Android UI Adapters

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“Learn with Passion!”

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Topics

- AdapterView & Adapter
- AdapterView responsibilities
- ListActivity, ListView, and ListAdapter
- Spinner

AdapterView & Adapter

What is AdapterView Class?

- The *AdapterView* is a child class of *ViewGroup*
  - A special kind of container of view objects (list items)
- Typically you are going to use subsclasses of *AdapterView* class instead of using it directly
- Example subclasses of *AdapterView* class
  - *ListView*
  - *Spinner*
  - *GridView*
- An *AdapterView* access the data through *Adapter* object
  - Instead of accessing data directly itself

What is an Adapter?

- An *Adapter* object acts as a bridge between an *AdapterView* object and the underlying data for that view.
  - The Adapter provides access to the data items.
  - You need to create Adapter object and then provide it to the AdapterView object
- The Adapter is also responsible for making a View for each item in the data set
  - When you create Adapter object, you have to provide a layout resource for the item

```
static final String[] COUNTRIES = new String[] {
  "Afghanistan", "Albania", "Algeria", "American Samoa", ...};
ArrayAdapter<String> arrayAdapter = new ArrayAdapter<String>(
        this,                   // Application context
        R.layout.list_item,     // layout description for each li
        COUNTRIES);             // Array object that works as data source
```

layout for each item

data source

Example Adapters

- Android provided Adapters
  - *ArrayAdatper* – data is in the form of array object
  - *CursorAdatper* – data is in the form of cursor object
- You can build custom adapters
  - Custom adapter typically extends *BaseAdapter* class
  - Implements

  public View getView(int position, View convertView, ViewGroup parent) method

AdapterView Responsibilities

AdapterView Responsibilities

- Two main responsibilities of AdapterView
  - Filling the layout with data (it received through the help of an Adapter)
  - Handling user selections - when a user selects an item, perform some action

