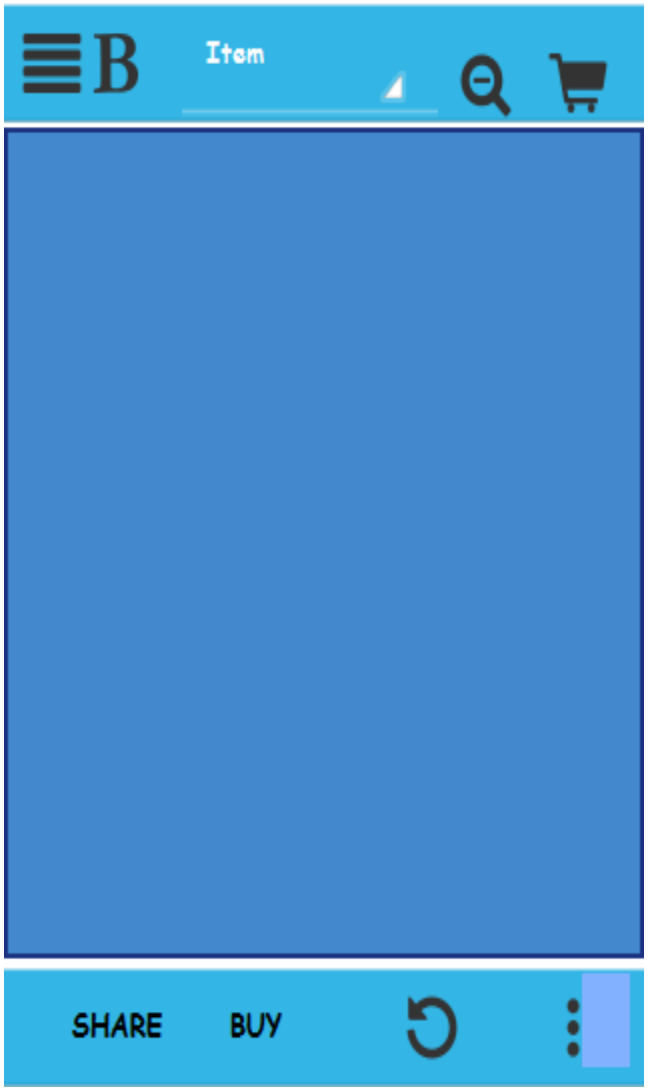
Lesson 8

ActionBars, Menus Dialog Boxes & Toast Widgets

Android Design Strategies

The ActionBar Design Model



Header / Top Décor
An **ActionBar** occupies the top décor screen space. If this space is not sufficient, it splits its contents to the footer section of the app's GUI.

Body: Main application's UI

Footer:
ActionBar overflows to the bottom of the screen. Toolbars may also be placed at the bottom of the UI.

Android Design Strategies

Menus

- Menus are a common design feature often included in Android solutions.
- A *good menu* provides a simple and unobtrusive interface that adds more capabilities to the app without occupying much space on the app's UI.
- Menus can be adjusted to the currently displayed UI. Each screen may have its own set of options.
- A screen could have any number of widgets and you may optionally attach a menu to any of those widgets.
- **Current design practices promote the integration of menus and the top décor component.**

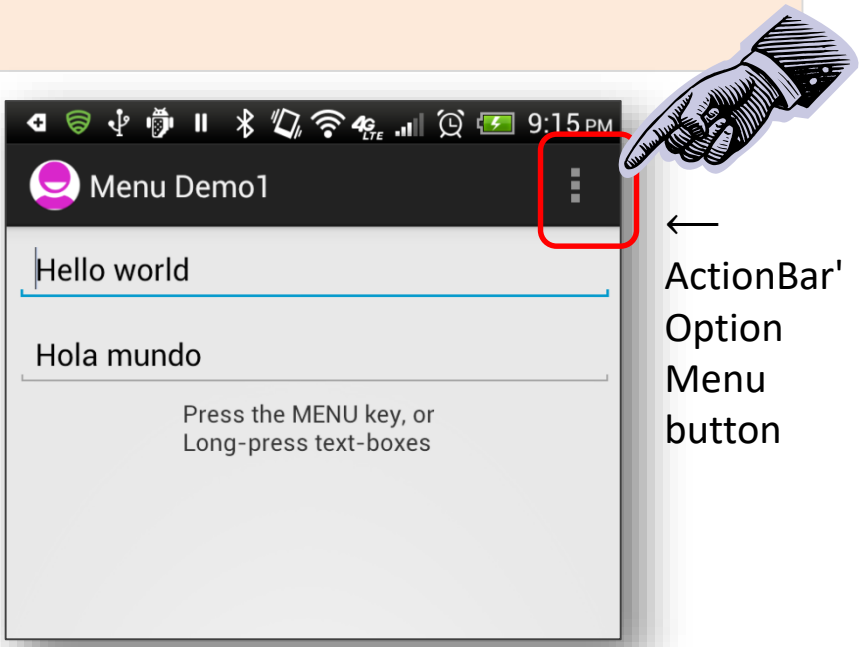
Using Menus

Menu Types

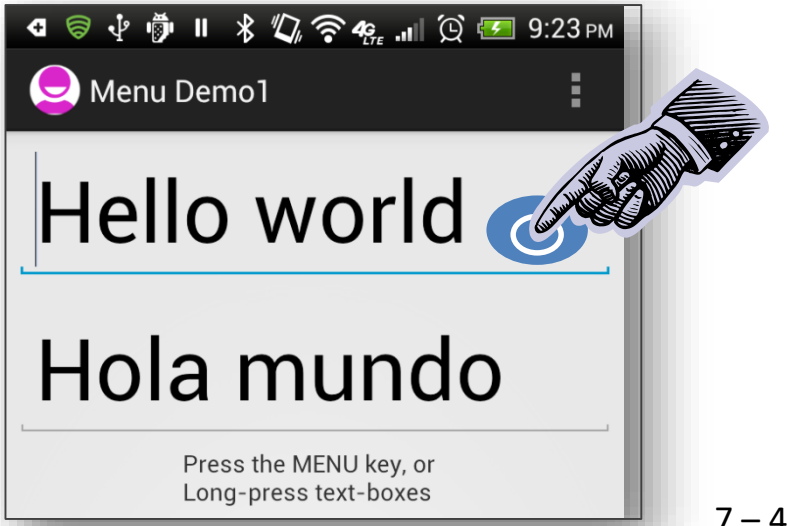
Android supports two types of menus: **Options Menu** and **Context Menu**.

1. The global **options menu** is triggered by pressing the device's hardware or virtual **Menu** button. The global menu is also known as **action menu**. *There is only ONE option menu for each UI*.

