Mobile Computing

Practice # 2c

Android Applications - Interface

One more step in the restaurants application.

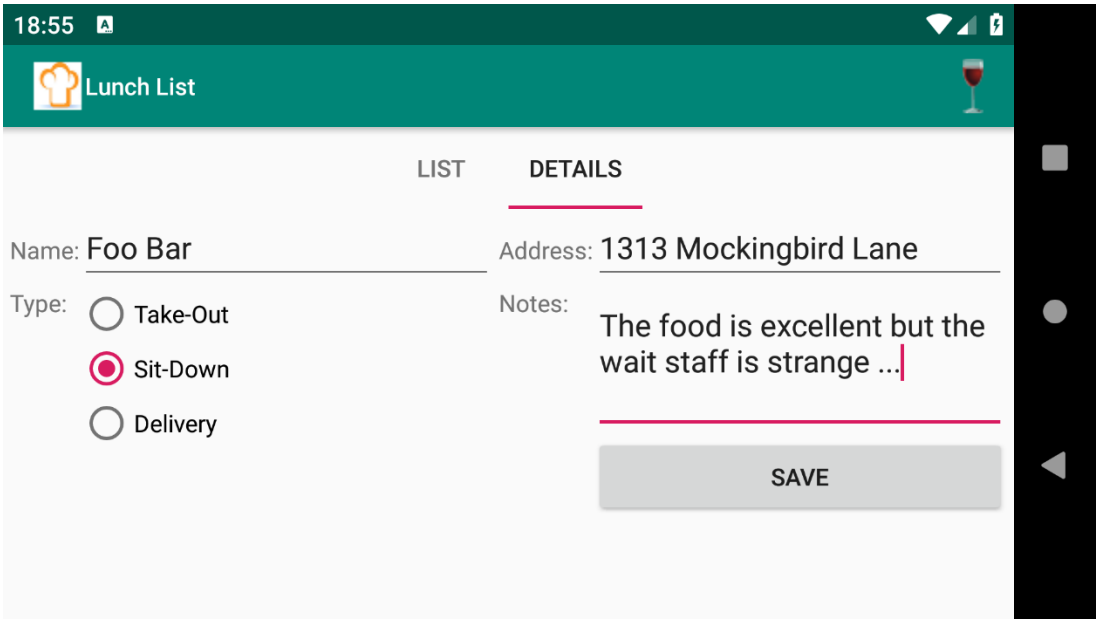
1. Design an alternative layout for showing up in landscape mode.

Our current layout is not very good in landscape orientation. You can improve it putting a ScrollView around the Details Tab, but it is better to design a new layout just for landscape mode (you should not have ever Views outside of the available space).

a. First, create a new layout file with the same name (activity_main.xml), but with an orientation (landscape) qualifier. This will create a new resource directory (LunchList/res/layout-land/) and put the file inside (use File->New->Layout resource file)

b. Then, copy the contents of the original layout file and change it to have the following characteristics:
   - Use a table of four columns, with columns #1 and #3 as stretchable
   - Put the name and address labels and edits on the same row
   - Put the type, notes, and Save button on the same row, with the notes and Save button stacked via a LinearLayout.
   - Make the notes three lines instead of two, since we have the room
   - **[Optionally** fix the maximum width of the EditText widgets to 130 scaled pixels (sp), so they do not automatically grow outlandishly large if we type a lot**]**
   - Add a bit of padding in places to make the placement of the labels and fields look a bit better

   The Details tab of the new design should look like the following. The List tab can remain the same.



Note that we did not create a landscape version of our row layout (row.xml). Android, upon not finding one in LunchList/res/layout-land/, will fall back to the one in LunchList/res/layout/. Since we do not really need our row to change, we can leave it as is.

Note also that when you change the screen orientation, your existing restaurants will vanish. That is because we are not persisting them anywhere, and rotating the screen, by default, destroys and recreates the activity. Android automatically saves, before destroying an activity in a configuration change, the state of some interface controls that are not based on other variables (for instance Lists are based on external arrays). The values of internal activity variables are lost because those are not automatically saved.

