



군산대학교
KUNSAN NATIONAL UNIVERSITY

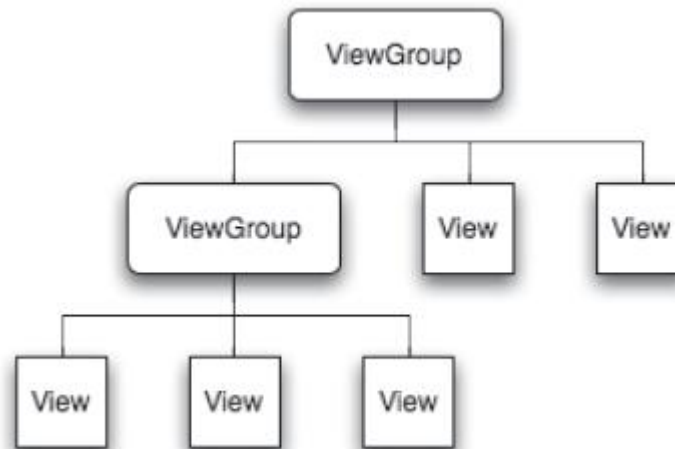
User Interface

모바일 응용

주요 강의자료 인용 : 알짜만 골라배우는, 시작하세요 안드로이드, Professional Android

사용자 인터페이스

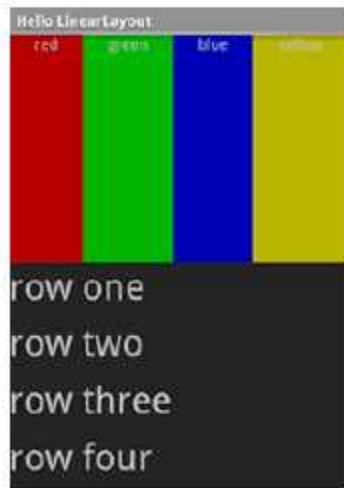
❖ 뷰 계층 구성구조



Layout

❖ Layout의 종류

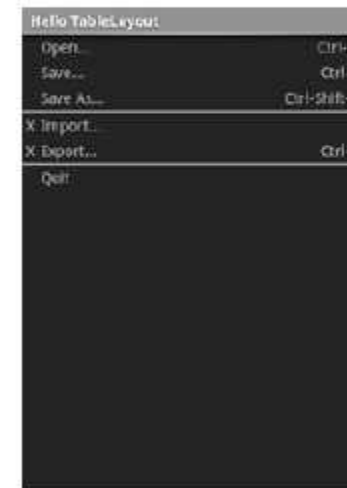
LinearLayout



RelativeLayout



TableLayout



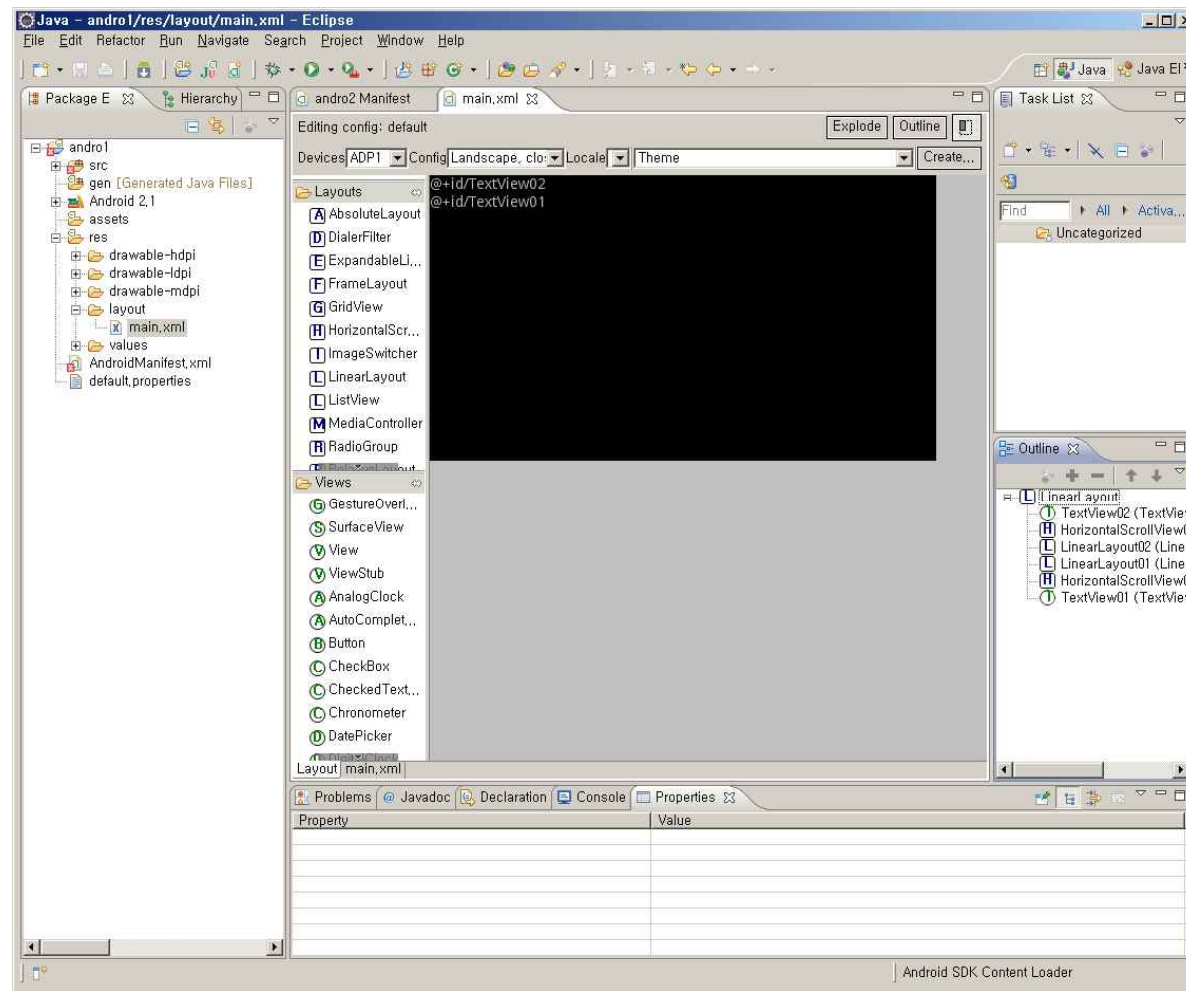
❖ Layout의 생성

- ✓ XML로 UI 엘리먼트를 선언하기
- ✓ 런타임에서 레이아웃 엘리먼트를 인스턴스화하기

❖ Linear Layout in XML

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:orientation="vertical" >
    <TextView android:id="@+id/text"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello, I am a TextView" />
    <Button android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello, I am a Button" />
</LinearLayout>
```

❖ Layout Design in Eclipse

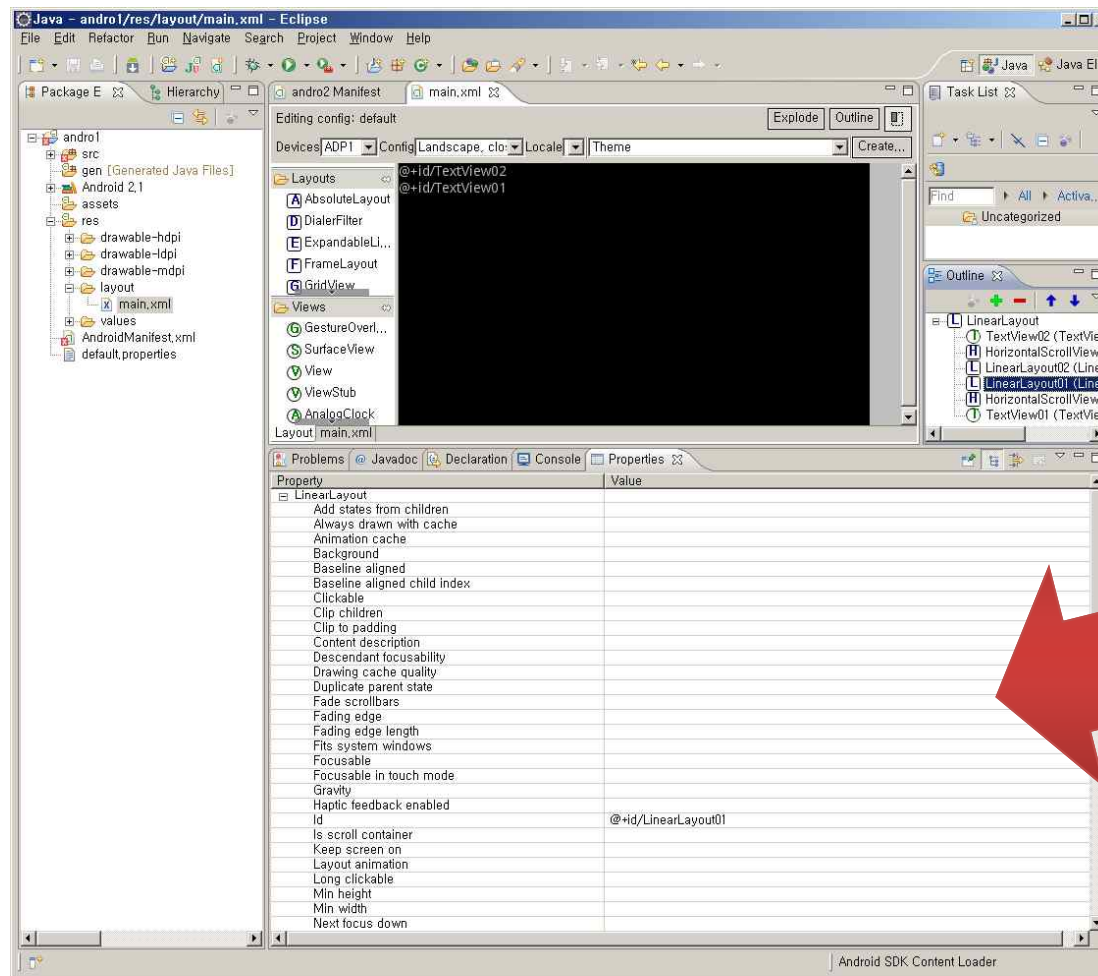


❖ XML 리소스 로딩

```
public void onCreate(Bundle savedInstanceState) {  
    super.onCreate(savedInstanceState);  
    setContentView(R.layout.main_layout);  
}
```

```
Button myButton = (Button) findViewById(R.id.my_button);
```

❖ Layout의 Properties 보기



UI Event 처리하기

```
public class ExampleActivity extends Activity
implements OnClickListener
{
protected void onCreate(Bundle savedInstanceState) {
...
    Button button = (Button)findViewById(R.id.corky);
    button.setOnClickListener(this);
}
// Implement the OnClickListener callback
public void onClick(View v) {
// do something when the button is clicked

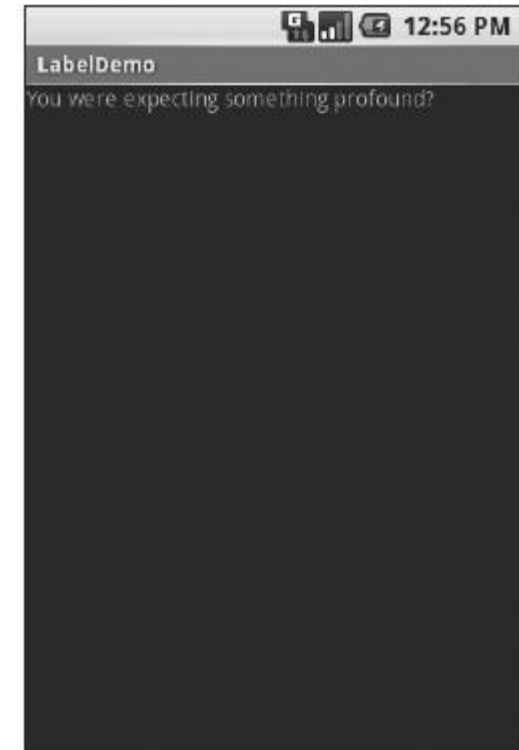
}
```


기본 위젯 : TextView

❖ TextView XML

```
<?xml version="1.0" encoding="utf-8"?>
<TextView xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:text="You were expecting something profound?"
/>
```

- ✓ android:typeface : 글꼴 종류 지정, monospace
- ✓ android:textStyle : bold, italic
- ✓ android:textColor : 글자색



기본 위젯 : TextView

❖ TextView XML 설정

- URL : <http://developer.android.com/reference/android/widget/TextView.html>
- ✓ android:ems
 - TextView 너비 설정(12pt 글꼴은 12pt)
 - maxEms, minEms 설정 가능
- ✓ android:lines
 - TextView의 Line 수 설정가능
 - maxLines, minLines 설정가능
- ✓ android:textSize
 - sp(scaled-pixel) 단위를 사용 : 예 15sp