2. A **context menu** is raised by a *tap-and-hold interaction (long-tap)* on the widget associated to the menu. *You may set one context menu on any widget.*



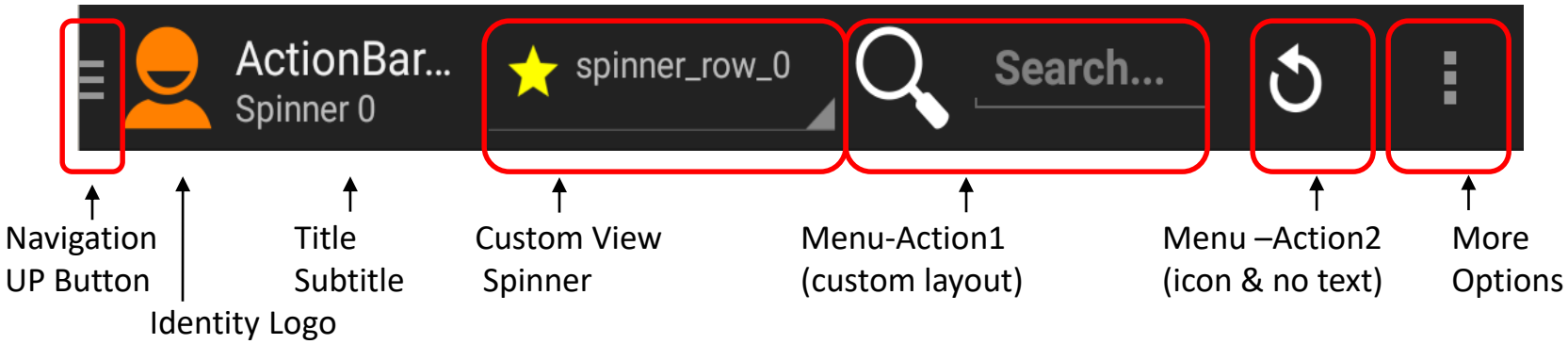
← ActionBar' Option Menu button



ActionBar Design Strategy

- The **ActionBar** control was introduced in SDK 3.0 and plays a special role on the crafting of non-trivial Android apps. It is depicted as a graphical tool-bar at the top of each screen and it is usually persistent across the app.

- It normally contains the following pieces:
  - Navigation – UP Button (Hamburger or Arrow icon)
  - An Identity Logo,
  - Title and Subtitle
  - Optional custom view,
  - Action Tiles (clickable buttons showing icon/text/custom layouts),
  - Overflow Option Menu Button
  - Legacy app's may also include Navigation Tabs (*deprecated after SDK4.4*)

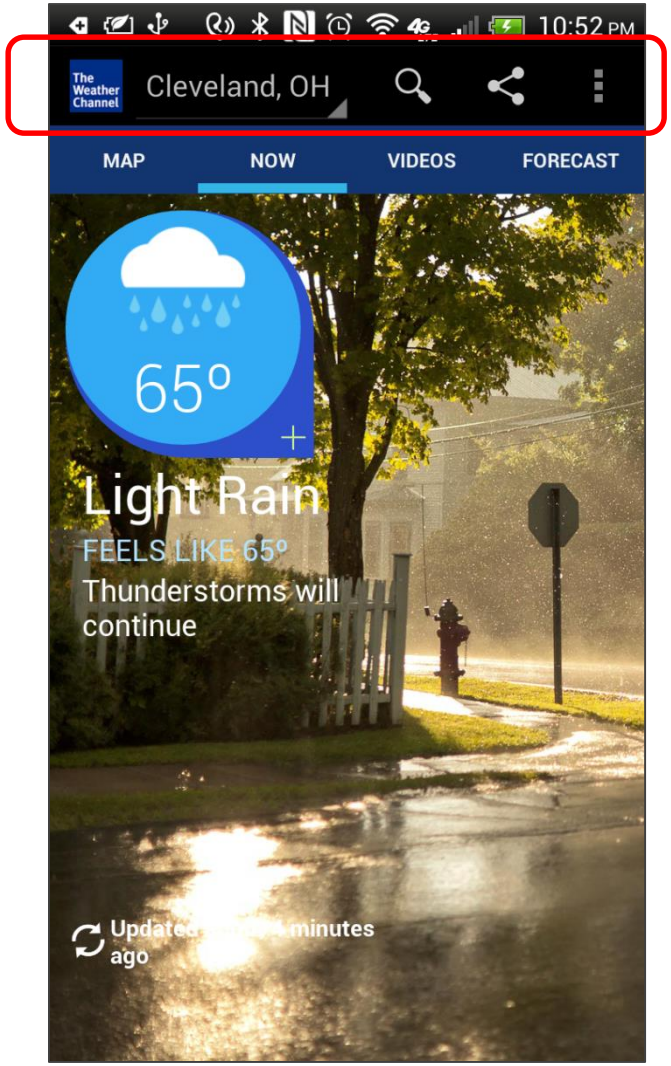


Example of Apps based on the ActionBar Architecture

	Free App Name	Downloads	Rating	Category
1	Google Search	1B	4.4	Tools
2	Gmail	1B	4.3	Communication
3	Google Maps	1B	4.3	Travel & Local
4	YouTube	1B	4.1	Media & Video
5	Facebook	1B	4.0	Social
6	WhatsApp	500M	4.4	Communications
7	Instagram	100M	4.5	Social
8	Pandora	100M	4.4	Music & Audio
9	Netflix	100M	4.4	Entertainment
10	Adobe Reader	100M	4.3	Productivity
11	Skype	100M	4.1	Communications
12	Twitter	100M	4.1	Social
13	eBay	50M	4.3	Shopping
14	Weather Channel	50M	4.2	Weather
15	Kindle	50M	4.1	Books & References
16	Wikipedia	10M	4.4	Books & References
17	Zillow	10M	4.4	Lifestyle
18	ESPN SportCenter	10M	4.2	Sports
19	BBC News	10M	4.2	News & Magazines
20	Amazon (Tablets)	10M	4.0	Shopping
21	Expedia	10M	4.0	Travel & Local

