

Splash! 2012

Android Essentials: Create Your Own Android App

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Android SDK: <http://developer.android.com/sdk/index.html>

Different Training Resources: developer.android.com/training/index.html

API Guides: developer.android.com/guide/components/index.html

Eclipse: www.eclipse.org/

Marketing and Distributing: developer.android.com/distribute/index.html

String.xml

```
<resources>

    <string name="app_name">Example</string>
    <string name="menu_settings">Settings</string>
    <string name="title_activity_main">MainActivity</string>
    <string name="edit_message">Please write something!</string>
    <string name="click_here">Click Here</string>
    <string name="text_instructions">Please input the coefficients and X.</string>
    <string name="input_digits">1234567890</string>
    <string name="input_number_1">x<sup>3</sup></string>
    <string name="input_number_2">x<sup>2</sup></string>
    <string name="input_number_3">x<sup>1</sup></string>
    <string name="input_number_4">c</string>
    <string name="input_number_x">X</string>
    <string name="button_submit">Submit</string>
    <string name="title_activity_display_message">DisplayMessageActivity</string>

</resources>
```

MainActivity.java

```
package com.example.example;

import android.app.Activity;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.EditText;

public class MainActivity extends Activity {

    public final static String DIGIT1 = "com.example.myfirstapp.MESSAGE1";
    public final static String DIGIT2 = "com.example.myfirstapp.MESSAGE2";
    public final static String DIGIT3 = "com.example.myfirstapp.MESSAGE3";
    public final static String DIGIT4 = "com.example.myfirstapp.MESSAGE4";
    public final static String DIGITX = "com.example.myfirstapp.MESSAGE4";

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

    /** Called when the user clicks the Go! button */
    public void displayMessageActivity(View view) {
        EditText editText1 = (EditText) findViewById(R.id.input_number1);
        EditText editText2 = (EditText) findViewById(R.id.input_number2);
        EditText editText3 = (EditText) findViewById(R.id.input_number3);
        EditText editText4 = (EditText) findViewById(R.id.input_number4);
        EditText editTextx = (EditText) findViewById(R.id.input_number_x);
        String message1 = editText1.getText().toString();
        String message2 = editText2.getText().toString();
```

```

String message3 = editText3.getText().toString();
String message4 = editText4.getText().toString();
String messageX = editTextX.getText().toString();
if (message1.length() > 0 && message2.length() > 0 && message3.length() > 0 && message4.length() > 0) {
    Intent intent = new Intent(this, DisplayMessageActivity.class);
    intent.putExtra(DIGIT1, message1);
    intent.putExtra(DIGIT2, message2);
    intent.putExtra(DIGIT3, message3);
    intent.putExtra(DIGIT4, message4);
    intent.putExtra(DIGITX, messageX);
    startActivity(intent);
    MainActivity.this.finish();
}
}

/** Called when the user clicks the Send button */
public void sendMessage(View view) {
    Intent intent = new Intent(this, DisplayMessageActivity.class);
    startActivity(intent);
}
}

```

activity_main.xml

```

<LinearLayout 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="16dp"
    android:paddingRight="16dp"
    android:orientation="vertical" >

    <TextView
        android:id="@+id/text_instructions"
        android:gravity="center_horizontal"
        android:layout_gravity="center_horizontal"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/text_instructions"
        android:textSize="10sp"
        android:textStyle="bold"
        android:typeface="sans" />

    <EditText
        android:id="@+id/input_number1"
        android:layout_gravity="center_horizontal"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:digits="@string/input_digits"
        android:ems="10"
        android:gravity="center_horizontal"
        android:hint="@string/input_number_1"
        android:inputType="number"
        android:maxLength="1"
        android:textSize="10dp"
        android:textStyle="bold" />

    <EditText
        android:id="@+id/input_number2"
        android:layout_gravity="center_horizontal"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:digits="@string/input_digits"
        android:ems="10"
        android:gravity="center_horizontal"
        android:hint="@string/input_number_2"
        android:inputType="number"
        android:maxLength="1"
        android:textSize="10dp"
        android:textStyle="bold" />