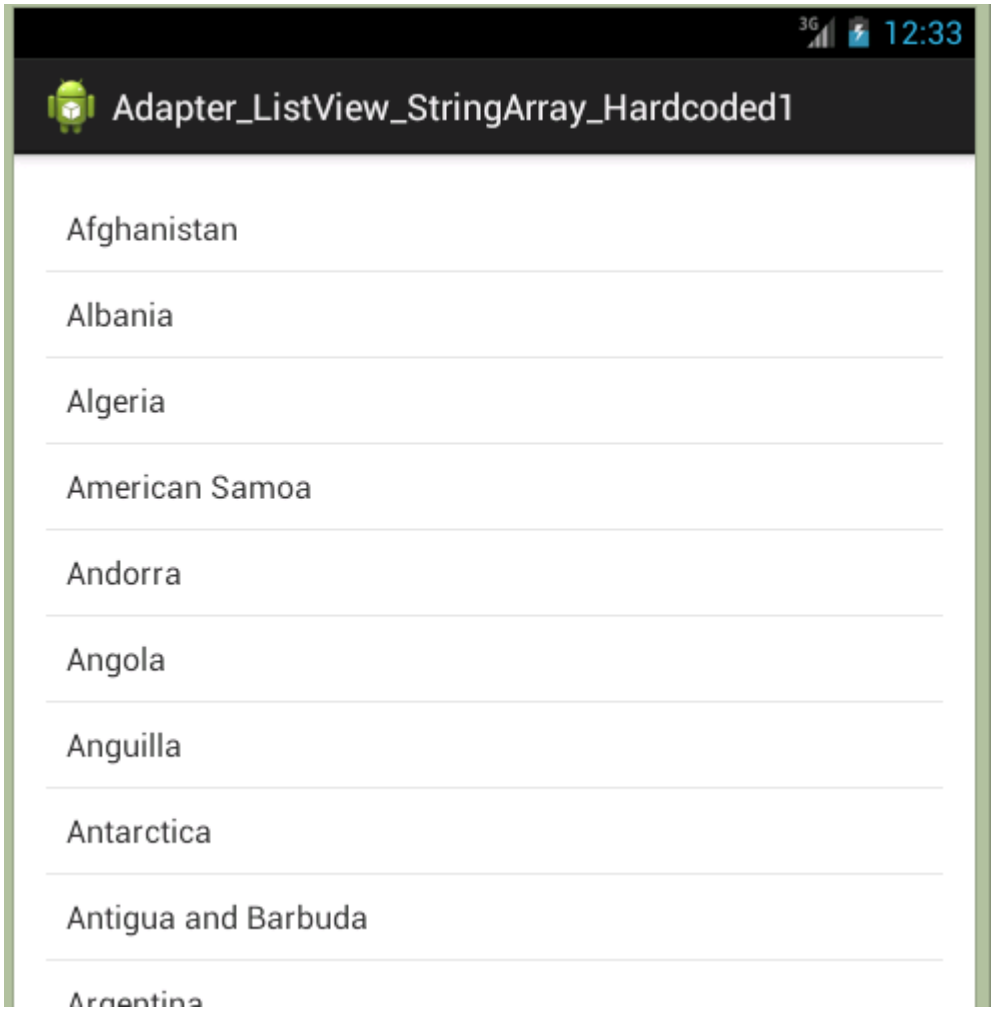
Filling the Layout with Data

- Inserting data into the layout is typically done by binding the *AdapterView* class to an *Adapter*, which retrieves data from an external source (perhaps a list that the code supplies or query results from the device's database)
  - We will see the code soon

ListView

ListView Class

- A child class of *AdapterView* class
- Shows items in a vertically scrolling list.
- The items come from the *Adapter* associated with this view



Two Options of ListView Build

- Option #1 - Your activity extends *Activity* class
  - You have to create *ListView* object yourself from resource file just like any other View object
- Option #2 - Your activity extends *ListActivity* class
  - *ListView* object gets created by the *ListActivity*'s constructor, so you don't need to create it yourself
  - Xml Resource for ListView is optional

Option #1 - Extending Activity Class

```
public class HelloListView extends Activity {

    static final String[] COUNTRIES = new String[] {
        "Afghanistan", "Albania", "Algeria", ...};

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

        // Since HelloListView extends Activity (instead of ListActivity),
        // we have to create ListView object ourselves.
        ListView lv =(ListView)findViewById(R.id.listview);

        ArrayAdapter<String> arrayAdapter = new ArrayAdapter
                this,                   // Application cont
                R.layout.list_item,     // layout description for each
                COUNTRIES);             // Array object
        lv.setAdapter(arrayAdapter);
    }
```

Activity Class

Xml Resource For ListView layout

Xml Resource For ListView Row

Option #2: *ListActivity* class

- Android-provided utility class specially designed for displaying a list of items by binding to a data source such as an array or Cursor, and exposes event handlers when the user selects an item.
  - *ListActivity* hosts a *ListView* object that can be bound through an *adapter* to different data sources, typically either an array or a Cursor holding query results.
  - *setListAdapter(Adatper adapter)* method automatically creates *ListView* object from the *ListAdapter* object
- Has a default *ListView* layout that consists of a single, full-screen list in the center of the screen

Option #2: Extending ListActivity

```
public class HelloListView extends ListActivity {

    // Array as a data source
    static final String[] COUNTRIES = new String[] {
        "Afghanistan", "Albania", "Algeria", "American Samoa" ... };

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

        //Note: Layout is handled by the ListActivity
        setContentView(R.layout.activity_hello_list_view);

        // Create an adapter from Array data source object
        ArrayAdapter<String> arrayAdapter = new ArrayAdapter<String>(
                this,                   // Application context
                R.layout.list_item,     // layout description for each list item
                COUNTRIES);             // String array of countries defined

        // Notice that this does not load a layout file for the Activity (which you
        // usually do with setContentView(int)). Instead, setListAdapter(ListAdapter)
        // automatically adds a ListView to fill the entire screen of the ListActivity.
        setListAdapter(arrayAdapter);

    }
}
```