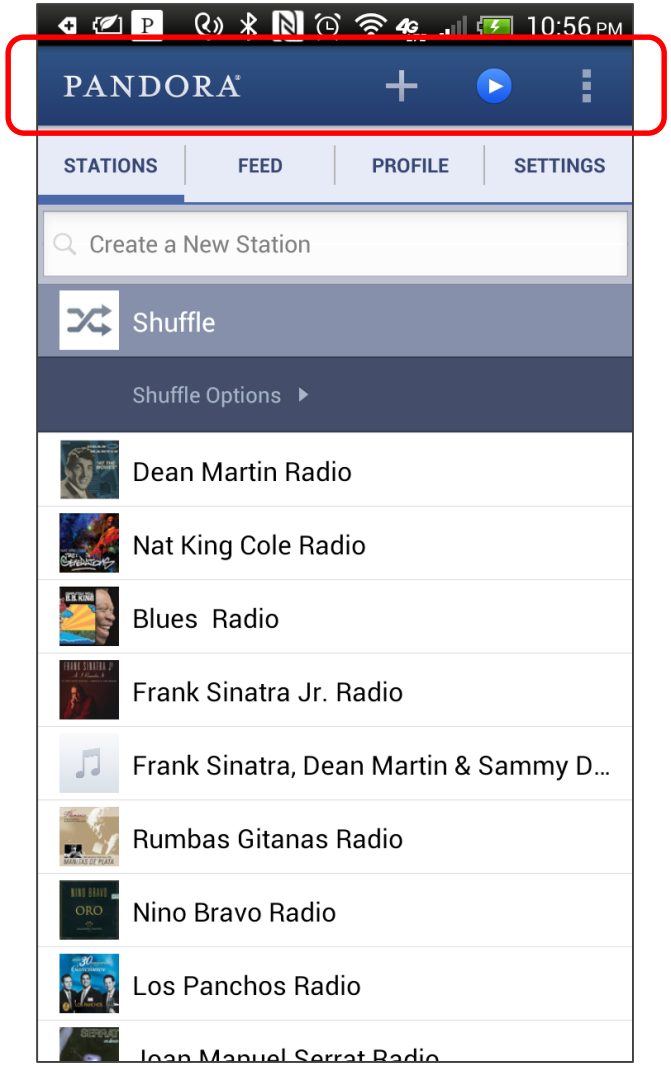
Source:
Google Play Store. Last visited: Feb 16, 2015. Link: https://play.google.com/store?hl=en

Example of Apps based on the ActionBar Architecture



ActionBar

Two different apps showing a relatively similar navigation pattern and visual structure.



Factoid: According to techcrunch.com as of Q1-2013 the *Weather Channel* mobile application has been downloaded more than 100 million times. On the other hand, *Pandora* app exceeds 250 million downloads.

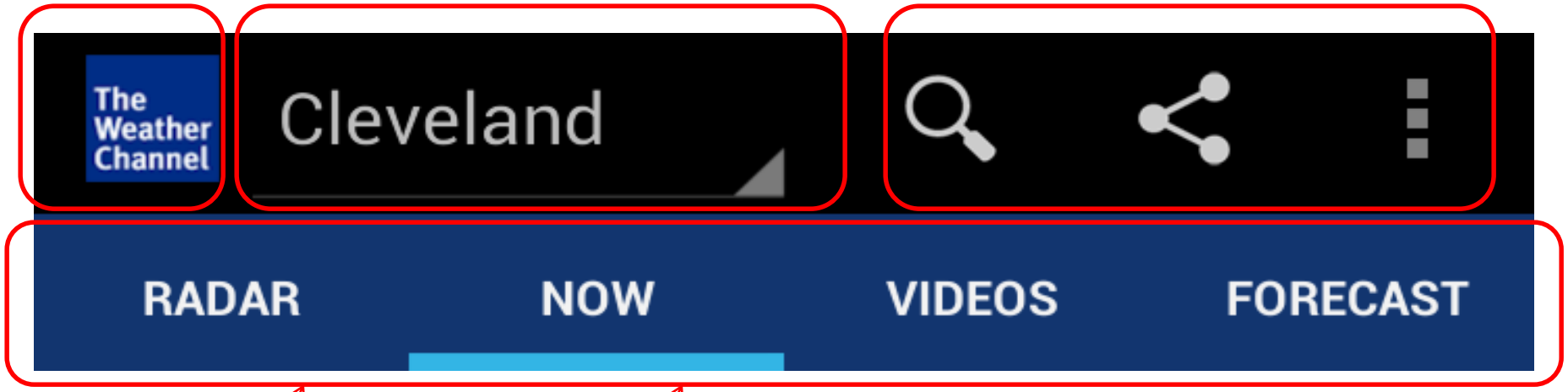
Reverse Engineering an App's ActionBar

A possible interpretation of the Weather Channel App's ActionBar+PageViewer design follows

Identity Logo

Custom ListView

Menu Items (Search & Share) and rest of ⋮ Options Menu (*topic is explored later*)



PageViewer Control

Current Tab Selection

In this example UI navigation is supported through PageViewer control (discussed later). Older apps used the ActionBar to anchor their navigation tabs (this technique is now deprecated – see Appendix)

Disclaimer:
The Weather Channel app is a copyrighted product and belongs to its authors and the Weather Channel LLC. Our interpretation of its organization is pure speculation intended to guide the reader into the appreciation of a well known and designed app.

ActionBar Architecture

The clickable *action tiles* (or action Items) exposed by an ActionBar are usually defined in a **res/menu** XML resource file. This resource file can be later inflated and shown as part of the app's global Option's Menu. Please notice that "Menu Items" and "Action Items" as well as "OptionMenu" and "ActionOverflow" are overlapping concepts.

By default each action item is included in a simple dropdown text-only list activated by the clicking of the virtual ⋮ ActionOverflow buton. However, selected tiles can be separately shown as icons (with or without text) as part of the ActionBar.

An OptionMenu generally persists for the lifetime of the app, however it could be dynamically enabled, disable, and changed.

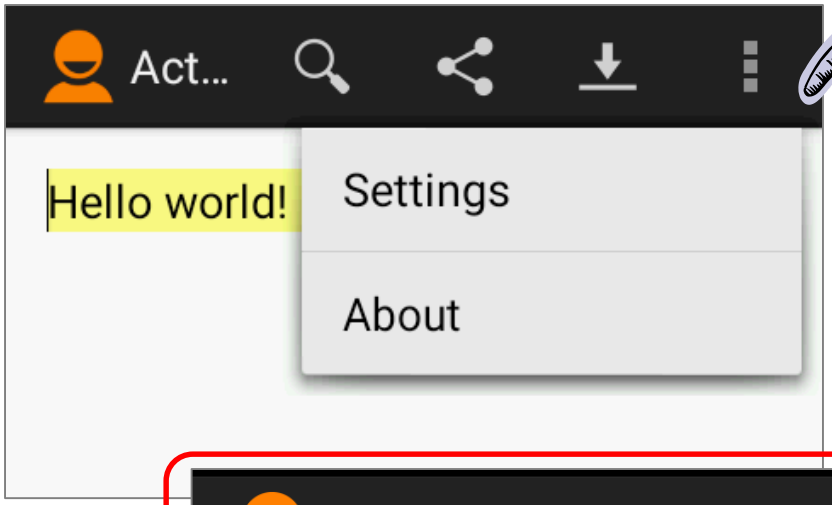
Two methods are responsible for most of the work related to interacting with the tiles on an ActionBar

onCreateOptionsMenu(…)
Inflates the XML specs defining each of the action-tiles.

onOptionsItemSelected(…)
Captures the click-event on any tile and dispatches the proper response to the user's request.