To solve this last problem do the following:

Use onSaveInstanceState() to save the current contents of one of the activity variables (the **current** variable), and restore it in onRestoteInstanceState(). It could be also restored in the onCreate() method testing if the Bundle parameter is not null (after the screen was rotated). Complex variables should be Serializable (Java standard) or Parcelable (a more compact form of serialization) before we can save them on a Bundle. For this exercise, just implement the Serializable interface for the Restaurant class.

We will, at this point, not cover the restaurant list array – you will still lose all existing restaurants on a rotation event. For solving that issue, we will later persist our restaurant list, for instance in a database.

2. We will now add support for both creating new restaurants and editing ones that were previously entered. Along the way, we will get rid of our tabs, splitting the application into two activities: one for the list, and one for the details form.

a. Create a new Empty Activity to serve as our details form. Call it DetailsActivity.java. Edit its content to have only the icon in the ActionBar as the MainActivity:

```
public class DetailsActivity extends AppCompatActivity {
   @Override
   public void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      …
   }
}
```

b. This Activity should be added to the project manifest inside the <application> tag. If it was created by Android Studio using the New Activity option, that should be already in place.

```
<activity android:name=".DetailsActivity">
</activity>
```

c. To share information between activities we can use several techniques, like static variables. Nevertheless every Android application has a singleton object that represents the application. It's easy to create our own application class in the project and to access that object from the activities. The Application object remain in memory with the app process.
We will need to share between our two activities the array list of restaurants (the model (restaurants) of the application), the adapter, for changing data in the second activity, and the current selected restaurant.
Add a new class to the project, derived from Application, as follows:

```
public class LunchApp extends Application {
   public List<Restaurant> restaurants=new ArrayList<>();
   public MainActivity.RestaurantAdapter adapter;
   public Restaurant current;
}
```

The RestaurantAdapter is an inner class of the MainActivity and should be instantiated there, to work with the ListView control.
The new name of the Application class must be registered in the manifest as an android:name property of the application tag:

```
  <application
       android:name=".LunchApp"
```

```
. . .
```

d. Then, we need to refactor our MainActivity activity, simplifying also the layout (activity_main.xml) to have only the ListView. To let the user to see something when the list is empty we can also define a TextView (not visible when the ListView is not empty) to show a message in that situation. We should then have as activity_main.xml the following:

```
<LinearLayout
  xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:orientation="vertical">
  <ListView
    android:id="@+id/listview"
    android:layout_width="match_parent"
    android:layout_height="match_parent"/>
  <TextView
    android:id="@+id/empty_list"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="@string/lv_empty_msg"/>
</LinearLayout>
```

The onCreate() callback instantiates the Adapter and associates it with the list, setting the TextView as the message to show when the list is empty:

```
private LunchApp app;

ListView list = findViewById(R.id.listview);
app = (LunchApp) getApplicationContext();
app.adapter=new RestaurantAdapter();
list.setAdapter(app.adapter);
list.setEmptyView(findViewById(R.id.empty_list));
list.setOnItemClickListener(this);
```

e. Add a new menu item to add a new restaurant.
On the onOptionsItemSelected() menu handler, add the code to start the new DetailsActivity:

```
. . .
else if (item.getItemId()==R.id.add) {
 startActivity(new Intent(this, DetailsActivity.class));
 return(true);
}
```

f. The ListView listener for clicking a list item should contain:

```
Intent i=new Intent(this, DetailsActivity.class);
app.current = app.restaurants.get(pos);
i.putExtra(ID_EXTRA, pos);                    // pass the position to the Details activity
startActivity(i);
```

When the user selects a restaurant, the Details activity should start, showing the restaurant details and allowing the user to edit the data. To distinguish this situation from the one where the user wants to add a new restaurant, this time the intent to invoke the Details activity will

transport the position of the selected restaurant. The string acting as key is defined as a public final static field of the MainActivity class.

