Layouts

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Layouts?

- In Android, Layouts define the visual structure for user interfaces
- Layouts can be declared in two ways:
  - Declared UI elements in XML
  - Instantiated at runtime

XML vs Code

In other words:

- with XML you create your UI that directly corresponds to the View classes and subclasses automatically
- or you create View and ViewGroup objects manually in your code

- => the XML way is the currently more popular but sometimes coding the layout makes more sense

Why XML?

- XML usage for layouts is not required, but highly recommended!
- Advantages:
  - GUI-assisted creation
  - Separation of generated vs hand-written code
  - Allows a UI specialist to work on layout without having to worry about underlying code

Implications?

- XML is compiled into very efficient form for runtime, so performance is not a problem
- Your interfaces should be known beforehand. Manipulating XML interface at runtime is tricky.

How to Attach the XML layout ?

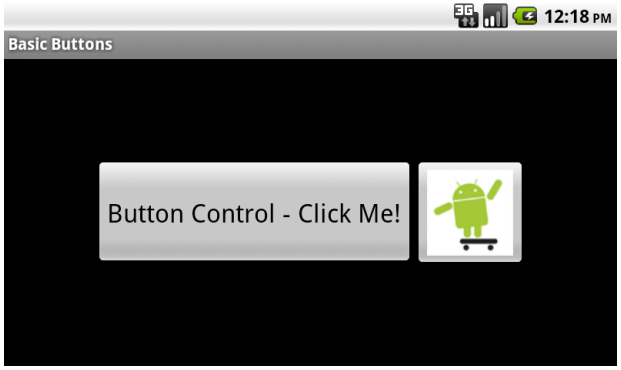
In your activity:

setContentView(R.layout.main);

i.e.

```
@Override
public void onCreate(Bundle icicle) {
super.onCreate(icicle);
setContentView(R.layout.main);
```

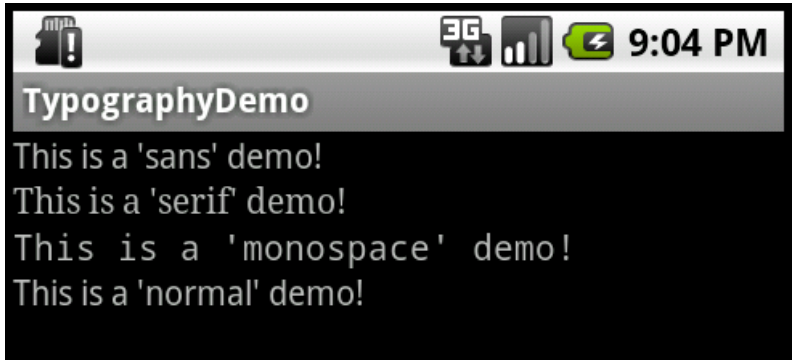
Sample Layout (Button)



- <?xml ... ?>
- <Button xmlns:android="..."
- android:id="@+id/button"
- android:text=""
- android:layout_width="fill_parent"
- android:layout_height="fill_parent"
- />

Text View

```
<?xml version="1.0" encoding="utf8"?>
<TextView xmlns:android="..."
android:layout_width="fill_parent"
android:layout_height="wrap_content"
android:text="You were expecting
something profound?"
/>
```

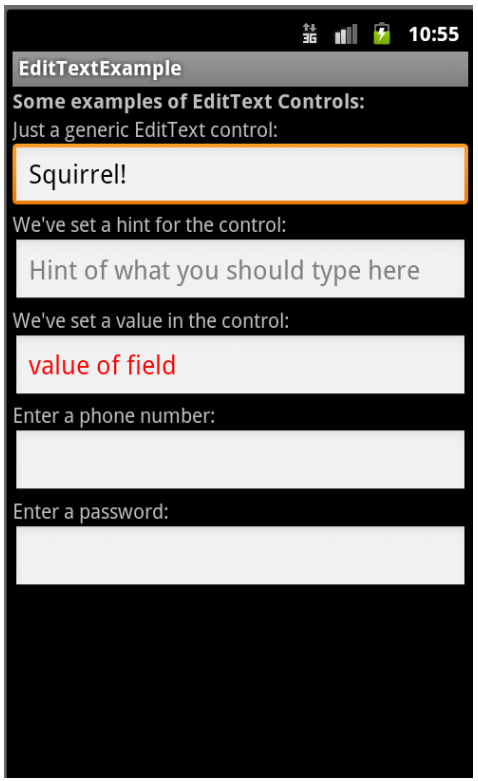


ImageView

```
<?xml version="1.0" encoding="utf8"?>
<ImageView xmlns:android="..."
android:id="@+id/icon"
android:layout_width="fill_parent"
android:layout_height="fill_parent"
android:adjustViewBounds="true"
android:src="@drawable/molecule"
/>
```

