Basic UI Operation

Android Activity

- Interact with users
- Present a visual user interface
- The visual content of the window is provided by a hierarchy of views
- Activity excuted in foreground
- An application might contains one or several activities
- Class Activity

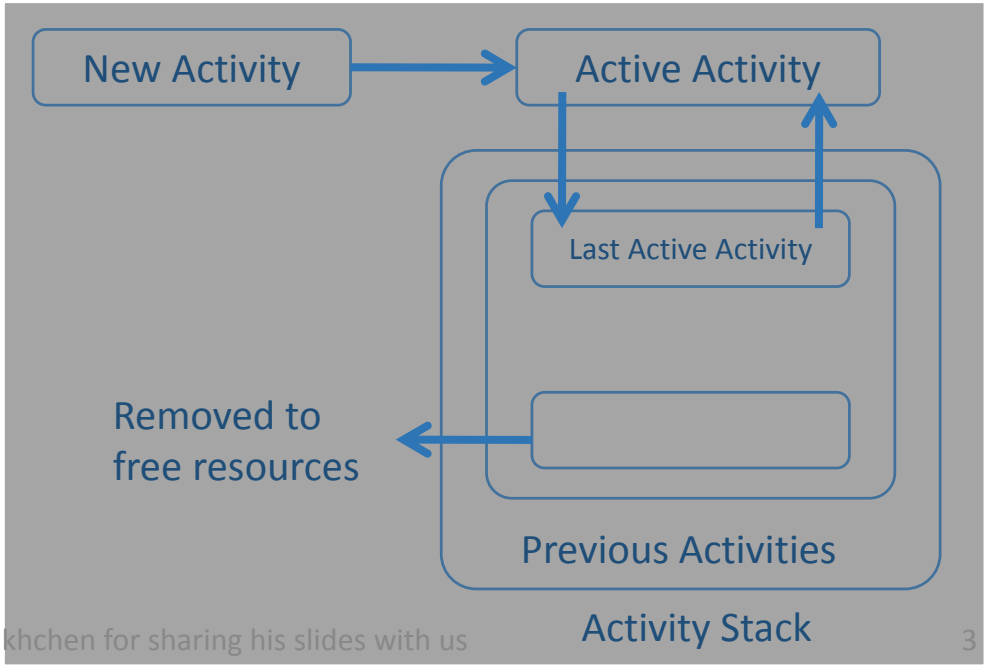
```
package tw.nthu.cs241001.helloandroid;

import android.app.Activity;
import android.os.Bundle;
import android.widget.TextView;


public class HelloAndroid extends Activity {
    /** Called when the activity is first created. */
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
    }
}
```

The class you create for your application to take care of creating window must extend Activity

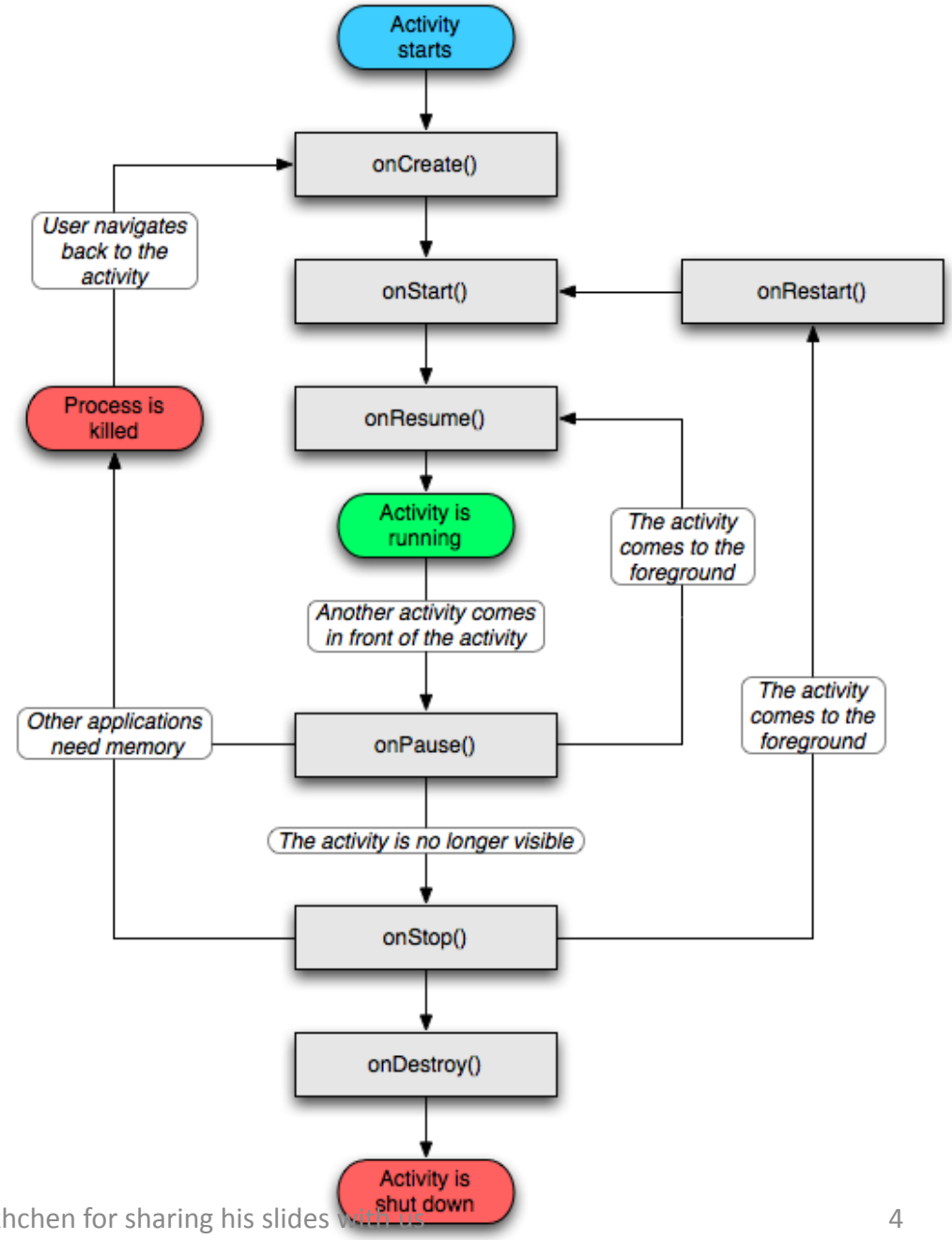
You place your UI with setContentView(View)

Activity Life Cycle

- Activities in the system are managed as an *activity stack*. When a new activity is started, it is placed on the top of the stack and becomes the running activity
- Active / running: activity in the foreground
- Pause: An activity has lost focus but is still visible
- Stopped: It's no longer visible but still retains all state and member information
- Finish / kill