```

```
<EditText
    android:id="@+id/input_number3"
    android:layout_gravity="center_horizontal"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:digits="@string/input_digits"
    android:ems="10"
    android:gravity="center_horizontal"
    android:hint="@string/input_number_3"
    android:inputType="number"
    android:maxLength="1"
    android:textSize="10dp"
    android:textStyle="bold" />
```

```
<EditText
    android:id="@+id/input_number4"
    android:layout_gravity="center_horizontal"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:digits="@string/input_digits"
    android:ems="10"
    android:gravity="center_horizontal"
    android:hint="@string/input_number_4"
    android:inputType="number"
    android:maxLength="1"
    android:textSize="10dp"
    android:textStyle="bold" />
```

```
<EditText
    android:id="@+id/input_number_x"
    android:layout_gravity="center_horizontal"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:digits="@string/input_digits"
    android:ems="10"
    android:gravity="center_horizontal"
    android:hint="@string/input_number_x"
    android:inputType="number"
    android:maxLength="1"
    android:textSize="10dp"
    android:textStyle="bold" />
```

```
<Button
    android:id="@+id/button_submit"
    android:layout_gravity="center_horizontal"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="15dp"
    android:onClick="displayMessageActivity"
    android:text="@string/button_submit" />
```

```
</LinearLayout>
```

DisplayMessageActivity.java

```
package com.example.example;

import android.os.Bundle;
import android.app.Activity;
import android.content.Intent;
import android.view.MenuItem;
import android.view.View;
import android.widget.TextView;
import android.support.v4.app.NavUtils;

public class DisplayMessageActivity extends Activity {

    @Override
    public boolean onOptionsItemSelected(MenuItem item) {
        switch (item.getItemId()) {
```

```

        case android.R.id.home:
            NavUtils.navigateUpFromSameTask(this);
            return true;
    }
    return super.onOptionsItemSelected(item);
}

@Override
public void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_display_message);
}

protected void onStart() {
    super.onStart();
    TextView tvAnswer = (TextView)findViewById(R.id.textView_answer);

    // Get the message from the intent
    Intent intent = getIntent();
    String message1 = intent.getStringExtra(MainActivity.DIGIT1);
    String message2 = intent.getStringExtra(MainActivity.DIGIT2);
    String message3 = intent.getStringExtra(MainActivity.DIGIT3);
    String message4 = intent.getStringExtra(MainActivity.DIGIT4);
    String messagex = intent.getStringExtra(MainActivity.DIGITX);

    // Create the text view
    double inp1 = Double.parseDouble(message1);
    double inp2 = Double.parseDouble(message2);
    double inp3 = Double.parseDouble(message3);
    double inp4 = Double.parseDouble(message4);
    double inpx = Double.parseDouble(messagex);

    double[] arr = new double[4];
    arr[0] = inp1;
    arr[1] = inp2;
    arr[2] = inp3;
    arr[3] = inp4;
    Polynomial result = new Polynomial(arr);
    double output = result.evaluate(inpx);
    String output1 = Double.toString(output);
    tvAnswer.setText(output1);
}

protected void onStop() {
    super.onStop();
    DisplayMessageActivity.this.finish();
}

protected void onDestroy() {
    super.onDestroy();
    DisplayMessageActivity.this.finish();
}

public void restart(View view) {
    Intent intent = new Intent(DisplayMessageActivity.this, MainActivity.class);
    startActivity(intent);
    DisplayMessageActivity.this.finish();
}
}

```

activity_display_message.xml

```

<LinearLayout 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:orientation="vertical" >

```

```
<TextView
    android:id="@+id/textView_answer"
    android:gravity="center_horizontal"
    android:layout_gravity="center_horizontal"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="10dp"
    android:layout_marginBottom="10dp"
    android:layout_marginLeft="5dp"
    android:layout_marginRight="5dp"
    tools:context=".DisplayMessageActivity" />
```

```
</LinearLayout>
```