```
<TextView
    android:id="@+id/TextView04"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:lines="2"
    android:ems="12"
    android:textSize="15sp"
    android:layout_marginRight="3dip"
    android:text="Hello kwnam@kunsan.ac.kr"
    android:autoLink="email|web"
/>
```

기본 위젯 : TextView

❖ TextView XML 설정

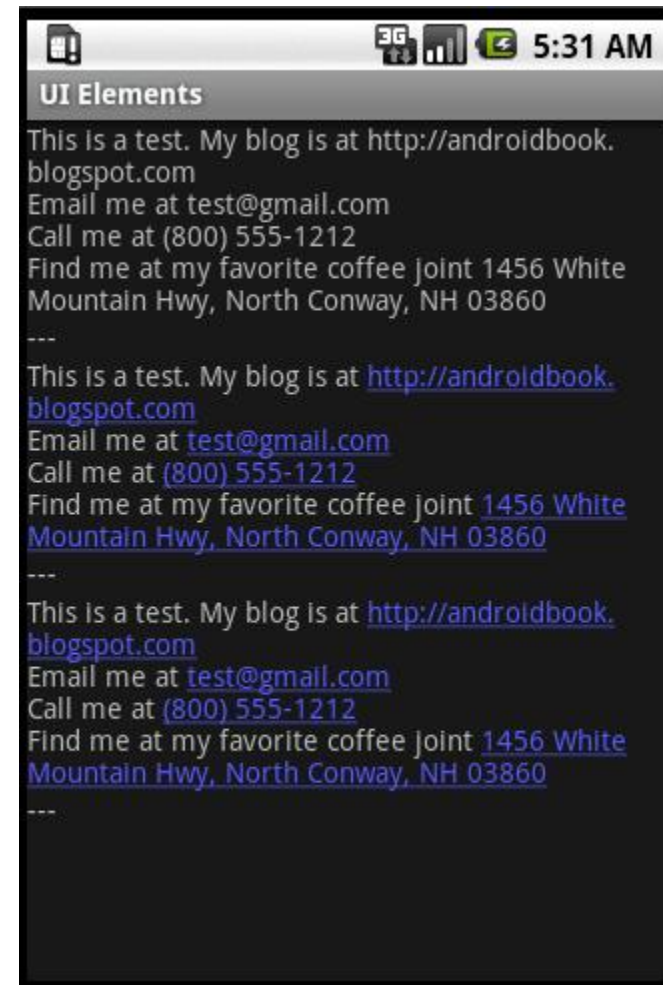
- ✓ android:autoLink
 - Text안의 문자들 중에서 자동인식하여 Link화 함
 - android:autoLink="web|email" 등과 같이 사용
 - web, email, phone, map, all 등 사용가능

- ✓ android:text="@string/...."의 사용법
 - @string은 res/values/ 밑의 <resources> 들중 string을 의미함
 - 예 : android:text="@string/autolink_test"
 - res/values/string.xml 안에
 - ♦ <resources>
 - ♦ <string name="autolink_test">This is a test. My blog is at
 - ♦ http://androidbook.blogspot.com\nEmail me at
 - ♦ test@gmail.com\nCall me at (800) 555-1212\nFind me at my coffee joint
 - ♦ 1456 White Mountain Hwy, North Conway, NH 03860
 - ♦ </string>

기본 위젯 : TextView

```
<ScrollView
    android:id="@+id/ScrollView01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    xmlns:android="http://schemas.android.com/apk/res/android">
    <LinearLayout
        android:id="@+id/LinearLayout01"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:orientation="vertical">
        <TextView
            android:id="@+id/TextView01"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="@string/autolink_test" />
        <TextView
            android:id="@+id/TextView01"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="@string/dash" />
        <TextView
            android:id="@+id/TextView02"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="@string/autolink_test"
            android:autoLink="all"
            android:linksClickable="false" />
        <TextView
            android:id="@+id/TextView01"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="@string/dash" />
        <TextView
            android:id="@+id/TextView03"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="@string/autolink_test"
            android:autoLink="all"
            android:linksClickable="true" />
        <TextView
            android:id="@+id/TextView01"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="@string/dash" />
    </LinearLayout>
</ScrollView>
```

res/layout/text_display.xml



기본 위젯 : TextView

res/values/string.xml

```
<resources>
<string
  name="hello">Hello World, ViewsMenu</string>
<string
  name="app_name">UI Elements</string>
<string
  name="spin_prompt">Choose a color</string>
<string
  name="autolink_test">This is a test. My blog is at
http://androidbook.blogspot.com\nEmail me at
test@gmail.com\nCall me at (800) 555-1212\nFind me at my favorite coffee joint
1456 White Mountain Hwy, North Conway, NH 03860
</string>
```

textdisplay.java

```
public class TextDisplay extends Activity {

    @Override
    protected void onCreate(
        Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);

        setContentView(R.layout.text_display);

        TextView text = (TextView)findViewById(R.id.TextView02);
        registerForContextMenu(text);
    }

    @Override
    public void onCreateContextMenu(
        ContextMenu menu, View v, ContextMenuInfo menuInfo) {
        // TODO Auto-generated method stub
        super
            .onCreateContextMenu(
                menu, v, menuInfo);


        if (((TextView)v).getLinksClickable()) {
            menu.add("Disable Clickability");
        } else {
            menu.add("Enable Clickability");
        }
    }

    @Override
    public boolean onContextItemSelected(
        MenuItem item) {
        super
            .onContextItemSelected(item);

        TextView text = (TextView)findViewById(R.id.TextView02);
        if (text.getLinksClickable())
        {
            //text.setLinksClickable(false);
            text.setMovementMethod(null);
        }
        else
        {
            text.setLinksClickable(true);
            text.setMovementMethod(new
                android.text.method.LinkMovementMethod());
        }
        return true;
    }
}
```

기본 위젯 : EditText

❖ EditText 예제(API Demo)



```
<TextView
    android:id="@+id/username_view"
    android:layout_height="wrap_content"
    android:layout_width="wrap_content"
    android:layout_marginLeft="20dip"
    android:layout_marginRight="20dip"
    android:text="@string/alert_dialog_username"
    android:gravity="left"
    android:textAppearance="?android:attr/textAppearanceMedium" />
```

```
<EditText
    android:id="@+id/username_edit"
    android:layout_height="wrap_content"
    android:layout_width="fill_parent"
    android:layout_marginLeft="20dip"
    android:layout_marginRight="20dip"
    android:scrollHorizontally="true"
    android:autoText="false"
    android:capitalize="none"
    android:gravity="fill_horizontal"
    android:textAppearance="?android:attr/textAppearanceMedium" />
```

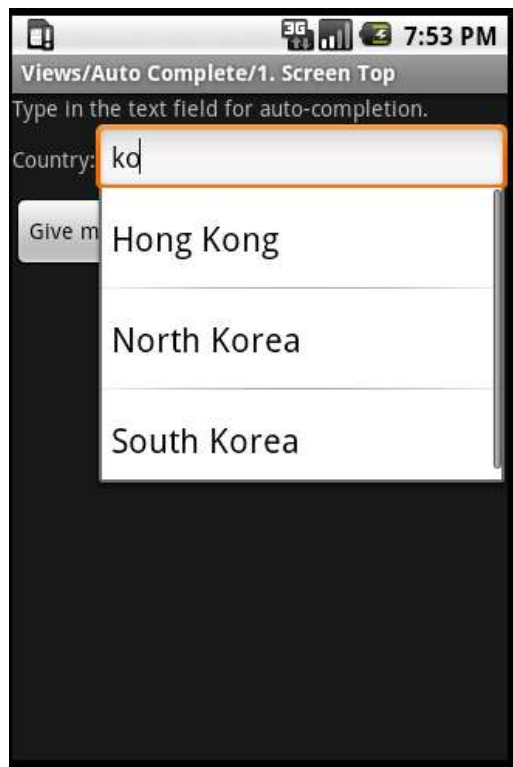
```
<TextView
    android:id="@+id/password_view"
    android:layout_height="wrap_content"
    android:layout_width="wrap_content"
    android:layout_marginLeft="20dip"
    android:layout_marginRight="20dip"
    android:text="@string/alert_dialog_password"
    android:gravity="left"
    android:textAppearance="?android:attr/textAppearanceMedium" />
```

```
<EditText
    android:id="@+id/password_edit"
    android:layout_height="wrap_content"
    android:layout_width="fill_parent"
    android:layout_marginLeft="20dip"
    android:layout_marginRight="20dip"
    android:scrollHorizontally="true"
    android:autoText="false"
    android:capitalize="none"
    android:gravity="fill_horizontal"
    android:password="true"
    android:textAppearance="?android:attr/textAppearanceMedium" />
```

기본 위젯 : EditText

❖ AutoComplete 예제

✓ 나라이름 autocomplete



android:completionHint => Hint

autocomplete_1.xml

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

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/autocomplete_1_instructions" />

    <LinearLayout
        android:orientation="horizontal"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content">

        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="@string/autocomplete_1_country" />

        <AutoCompleteTextView android:id="@+id/edit"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:completionHint = "나라 이름 중에 일부를 쓰세요"
            android:completionThreshold="1"
            />

    </LinearLayout>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/autocomplete_1_focus" />

</LinearLayout>
```

기본 위젯 : EditText

❖ AutoComplete 예제

✓ 나라이름 autocomplete

```
public class AutoComplete1 extends Activity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.autocomplete_1);

        ArrayAdapter<String> adapter = new ArrayAdapter<String>(this,
            android.R.layout.simple_dropdown_item_1line, COUNTRIES);
        AutoCompleteTextView textView = (AutoCompleteTextView) findViewById(R.id.edit);
        textView.setAdapter(adapter);
    }

    static final String[] COUNTRIES = new String[] {
        "Afghanistan", "Albania", "Algeria", "American Samoa", "Andorra",
        "Angola", "Anguilla", "Antarctica", "Antigua and Barbuda", "Argentina",
        "Armenia", "Aruba", "Australia", "Austria", "Azerbaijan",
        "Bahrain", "Bangladesh", "Barbados", "Belarus", "Belgium"}
    }
```


기본 위젯 : EditText

❖ 입력 필터를 이용한 사용자 입력 제한

✓ setFilters() 함수를 이용하여 설정

– 예

```
final EditText text_filtered = (EditText) findViewById(R.id.input_filtered);
text_filtered.setFilters(new InputFilter[]
{
    new InputFilter.AllCaps(),
    new InputFilter.LengthFilter(2)
});
```

✓ android.text.inputFilter를 이용하여 Filter 생성

– AllCaps Class

- **InputFilter.AllCaps()**에 의해 생성
- method
 - ♦ filter(CharSequence source, int start, int end, Spanned dest, int dstart, int dend)

– LengthFilter Class

- **InputFilter.LengthFilter(int max)**에 의해 생성
- method
 - ♦ filter(CharSequence source, int start, int end, Spanned dest, int dstart, int dend)

기본 위젯 : Spinner

❖ Spinner 의 예

```
<Spinner
    android:id="@+id/Spinner01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:entries="@array/colors"
    android:prompt="@string/spin_prompt" />
```

✓ 구현

```
final Spinner spin = (Spinner)findViewById(R.id.Spinner01);

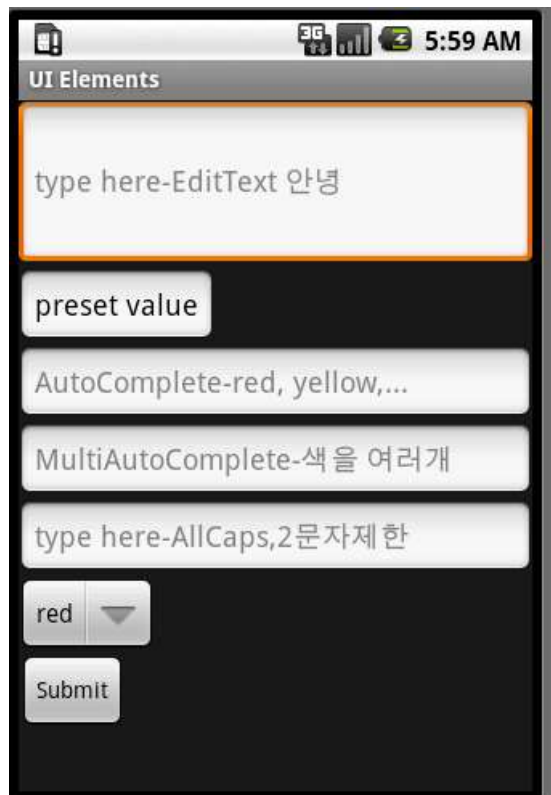
TextView text_sel = (TextView)spin.getSelectedView();
String = text_sel.getText();
final String[] COLORS =
{
    "red", "green", "orange", "blue", "purple",
    "black", "yellow", "cyan", "magenta" };

