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## Tutorial Week 3 – 31285 MAD

### 4%

### Part A:(aim to complete in class)

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#### Objectives:

- More layouts.
- Handle button events
- Learn how to use the debugger.

1. (5%) Create a new Android Studio project with the following characteristics:
  - Application name: Exercise 3
  - Package name: com.mad.exercise3
  - Min SDK: API15
  - Empty Activity
  - Activity name: MainActivity

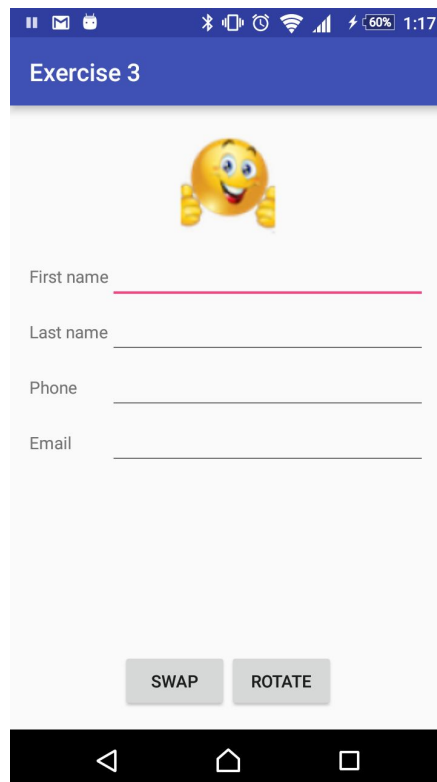


Fig. 1

2. (15%) Create a form as shown in figure 1. The form **must** use the following layouts:
  - **RelativeLayout**, for the root layout consisting of 3 children:
    - an **ImageView** of dimensions 100dp x 100dp
    - a **TableLayout** with 4 **TableRow** elements. You must shrink the first column and stretch the second column.
  - a horizontal **LinearLayout** for the buttons. The buttons must be displayed at the bottom and be centred horizontally. They must wrap content but must be of equal width.

References: <https://developer.android.com/guide/topics/ui/layout/relative.html>  
<https://developer.android.com/guide/topics/ui/layout/grid.html>  
<https://developer.android.com/guide/topics/ui/layout/linear.html>

3. (3%) In the onCreate() method of MainActivity.java, use findViewById() to find all EditTexts and the ImageView and store them into private fields. *Temporarily* change one of your EditTexts to a TextView in XML **without** also changing it to a TextView in your MainActivity class. Your app should now crash on start up. Insert a breakpoint in your onCreate() method and step through you program to see how the crash occurs. Fix the bug before continuing.
4. (5%) When you click on the “Email” EditText you show a toast “Email has focus”. When you click on another EditText you show a toast “Email lost focus” (see <https://developer.android.com/guide/topics/ui/notifiers/toasts.html>). You need to use the **View.OnFocusChangeListener** interface.
5. (15%) When you click the “Rotate” button you rotate the screen to portrait or landscape depending on the current screen orientation. Try to find sample Java code using Google. You **must** implement the click listener by defining it in the activity\_main.xml file.
6. (12%) When the form is in **landscape** mode the UI should look like fig 2.  
Hint 1: The landscape layout XML goes in the layout-land directory. Select “Create landscape variation” from the top-left menu of the layout preview in Android Studio.  
Hint 2: use the color.xml to define the green color to be used as background color.  
Hint 3: use a ScrollView.

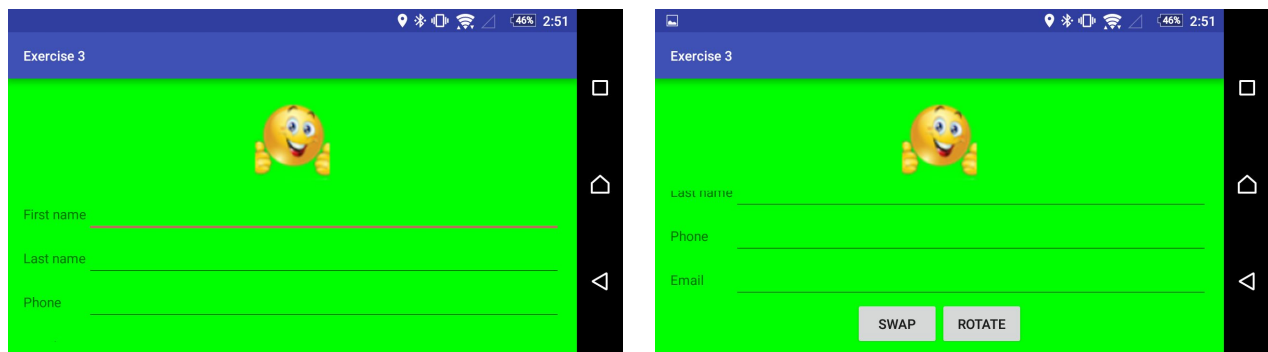


Fig. 2

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## Part B: (complete at home)