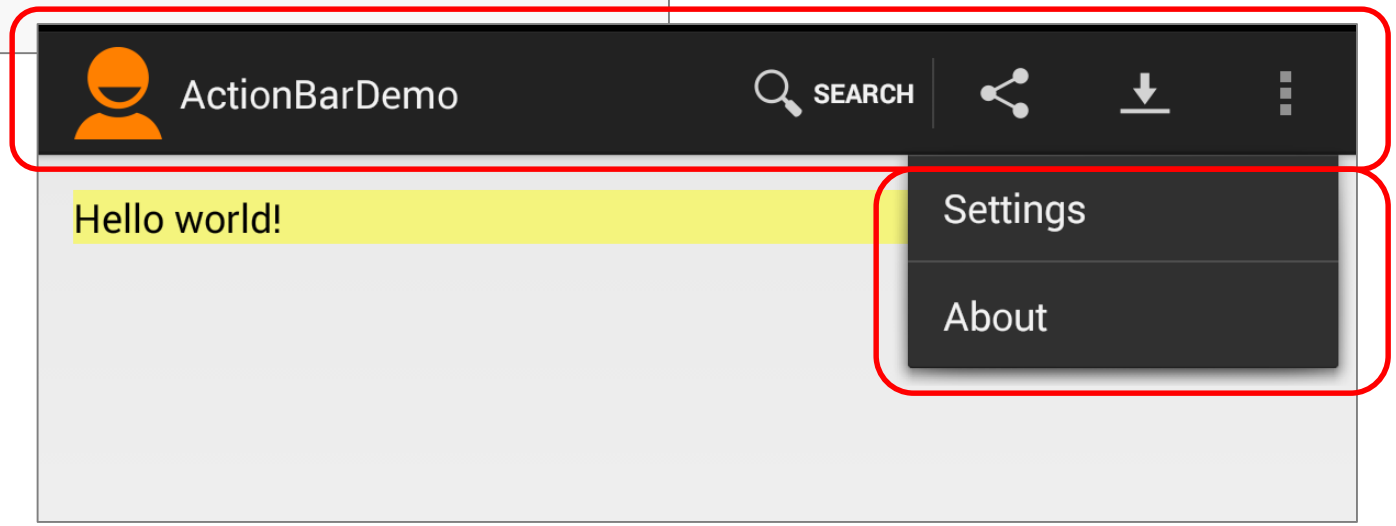
Example 1 – Creating a Simple ActionBar

This example uses the "Blank Application" ADT-wizard to generate a basic Android app. We modify its **res/menu/main.xml** file to produce a custom ActionBar. The screen-shots below are taken from a small handset and a tablet running the app.



Each ActionBar contains: logo, title, action-tiles, and overflow menu button. Images are slightly different, the final decision of how to best display the ActionBar is made by the Android runtime environment based on how much screen space is available.

→ ActionBar

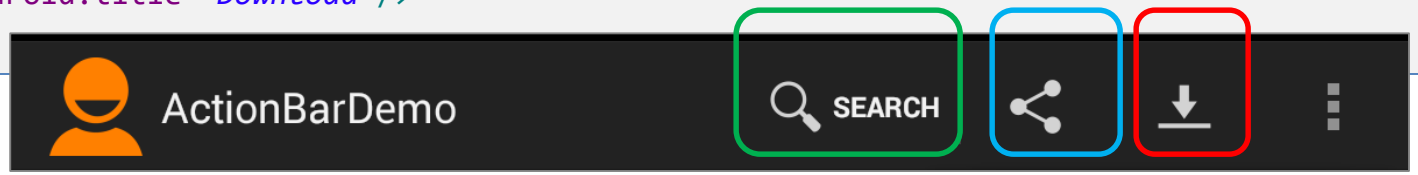


← Overflow Action Menu

Example 1 – Creating a Simple ActionBar

Below is the **res/menu/main.xml** definition used to create the app's ActionBar.

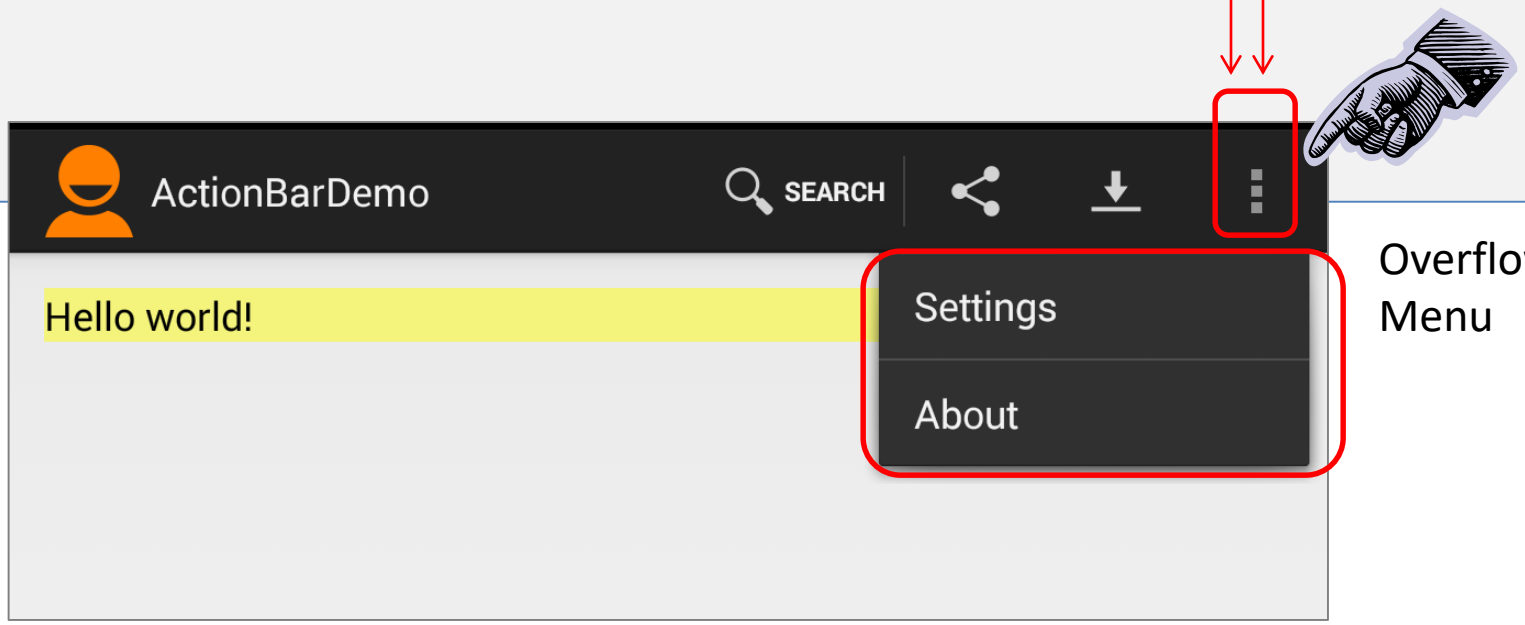
```
<menu xmlns:android="http://schemas.android.com/apk/res/android"
   xmlns:app="http://schemas.android.com/apk/res-auto"
   xmlns:tools="http://schemas.android.com/tools"
   tools:context="csu.matos.MainActivity" >

   <item
       android:id="@+id/action_search"
       android:icon="@drawable/ic_action_search"
       android:orderInCategory="120"
       android:showAsAction="always|withText"
       android:title="Search"/>
   <item
       android:id="@+id/action_share"
       android:icon="@drawable/ic_action_share"
       android:orderInCategory="140"
       android:showAsAction="always"
       android:title="Share"/>
   <item
       android:id="@+id/action_download"
       android:icon="@drawable/ic_action_download"
       android:orderInCategory="160"
       android:showAsAction="always"
       android:title="Download"/>
```