```



기본 위젯 : 종합 예제1

❖ 입력 필터를 이용한 사용자 입력 제한



```
<LinearLayout
    android:id="@+id/LinearLayout01"
    android:orientation="vertical"
    android:layout_height="fill_parent"
    android:layout_width="fill_parent">
    <EditText
        android:id="@+id/EditText01"
        android:layout_height="wrap_content"
        android:hint="type here-EditText 안녕"
        android:lines="4"
        android:layout_width="fill_parent" />
    <EditText
        android:id="@+id/EditText02"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="preset value"
        android:editable="false"></EditText>
    <AutoCompleteTextView
        android:id="@+id/AutoCompleteTextView01"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:hint="AutoComplete-red, yellow,..."
        android:completionHint="Pick a color or type your own"
        android:completionThreshold="1" />
    <MultiAutoCompleteTextView
        android:id="@+id/MultiAutoCompleteTextView01"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:hint="MultiAutoComplete-색을 여러개"
        android:completionThreshold="1"
        android:completionHint="Pick a color or type your own" />
    <EditText
        android:id="@+id/input_filtered"
        android:layout_height="wrap_content"
        android:hint="type here-AllCaps, 2문자제한"
        android:layout_width="fill_parent" />
    <Spinner
        android:id="@+id/Spinner01"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:entries="@array/colors"
        android:prompt="@string/spin_prompt" />
    <Button
        android:id="@+id/submit"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Submit" />
</LinearLayout>
```

기본 위젯 : 종합 예제1

❖ 입력제한 소스

TextInput.java

```
public class TextInput extends Activity {

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

        final EditText text1 = (EditText)findViewById(R.id.EditText01);
        final EditText text2 = (EditText)findViewById(R.id.EditText02);
        final Spinner spin = (Spinner)findViewById(R.id.Spinner01);

        final Button submit = (Button)findViewById(R.id.submit);
        submit.setOnClickListener(new OnClickListener() {

            public void onClick(View v) {
                TextView text_sel = (TextView)spin.getSelectedView();
                Toast.makeText(TextInput.this, "1 = "+text1.getText()+ " 2 = "
                    + text2.getText() + "\n spinner = "+text_sel.getText(), Toast.LENGTH_SHORT).show();
            }
        });

        final String[] COLORS =
        {
            "red", "green", "orange", "blue", "purple",
            "black", "yellow", "cyan", "magenta" };
        ArrayAdapter<String> adapter =
            new ArrayAdapter<String>(
                this,
                android.R.layout.simple_dropdown_item_1line,
                COLORS);
        AutoCompleteTextView text =
            (AutoCompleteTextView) findViewById(R.id.AutoCompleteTextView01);
        text
            .setAdapter(adapter);
    }
}
```

```
MultiAutoCompleteTextView mtext =
    (MultiAutoCompleteTextView) findViewById(R.id.MultiAutoCompleteTextView01);
mtext
    .setAdapter(adapter);
mtext
    .setTokenizer(new MultiAutoCompleteTextView.CommaTokenizer());

final EditText text_filtered =
    (EditText) findViewById(R.id.input_filtered);
text_filtered
    .setFilters(new InputFilter[]
    {
        new InputFilter.AllCaps(),
        new InputFilter.LengthFilter(
            2) });
    }
}
```

기본 위젯 : Image

❖ ImageView와 ImageButton

- <http://developer.android.com/reference/android/widget/ImageButton.html>

✓ 클래스 종류

- ImageView : Image를 넣을수 있는 TextView
- ImageButton : Image를 넣을수 있는 Button

✓ Image를 넣는 방법

- android:src 속성에 Image 파일을 지정

기본 위젯 : Image

❖ ImageButton

```
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:orientation="vertical">

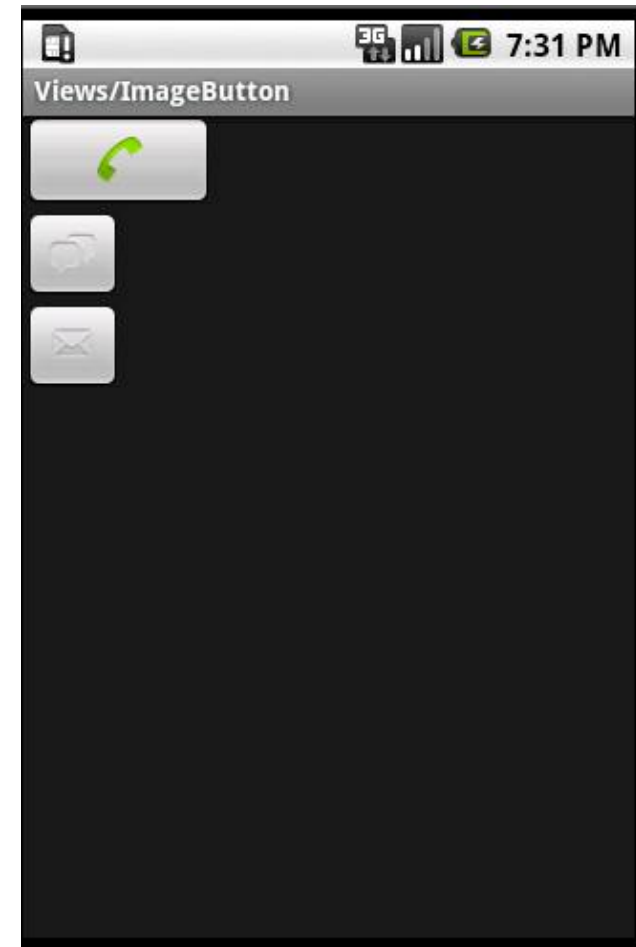
    <ImageButton
    android:layout_width="100dip"
    android:layout_height="50dip"
    android:src="@android:drawable/sym_action_call" />

    <ImageButton
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:src="@android:drawable/sym_action_chat" />

    <ImageButton
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:src="@android:drawable/sym_action_email" />
</LinearLayout>
```

```
public class ImageButton1 extends Activity {

    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.image_button_1);
    }
}
```



기본 위젯 : Image

❖ ImageView 예제(API Demo)

```
<ScrollView xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent">

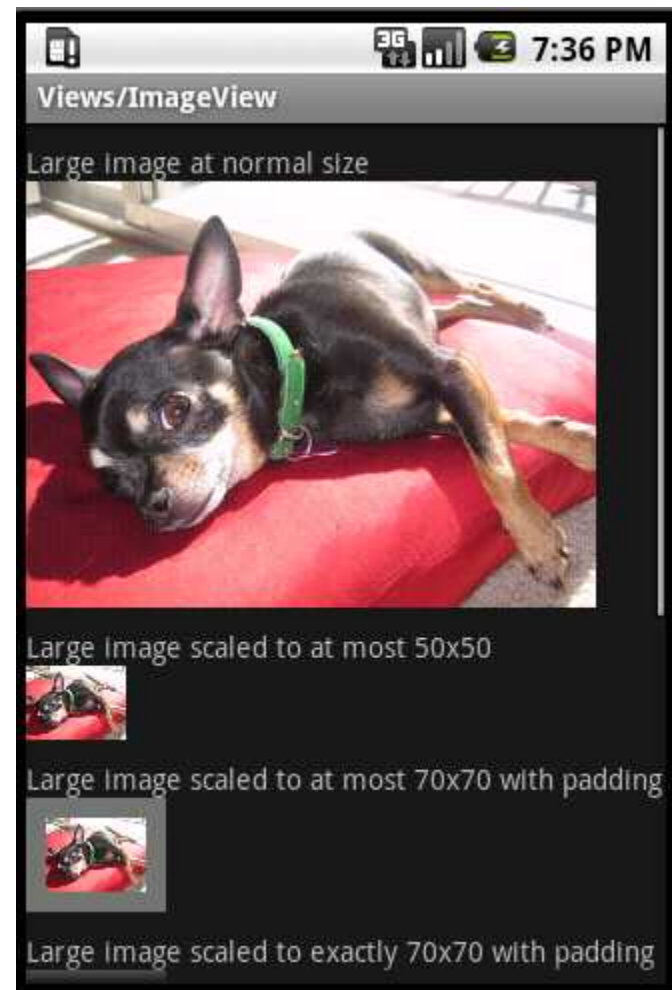
    <LinearLayout
        android:layout_width="fill_parent"
        android:layout_height="fill_parent"
        android:orientation="vertical">

        <!-- The following four examples use a large image -->
        <!-- 1. Non-scaled view, for reference -->
        <TextView
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:paddingTop="10dip"
            android:text="@string/image_view_large_normal"/>

        <ImageView
            android:src="@drawable/sample_1"
            android:adjustViewBounds="true"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content" />

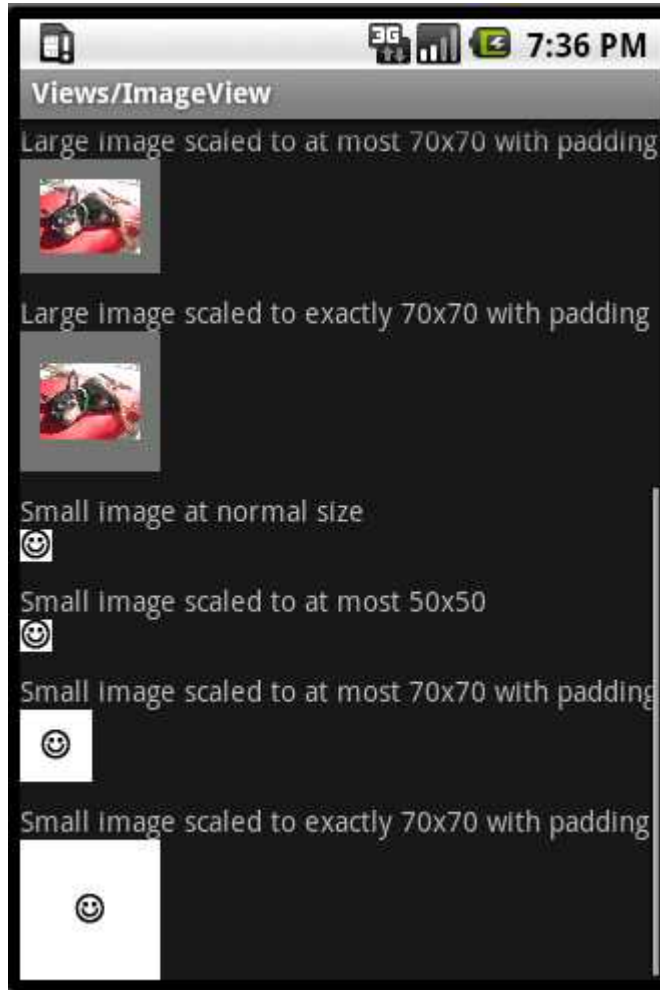
        <!-- 2. Limit to at most 50x50 -->
        <TextView
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:paddingTop="10dip"
            android:text="@string/image_view_large_at_most"/>

        <ImageView
            android:src="@drawable/sample_1"
            android:adjustViewBounds="true"
            android:maxWidth="50dip"
            android:maxHeight="50dip"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content" />
```



기본 위젯 : Image

❖ ImageView 예제(API Demo)



<!-- 3. Limit to at most 70x70, with 10 pixels of padding all around -->

```
<TextView
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:paddingTop="10dip"
    android:text="@string/image_view_large_at_most_padded"/>
```

```
<ImageView
    android:src="@drawable/sample_1"
    android:background="#66FFFFFF"
    android:adjustViewBounds="true"
    android:maxLength="70dip"
    android:padding="10dip"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content" />
```

<!-- 4. Limit to exactly 70x70, with 10 pixels of padding all around -->

```
<TextView
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:paddingTop="10dip"
    android:text="@string/image_view_large_exactly_padded"/>
```

```
<ImageView
    android:src="@drawable/sample_1"
    android:background="#66FFFFFF"
    android:scaleType="centerInside"
    android:padding="10dip"
    android:layout_width="70dip"
    android:layout_height="70dip" />
```