Android Life Cycle



Application Components

- Activities
- Services
  - Doesn't have a visual user interface, but rather runs in the background for an indefinite period of time
- Content Provider
  - A shareable data store.
- Intents
  - A simple message-passing framework
- Broadcast Receivers
  - Receive and react to broadcast announcements
- Notifications
  - A user notification framework. Signal users without stealing focus or interrupting their current activities.
- http://developer.android.com/guide/topics/fundamentals.html

Application Manifest

- Every application must have an AndroidManifest.xml file
- Presents essential information about the application to the Android system
- Those components using in the application should be declare in Manifest

Application Manifest – Example

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="tw.nthu.cs241001"
    android:versionCode="1"
    android:versionName="1.0">
  <application android:icon="@drawable/icon" android:label="@string/app_name">
    <activity android:name=".IntentEx"
            android:label="@string/app_name">
      <intent-filter>
        <action android:name="android.intent.action.MAIN" />
        <category android:name="android.intent.category.LAUNCHER" />
      </intent-filter>
    </activity>
  </application>
</manifest>
```

The Java package for the application

Describe the application

Describe the components of the application: activity, intent

Example 1

Button

TextView

EditText

User Interface

- View
  - Represents the basic building block for user interface components
  - Occupies a rectangular area on the screen and is responsible for drawing and event handling
- Widget
  - A View object that serves as an interface for interaction with the user
  - buttons, checkboxes, and text-entry fields
- Layout
  - Define the layout for your views

Main.xml

- res → layout → main.xml
- The main layout of the application window
- Contain Layout and main.xml
  - Layout : a GUI to edit the component(View) layout
  - Main.xml : the .xml format of the layout

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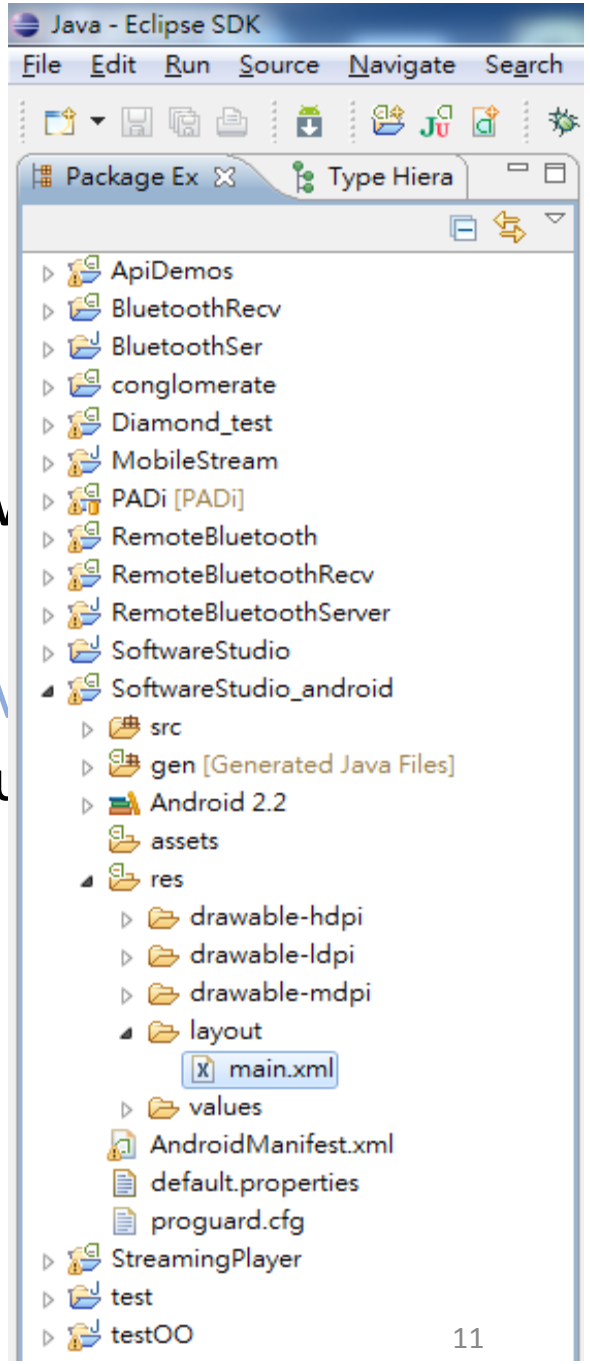


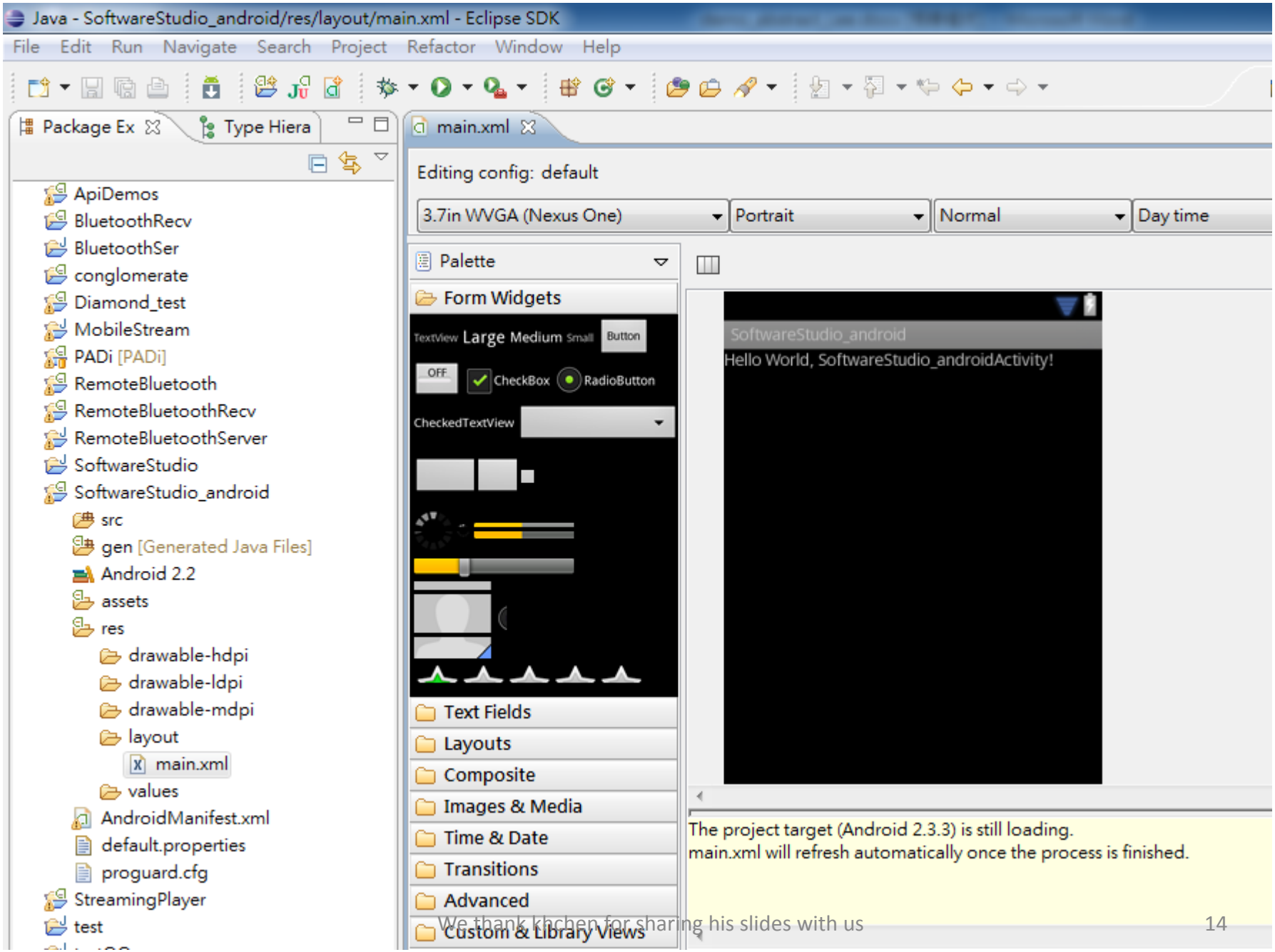
Layout

- Linear Layout(default)
  - Linearly set the View component
- Absolute Layout
  - Set the View component at where you put it
- Change layout to LinearLayout in Main.xml Layout