Example 1 – Creating a Simple ActionBar

Below is the **res/menu/main.xml** definition of the app's ActionBar.

```
<item
        android:id="@+id/action_settings"
        android:orderInCategory="180"
        android:showAsAction="never"
        android:title="Settings"/>
    <item
        android:id="@+id/action_about"
        android:orderInCategory="200"
        android:showAsAction="never"
        android:title="About"/>

</menu>
```

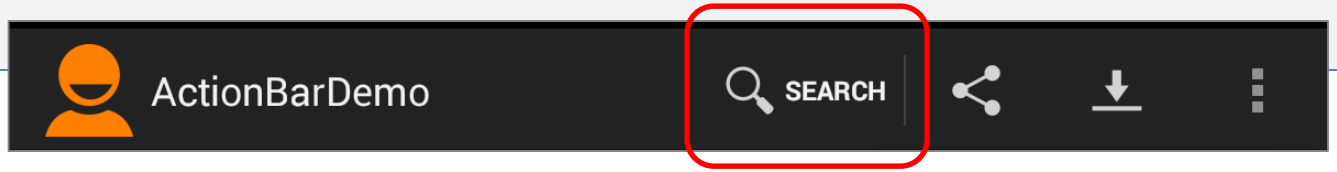


Overflow Menu

Example 1 – Creating a Simple ActionBar

Each menu <**item**> element represents an action-tile. Consider the following sample:

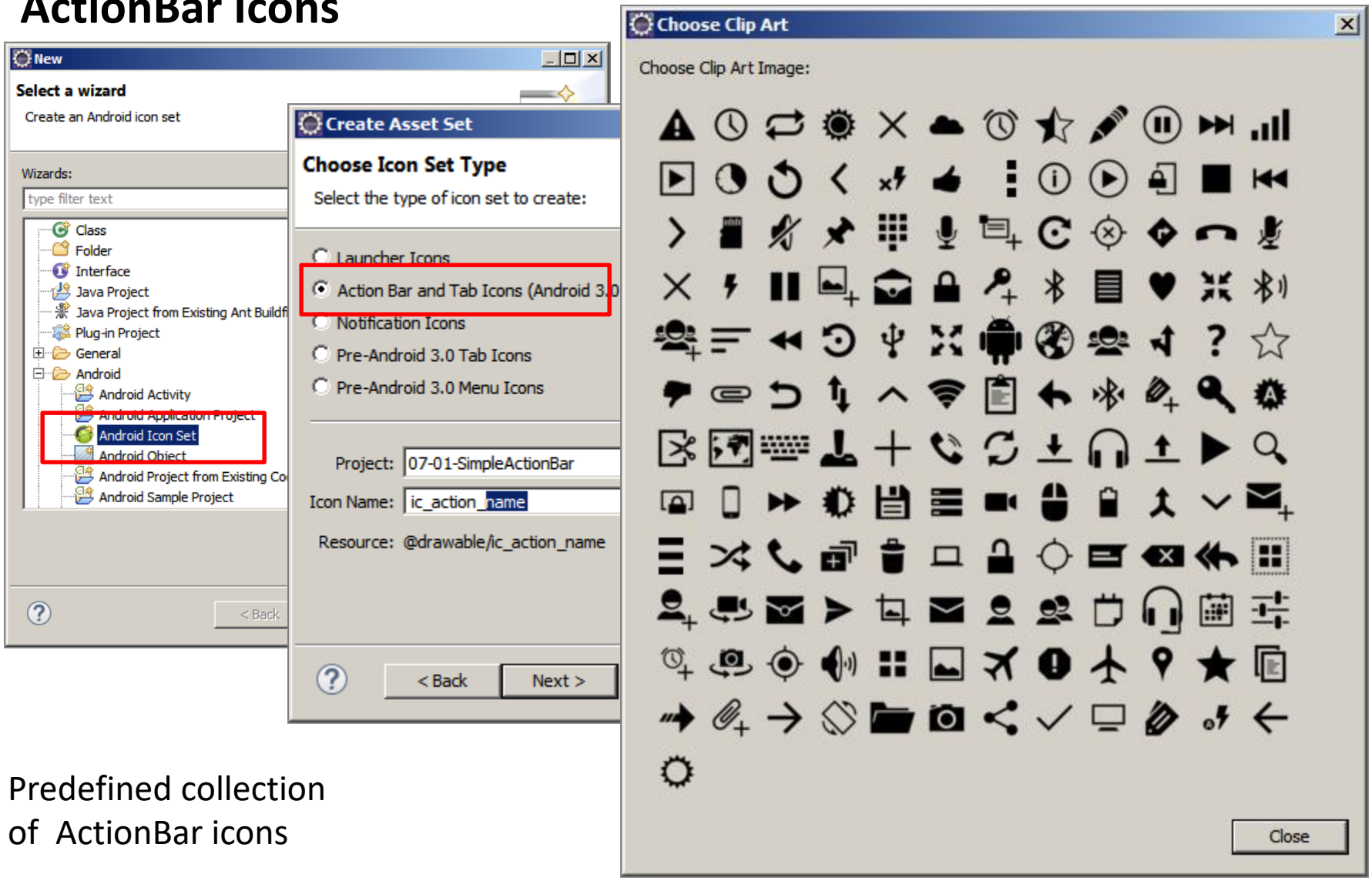
```
<item
        android:id="@+id/action_search"
        android:icon="@drawable/ic_action_search"
        android:orderInCategory="120"
        android:showAsAction="always|withText"
        android:title="Search"/>
```



android:id	Action tile **ID** (@+id/action_search), needed to identify what action has been selected.
android:icon	Optional icon to be displayed with this entry. For guidance on how to create an action icon consult **http://developer.android.com/design/style/iconography.html**
:orderInCategory	Relative position of the tile on the ActionBar (100, 120, 140, ...)
:showAsAction	Custom placement of an individual tile is determined using the clauses: “never”, “ifRoom”, “always”, “withText”, and “collapseActionView”.
:title	Optional text (‘SEARCH’) describing the action-tile