<!-- Repeating the previous four examples with small image -->

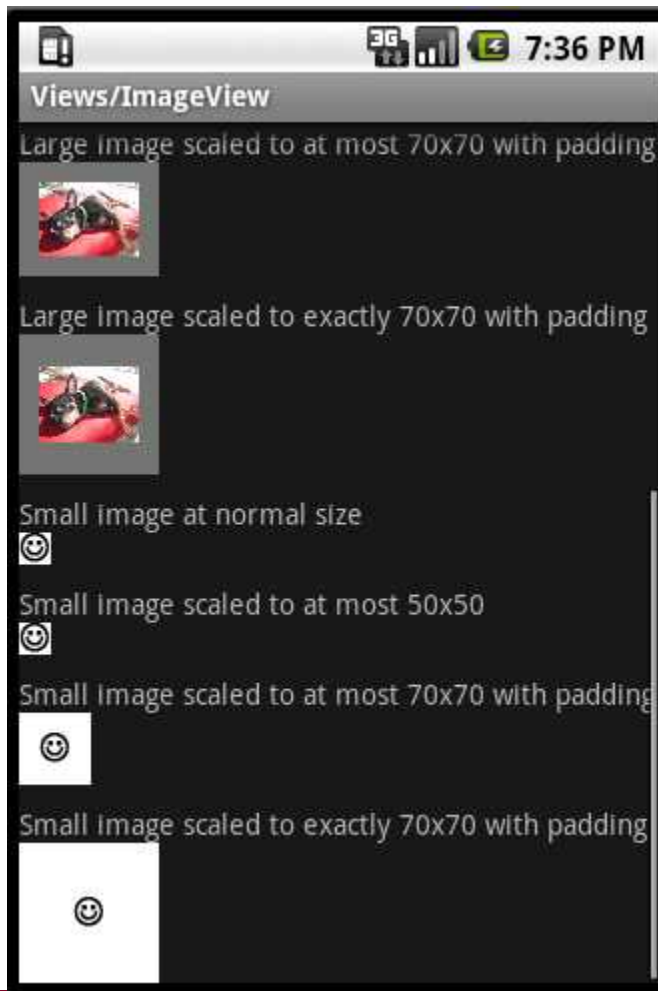
<!-- 1. Non-scaled view, for reference -->

```
<TextView
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:paddingTop="10dip"
    android:text="@string/image_view_small_normal"/>
```

```
<ImageView
    android:src="@drawable/stat_happy"
    android:background="#FFFFFF"
    android:adjustViewBounds="true"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content" />
```


기본 위젯 : Image

❖ ImageView 예제(API Demo)



<!-- 2. Limit to at most 50x50 -->

```
<TextView
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:paddingTop="10dip"
    android:text="@string/image_view_small_at_most"/>
<ImageView
    android:src="@drawable/stat_happy"
    android:background="#FFFFFF"
    android:adjustViewBounds="true"
    android:maxLength="50dip"
    android:maxLength="50dip"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content" />
```

<!-- 3. Limit to at most 70x70, with 10 pixels of padding all around -->

```
<TextView
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:paddingTop="10dip"
    android:text="@string/image_view_small_at_most_padded"/>
<ImageView
    android:src="@drawable/stat_happy"
    android:background="#FFFFFF"
    android:adjustViewBounds="true"
    android:maxLength="70dip"
    android:maxLength="70dip"
    android:padding="10dip"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content" />
```

<!-- 4. Limit to exactly 70x70, with 10 pixels of padding all around -->

```
<TextView
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:paddingTop="10dip"
    android:text="@string/image_view_small_exactly_padded"/>
<ImageView
    android:src="@drawable/stat_happy"
    android:background="#FFFFFF"
    android:scaleType="centerInside"
    android:padding="10dip"
    android:layout_width="70dip"
    android:layout_height="70dip" />
```

```
</LinearLayout>
</ScrollView>
```

기본 위젯 : Button

❖ Button XML과 OnClickListener

✓ Button XML의 예

```
<Button
    android:id="@+id/basic_button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Basic Button"
/>
```

```
<CheckBox
    android:id="@+id/checkbox"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Check me?"
/>
```

```
<RadioGroup
    android:id="@+id/RadioGroup01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content">
    <RadioButton
        android:id="@+id/RadioButton01"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Option 1"></RadioButton>
    <RadioButton
        android:id="@+id/RadioButton02"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Option 2"></RadioButton>
</RadioGroup>
```

```
<ImageButton
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:id="@+id/image_button"
    android:src="@drawable/droid">
</ImageButton>
```

```
<ToggleButton
    android:id="@+id/toggle_button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Toggle"
    android:textOff="Disabled"
    android:textOn="Enabled"
/>
```

기본 위젯 : Button

❖ Button의 OnClickListener

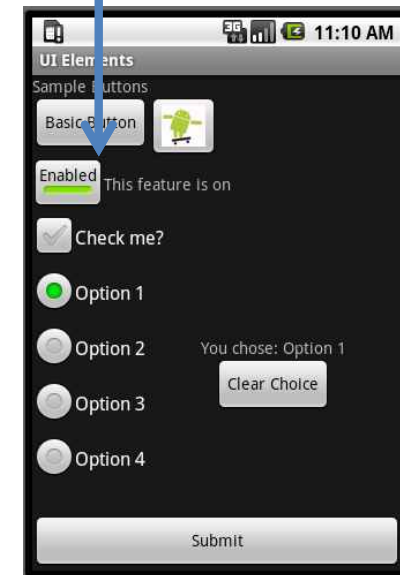
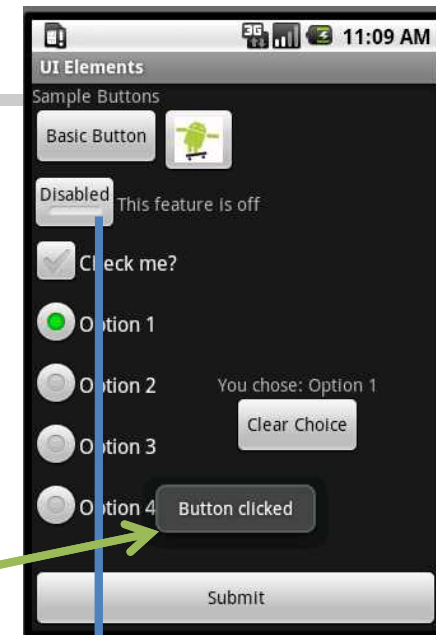
- ✓ Toast를 이용하여 화면에 표시하기

```
final Button basic_button = (Button) findViewById(R.id.basic_button);
basic_button.setOnClickListener(new View.OnClickListener() {
    public void onClick(View v) {
        Toast.makeText(Buttons.this, "Button clicked",
            Toast.LENGTH_SHORT).show();
    }
});
```

- ✓ 화면 내용 바꾸기

```
final ToggleButton toggle_button = (ToggleButton) findViewById(R.id.toggle_button);
toggle_button.setOnClickListener(new View.OnClickListener() {
    public void onClick(View v) {
        TextView tv = (TextView) findViewById(R.id.text_feature);
        tv.setText(toggle_button.isChecked() ? "This feature is on" : "This feature is off");
    }
});
```

toast



기본 위젯 : Button

❖ RadioButton의 OnCheckedChangeListener

```
final RadioGroup group = (RadioGroup)findViewById(R.id.RadioGroup01);
group.setOnCheckedChangeListener(new RadioGroup.OnCheckedChangeListener() {

    public void onCheckedChanged(RadioGroup group, int checkedId) {
        TextView tv = (TextView) findViewById(R.id.TextView01);
        if (checkedId != -1) {
            RadioButton rb = (RadioButton) findViewById(checkedId);

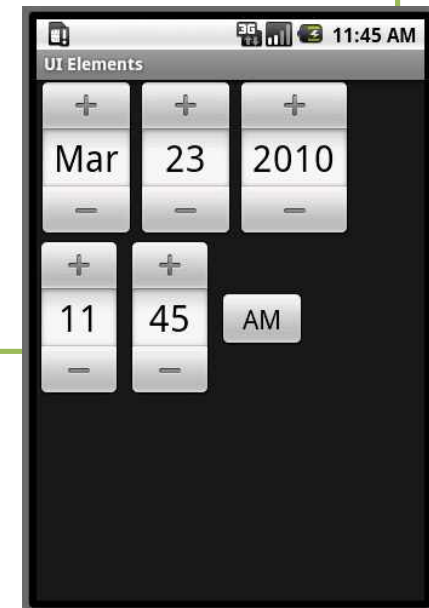
            if (rb != null) {
                tv.setText("You chose: " + rb.getText());
            }
            else {
                tv.setText("Choose 1");
            }
        }
    }
});
```

고급 위젯 : Picker

❖ DatePicker와 TimePicker

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    android:id="@+id/LinearLayout01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical">
    <DatePicker
        android:id="@+id/DatePicker01"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"></DatePicker>
    <TimePicker
        android:id="@+id/TimePicker01"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"></TimePicker>
    <TextView
        android:id="@+id/text_datetime"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"></TextView>
</LinearLayout>
```

picker.xml



고급 위젯 : Picker

❖ DatePicker



```
public class Pickers extends Activity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);

        setContentView(R.layout.pickers);

        final TextView text =(TextView)findViewById(R.id.text_datetime);
        final DatePicker date = (DatePicker)findViewById(R.id.DatePicker01);
        final TimePicker time = (TimePicker)findViewById(R.id.TimePicker01);

        time.setOnTimeChangedListener(new TimePicker.OnTimeChangedListener(){

            public void onTimeChanged(TimePicker view, int hourOfDay, int minute) {

                Date dt = new Date(date.getYear(), date.getMonth(), date.getDayOfMonth(),
                    hourOfDay, minute);
                text.setText(dt.toString());
            }
        });

        date.init(date.getYear(), date.getMonth(), date.getDayOfMonth(),
            new DatePicker.OnDateChangedListener() {

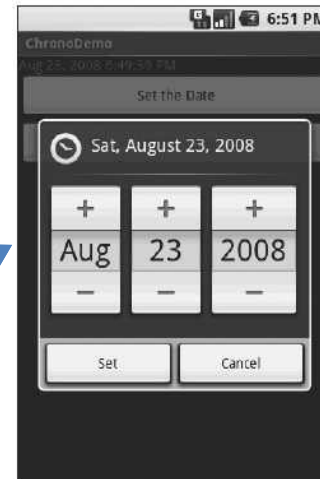
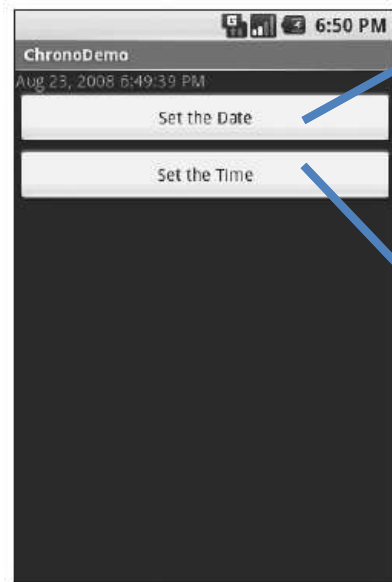
                public void onChanged(DatePicker view, int year,
                    int monthOfYear, int dayOfMonth) {

                    Date dt = new Date(year-1900, monthOfYear, dayOfMonth,
                        time.getCurrentHour(), time.getCurrentMinute());
                    text.setText(dt.toString());
                }
            }
        );
    }
}
```

고급 위젯 : Picker

❖ Picker 예제

- ✓ 다음 그림과 같이 버튼을 클릭하면
- ✓ Picker dialog가 뜨는 프로그램 작성



고급 위젯 : Picker

❖ Picker 예제

xml

```
<LinearLayout
    android:orientation="vertical"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    >
    <TextView android:id="@+id/dateAndTime"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        />
    <Button android:id="@+id/dateBtn"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text="Set the Date"
        />
    <Button android:id="@+id/timeBtn"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text="Set the Time"
        />
</LinearLayout>
```

java

```
public class ChronoDemo extends Activity {
    DateFormat fmtDateAndTime=DateFormat.getDateTimeInstance();
    TextView dateAndTimeLabel;
    Calendar dateAndTime=Calendar.getInstance();
    DatePickerDialog.OnDateSetListener d=new DatePickerDialog.OnDateSetListener() {
        public void onDateSet(DatePicker view, int year, int monthOfYear,
            int dayOfMonth) {
            dateAndTime.set(Calendar.YEAR, year);
            dateAndTime.set(Calendar.MONTH, monthOfYear);
            dateAndTime.set(Calendar.DAY_OF_MONTH, dayOfMonth);
            updateLabel();
        }
    };