  - Select screen→ right click → remove
  - Select Layout → LinearLayout → Drop to the screen
  - Properties → ID → Change the Layout name

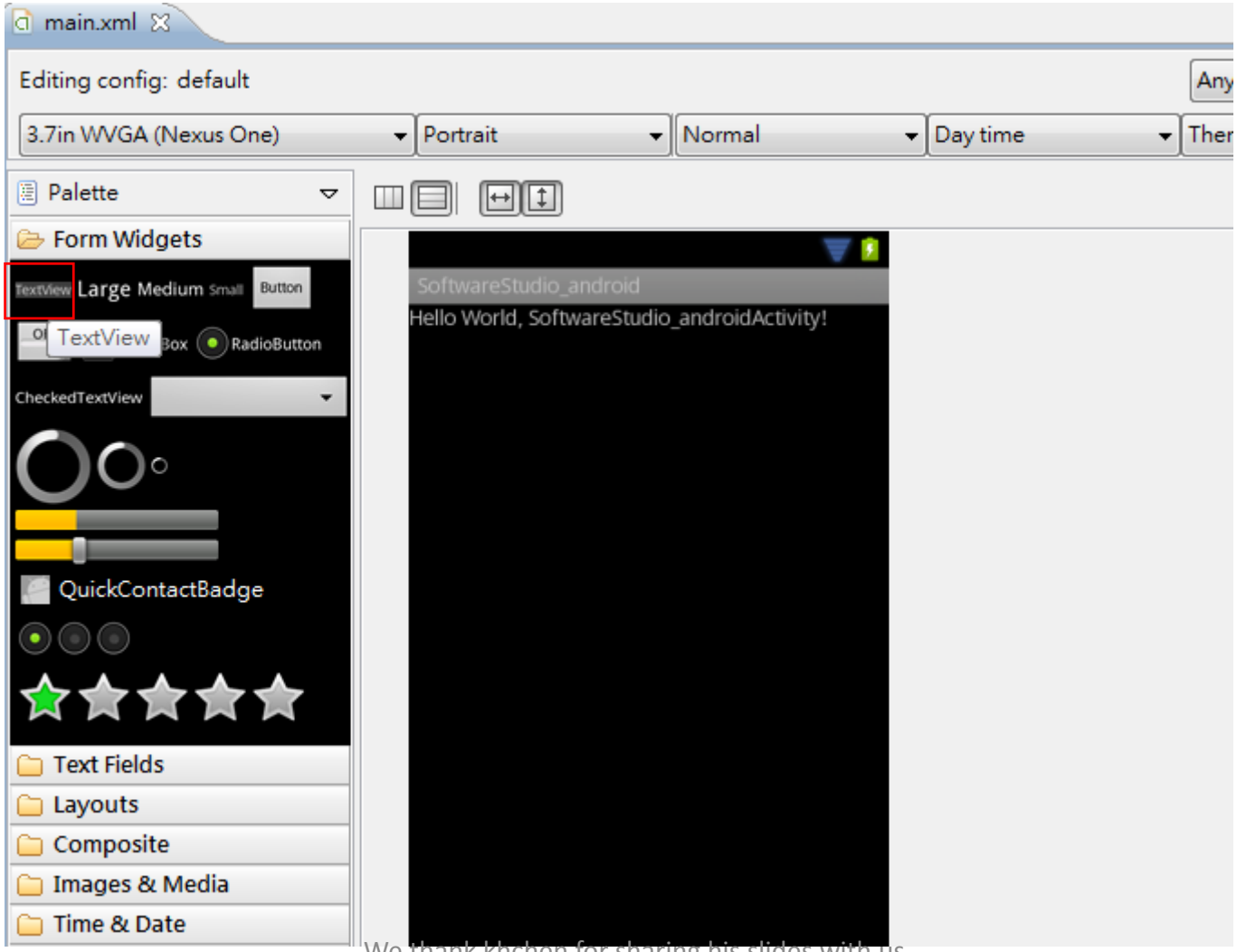
TextView

- In main.xml Layout → Select Views (Form Widgets)→ TextView → drop to the screen
- Properties→Property
  - right click → edit Id : Name of the TextView(also seen at right side of Eclipse→Layout)

    Do not remove keywords "@+id/"
  - right click → edit Text : the showing text of the text field
  - right click → Layout height / Layout width : the height/width of the text feild (unit : px or dip)
- API : setText(String)


Java - SoftwareStudio_android/res/layout/main.xml - Eclipse SDK
File Edit Run Navigate Search Project Refactor Window Help
Package Ex
Type Hiera
main.xml
Editing config: default
3.7in WVGA (Nexus One)
Portrait
Normal
Day time
Palette
Form Widgets
TextView Large Medium Small
Button
OFF
CheckBox
RadioButton
CheckedTextView
Text Fields
Layouts
Composite
Images & Media
Time & Date
Transitions
Advanced
Custom & Library Views
SoftwareStudio_android
Hello World, SoftwareStudio_androidActivity!
The project target (Android 2.3.3) is still loading.