Example 1 – Creating a Simple ActionBar

ActionBar Icons



Predefined collection of ActionBar icons

Example 1 – Creating a Simple ActionBar

ActivityMain.java

```
public class MainActivity extends Activity {
    EditText txtMsg;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
1       txtMsg = (EditText)findViewById(R.id.txtMsg);
    }

    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        // Inflate the menu; add items to the action bar
2       getMenuInflater().inflate(R.menu.main, menu);
        return true;
    }

    @Override
    public boolean onOptionsItemSelected(MenuItem item) {
        // user clicked a menu-item from ActionBar
        int id = item.getItemId();

3       if (id == R.id.action_search) {
            txtMsg.setText("Search...");
            // perform SEARCH operations...
            return true;
        }
```

Example 1 – Creating a Simple ActionBar

ActivityMain.java

3

```
        else if (id == R.id.action_share) {
            txtMsg.setText("Share...");
            // perform SHARE operations...
            return true;
        }
        else if (id == R.id.action_download) {
            txtMsg.setText("Download...");
            // perform DOWNLOAD operations...
            return true;
        }
        else if (id == R.id.action_about) {
            txtMsg.setText("About...");
            // perform ABOUT operations...
            return true;
        }
        else if (id == R.id.action_settings) {
            txtMsg.setText("Settings...");
            // perform SETTING operations...
            return true;
        }

        return false;
    }
}
```

Example 1 – Creating a Simple ActionBar

Comments: ActivityMain.java

1. Plumbing operation. Establish access to the GUI's **EditText** field displaying the "Hello World" line.

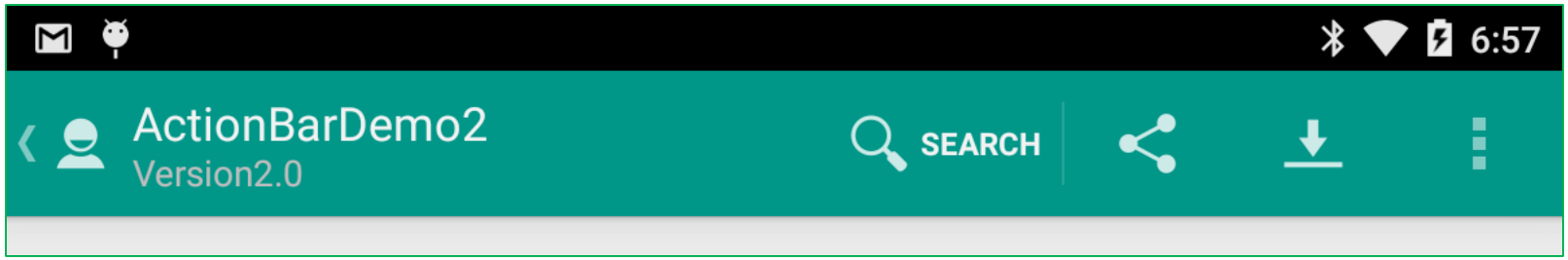
2. The method `onCreateOptionsMenu()` is called to prepare the app's OptionMenu. The xml file **res/memu/main.xml** containing the ActionBar item specifications is inflated using a MenuInflater object. Some action items will be shown on the ActionBar as an Icon/Text tile and the rest moved to the overflow menu window.

3. When the user clicks on a reactive portion of the ActionBar, its item's ID is supplied to the `onOptionsItemSelected()` method. There you branch to the appropriated service routine where the action is served. Finally return **true** to signal the event has been fully consumed.

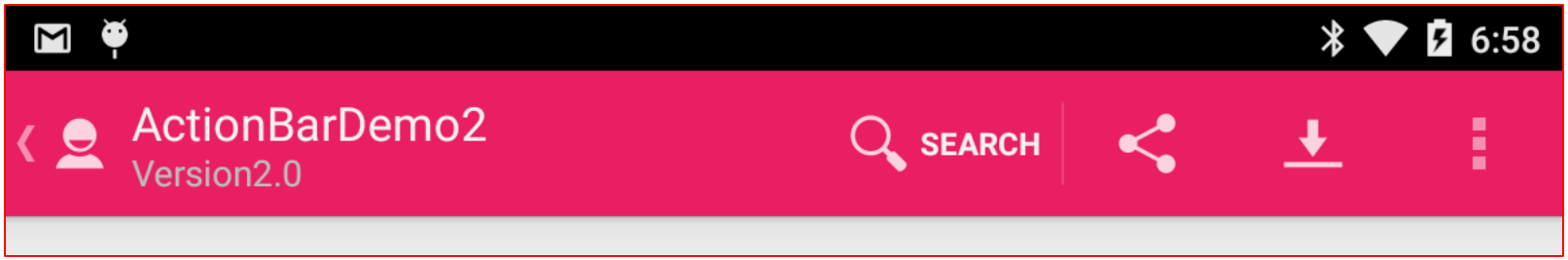
Example 2 – Modifying the ActionBar

This example is a minor extension of Example1. The ActionBar is modified so it can show a different background color, logo, and UP affordance. Colors selected from: http://www.google.com/design/spec/style/color.html#color-color-palette

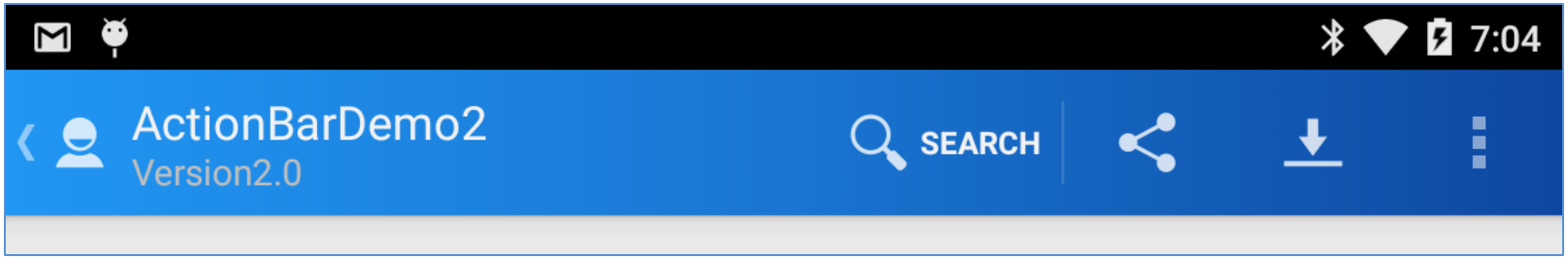
1



2



3



Colors: (1) Teal-500, (2) Pink-500, (3) Gradient Blue-500-700-900

Example 2 – Modifying the ActionBar

The ActionBar is programmatically changed as follows

```
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
    txtMsg = (EditText)findViewById(R.id.txtMsg);

    // setup ActionBar
    actionBar = getActionBar();

    actionBar.setTitle("ActionBarDemo2");
    actionBar.setSubtitle("Version2.0");
    actionBar.setIcon(R.drawable.ic_action_logo);

    // choose one type of background
    actionBar.setBackgroundDrawable(getResources().getDrawable(R.drawable.mybackground0));
    actionBar.setBackgroundDrawable(getResources().getDrawable(R.drawable.mybackground1));
    actionBar.setBackgroundDrawable(getResources().getDrawable(R.drawable.mybackground2));

    actionBar.setDisplayShowCustomEnabled(true);    // allow custom views to be shown
    actionBar.setDisplayHomeAsUpEnabled(true);      // show 'UP' affordance < button
    actionBar.setDisplayShowHomeEnabled(true);      // allow app icon – logo to be shown
    actionBar.setHomeButtonEnabled(true);           // needed for API14 or greater

 }
```