ListActivity Class

ListView Layout Optional for Default

Xml Resource For ListView Row

Example of ListView Xml Layout

```
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:paddingBottom="@dimen/activity_vertical_margin"
    android:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin" >

     <ListView
        android:id="@android:id/list"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content" >
     </ListView>
</RelativeLayout>
```

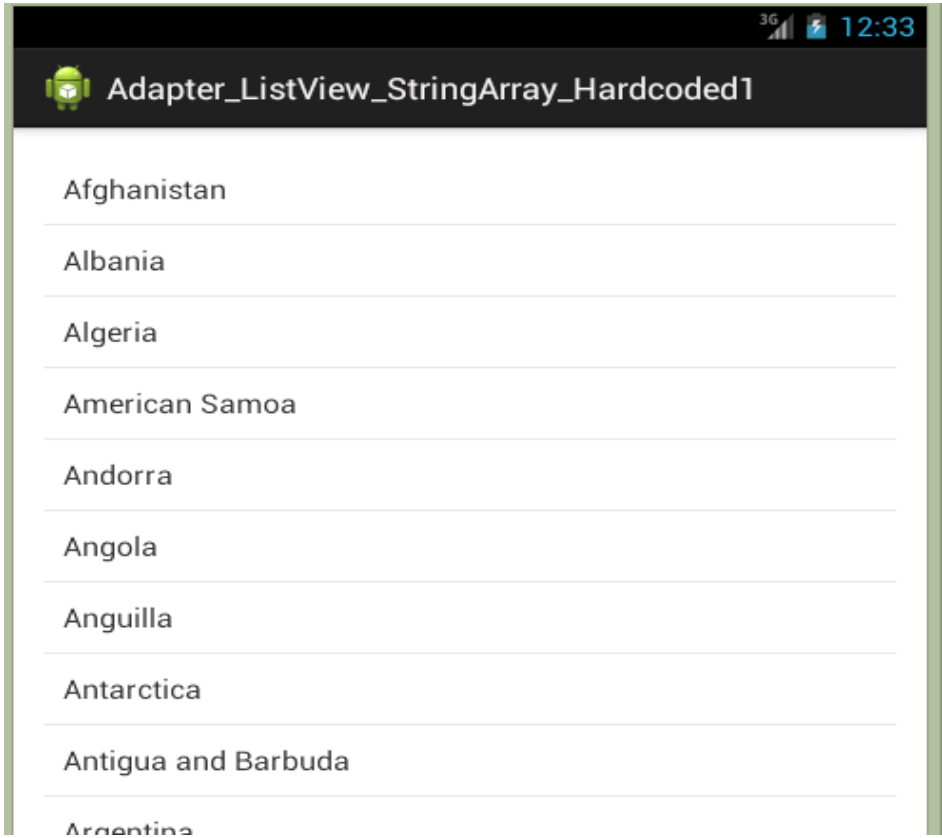
Padding To center ListView

ListView Defn: must have id list For ListActivity

Example of List Item Row Layout

```
<?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="fill_parent"
    android:padding="10dp"
    android:textSize="16sp"
    >
</TextView>
```