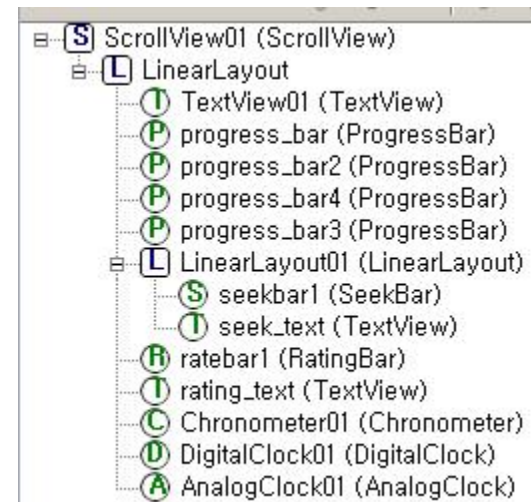
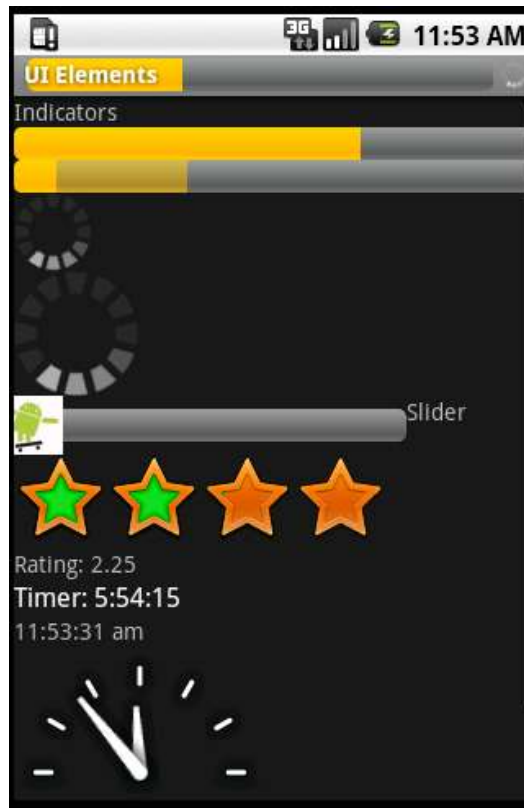
    TimePickerDialog.OnTimeSetListener t=new TimePickerDialog.OnTimeSetListener() {
        public void onTimeSet(TimePicker view, int hourOfDay,
            int minute) {
            dateAndTime.set(Calendar.HOUR_OF_DAY, hourOfDay);
            dateAndTime.set(Calendar.MINUTE, minute);
            updateLabel();
        }
    };
    @Override
    public void onCreate(Bundle icle) {
        super.onCreate(icle);
        setContentView(R.layout.main);
        Button btn=(Button)findViewById(R.id.dateBtn);
        btn.setOnClickListener(new View.OnClickListener() {
            public void onClick(View v) {
                new DatePickerDialog(ChronoDemo.this,
                    d,
                    dateAndTime.get(Calendar.YEAR),
                    dateAndTime.get(Calendar.MONTH),
                    dateAndTime.get(Calendar.DAY_OF_MONTH)).show();
            }
        });
    }
}
```


고급 위젯 : Picker

```
btn=(Button)findViewById(R.id.timeBtn);
btn.setOnClickListener(new View.OnClickListener() {
    public void onClick(View v) {
        new TimePickerDialog(ChronoDemo.this,
            t,
            dateAndTime.get(Calendar.HOUR_OF_DAY),
            dateAndTime.get(Calendar.MINUTE),
            true).show();
    }
});
dateAndTimeLabel=(TextView)findViewById(R.id.dateAndTime);
updateLabel();
private void updateLabel() {
    dateAndTimeLabel.setText(fmtDateAndTime
        .format(dateAndTime.getTime()));
}
}
```

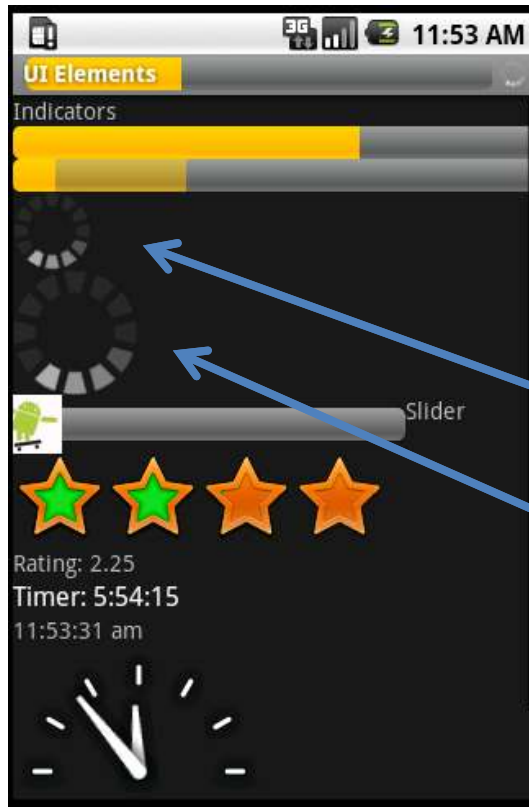
고급 위젯 : Indicator

❖ ProgressBar



고급 위젯 : Indicator

❖ ProgressBar



```
<ProgressBar
    android:id="@+id/progress_bar"
    style="?android:attr/progressBarStyleHorizontal"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:max="100" />

<ProgressBar
    android:id="@+id/progress_bar2"
    style="?android:attr/progressBarStyleHorizontal"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:max="100" />

<ProgressBar
    android:id="@+id/progress_bar4"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content" />

<ProgressBar
    android:id="@+id/progress_bar3"
    style="?android:attr/progressBarStyleLarge"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content" />
```

고급 위젯 : Indicator

❖ Thread를 이용해 ProgressBar 표시



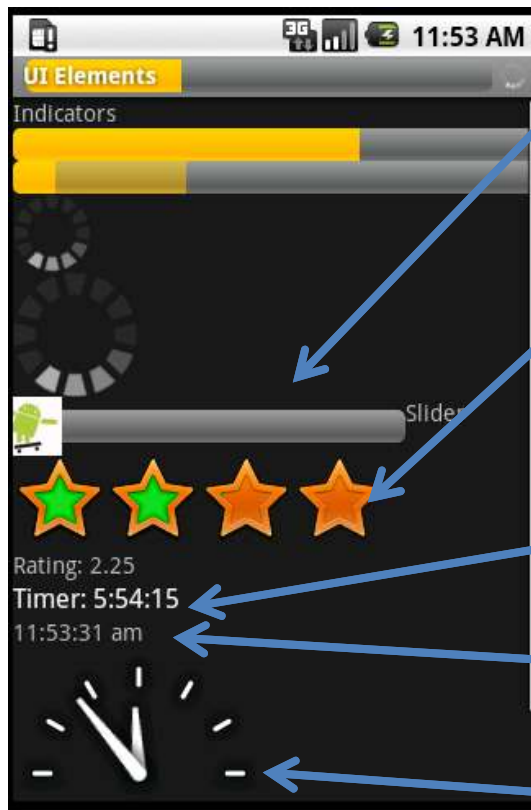
```
mProgress = (ProgressBar) findViewById(R.id.progress_bar);

// Start lengthy operation in a background thread
new Thread(new Runnable() {
    public void run() {
        while (mProgressStatus < 100) {
            try {
                synchronized (this) {
                    wait(50);
                }
            } catch (Exception e) {
                Log.e(ViewsMenu.debugTag, "wait failed", e);
            }
            mProgressStatus++;

            // Update the progress bar
            mHandler.post(new Runnable() {
                public void run() {
                    mProgress.setProgress(mProgressStatus);
                }
            });
        }
    }
}).start();
```

고급 위젯 : Indicator

❖ SeekBar 와 RatingBar

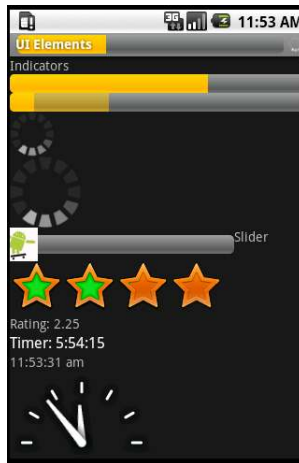


```
<SeekBar
    android:id="@+id/seekbar1"
    android:layout_height="wrap_content"
    android:layout_width="240px"
    android:max="512"
    android:thumb="@drawable/droid" />
<RatingBar
    android:id="@+id/ratebar1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:numStars="4"
    android:stepSize="0.25" android:focusable="true"
    android:focusableInTouchMode="true"
    android:soundEffectsEnabled="true"></RatingBar>
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:id="@+id/rating_text"></TextView>
<Chronometer
    android:id="@+id/Chronometer01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:format="Timer: %s" android:focusable="false"
    android:focusableInTouchMode="false"></Chronometer>
<DigitalClock
    android:id="@+id/DigitalClock01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"></DigitalClock>
<AnalogClock
    android:id="@+id/AnalogClock01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"></AnalogClock>
```

고급 위젯 : Indicator

❖ SeekBar 구현

```
<SeekBar  
    android:id="@+id/seekbar1"  
    android:layout_height="wrap_content"  
    android:layout_width="240px"  
    android:max="512"  
    android:thumb="@drawable/droid" />
```



```
SeekBar seek = (SeekBar) findViewById(R.id.seekbar1);  
seek.setOnSeekBarChangeListener(new SeekBar.OnSeekBarChangeListener() {  
  
    public void onProgressChanged(SearchBar seekBar, int progress,  
        boolean fromTouch) {  
  
        Log.d(ViewsMenu.debugTag, "progress = " + progress + " fromTouch = " + fromTouch);  
        ((TextView)findViewById(R.id.seek_text))  
            .setText("Value: "+progress);  
  
        seekBar.setSecondaryProgress((progress+seekBar.getMax())/2);  
  
    }  
  
    public void onStartTrackingTouch(SearchBar seekBar) {  
        // TODO Auto-generated method stub  
  
    }  
  
    public void onStopTrackingTouch(SearchBar seekBar) {  
        // TODO Auto-generated method stub  
  
    }  
  
});
```

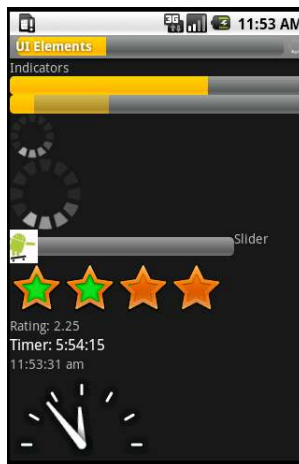
고급 위젯 : Indicator

❖ RatingBar 구현

```
<RatingBar
    android:id="@+id/ratebar1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:numStars="4"
    android:stepSize="0.25"
    android:focusable="true"
    android:focusableInTouchMode="true"
    android:soundEffectsEnabled="true">
</RatingBar>
```

```
RatingBar rate = (RatingBar) findViewById(R.id.ratebar1);
rate.setOnRatingBarChangeListener(new RatingBar.OnRatingBarChangeListener() {

    public void onRatingChanged(RatingBar ratingBar, float rating,
        boolean fromTouch) {
        Log.d(ViewsMenu.debugTag, "rating = " + rating + " fromTouch = " + fromTouch);
        ((TextView)findViewById(R.id.rating_text)).setText("Rating: " + rating);
    }
});
```



고급 위젯 : Tab

❖ 탭 구성요소

- ✓ TabHost 클래스 : 탭 버튼과 내용을 포함하는 탭 컨테이너
- ✓ TabWidget 클래스 : 탭 버튼 목록을 관리. 아이콘 설정 가능
- ✓ FrameLayout : 탭 내용을 관리

TabWidget의 id는
항상 "**@android:id/tabs**"이어야함

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent">
    <TabHost android:id="@+id/tabhost"
        android:layout_width="fill_parent"
        android:layout_height="fill_parent">
        <TabWidget android:id="@android:id/tabs"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            />
        <FrameLayout android:id="@android:id/tabcontent"
            android:layout_width="fill_parent"
            android:layout_height="fill_parent"
            android:paddingTop="62px">
            <AnalogClock android:id="@+id/tab1"
                android:layout_width="fill_parent"
                android:layout_height="fill_parent"
                android:layout_centerHorizontal="true"
                />
            <Button android:id="@+id/tab2"
                android:layout_width="fill_parent"
                android:layout_height="fill_parent"
                android:text="A semi-random button"
                />
        </FrameLayout>
    </TabHost>
</LinearLayout>
```