1 → `actionBar = getActionBar();`

2 → `actionBar.setSubtitle("Version2.0");`

3 → `actionBar.setBackgroundDrawable(getResources().getDrawable(R.drawable.mybackground0));`

4 → `actionBar.setDisplayShowCustomEnabled(true);`

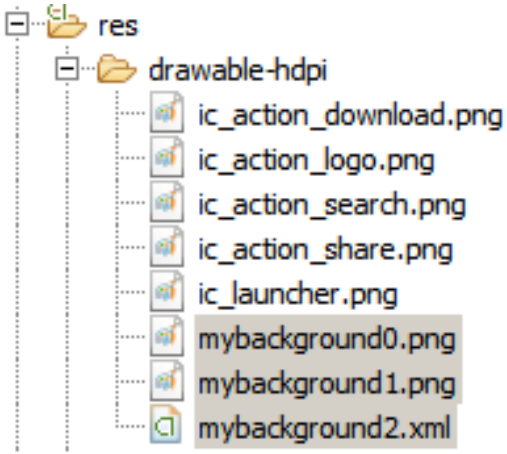
Example 2 – Modifying the ActionBar

Comments

1. A call to the `getActionBar()` method returns a handle to the app's ActionBar. Using this reference you now have programmatic control to any of its components.

2. In this example a new title & subtitle is assigned to the ActionBar. Notice that when you work with a complex app exposing many screens, changing title and/or subtitle becomes a simple, yet powerful way of guiding the user through the app.

3. The app's identifying logo could be changed with a call to `.setLogo(drawable)`. Similarly, the ActionBar's background image could be changed to any drawable you chose. In our example the first two backgrounds are just a pair of solid rectangular Teal and Pink color swatches stored as .PNG images and added to the **res/drawable** folder.



mybackground0.png

mybackground1.png

Example 2 – Modifying the ActionBar

Comments

3. (*cont.*) You may also provide an XML gradient definition for a background. For instance

```
<shape xmlns:android="http://schemas.android.com/apk/res/android"
    android:shape="rectangle">
    <gradient
        android:angle="0"
        android:centerColor="#1976D2"
        android:centerX="50%"
        android:endColor="#0D47A1"
        android:startColor="#2196F3"
        android:type="linear" />
</shape>
```

4. You may set/reset features such as: show custom views, show Up-affordance, and show application's logo or icon.

```
// set ActionBar options
actionBar.setDisplayShowCustomEnabled(true); // allow custom views to be shown
actionBar.setDisplayHomeAsUpEnabled(true);   // show 'UP' affordance < button
actionBar.setDisplayShowHomeEnabled(true);   // allow app icon – logo to be shown
actionBar.setHomeButtonEnabled(true);        // needed for API.14 or greater
```

Example 2 – Modifying the ActionBar

Comments

4. (*cont.*) Alternatively, you may set/reset the ActionBar features using a single statement.

```
// set ActionBar options

actionBar.setDisplayOptions(  ActionBar.DISPLAY_SHOW_TITLE
                            | ActionBar.DISPLAY_SHOW_HOME
                            | ActionBar.DISPLAY_HOME_AS_UP
                            | ActionBar.DISPLAY_SHOW_CUSTOM );
```

MISCELLANEOUS. Drawing Resources

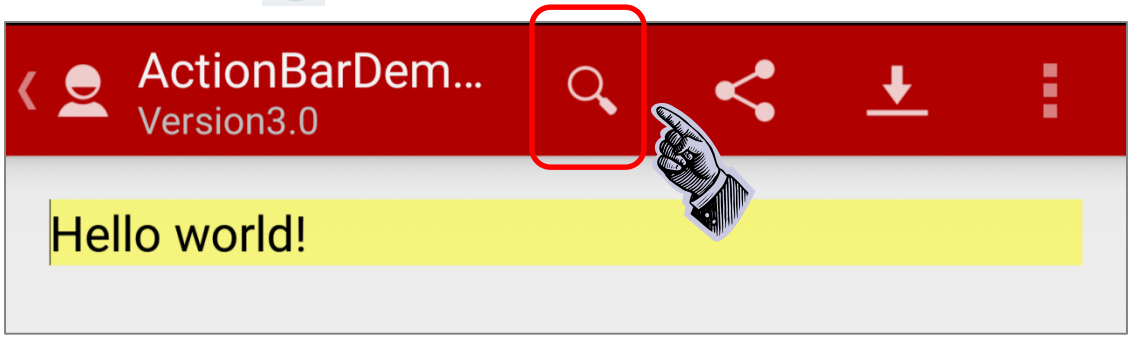
Gradients http://angrytools.com/gradient/

Color Chart http://www.google.com/design/spec/style/color.html#color-color-palette

Drawables http://developer.android.com/guide/topics/resources/drawable-resource.html