main.xml will refresh automatically once the process is finished.
ApiDemos
BluetoothRecv
BluetoothSer
conglomerate
Diamond_test
MobileStream
PADi [PADi]
RemoteBluetooth
RemoteBluetoothRecv
RemoteBluetoothServer
SoftwareStudio
SoftwareStudio_android
src
gen [Generated Java Files]
Android 2.2
assets
res
drawable-hdpi
drawable-ldpi
drawable-mdpi
layout
main.xml
values
AndroidManifest.xml
default.properties
proguard.cfg
StreamingPlayer
test

- In main.xml Layout → Select Views → TextView → drop to the screen



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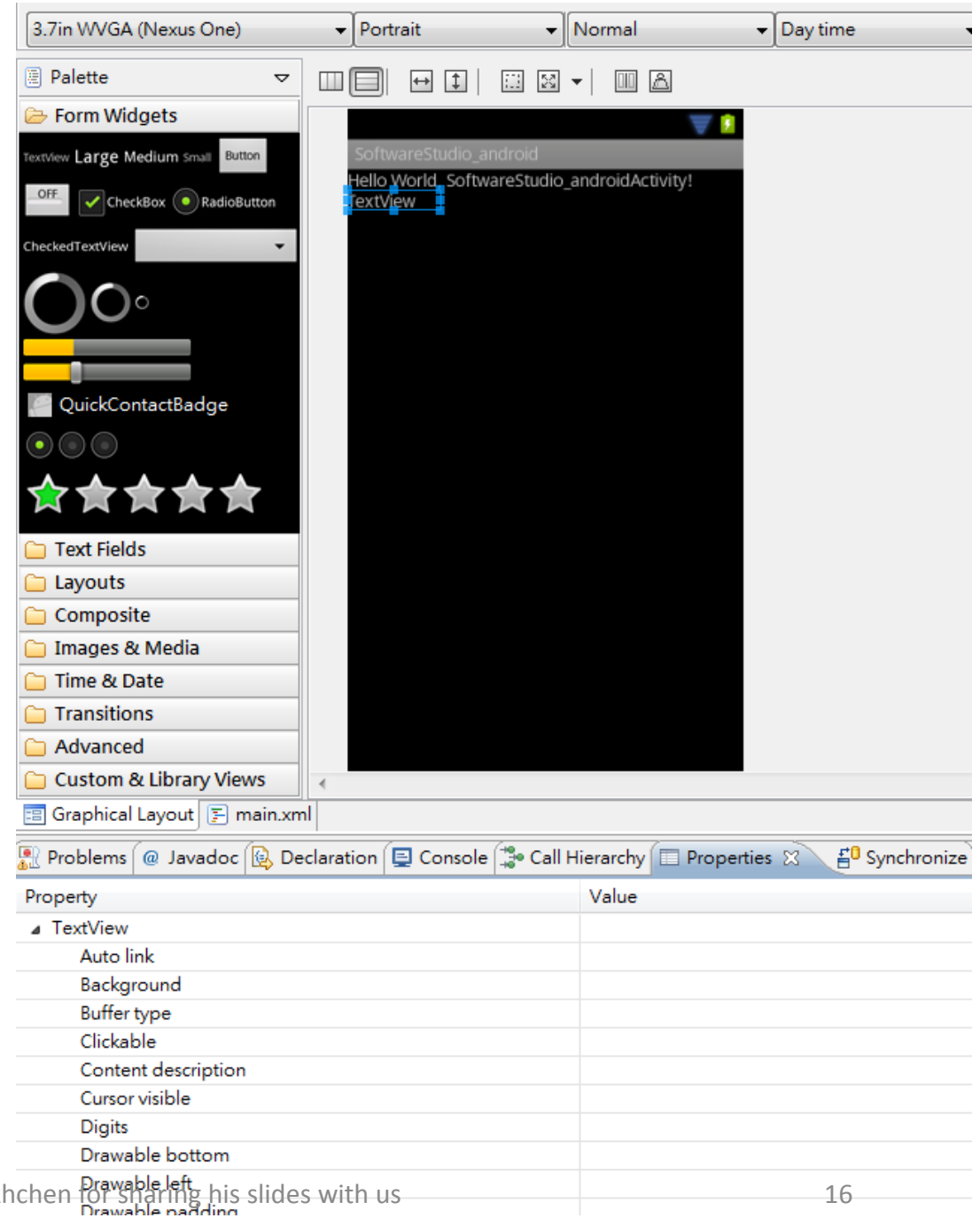

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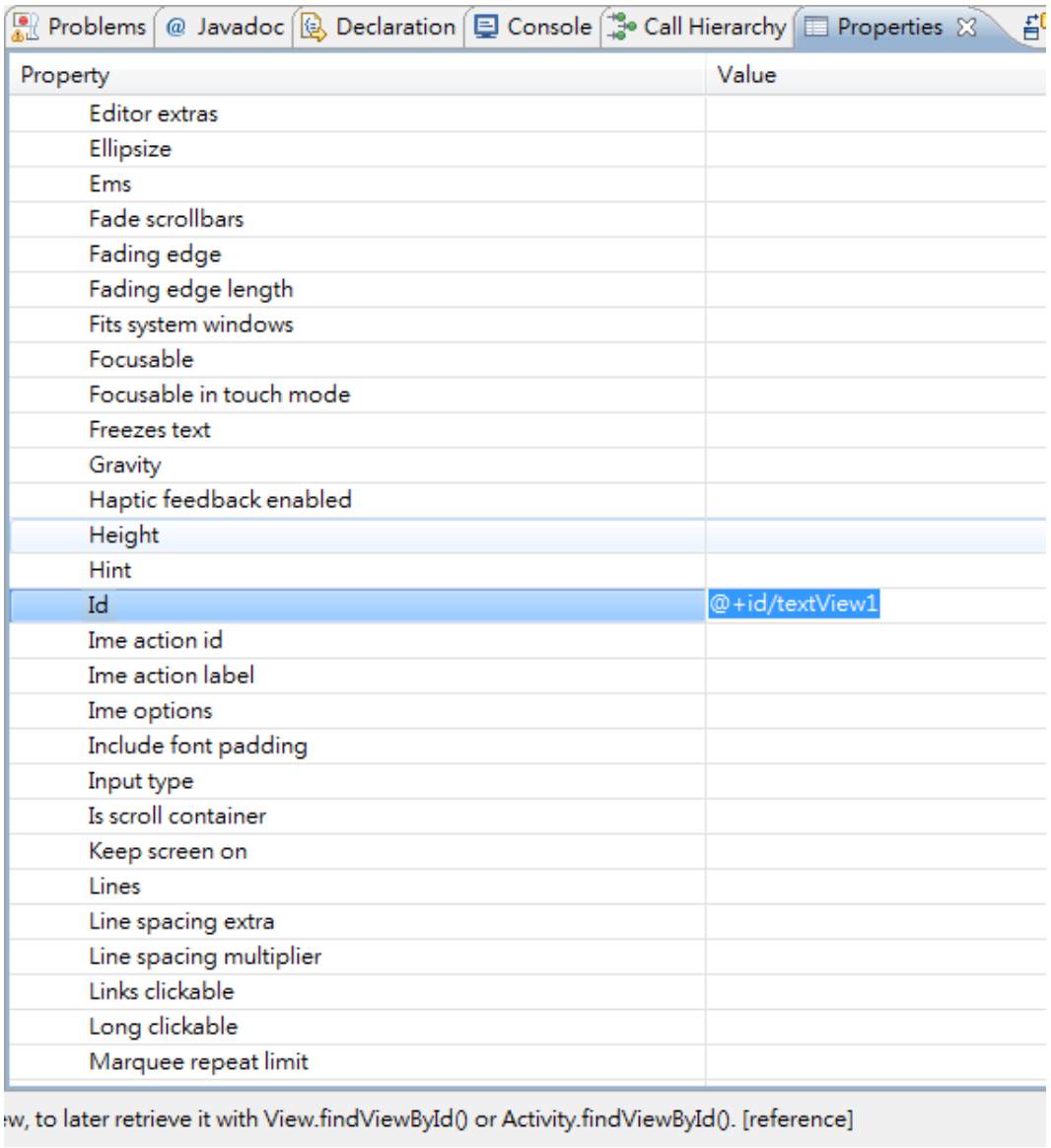
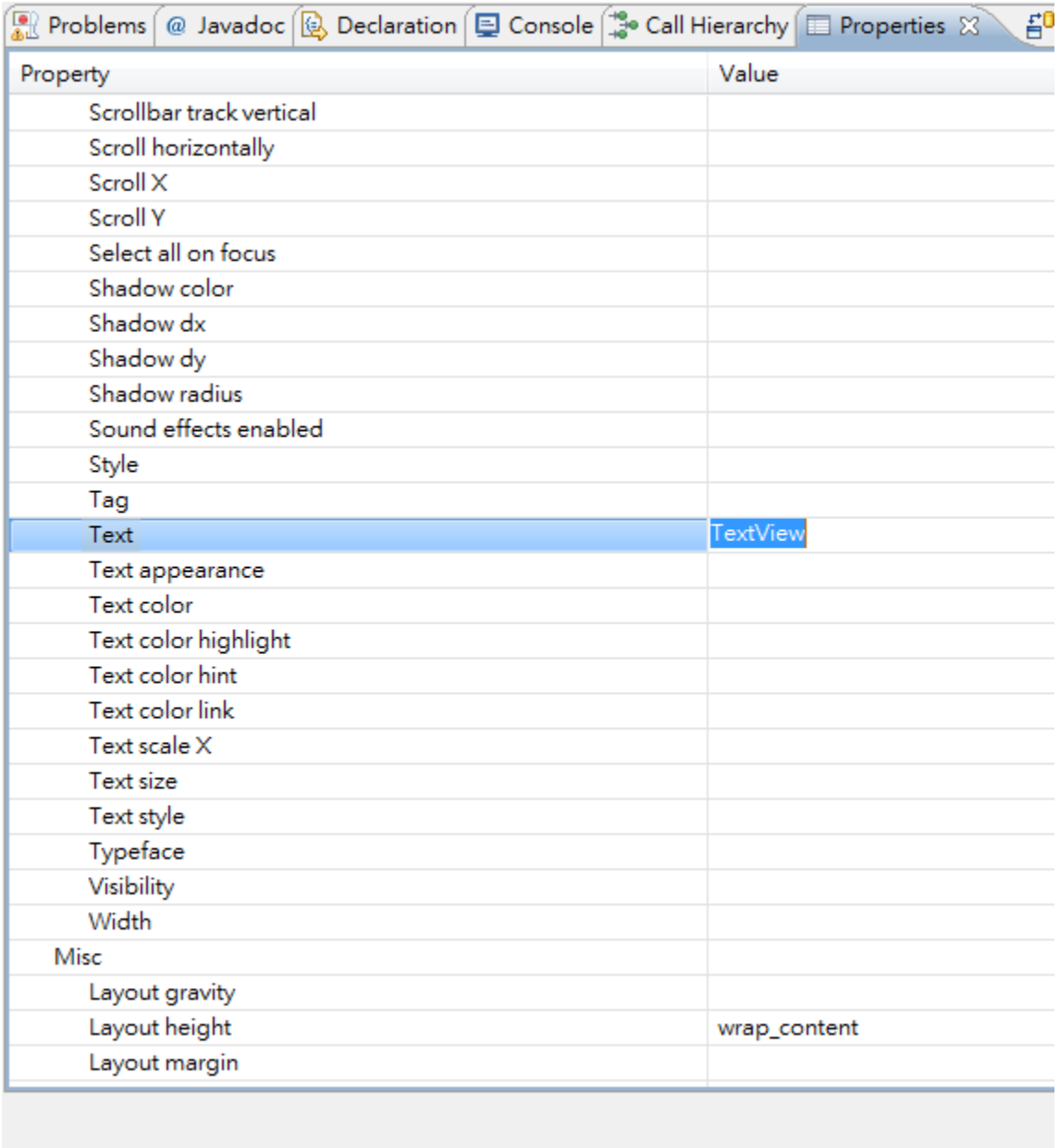
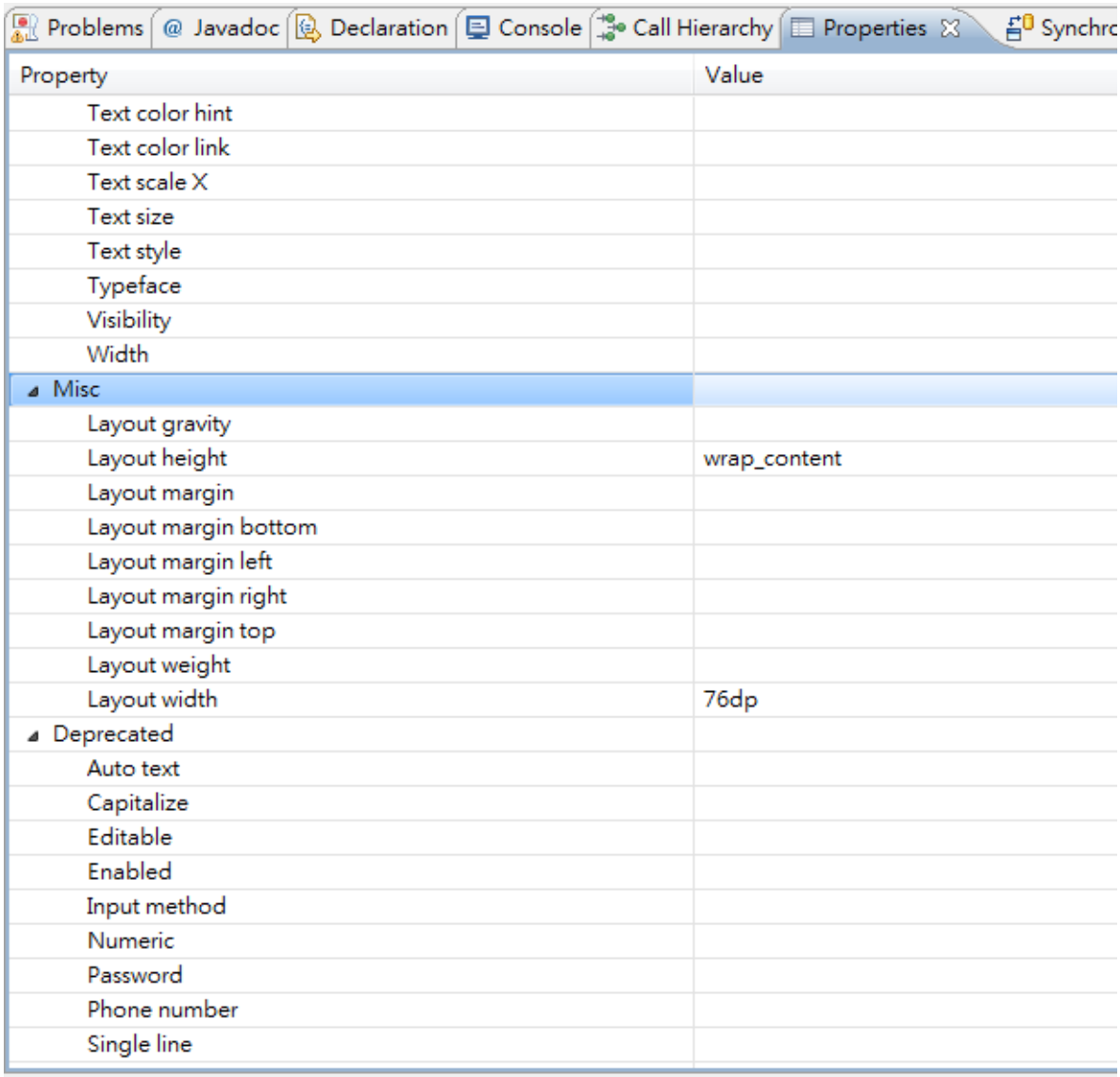


- TextView→ Text : the showing text of the text field



- Misc → Layout height / Layout width : the height/width of the text feild (unit : px or dip)



EditText

- A User edited Text field
- In main.xml Layout → Select Views → EditText → drop to the screen
- Properties→Property
  - EditText→Id : Name of the TextView(also seen at right side of Eclipse→Layout)
  - EditText → Text : the showing text of the text field