g. To complete the Details functionality start by creating a new layout file, activity_details.xml, and put there what was inside the Details tab, which should be by now, something like:

```
<?xml version="1.0" encoding="utf-8"?>
<TableLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/details"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:stretchColumns="1"
    android:paddingTop="4dip" >
    <TableRow android:layout_width="match_parent"
              android:layout_height="wrap_content">
        <TextView android:text="@string/tv_name" />
        <EditText android:id="@+id/ed_name"
                  android:inputType="text"/>
    </TableRow>
    <TableRow android:layout_width="match_parent"
              android:layout_height="wrap_content">
        <TextView android:text="@string/tv_address" />
        <EditText android:id="@+id/ed_address"
                  android:inputType="text"/>
    </TableRow>
    <TableRow>
        <TextView android:text="@string/tv_type" />
        <RadioGroup android:id="@+id/rg_types">
            <RadioButton android:id="@+id/take"
                         android:text="@string/rb_take"
                         android:checked="true"
                         android:layout_width="match_parent"
                         android:layout_height="wrap_content"/>
            <RadioButton android:id="@+id/sit"
                         android:text="@string/rb_sit"
                         android:layout_width="match_parent"
                         android:layout_height="wrap_content"/>
            <RadioButton android:id="@+id/delivery"
                         android:text="@string/rb_delivery"
                         android:layout_width="match_parent"
                         android:layout_height="wrap_content"/>
        </RadioGroup>
    </TableRow>
    <TableRow>
        <TextView android:text="@string/tv_notes"/>
        <EditText android:id="@+id/ed_notes"
                  android:maxLines="2"
                  android:inputType="textMultiLine"
                  android:lines="2"
                  android:gravity="top"/>
    </TableRow>
    <Button android:id="@+id/bt_save"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="@string/bt_save"/>
</TableLayout>
```

Have the setContentView() call in onCreate() in Details load this layout (R.layout.activity_detais). In the res\layout-land directory change the name of activity_main.xml to activity_details.xml and eliminate the TabHost stuff, leaving only its contents.

h. Add now the following data members to the Details class:

```
private int rPos;
private LunchApp app;
```

and complete the Details onCreate() method with:

```
rPos=getIntent().getIntExtra(MainActivity.ID_EXTRA, -1);   // if not present, get -1
```

```
if (rPos != -1)
    load();
```

The private load() method should fill the form views with the application **current** Restaurant (if the intent brings a valid position, the user has clicked a restaurant in the Main activity which has filled the LunchApp shared **current** variable).

```
private void load() {
   . . .
   ((EditText)findViewById(R.id.ed_notes)).setText(app.current.getNotes());
   RadioGroup rgTypes = findViewById(R.id.rg_types);
   if (app.current.getType().equals("sit"))
      rgTypes.check(R.id.sit);
   else . . .
}
```