고급 위젯 : Tab

❖ 간단한 Tab 예제

```
import android.app.Activity;
import android.os.Bundle;
import android.widget.TabHost;
public class TabDemo extends Activity {
    @Override
    public void onCreate(Bundle icle) {
        super.onCreate(icle);
        setContentView(R.layout.main);
        TabHost tabs=(TabHost)findViewById(R.id.tabhost);
        tabs.setup();

        TabHost.TabSpec spec=tabs.newTabSpec("tag1");
        spec.setContent(R.id.tab1);
        spec.setIndicator("Clock");
        tabs.addTab(spec);

        spec=tabs.newTabSpec("tag2");
        spec.setContent(R.id.tab2);
        spec.setIndicator("Button");
        tabs.addTab(spec);

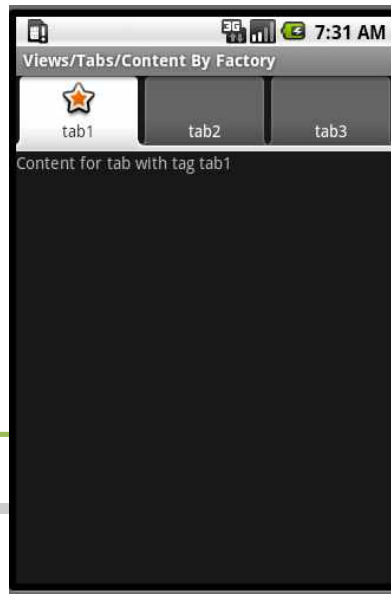
        tabs.setCurrentTab(0);
    }
}
```



고급 위젯 : Tab

❖ Tab을 생성하는 또다른 방법

```
public class Tabs1 extends TabActivity {  
  
    @Override  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        TabHost tabHost = getTabHost();  
  
        LayoutInflater.from(this).inflate(R.layout.tabs1, tabHost.getTabContentView(), true);  
  
        tabHost.addTab(tabHost.newTabSpec("tab1")  
            .setIndicator("tab1")  
            .setContent(R.id.view1));  
        tabHost.addTab(tabHost.newTabSpec("tab2")  
            .setIndicator("tab2")  
            .setContent(R.id.view2));  
        tabHost.addTab(tabHost.newTabSpec("tab3")  
            .setIndicator("tab3")  
            .setContent(R.id.view3));  
    }  
}
```



```
<FrameLayout  
    android:layout_width="fill_parent"  
    android:layout_height="fill_parent">  
  
    <TextView android:id="@+id/view1"  
        android:background="@drawable/blue"  
        android:layout_width="fill_parent"  
        android:layout_height="fill_parent"  
        android:text="@string/tabs_1_tab_1"/>  
  
    <TextView android:id="@+id/view2"  
        android:background="@drawable/red"  
        android:layout_width="fill_parent"  
        android:layout_height="fill_parent"  
        android:text="@string/tabs_1_tab_2"/>  
  
    <TextView android:id="@+id/view3"  
        android:background="@drawable/green"  
        android:layout_width="fill_parent"  
        android:layout_height="fill_parent"  
        android:text="@string/tabs_1_tab_3"/>  
  
</FrameLayout>
```

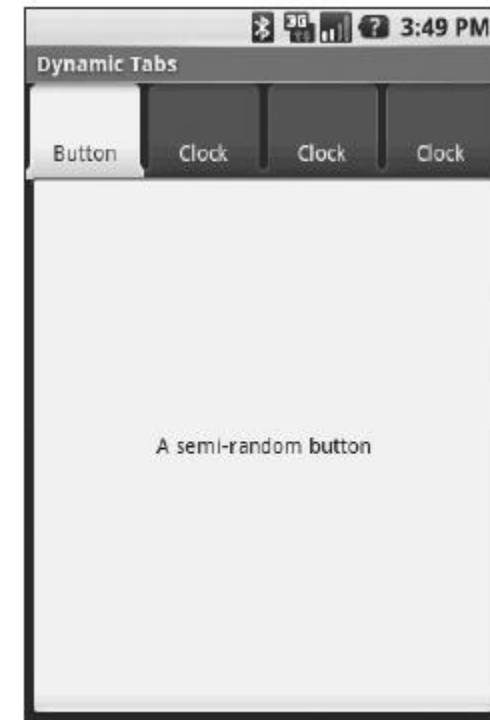
icon 설정

고급 위젯 : Tab

❖ 동적으로 Tab 생성하기

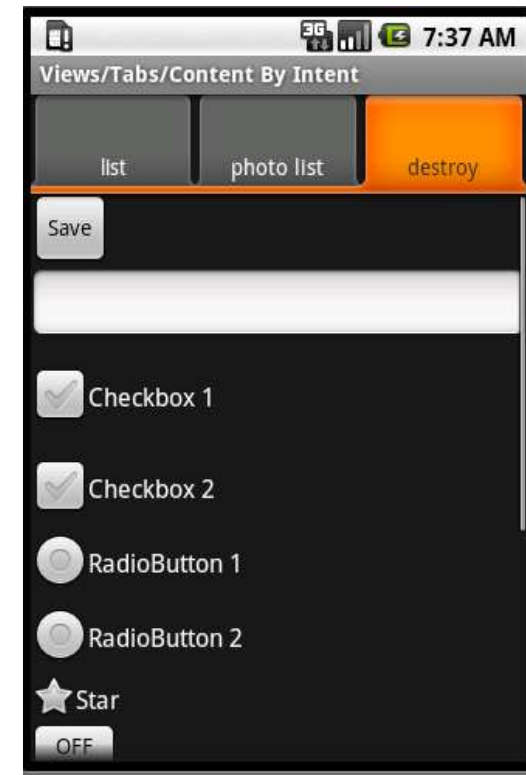
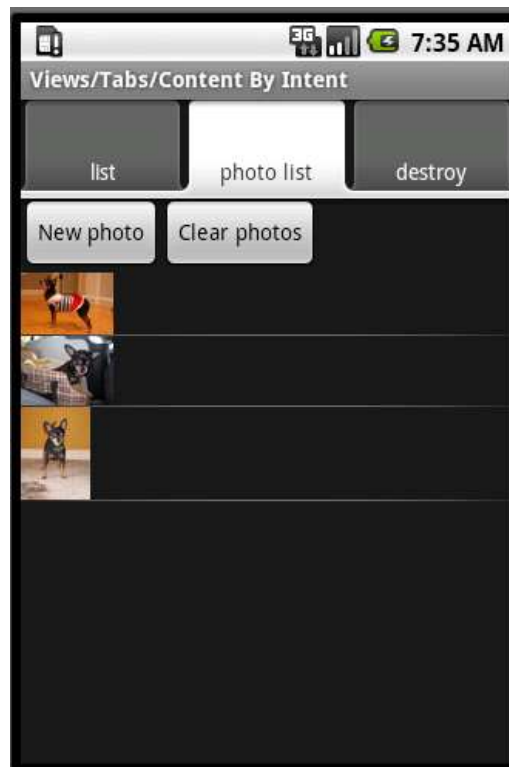
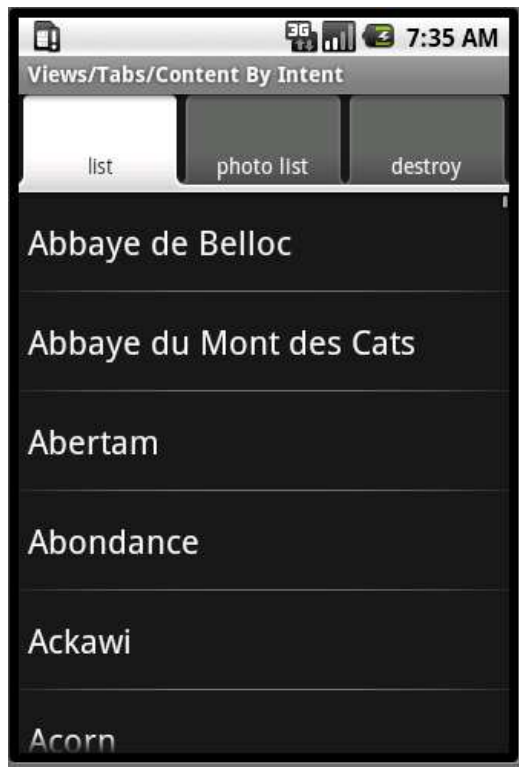
- ✓ 버튼을 누르면 Tab을 생성

```
Button btn=(Button)tabs.getCurrentView().findViewById(R.id.buttontab);
btn.setOnClickListener(new View.OnClickListener() {
    public void onClick(View view) {
        TabHost.TabSpec spec=tabs.newTabSpec("tag1");
        spec.setContent(new TabHost.TabContentFactory() {
            public View createTabContent(String tag) {
                return(new AnalogClock(DynamicTabDemo.this));
            }
        });
        spec.setIndicator("Clock");
        tabs.addTab(spec);
    }
});
```



고급 위젯 : Tab

❖ 예제



고급 위젯 : Tab

❖ Tab 예제

```
public class Tabs3 extends TabActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);

        final TabHost tabHost = getTabHost();

        tabHost.addTab(tabHost.newTabSpec("tab1")
            .setIndicator("list")
            .setContent(new Intent(this, List1.class)));

        tabHost.addTab(tabHost.newTabSpec("tab2")
            .setIndicator("photo list")
            .setContent(new Intent(this, List8.class)));

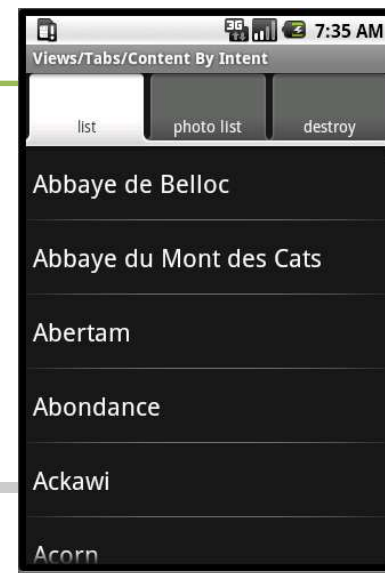
        // This tab sets the intent flag so that it is recreated each time
        // the tab is clicked.
        tabHost.addTab(tabHost.newTabSpec("tab3")
            .setIndicator("destroy")
            .setContent(new Intent(this, Controls2.class)
                .addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP)));
    }
}
```

```
public class List1 extends ListActivity {

    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);

        // Use an existing ListAdapter that will map an array
        // of strings to TextViews
        setListAdapter(new ArrayAdapter<String>(this,
            android.R.layout.simple_list_item_1, mStrings));
        getListView().setTextFilterEnabled(true);
    }

    private String[] mStrings = {
        "Abbaye de Belloc", "Abbaye du Mont des Cats", "Abertam",
        "Abondance", "Ackawi",
        "Acorn", "Adelost", "Affelice au Chablis", "Afuega'l Pitu",
        "Airag", "Airedale"}
}
```



고급 위젯 : Tab

❖ Tab 예제

```
public class List8 extends ListActivity {

    PhotoAdapter mAdapter;

    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);

        // Use a custom layout file
        setContentView(R.layout.list_8);

        // Tell the list view which view to display when the list is empty
        getListView().setEmptyView(findViewById(R.id.empty));

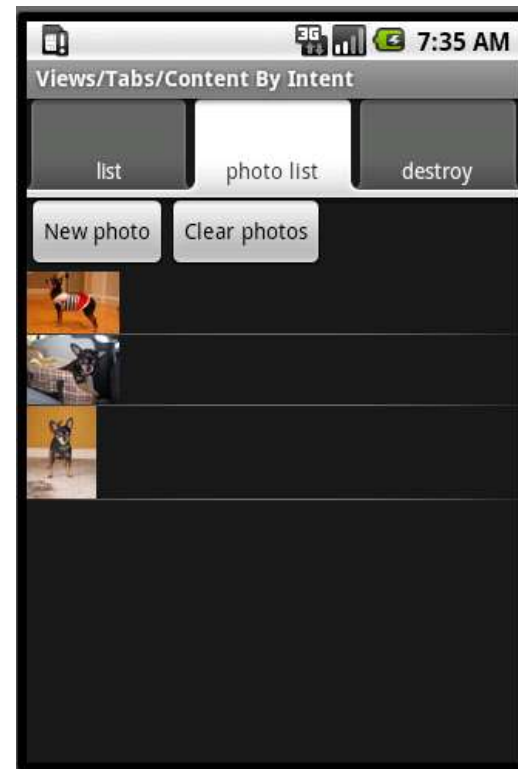
        // Set up our adapter
        mAdapter = new PhotoAdapter(this);
        setListAdapter(mAdapter);

        // Wire up the clear button to remove all photos
        Button clear = (Button) findViewById(R.id.clear);
        clear.setOnClickListener(new View.OnClickListener() {

            public void onClick(View v) {
                mAdapter.clearPhotos();
            }
        });

        // Wire up the add button to add a new photo
        Button add = (Button) findViewById(R.id.add);
        add.setOnClickListener(new View.OnClickListener() {

            public void onClick(View v) {
                mAdapter.addPhotos();
            }
        });
    }
}
```