  - Misc → Layout height / Layout width : the height/width of the text feild
  - Misc → Layout height / Layout width : the height/width of the text feild (unit : px or dip)
  - Misc → Layout x / Layout y : the position of the EditText (unit : px or dip)
- API : getText(String)

Button

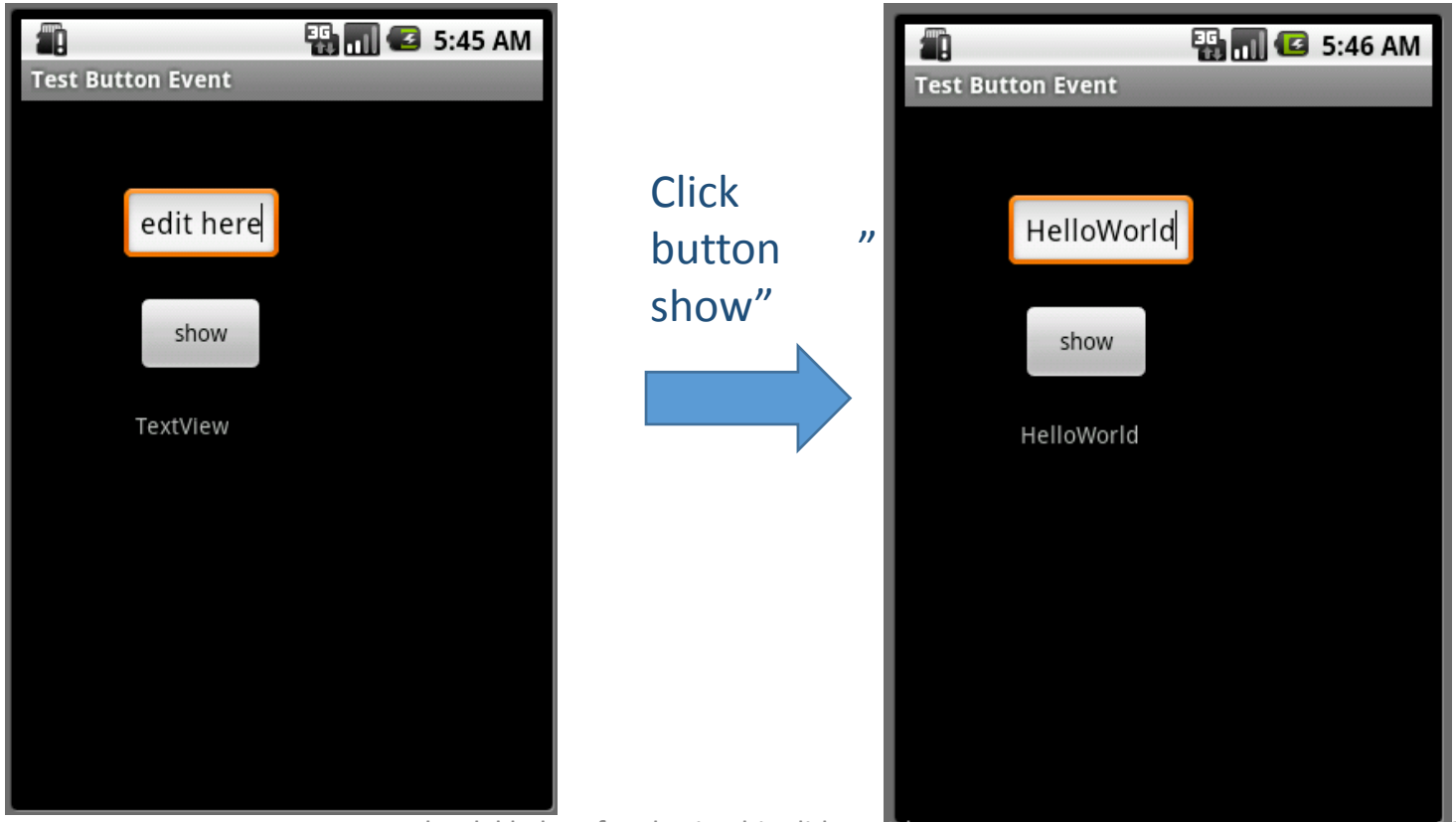
- In main.xml Layout → Select Views → Button → drop to the screen
- Properties→Property
  - Button→Id : Name of the TextView(also seen at right side of Eclipse→Layout)
  - Button → Text : the showing text of the text field
  - Misc → Layout height / Layout width : the height/width of the button
  - Misc → Layout height / Layout width : the height/width of the button (unit : px or dip)
  - Misc → Layout x / Layout y : the position of the button(unit : px or dip)

Event Listener

- Event Listener : A way for a class to provide notifications when something of interesting happens.
- Class android.view. View.setOnClickListener
  - Interface definition for a callback to be invoked when a view is clicked.
  - Public void onClick(View v)
    - Called when a view has been clicked

Example – Button Click

- Click the Button and change the text of TextView



TestButtonEvent.java