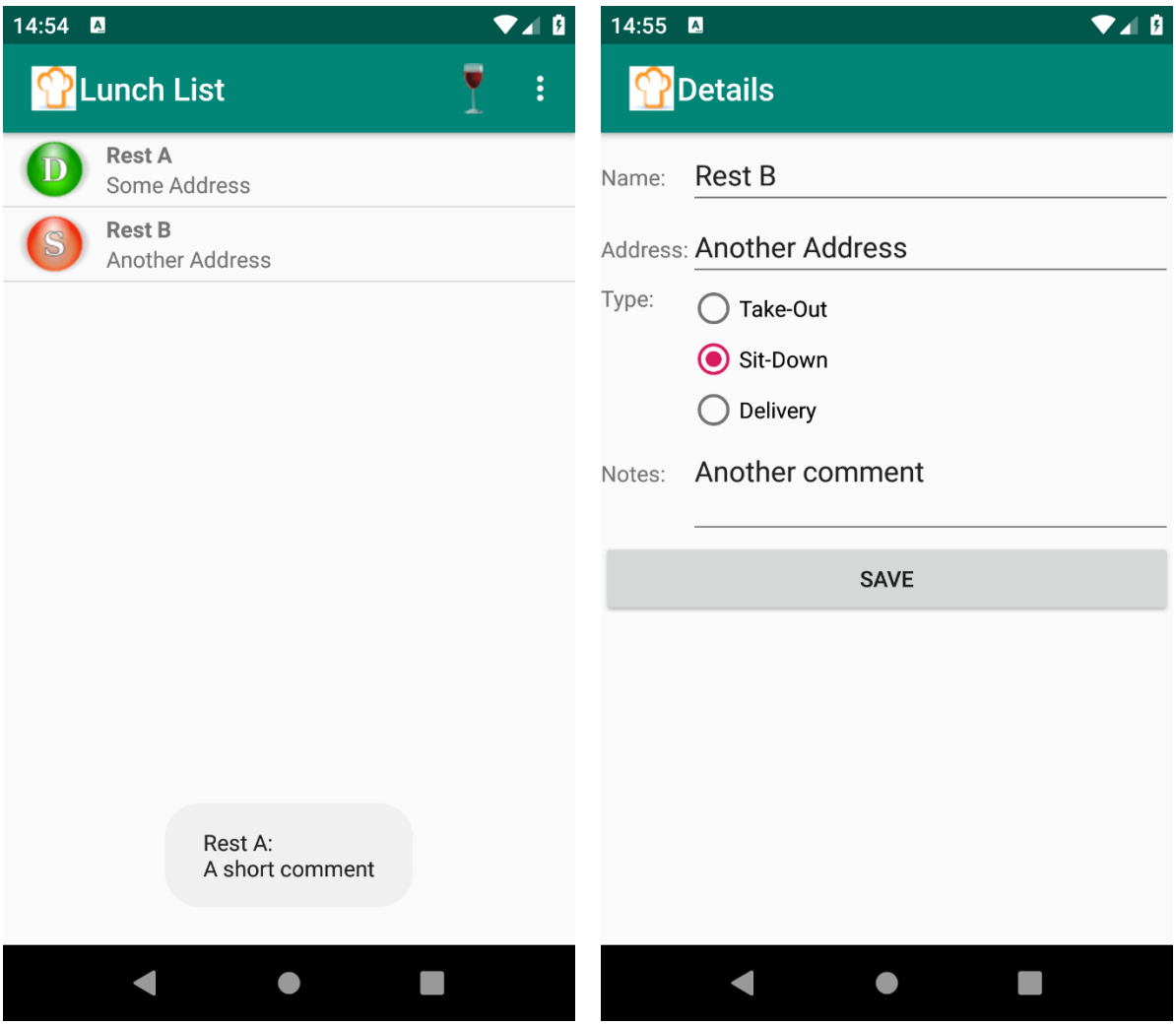
i. Finally when the user clicks the save button, one of two things should happen, depending on if the user has filled a new restaurant form or has edited an existing one. In the last case the existing one should be removed from the adapter. In both cases a new current restaurant should be created and added to the adapter (in the same position if it is a replacement). After saving the new data, this activity should be finished, returning to the Main activity. All of this is done in the Save button listener:

```
void onBtSaveClick() {
 String type = "";

 switch (((RadioGroup)findViewById(R.id.rg_types)).getCheckedRadioButtonId()) {
   case R.id.sit:
     type = "sit";
     break;
   case . . .
 }
 if (rPos!=-1)
    app.adapter.remove(app.current);
 app.current = new Restaurant();
 app.current.setName(((EditText)findViewById(R.id.ed_name)).getText().toString());
 . . .
 if (rPos!=-1)
    app.adapter.insert(app.current, rPos);
 else
    app.adapter.add(app.current);
 finish();
}
```

You can finish by replacing the application icon on the manifest to rest_icon.png.

The appearance of the new interface is now as follows:



Notice that now the restaurants list survives rotations (and other activity destructions) because now it is stored in the application class (as long as the application (process) remains in memory).