고급 위젯 : Tab

```
public class PhotoAdapter extends BaseAdapter {
```

```
    private Integer[] mPhotoPool = {  
        R.drawable.sample_thumb_0, R.drawable.sample_thumb_1, R.drawable.sample_thumb_2,  
        R.drawable.sample_thumb_3, R.drawable.sample_thumb_4, R.drawable.sample_thumb_5,  
        R.drawable.sample_thumb_6, R.drawable.sample_thumb_7};
```

```
    private ArrayList<Integer> mPhotos = new ArrayList<Integer>();
```

```
    public PhotoAdapter(Context c) {  
        mContext = c;  
    }
```

```
    public int getCount() {  
        return mPhotos.size();  
    }
```

```
    public Object getItem(int position) {  
        return position;  
    }
```

```
    public long getItemId(int position) {  
        return position;  
    }
```

```
    public View getView(int position, View convertView, ViewGroup parent) {  
        // Make an ImageView to show a photo  
        ImageView i = new ImageView(mContext);  
  
        i.setImageResource(mPhotos.get(position));  
        i.setAdjustViewBounds(true);  
        i.setLayoutParams(new AbsListView.LayoutParams(LayoutParams.WRAP_CONTENT,  
            LayoutParams.WRAP_CONTENT));  
        // Give it a nice background  
        i.setBackgroundResource(R.drawable.picture_frame);  
        return i;  
    }
```

```
    private Context mContext;
```

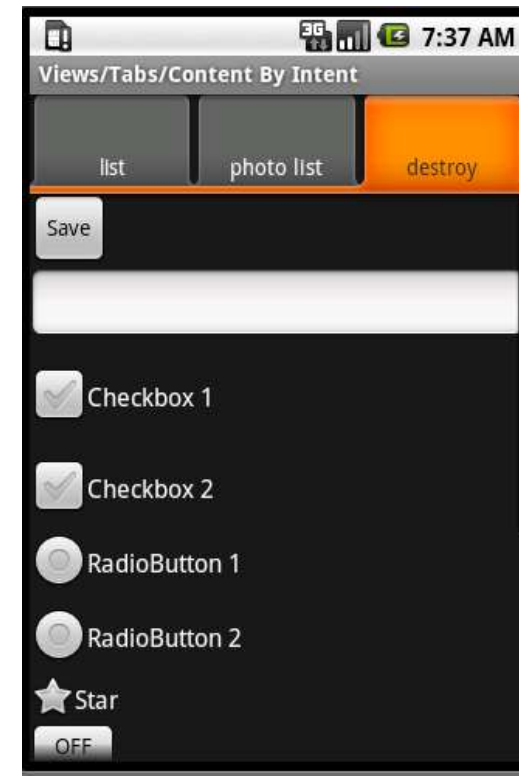
```
    public void clearPhotos() {  
        mPhotos.clear();  
        notifyDataSetChanged();  
    }
```

```
    public void addPhotos() {  
        int whichPhoto = (int) Math.round(Math.random() * (mPhotoPool.length - 1));  
        int newPhoto = mPhotoPool[whichPhoto];  
        mPhotos.add(newPhoto);  
        notifyDataSetChanged();  
    }  
}
```

고급 위젯 : Tab

❖ Tab 예제

```
public class Controls2 extends Activity {  
  
    @Override  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        setContentView(R.layout.controls_1);  
  
        Spinner s1 = (Spinner) findViewById(R.id.spinner1);  
        ArrayAdapter<String> adapter = new ArrayAdapter<String>(this,  
            android.R.layout.simple_spinner_item, mStrings);  
        adapter.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item);  
        s1.setAdapter(adapter);  
    }  
  
    private static final String[] mStrings = {  
        "Mercury", "Venus", "Earth", "Mars", "Jupiter", "Saturn", "Uranus", "Neptune"  
    };  
}
```

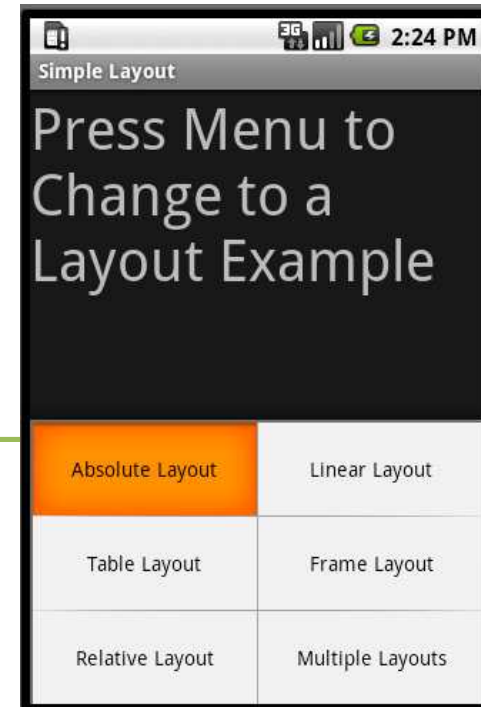


Layout

❖ Layout의 종류와 개념

- ✓ AbsoluteLayout(1.5이후 폐기)
- ✓ FrameLayout
- ✓ LinearLayout
- ✓ TableLayout
- ✓ RelativeLayout

```
public abstract class layout_menu_class extends Activity {  
  
    @Override  
    public boolean onCreateOptionsMenu(Menu menu) {  
        // TODO Auto-generated method stub  
        getMenuInflater().inflate(R.menu.layout_menu, menu);  
  
        menu.findItem(R.id.absolute_menu_item).setIntent(new Intent(this, absolute_layout.class));  
        menu.findItem(R.id.frame_menu_item).setIntent(new Intent(this, frame_layout.class));  
        menu.findItem(R.id.relative_menu_item).setIntent(new Intent(this, relative_layout.class));  
        menu.findItem(R.id.linear_menu_item).setIntent(new Intent(this, linear_layout.class));  
        menu.findItem(R.id.table_menu_item).setIntent(new Intent(this, table_layout.class));  
        menu.findItem(R.id.multi_menu_item).setIntent(new Intent(this, multiple_layout.class));  
  
        super.onCreateOptionsMenu(menu);  
        return true;  
    }  
}
```



Layout : FrameLayout

❖ 정의

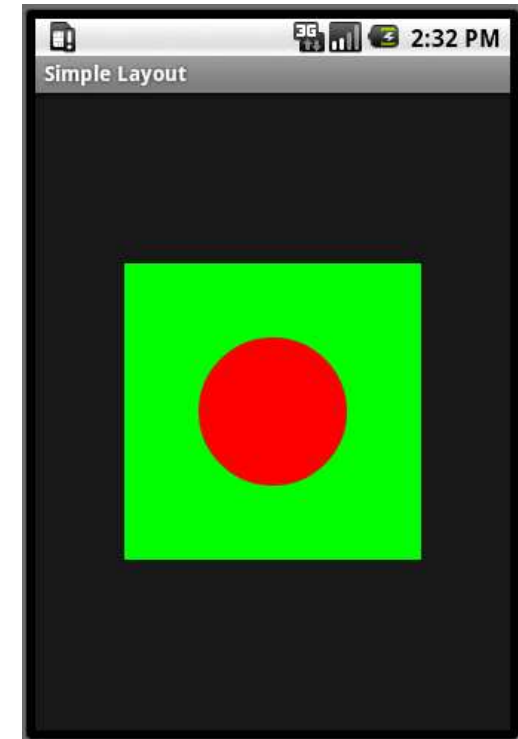
✓ 여러 자식 뷰들을 겹쳐서 그리고자 할 때 사용하는 Layout

```
<FrameLayout
    android:id="@+id/FrameLayout01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_gravity="center">

    <ImageView
        android:id="@+id/ImageView01"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:src="@drawable/green_rect"
        android:minHeight="200px"
        android:minWidth="200px"></ImageView>

    <ImageView
        android:id="@+id/ImageView02"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:src="@drawable/red_oval"
        android:minHeight="100px"
        android:minWidth="100px"
        android:layout_gravity="center"></ImageView>

</FrameLayout>
```



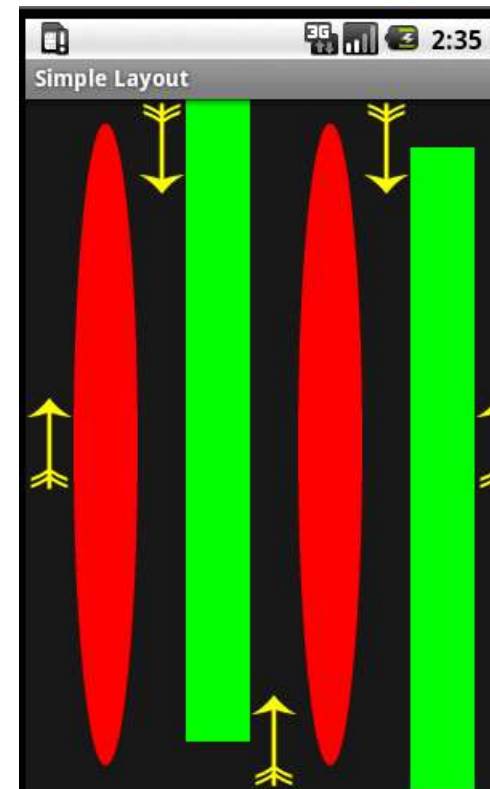
```
public class frame_layout extends layout_menu_class {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        // TODO Auto-generated method stub
        super.onCreate(savedInstanceState);
        setContentView(R.layout.frame_layout);
    }

}
```

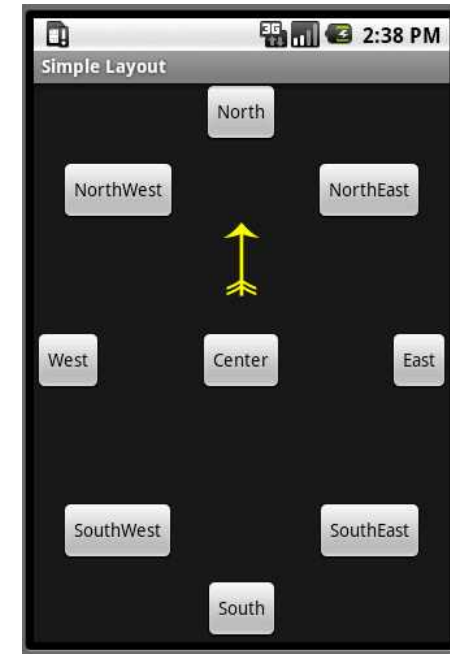
Layout : LinearLayout

```
<LinearLayout
  xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_width="fill_parent"
  android:layout_height="fill_parent"
  android:orientation="horizontal" android:layout_gravity="center_vertical">
  <ImageView
    android:id="@+id/ImageView03"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:src="@drawable/arrow" android:layout_gravity="center">
  </ImageView>
  <ImageView
    android:id="@+id/ImageView02"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:src="@drawable/red_oval"
    android:minWidth="40px" android:minHeight="400px"
    android:layout_gravity="center_vertical">
  </ImageView>
  ...
```



Layout : RelativeLayout

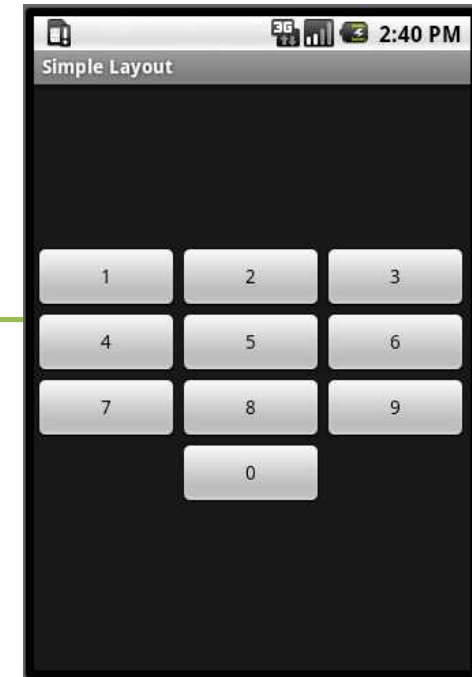
```
<RelativeLayout
    android:id="@+id/RelativeLayout01"
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_height="fill_parent"
    android:layout_width="fill_parent">
    <Button
        android:id="@+id/ButtonNorth"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="North"
        android:layout_alignParentTop="true"
        android:layout_centerHorizontal="true"></Button>
    <Button
        android:id="@+id/ButtonNorthEast"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="NorthEast"
        android:layout_marginRight="20px"
        android:layout_marginTop="60px"
        android:layout_alignParentRight="true"></Button>
    <ImageView
        android:id="@+id/ImageView01"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_above="@id/ButtonCenter"
        android:layout_centerHorizontal="true"
        android:layout_marginBottom="25px"
        android:src="@drawable/arrow"></ImageView>
```