```
package tw.nthu.cs241001.examples;

import android.app.Activity;
import android.os.Bundle;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;

public class labhello extends Activity {
   public Button myButton;
   public TextView myText;
   public EditText myEdit;
```

```
@Override
  public void onCreate(Bundle savedInstanceState) {
     super.onCreate(savedInstanceState);
     setContentView(R.layout.main);
     // get Views generated by main.xml layout
     myButton = (Button)findViewById(R.id.RButton);
     myText = (TextView)findViewById(R.id.RText);
     myEdit= (EditText)findViewById(R.id.REdit);
     //set onClickListerner
     myButton.setOnClickListener(event);
  }

  private OnClickListener event = new OnClickListener(){
    public void onClick(View v){
       String str= myEdit.getText().toString();
       myText.setText(str);
     }
  };
}
```

Main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<AbsoluteLayout
        android:id="@+id/AbsoluteLayout01"
        android:layout_width="fill_parent"
        android:layout_height="fill_parent"
        xmlns:android="http://schemas.android.com/apk/res/android">
<EditText
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/REdit"
        android:layout_y="53dip"
        android:layout_x="63dip"
        android:text="edit here">
</EditText>
```

```
<Button
        android:id="@+id/RButton"
        android:layout_height="50dip"
        android:layout_width="80dip"
        android:text="show"
        android:layout_y="120dip"
        android:layout_x="70dip">
</Button>
<TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/RText"
        android:layout_y="190dip"
        android:layout_x="70dip"
        android:text="TextView">
</TextView>
</AbsoluteLayout>
```

Find API By Yourself!!

- Android API reference
  - http://developer.android.com/reference/packages.html
- View API
  - http://developer.android.com/reference/android/view/View.html

Example2

Menu

Toast

Menu

- A button “Menu” as a shortcut of opening menu list.
- Design menu items and its function to manage application.
- API reference

  http://developer.android.com/intl/zh-TW/reference/android/view/Menu.html


Menu
Shortcut
button
8:37 AM
Google
Messaging
Phone
Contacts
Browser
MENU
ALT
SYM
ALT

Design Menu – Data Structure

- public interface Menu
  - Data type of Menu component
- public interface MenuItem
  - Data type of Menu items

Design Menu - API

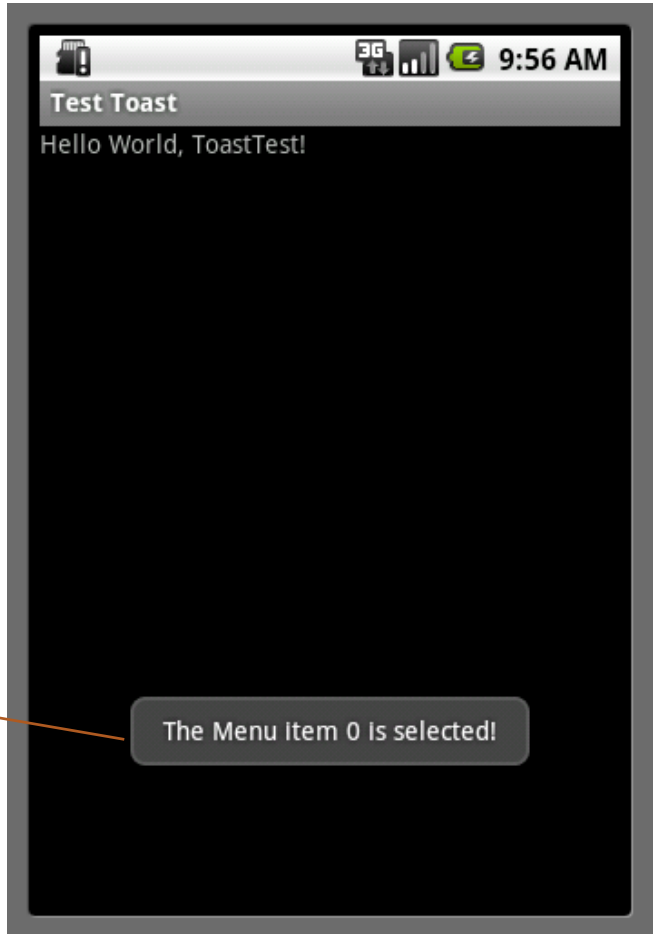
- Create Menu
  - public boolean onCreateOptionsMenu (Menu menu)
- Add item
  - public abstract MenuItem add(int groupId, int itemId, int order, CharSequence title)
    - groupId : The group identifier that this item should be part of
    - itemId : Unique item ID
    - order : The order for the item
    - Title : The text to display for the item

Design Menu – API(2)

- Listen to menu item selected
  - This hook is called whenever an item in your options menu is selected
  - public boolean onOptionsItemSelected (MenuItem item)
- Listen to menu closed
  - public void onOptionsMenuClosed (Menu menu)
  - This hook is called whenever the options menu is being closed (either by the user canceling the menu with the back/menu button, or when an item is selected).
- Get selected item id
  - abstract int getItemId()

Toast

- Show message box on the screen
- import android.widget.Toast;



Toast Message

Toast API

- public static Toast makeText (Context context, CharSequence text, int duration)
  - context : the context to use. Usually your Application or Activity object.
  - text : the text to show.
  - duration : How long to display the message. Either LENGTH_SHORT or LENGTH_LONG
    - LENTH_LONG
      - Show the view or text notification for a long period of time. This time could be user-definable
      - public void setDuration(int duration)
- public void show()
  - Show the view for the specified duration.