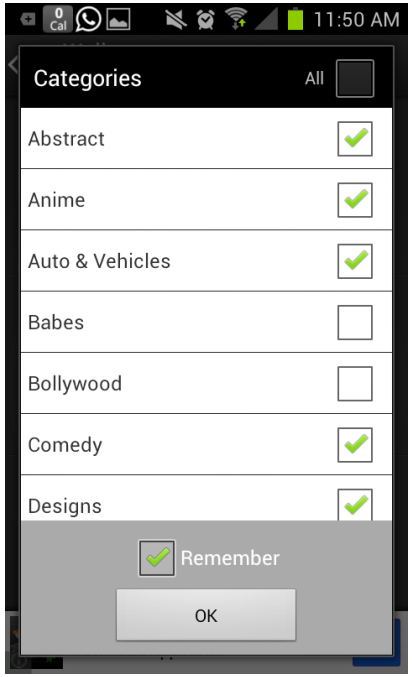
EditView

```
<?xml version="1.0" encoding="utf8"?>
<EditText xmlns:android="..."
android:id="@+id/field"
android:layout_width="fill_parent" *
android:layout_height="fill_parent"
android:singleLine="false"
/> * note on fill_parent
```



CheckBox

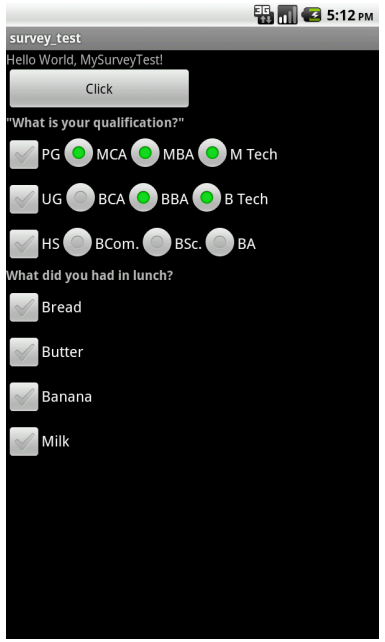
```
<?xml version="1.0" encoding="utf8"?>
<CheckBox xmlns:android="..."
android:id="@+id/check"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="This checkbox is:
unchecked" />
```



RadioButton and RadioGroup

```
<RadioButton
android:id="@+id/radio1"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="Rock" />
```

Part of RadioGroup



RadioGroup

```
<?xml version="1.0" encoding="utf8"?>
<RadioGroup
xmlns:android="..."
android:orientation="vertical"
android:layout_width="fill_parent"
android:layout_height="fill_parent"
> ... add radio buttons here
</RadioGroup>
```

Views

- All of the above widgets extend Views.
- Useful properties:
  - android:nextFocusDown
  - android:nextFocusLeft
  - android:nextFocusRight
  - android:nextFocusUp
  - android:visibility

Views Cont'd

- Useful Methods:
  - getParent(): Finds the parent widget or container.
  - findViewById(): Finds a child widget with a certain ID.
  - getRootView(): Gets the root of the tree (e.g., what you provided to the activity via setContentView()).

Containers

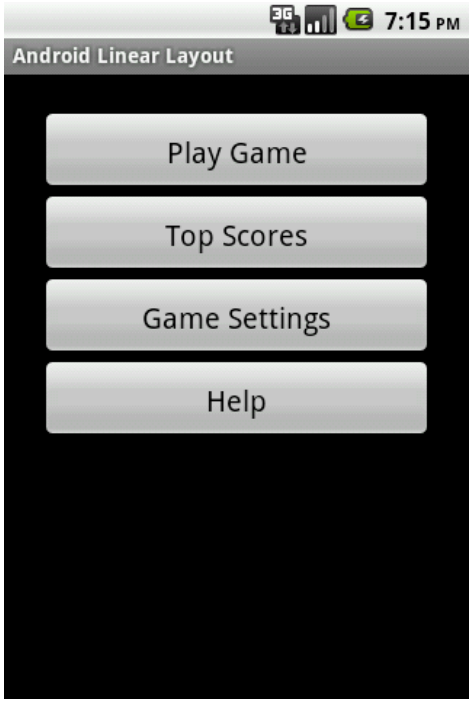
- Container is a collection of widgets and child containers
- Similar to BoxLayout in Swing

