과 같이 Download 버튼이 있고, 밑에 'Nost started'라는 status 를 띄운 화면이 보여집니다.



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



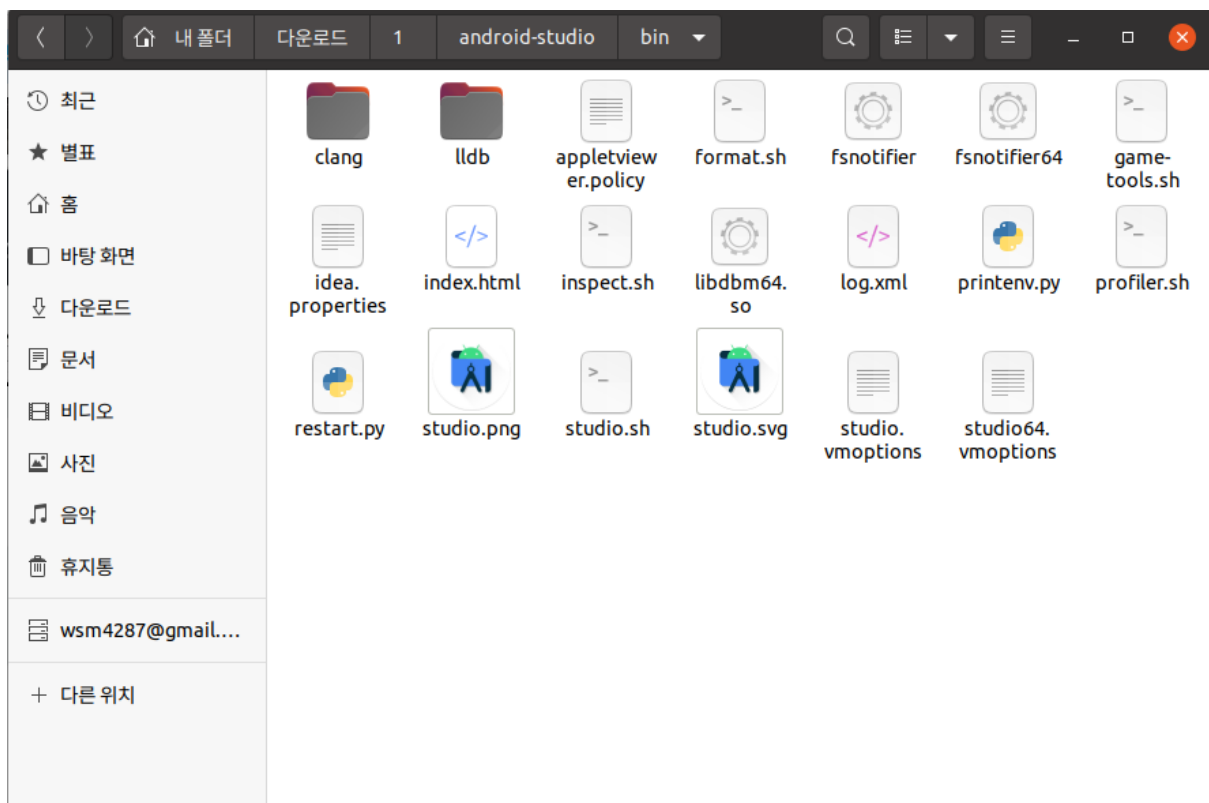
다운이 완료되면 아래와 같이 'Download done'으로 status 가 변경됩니다.



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

```
seungmin@seungmin-W65-W67RC: ~/다운로드/1/android-stud...
seungmin@seungmin-W65-W67RC:~/다운로드/1/android-studio/bin$ adb pull /storage/emulated/0/index.html ./
/storage/emulated/0/index.html: 1 file...pped. 7.1 MB/s (27726 bytes in 0.004s)
seungmin@seungmin-W65-W67RC:~/다운로드/1/android-studio/bin$
```

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



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

