COMP4521 EMBEDDED SYSTEMS SOFTWARE

LAB 2: CREATING AN APPLICATION WITH MULTIPLE ACTIVITIES AND A SIMPLE MENU USING LISTVIEW

INTRODUCTION

We already got familiar with the development environment of Android and implemented our first simple applications on Android in the last lab. Today, we will extend the COMP 4521 application further, in the process learning about new features of the Android platform. We will make use of the functions offered by Android to build applications with multiple activities, and how we can launch another activity from the current activity. Then we will learn how to create a menu in the application.

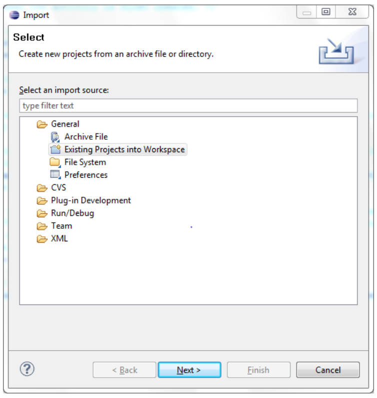
OBJECTIVES

- Launch a new activity from the current activity using an Intent
- Use the OnClick() listener to handle UI events
- Create a menu using ListView and populate it with items
- Learn to how use Toast to display short messages on the screen.

IMPLEMENT AN APPLICATION WITH MULTIPLE ACTIVITIES AND LAUNCH AN ACTIVITY FROM THE CURRENT ACTIVITY

1. Download CourseInfo4521.zip from the course website, and extract it to the workspace of Eclipse, e.g., D:\temp. The zip file contains the final result of Lab 1, except that the application name and class name have been modified.
2. Locate the SDK of Android for Eclipse. In Eclipse folder, run eclipse.bat, set your workspace to D:\Temp, click **Window**-> **Preferences**-> **Android**, and choose the SDK location (must be D:\comp4521\android-sdk-windows) as where you have put the Android SDK.
3. Create an Android Virtual Device (AVD).
4. **Import an existing project**: In Eclipse, click **File**-> **Import** -> **General -> Existing Projects into Workspace**. Find the location of the root directory of CourseInfo4521, and press

Finish. Make sure that after importing the project, Eclipse gives no warnings. If there are warnings or errors in the project, right click on the project directory in Eclipse, try **Android Tools**-> **Fix Project Properties** to fix the error.



Select

Create new projects from an archive file or directory.

5. The following steps will create a startup screen for the program. First we create new strings necessary for the application. In **/res/values/strings.xml**, add two new strings, using the existing strings as example. The first string is named as “clickprompt”, with its content “Please click to continue …”. This strings serves as a hint for the users. The second string is named as “menu”, with its content “Main Menu Screen”. It serves as the title of the menu screen.

6. Add a TextView for the hint in the welcome layout. Open **/res/layout/welcome.xml**, add a TextView in the <LinearLayout> body, just below the “Semester” Textview. The description of the new TextView is shown below:

```
<TextView
android:layout_width="fill_parent"
android:layout_height="wrap_content"
android:text="@string/clickprompt"
android:gravity="center_vertical|center_horizontal"
android:textColor="#aaaaaa"
android:textSize="8pt"
/>
```

7. Create a new layout. In **/res/layout**, create a file named “menu.xml”. This file will describe the layout for the second activity in this application. The content of this file is as follows:

```
<?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"
   android:background="@color/ustblue"
   >
  <LinearLayout
   android:orientation="vertical"
   android:layout_width="fill_parent"
   android:layout_height="fill_parent"
   android:layout_weight="1">
```

```
        <TextView
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text="@string/CourseCode"
        android:gravity="center_vertical|center_horizontal"
        android:textColor="@color/ustblue"
        android:background="@android:color/white"
        android:textSize="6pt"
        android:textStyle="bold"/>

        <TextView
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text="@string/CourseTitle"
        android:gravity="center_vertical|center_horizontal"
        android:background="@android:color/white"
        android:textColor="@color/ustblue"
        android:textSize="6pt"
        android:textStyle="bold"/>

        <TextView
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text="@string/menu"
        android:gravity="center_vertical|center_horizontal"
        android:textColor="@android:color/white"
        android:textSize="12pt"
        />

    </LinearLayout>
         <ImageView
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:gravity="center_vertical|center_horizontal"
        android:src="@drawable/cse_logo"
        android:maxHeight="10px"
        android:background="@android:color/white"
        />
    </LinearLayout>
```