Layout : TableLayout

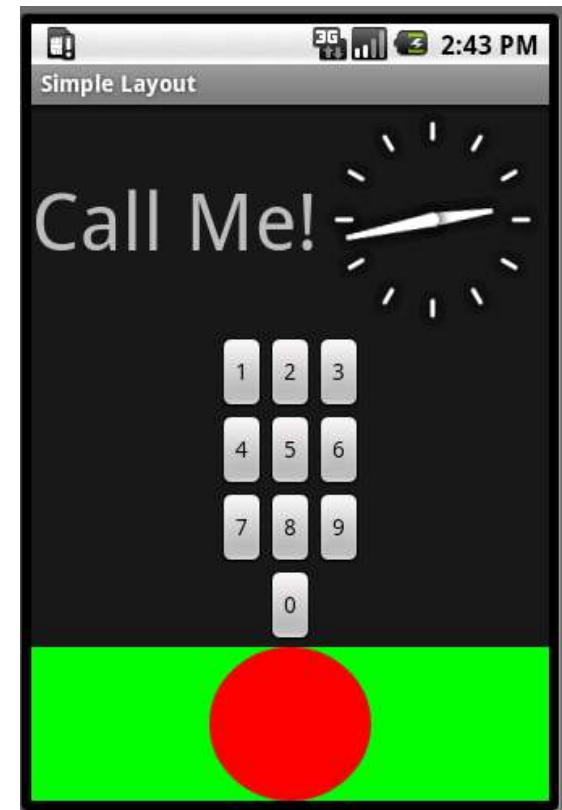
```
<TableLayout
  android:id="@+id/TableLayout01"
  xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_width="fill_parent"
  android:layout_height="fill_parent"
  android:stretchColumns="*" android:gravity="center_vertical">
  <TableRow
    android:id="@+id/TableRow01"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent">
    <Button
      android:id="@+id/Button01"
      android:text="1"></Button>
    <Button
      android:id="@+id/Button02"
      android:text="2"></Button>
    <Button
      android:id="@+id/Button03"
      android:text="3"></Button>
  </TableRow>
  <TableRow
    android:id="@+id/TableRow02"
    android:layout_height="wrap_content"
    android:layout_width="fill_parent">
    <Button
      android:id="@+id/Button04"
      android:text="4"></Button>
    <Button
      android:id="@+id/Button05"
      android:text="5"></Button>
    <Button
      android:id="@+id/Button06"
      android:text="6"></Button>
  </TableRow>
```

```
<TableRow
  android:id="@+id/TableRow02"
  android:layout_height="wrap_content"
  android:layout_width="fill_parent">
  <Button
    android:id="@+id/Button07"
    android:text="7"></Button>
  <Button
    android:id="@+id/Button08"
    android:text="8"></Button>
  <Button
    android:id="@+id/Button09"
    android:text="9"></Button>
</TableRow>
<TableRow
  android:id="@+id/TableRow02"
  android:layout_height="wrap_content"
  android:layout_width="fill_parent">
  <Button
    android:id="@+id/Button00"
    android:text="0"
    android:layout_column="1"></Button>
</TableRow>
</TableLayout>
```



Layout : MultipleLayout

```
<LinearLayout
  xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_width="fill_parent"
  android:orientation="vertical"
  android:layout_height="fill_parent">
  <LinearLayout
    android:id="@+id/LinearLayout01"
    android:orientation="horizontal"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content">
    <TextView
      android:id="@+id/TextView01"
      android:layout_height="wrap_content"
      android:text="Call Me!"
      android:textSize="22pt"
      android:layout_width="wrap_content"
      android:layout_gravity="center_vertical"></TextView>
    <AnalogClock
      android:id="@+id/AnalogClock01"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"></AnalogClock>
  </LinearLayout>
  <TableLayout
    android:id="@+id/TableLayout01"
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:gravity="center_vertical"
    android:layout_height="wrap_content"
    android:layout_gravity="center_horizontal"
    android:layout_width="wrap_content">
    <TableRow
      android:id="@+id/TableRow01"
      android:layout_width="fill_parent"
      android:layout_height="fill_parent">
      <Button
        android:id="@+id/Button01"
        android:text="1"></Button>
      <Button
        android:id="@+id/Button02"
        android:text="2"></Button>
      <Button
        android:id="@+id/Button03"
        android:text="3"></Button>
    </TableRow>
```



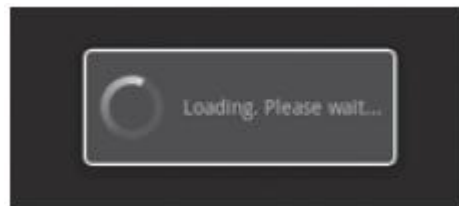
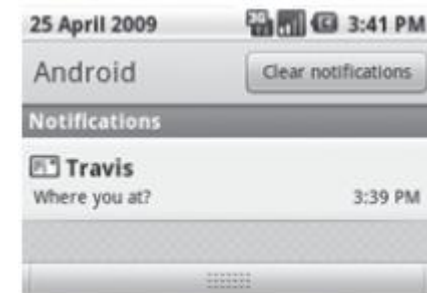
Layout

```
<</TableLayout>
<FrameLayout
  android:id="@+id/FrameLayout01"
  android:layout_height="wrap_content"
  xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_gravity="center"
  android:layout_width="fill_parent">
  <ImageView
    android:id="@+id/ImageView01"
    android:src="@drawable/green_rect"
    android:minHeight="200px"
    android:minWidth="200px"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"></ImageView>
  <ImageView
    android:id="@+id/ImageView02"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:src="@drawable/red_oval"
    android:minHeight="100px"
    android:minWidth="100px"
    android:layout_gravity="center"></ImageView>
</FrameLayout>
</LinearLayout>
```

사용자에게 통보하기

❖ Notification의 종류

- ✓ 토스트 노티피케이션(Toast Notification)
 - 백그라운드로부터 오는 짧은 메시지를 위한 것.
- ✓ 상태바 노티피케이션(Status Bar Notification)
 - 백그라운드로부터 와서 사용자에게 응답 요청을 지속적으로 상기reminder시키기 위한 것.
- ✓ 다이얼로그 노티피케이션(Dialog Notification)
 - 액티비티와 관련된 노티피케이션



사용자에게 통보하기

❖ Toast Notification

✓ 기본 구현 방법

```
Context context = getApplicationContext();  
CharSequence text = "Hello toast!";  
int duration = Toast.LENGTH_SHORT;  
Toast toast = Toast.makeText(context, text, duration);  
toast.show();
```

✓ 위치 지정하기

```
toast.setGravity(Gravity.TOP|Gravity.LEFT, 0, 0);
```

사용자에게 통보하기

❖ Custom Toast Notification 생성하기

✓ Icon 있는 Toast 생성하기



```
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/toast_layout_root"
    android:orientation="horizontal"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:padding="10dp"
    android:background="#DAAA" >
    <ImageView android:id="@+id/image"
        android:layout_width="wrap_content"
        android:layout_height="fill_parent"
        android:layout_marginRight="10dp"
        />
    <TextView android:id="@+id/text"
        android:layout_width="wrap_content"
        android:layout_height="fill_parent"
        android:textColor="#FFF"
        />
</LinearLayout>
```

```
LayoutInflater inflater = getLayoutInflater();
View layout = inflater.inflate(R.layout.toast_layout,
    (ViewGroup) findViewById(R.id.toast_layout_root));

ImageView image = (ImageView) layout.findViewById(R.id.image);
image.setImageResource(R.drawable.android);
TextView text = (TextView) layout.findViewById(R.id.text);
text.setText("Hello! This is a custom toast!");

Toast toast = new Toast(getApplicationContext());
toast.setGravity(Gravity.CENTER_VERTICAL, 0, 0);
toast.setDuration(Toast.LENGTH_LONG);
toast.setView(layout);
toast.show();
```

사용자에게 통보하기

❖ Status Bar Notification 구현하기

- ✓ 상태바 noti피케이션의 구현전 설계
 - 상태 바에 대한 아이콘.
 - 확장 뷰에 대한 타이틀과 확장 메시지(만약 여러분이 커스텀 확장 뷰를 정의하지 않는다면).
 - noti피케이션이 선택될 때 일어나도록 하기 위한 PendingIntent.
- ✓ 상태바 noti피케이션에 대한 선택적인 설정
 - 상태바에 대한 조회 텍스트(ticker-text) 메시지
 - 경보 사운드
 - 진동 설정
 - 발광 LED 설정

사용자에게 통보하기

❖ Status Bar Notification 구현하기

- ✓ 시스템으로 부터 NotificationManager 획득

```
String ns = Context.NOTIFICATION_SERVICE;  
NotificationManager mNotificationManager = (NotificationManager) getSystemService(ns);
```

- ✓ Notification을 생성

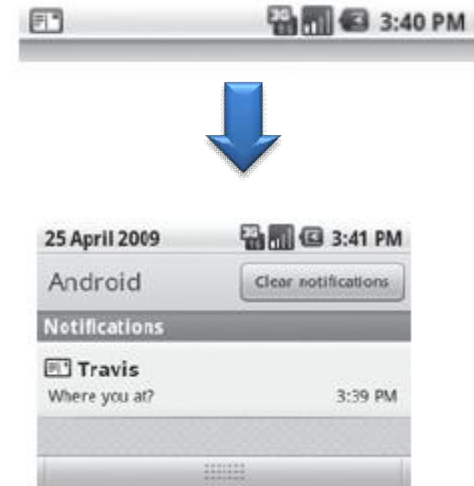
```
int icon = R.drawable.notification_icon;  
CharSequence tickerText = "Hello";  
long when = System.currentTimeMillis();  
Notification notification = new Notification(icon, tickerText, when);
```

- ✓ 확장 메시지와 Intent를 정의하라

```
Context context = getApplicationContext();  
CharSequence contentTitle = "My notification";  
CharSequence contentText = "Hello World!";  
Intent notificationIntent = new Intent(this, MyClass.class);  
PendingIntent contentIntent = PendingIntent.getActivity(this, 0, notificationIntent, 0);  
notification.setLatestEventInfo(context, contentTitle, contentText, contentIntent);
```

- ✓ Notification 전달

```
private static final int HELLO_ID = 1;  
mNotificationManager.notify(HELLO_ID, notification);
```



사용자에게 통보하기

❖ Status Bar Notification 구현확장

✓ Sound를 추가하기

— default를 확장

```
notification.defaults |= Notification.DEFAULT_SOUND;
```

— SD카드의 사운드를 지정

```
notification.sound = Uri.parse("file:///sdcard/notification/ringer.mp3");
```

— mediaStore 콘텐츠 프로바이더에서 지정

```
notification.sound = Uri.withAppendedPath(Audio.Media.INTERNAL_CONTENT_URI, "6");
```

✓ 진동을 추가하기

```
long[] vibrate = {0,100,200,300};  
notification.vibrate = vibrate;
```

사용자에게 통보하기

❖ Status Bar Notification 구현확장

- ✓ Flashing Lights를 추가하기

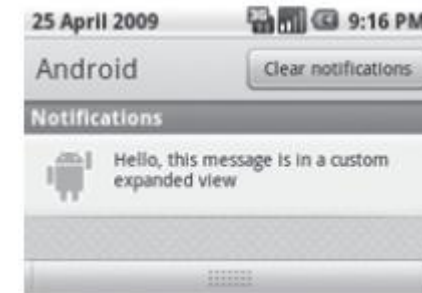
```
notification.defaults |= Notification.DEFAULT_LIGHTS;  
  
notification.ledARGB = 0xff00ff00;  
notification.ledOnMS = 300;  
notification.ledOffMS = 1000;  
notification.flags |= Notification.FLAG_SHOW_LIGHTS;
```

사용자에게 통보하기

❖ Status Bar Notification 구현확장

✓ Custom View로 확장하기

```
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="horizontal"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:padding="3dp"
    >
    <ImageView android:id="@+id/image"
        android:layout_width="wrap_content"
        android:layout_height="fill_parent"
        android:layout_marginRight="10dp" />
    <TextView android:id="@+id/text"
        android:layout_width="wrap_content" android:layout_height="fill_parent"
        android:textColor="#000"
        />
</LinearLayout>
```



✓ RemoteView로 설정

```
RemoteViews contentView = new RemoteViews(getPackageName(),
R.layout.custom_notification_layout);
contentView.setImageViewResource(R.id.image,
R.drawable.notification_image);
contentView.setTextViewText(R.id.text, "Hello, this message is in a custom expanded view");
notification.contentView = contentView;
```

사용자에게 통보하기

❖ Status Bar Notification 구현확장

✓ Intent 설정

```
Intent notificationIntent = new Intent(this, MyClass.class);  
PendingIntent contentIntent = PendingIntent.getActivity(this, 0, notificationIntent, 0);  
notification.contentIntent = contentIntent;
```