List Item
TextView Layout



Handling User Selections

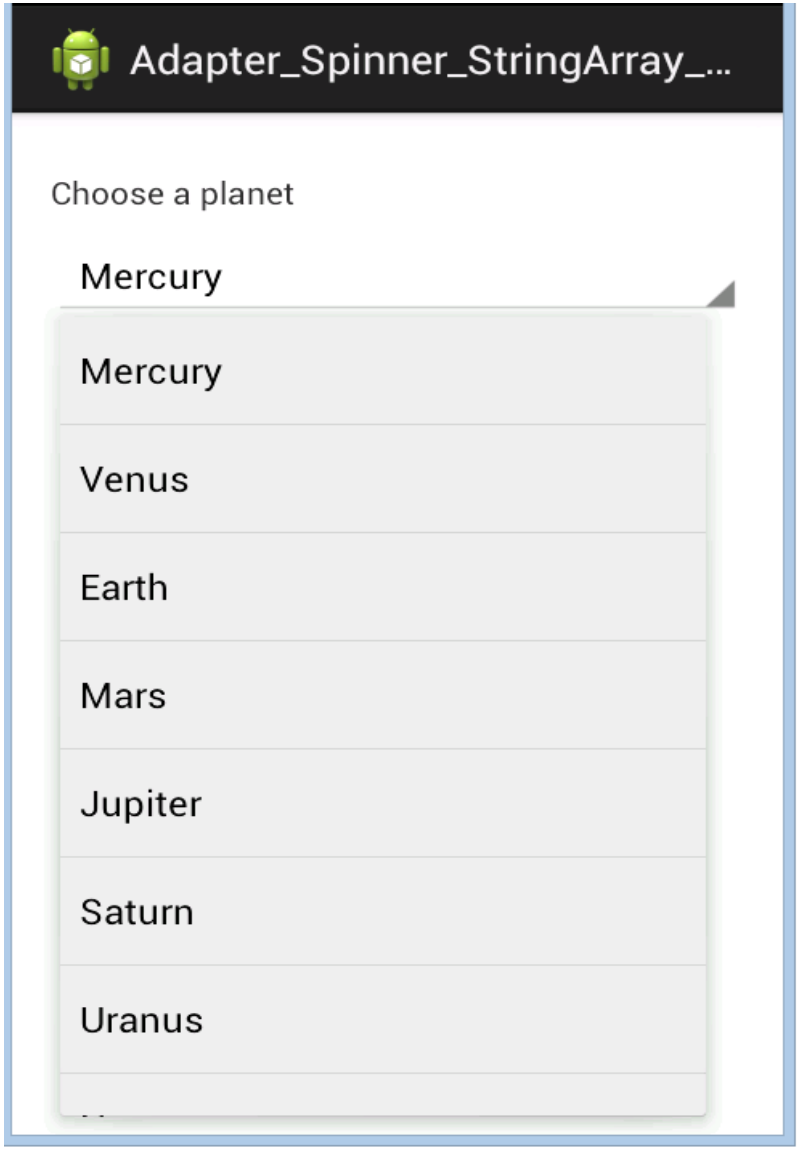
- You handle the user's selection by setting the class' *AdapterView.OnItemClickListener* member to a listener and catching the selection changes
- Bind ListView
  - Activity: ListView lv = (ListView) findViewById(R.id.*listview*);
  - ListActivity: ListView lv = getListView();
- Set Click Listener

```
lv.setOnItemClickListener(new OnItemClickListener() {
  public void onItemClick(AdapterView<?> parent, View view,
                                    int position, long id) {
    // When clicked, show a toast with the TextView text
    Toast.makeText(getApplicationContext(),
        ((TextView) view).getText() + " is selected",
        Toast.LENGTH_SHORT).show();
  }
});
```

Spinner

Spinner Class

- A child class of *AdapterView* class
- Displays one child at a time and lets the user pick among them.
- The items in the Spinner come from the Adapter associated with this view
- There is NO special SpinnerActivity class, so you have to create Spinner object yourself



Example of Spinner

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

        Spinner spinner = (Spinner) findViewById(R.id.spinner);
        ArrayAdapter<CharSequence> adapter =
                ArrayAdapter.createFromResource(
                        this,
                        R.array.planets_array,
                        android.R.layout.simple_spinner_item);

        adapter.setDropDownViewResource(
                        android.R.layout.simple_spinner_dropdown_item);
        spinner.setAdapter(adapter);
        spinner.setOnItemSelectedListener(new MyOnItemSelectedListener());
    }
```

Example of Spinner Layout

```
<?xml version="1.0" encoding="UTF-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:padding="10dip"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content">
    <TextView
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10dip"
        android:layout_marginBottom="10dip"
        android:text="@string/planet_prompt"
    />
    <Spinner
        android:id="@+id/spinner"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:prompt="@string/planet_prompt"
    />
</LinearLayout>
```

Thank you!

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