8. Add the source code for the new layout. In **/src/ hkust.comp4521.courseinfo**, right click on welcome.java, select **copy**. Then right click on **/src/ hkust.comp4521.courseinfo**, select **paste**. Name the copy as **menu**. This will create a copy of welcome.java named menu.java. The class name in this menu.java is automatically changed to *menu*. We only need to change the layout referred to in `setContentView()` to `R.layout.menu`. This menu.java will create a view according to layout described in `menu.xml` when executed.
9. Add an event in the main activity to jump from the welcome screen to the menu screen. Modify the content of welcome.java with following code. Please read the comments in the code to understand the function of each step[1].

```
package hkust.comp4521.courseinfo;

import android.app.Activity;
```

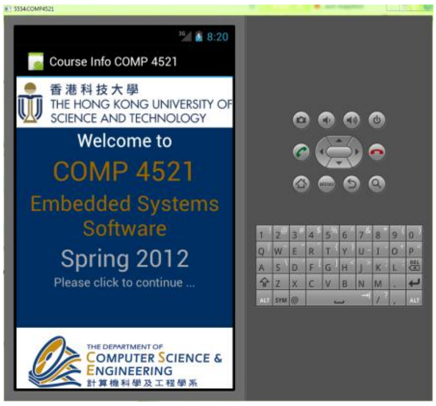
[1] Tip: in Eclipse, you can press Ctrl+Shift+F to automatically format the code so as to make it clear and easy to read.

```
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.LinearLayout;

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

        // Find the reference to the Welcome screen by using its ID
        LinearLayout screen = (LinearLayout) findViewById(R.id.WelcomeScreen);

        // Create an OnClick listener so that when the user touches the screen (clicks)
the Menu activity is created
        screen.setOnClickListener(new View.OnClickListener() {

            @Override
            public void onClick(View v) {
            // Create the Activity corresponding to the Menu screen
                startActivity(new Intent(welcome.this,menu.class));
            }
        });
    }
}
```

10. Create an Activity for the new layout in **AndroidManifest.xml**. **AndroidManifest.xml** is a very important file that is necessary for every Android project, recording some important configurations. In this special case, we cannot trigger any layouts in the application unless it is registered in **AndroidManifest.xml.** Open **AndroidManifest.xml**, add a new Activity in <application> body for menu. The description of this activity is as follows:

```
...
</activity>
<activity android:name=".menu"
        android:label="@string/app_name">
</activity>
...
```

11. Run the application. There will be two different activities in this application. The first screen is the image on the left below. If you click on anywhere on this screen, it will immediately switch to show the menu screen as shown in the image on the right below.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8:20
Course Info COMP 4521
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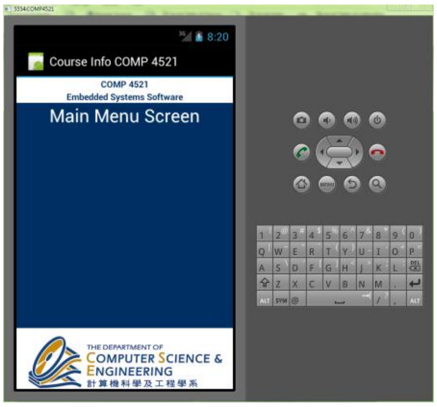


DESIGN A SIMPLE MENU

1. Add strings that are necessary for the menu. In **/res/values/strings.xml**, add a string array in the <resources> body. The description of the string array is as follows:

```
<string-array name="menu_items">
    <item>Contact Information</item>
    <item>Time Table</item>
    <item>Course Information</item>
    <item>Syllabus</item>
    <item>Lectures</item>
    <item>Labs</item>
    <item>Exams</item>
    <item>Project</item>
    <item>Links</item>
</string-array>
```

2. Modify the menu layout. In **/res/layout/menu.xml**, replace the TextView of the “menu” string which shows the text “Main Menu Screen” with a new object, a ListView. We use the ListView to display the strings we defined in the string array. The description of the ListView is as follows.

```
<ListView
android:id="@+id/ListView_menu"
android:layout_width="fill_parent"
android:layout_height="wrap_content"
android:gravity="center_vertical|center_horizontal"
>
</ListView>
```