Manifest.xml

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.example"
    android:versionCode="1"
    android:versionName="1.0" >

    <uses-sdk
        android:minSdkVersion="8"
        android:targetSdkVersion="15" />

    <application
        android:icon="@drawable/ic_launcher"
        android:label="@string/app_name"
        android:theme="@style/AppTheme" >
        <activity
            android:name=".MainActivity"
            android:label="@string/title_activity_main" >
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <activity
            android:name=".DisplayMessageActivity"
            android:label="@string/title_activity_display_message" >
            <meta-data
                android:name="android.support.PARENT_ACTIVITY"
                android:value="com.example.example.MainActivity" />
            </activity>
    </application>

</manifest>
```

Basics of Java programming

What does a Java program look like? Here's a simple program:

<pre>/* Main class */ public class Main { public static void main(String[] args) { System.out.println("hello world"); //prints "hello world" } }</pre>	<ul style="list-style-type: none">- declaring a class- main function- curly brackets- semicolons- output- comments
--	---

Let's make this program more interesting.

Variables:

<pre>public class Main { public static void main(String[] args) { int a, b, c; a = 1; b = 2; c = a + b; System.out.println("c: " + c); a = 5; System.out.println(" a: " + a); } }</pre>	<ul style="list-style-type: none">- primitive types- int: integers; double, float: decimal numbers- assigns a+b to c - program runs in order of commands
---	---

We can put $c = a+b$ into a **function**:

<pre>public class Main { //returns the sum of two integers public static int sum(int x, int y) { return x + y; } public static void main(String[] args) { int a = 1, b = 5; int c = sum(a, b); System.out.println("sum: " + c); } }</pre>	<ul style="list-style-type: none">- format of functions- scope- return types (can be void - method)- parameter arguments (type and order) - scope of variables- pass variables into function- guess what the (String[] args) does?
---	--

What if we want the computer to do more fancy stuff?

Conditionals:

<pre>public class Main { public static int sum(int x, int y) { return x + y; } public static void main(String[] args) { int a = 1, b = 5; if(sum(a, b) > 3) System.out.println("greater!"); else System.out.println("less!"); } }</pre>	<ul style="list-style-type: none">- if(condition)...else...- if.../if...elseif...else...- conditions<ul style="list-style-type: none"> : or &&: and !: not==: equals</>: less/greater than<=/>=: less/greater or equal to!=: not equal
---	---

Loops:

<pre>public class Main { public static int sum_sequence(int m, int n) { //swap m and n if necessary if(m > n) { int temp = n; n = m; m = temp; } int sum = 0; for(int i = m; i <= n; i++) { sum += i; //sum = sum + i } /*int sum = 0; int i = m; while(i <= n) { sum += i; i++; }*/ return sum; } public static void main(String[] args) { System.out.println(sum_sequence(1, 6)); } }</pre>	<ul style="list-style-type: none">-juggling variables - for(init value; condition; increment) - while(condition)- possibility of infinite loop
--	---

Brief introduction to **classes**:

- Power of **object oriented programming**

```
public class Polynomial {

    double [] coefficients = new double[4];

    public Polynomial(double[] poly_coefficients) {
        coefficients = poly_coefficients;
    }

    public double evaluate(double x) {
        double value = 0;
        for(int i = 0; i < 4; i++) {
            value += coefficients[i] * Math.pow(x, i);
        }
        return value;
    }

    public void sum(Polynomial p) {
        for(int i = 0; i < 4; i++) {
            coefficients[i] += p.coefficients[i]; //p.coefficients : coefficients array of p
        }
    }
}

public class Main {
    public static void main(String[] args) {
        double[] coefficients = {1, 1, 1, 1};
        Polynomial poly = new Polynomial(coefficients); //declare an instance of an object
        double value = poly.evaluate(1);
        System.out.println(value);

        double[] coefficients2 = { 2, 2, 2, 2};
        Polynomial poly2 = new Polynomial(coefficients2);
        poly.sum(poly2); // sum two polynomials
        double value = poly.evaluate(1);
        System.out.println(value);
    }
}
```