Example

- Create Menu with two items
- Select ShowMessage to show toast
- Select quit to finish activity

Example

```
package tw.nthu.cs241001.examples;
import android.app.Activity;
import android.os.Bundle;
import android.view.Menu;
import android.view.MenuItem;
import android.widget.Toast;

public class ToastTest extends Activity {
    /** Called when the activity is first created. */
    @Override
    public void onCreate(Bundle savedInstanceState) {
            super.onCreate(savedInstanceState);
            setContentView(R.layout.main);
    }
    public boolean onCreateOptionsMenu(Menu menu)
    {
            menu.add( 0,0,0 ,"ShowMessage");
```

```
public boolean onOptionsItemSelected(MenuItem item)
{
   // get selected item
   super.onOptionsItemSelected(item);
   // get selected item id and do the specify function
    switch(item.getItemId())
   {
       case 0:
            // show toast message
                Toast.makeText(
                            this,
                            "The Menu item 0 is selected!",
                            Toast.LENGTH_LONG).show() ;
                break;

        case 1:
                 // finish ap at quit select
                 finish();
        break;
      }
       return true;
}
}// end class ToastTest
```

Android Lab2

Lab2

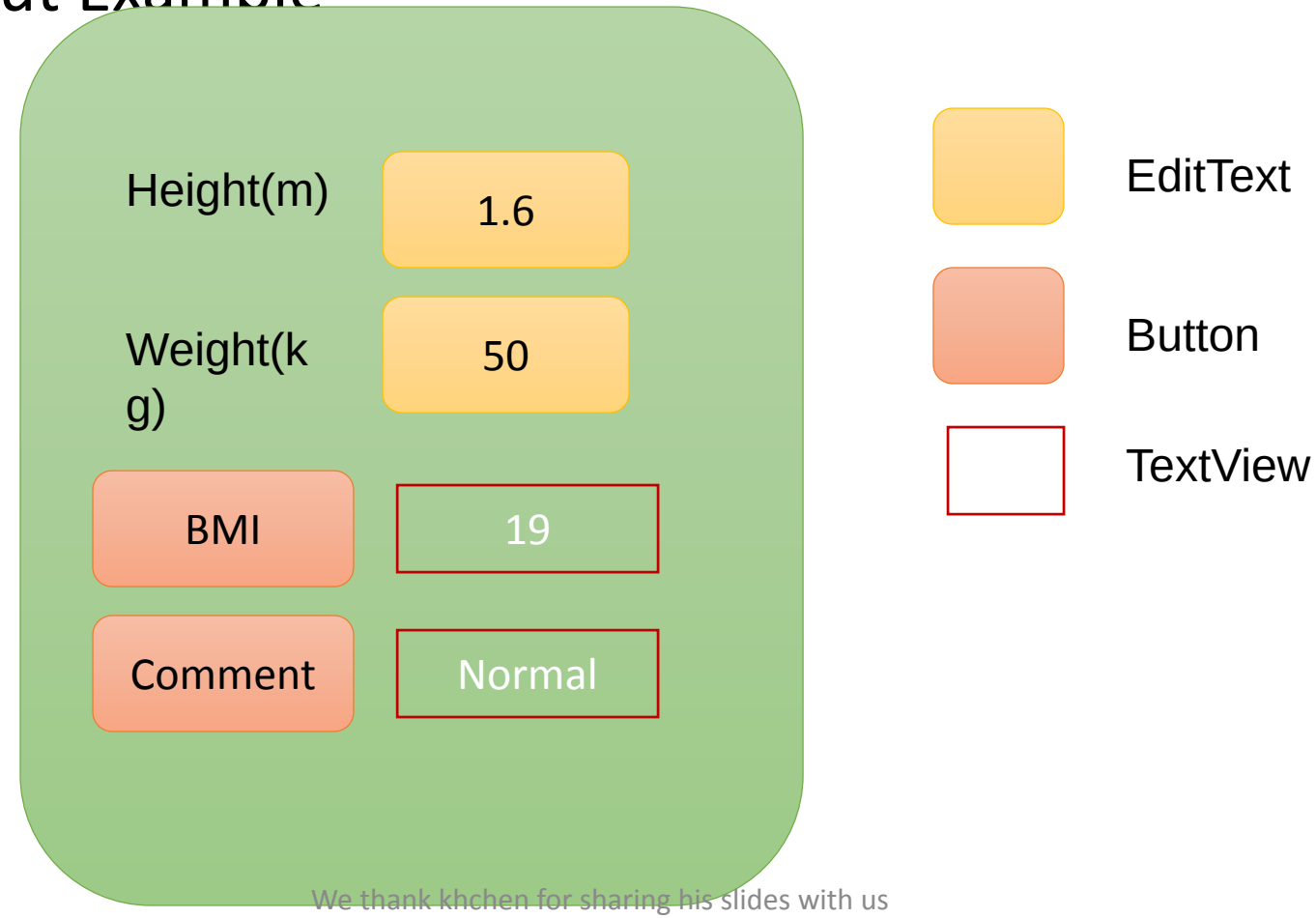
- BMI counting
  - User input height and weight, counting the BMI value and show the comment.
- Press “BMI” button to show the counting result.
  - BMI = weight(kg) / height^2(m^2)
- Press “Comment” button to show the comment
  - BMI < 18 : too light
  - 18 ≦ BMI ＜ 24 : normal
  - BMI ≧ 24 : too heavy

Lab Requirement

- Basic Requirement
  - Two Button : BMI , Comment
  - Two EditText : User enter field for height and weight
  - Two TextView : One to show the BMI value and the other show the comment

Lab Requirement

- Layout Example



Useful Method

- *String CharSequence.toString()*
  - Parsing CharSwquence to String
  - Eg. TextView.getText().toString
- int Integer.*parseInt(* string str *)*
  - Parsing string to integer
- String Integer.*toString(Interger integer)*
  - Parsing ineteger to string

Useful Method

- *String CharSequence.toString()*
  - Parsing CharSwquence to String
  - Eg. TextView.getText().toString
- float Float.*parseFloat(* string str *)*
  - Parsing string to float
- String *Float.toString(Float fp)*
  - Parsing float to string