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**Homework:** Read <https://developer.android.com/training/basics/activity-lifecycle/recreating.html>  
Watch Videos in Section 6 “Android App Development Essential Training” on LYNDAs.com

7. (10%) When you click the “Swap” button you swap between two alternate images depending on the current image as in Figure 3. You **must** implement the click listener by using the anonymous inner class construction:  

```
button.setOnClickListener(new View.OnClickListener() {  
    @Override public void onClick(View view) { ... }  
});
```

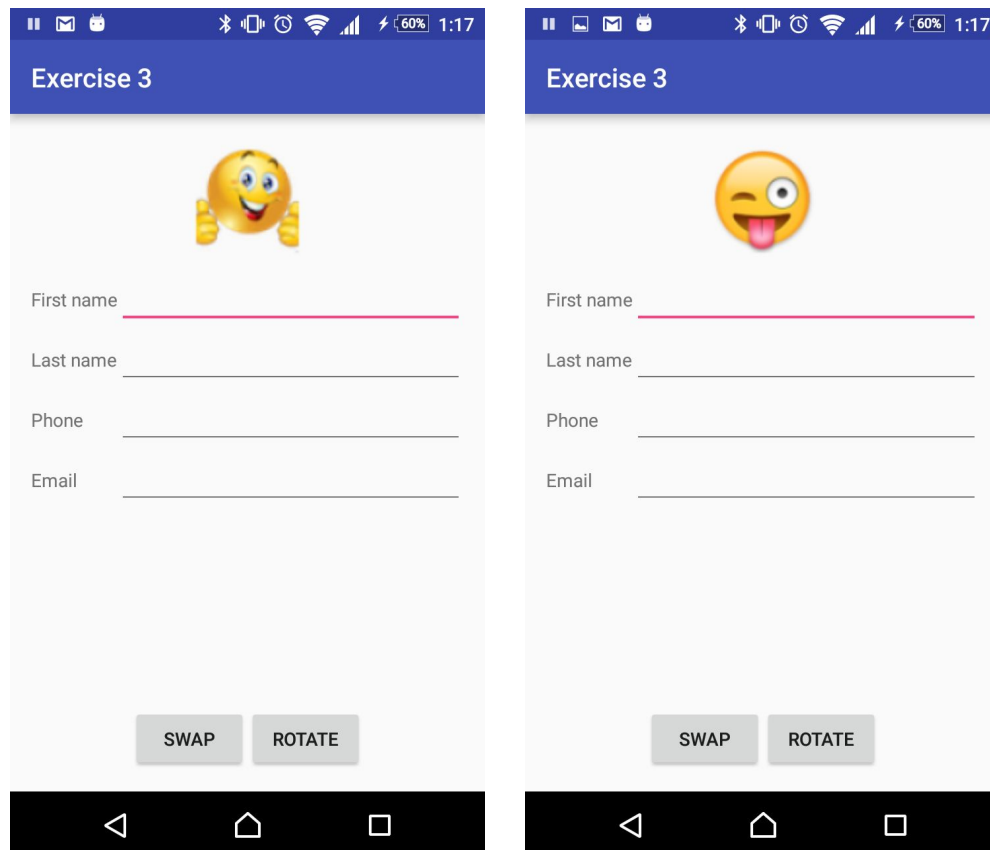


Fig. 3

8. (15%) Override the **onSaveInstanceState** and **onRestoreInstanceState** methods where you save and restore all text entered into EditTexts and the current image. Add Log.d(...) statements using the tag "MAD" so that you can see that these methods are called.
10. Add a filter to your LogCat window in Android Studio where you only show Log messages with the tag name "MAD".
11. (5%) Define all user interface strings and colours in XML resources.
12. (5%) Define all key strings as Java constants.
13. (5%) Use good variable names in Java and good resource ID names in XML.
14. (5%) Comment your code following the coding standards.

### Homework before next class

In week 4 we will cover our first "advanced" topic. Please watch/read before coming to class.

Watch the following Lynda.com videos:

<https://www.lynda.com/Android-tutorials/Run-background-thread-AsyncTask/630605/676299-4.html>  
<https://www.lynda.com/Android-tutorials/Communicate-UI-from-AsyncTask/630605/676300-4.html>  
<https://www.lynda.com/Android-tutorials/Return-result-from-AsyncTask/630605/676301-4.html>

NOTE: First go through the Lynda.com link through UTSONline (Orientation and Preparation weeks)

to activate your Lynda.com session. Then the above lynda.com link should work.

Read the following article up to section "Order of execution"

<https://developer.android.com/reference/android/os/AsyncTask.html>