LinearLayout

- Resembles Swing's BoxLayout
- Properties
  - Orientation: horizontal, vertical
  - Match model: width, height, wrap, fill
  - Weight: which widget has more of it?
  - Gravity: alignment
  - Padding: top, bottom, left, right...

LinearLayout Example

```
<?xml version="1.0" encoding="utf8"?>
<LinearLayout xmlns:android="..."
android:orientation="vertical"
android:layout_width="fill_parent"
android:layout_height="fill_parent"
> ... your widgets here...
</LinearLayout>
```

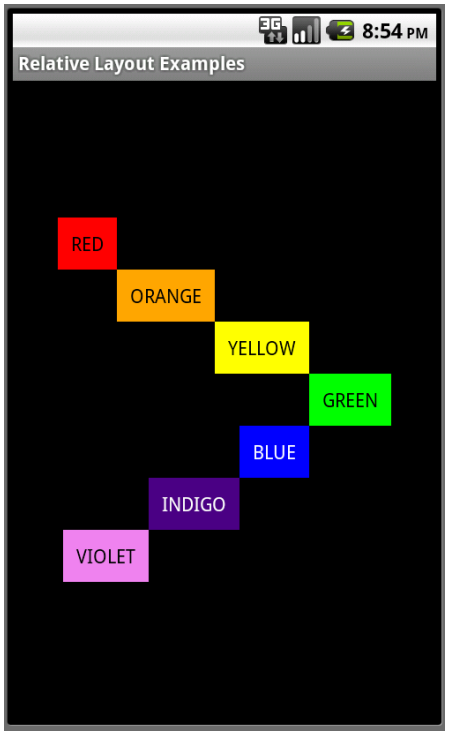


RelativeLayout

- Layouts widgets based on their relationship to other widgets in the container and the parent container
- To make your RelativeLayout work, you need ways to reference other widgets within an XML layout file, plus ways to indicate the relative positions of those widgets.

RelativeLayout Example

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
xmlns:android="..."
android:layout_width="fill_parent"
android:layout_height="wrap_content"
android:padding="5px">
<TextView android:id="@+id/label"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="URL:"
android:paddingTop="15px"/> ... </RelativeLayout>
```



TableLayout

- Table Layout works in conjunction with TableRow. TableLayout controls the overall behavior of the container, with the widgets themselves poured into one or more TableRow containers, one per row in the grid.

TableRow Example

```
<TableRow>
<TextView android:text="URL:" />
<EditText
android:id="@+id/entry"
android:layout_span="3"/>
</TableRow>
```

TableLayout Example

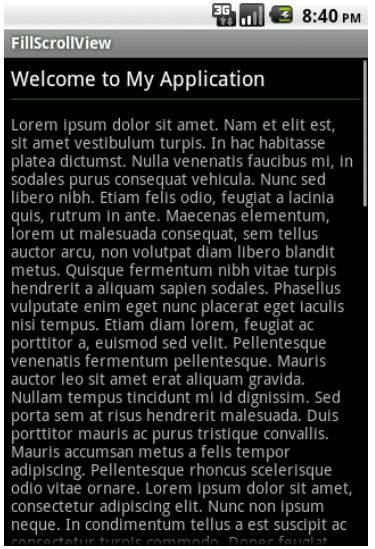
```
<?xml version="1.0" encoding="utf8"?>
<TableLayout
xmlns:android="..."
android:layout_width="fill_parent"
android:layout_height="fill_parent"
android:stretchColumns="1">
<TableRow>...
```

ScrollView

- ScrollView is a container that provides scrolling for its contents. You can take a layout that might be too big for some screens, wrap it in a ScrollView
- There is HorizontalScrollView as well...

ScrollView Example

```
<?xml version="1.0" encoding="utf8"?>
<ScrollView
xmlns:android="..."
android:layout_width="fill_parent"
android:layout_height="wrap_content">
<TableLayout
android:layout ...
```



Questions

- Please ask in the Student Forum