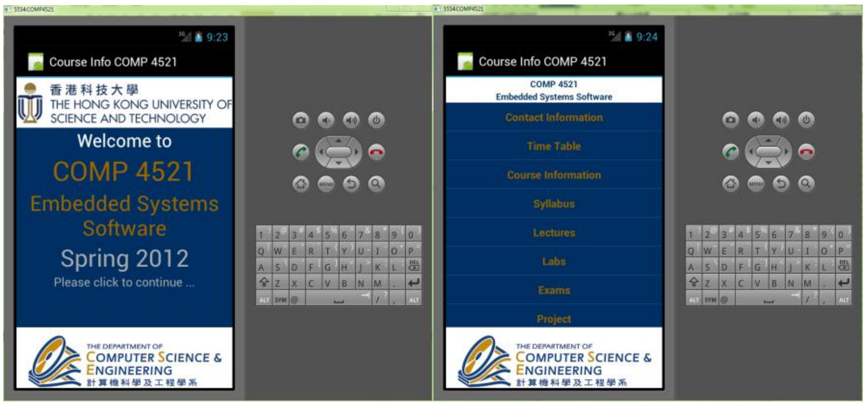
3. Define the layout of each element of the menu list. Create a new file list_item.xml in **/res/layout**. This file actually creates a TextView for the items in the list. The content of this file is as follows:

```
<?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:layout_gravity="center_horizontal"
  android:gravity="center_vertical|center_horizontal"
  android:text="test string"
  android:textColor="@color/ustgold"
  android:padding="10dp"
  android:textSize="16sp"
  android:textStyle="bold">
</TextView>
```

4. Define the onClick() action for each item in the menu list. Open **/src/hkust.comp4521.courseinfo/menu.java**. Modify the file with following code. Read the comments carefully.

```
package hkust.comp4521.courseinfo;

import hkust.comp4521.courseinfo.R;
import android.app.Activity;
import android.os.Bundle;
import android.view.View;
import android.widget.*;

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

          // Get the reference to the ListView item in the main.xml layout
          ListView menuList = (ListView) findViewById(R.id.ListView_menu);

          // Create an array of strings and populate it with the items from the
          // string array declared in strings.xml
          String[] items = getResources().getStringArray(R.array.menu_items);

          // Create an array adapter to create the menu with the list items being
          // laid out as per list_item.xml and the item names from the items[]
          // array created above
          ArrayAdapter<String> adapt = new ArrayAdapter<String>(this,
                    R.layout.list_item, items);
          menuList.setAdapter(adapt);

          // make the menu items actionable by declaring an onclick listener for
          // each of them.
          // Use "Toast" to display the name of the menu item for a short period
          // on the screen in a message box
          menuList.setOnItemClickListener(new AdapterView.OnItemClickListener() {
               public void onItemClick(AdapterView<?> parent, View itemClicked,
                         int position, long id) {
                    // When clicked, show a toast with the TextView text
                    Toast.makeText(getApplicationContext(),
                              ((TextView) itemClicked).getText(), Toast.LENGTH_SHORT)
                              .show();
               }
          });
     }
}
```

5. Run the application. There will be two different screens of this application. The first screen is as the left image below. After you click on any point of this screen, it will show the menu screen as the right image below.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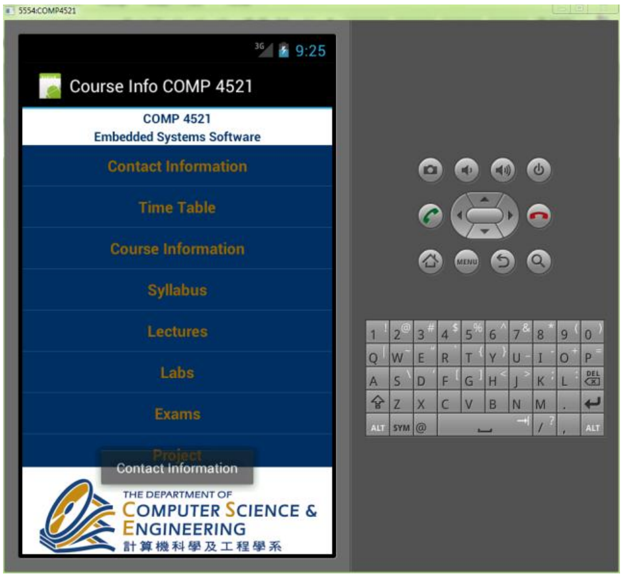
If you click on any of the menu items, it will pop out message box (a “toast”), displaying the name of the item. You can drag the menu with your mouse (for a real device, you can click on the screen and drag with your finger) to roll the menu up and down.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