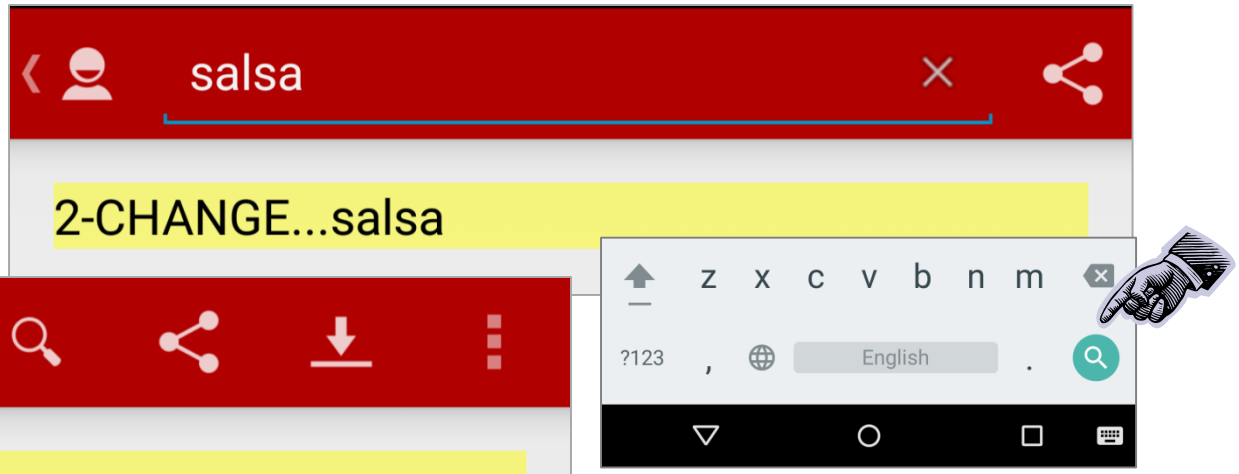
Example 3 – Search ActionBar Tile

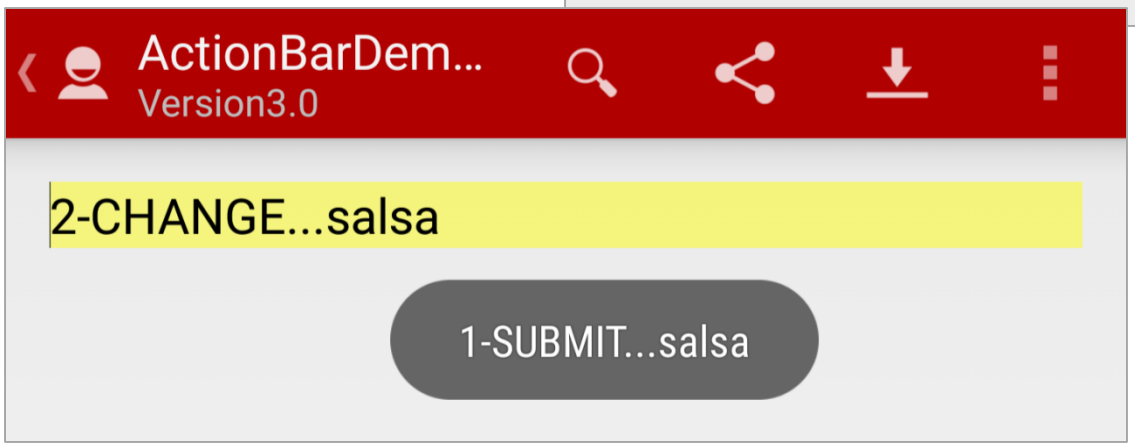
This is an extension of Example1. The ActionBar *search option* is implemented using a **SearchView** widget as a menu item. When the user finally taps on the keyboard's SEARCH key the text captured in the SeachView box is used to trigger an inquiry.



Press × to clear query string

A listener watches for each new character added to the query





Press to close SearchView and submit query

Example 3 – Search ActionBar Tile

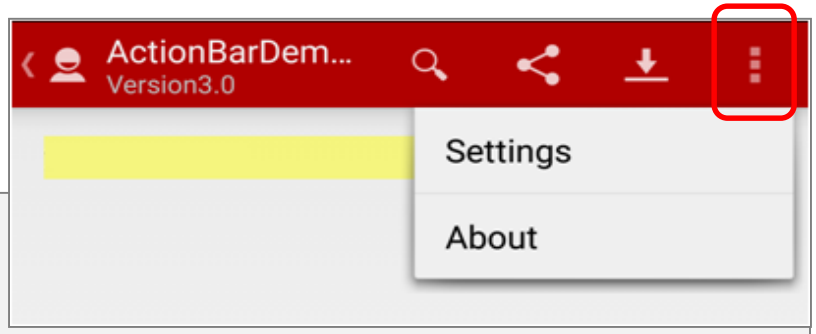
The **SearchView** box is defined as part of the ActionBar through an **XML MENU** file similar To the following code sample


```
<menu xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    tools:context="csu.matos.MainActivity" >

    <item
        android:id="@+id/action_search"
        android:actionViewClass="android.widget.SearchView"
        android:orderInCategory="120"
        android:showAsAction="always|withText"
        android:title="Search"/>
    <item
        android:id="@+id/action_share"
        android:icon="@drawable/ic_action_share"
        android:orderInCategory="140"
        android:showAsAction="always"
        android:title="Share"/>
    <item
        android:id="@+id/action_download"
        android:icon="@drawable/ic_action_download"
        android:orderInCategory="160"
        android:showAsAction="always"
        android:title="Download"/>
```

1

Example 3 – Search ActionBar Tile

The **SearchView** box is defined as part of the ActionBar through an **XML MENU** file similar To the following code sample




```
<item
        android:id="@+id/action_settings"
        android:orderInCategory="180"
        android:showAsAction="never"
        android:title="Settings"/>
    <item
        android:id="@+id/action_about"
        android:orderInCategory="200"
        android:showAsAction="never"
        android:title="About"/>

</menu>
```

Comments

1. The item *action_search* does not include an **:icon** clause, instead it relies on the clause **android:actionViewClass="*android.widget.SearchView*"** to set a collapsible view that –when expanded- allows the user to enter a search query and later submit it to a search provider.

Example 3 – Search ActionBar Tile

Setting up the ActionBar
The code on this page is taken from Example2.

```
public class MainActivity extends Activity {
   EditText txtMsg;
   ActionBar actionBar;
   SearchView txtSearchValue;

   @Override
   protected void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.activity_main);
      txtMsg = (EditText) findViewById(R.id.txtMsg);

      // setup the ActionBar
      actionBar = getActionBar();
      actionBar.setTitle("ActionBarDemo3");
      actionBar.setSubtitle("Version3.0");
      actionBar.setIcon(R.drawable.ic_action_logo);
      actionBar.setBackgroundDrawable(getResources().getDrawable(
                                    R.drawable.mybackground1));

      actionBar.setDisplayShowCustomEnabled(true);  // allow custom views to be shown
      actionBar.setDisplayHomeAsUpEnabled(true);    // show 'UP' affordance < button
      actionBar.setDisplayShowHomeEnabled(true);    // allow app icon – logo to be shown
      actionBar.setHomeButtonEnabled(true);         // needed for API14 or greater

   }
```

Example 3 – Search ActionBar Tile


```
@Override
public boolean onCreateOptionsMenu(Menu menu) {
   // Inflate the options menu to adds items from menu/main.xml into the ActionBar
   getMenuInflater().inflate(R.menu.main, menu);
   // get access to the collapsible SearchView
1  txtSearchValue = (SearchView) menu.findItem(R.id.action_search)
                                                   .getActionView();
   // set searchView listener (look for text changes, and submit event)
   txtSearchValue.setOnQueryTextListener(new OnQueryTextListener() {

      @Override
      public boolean onQueryTextSubmit(String query) {
2        Toast.makeText(getApplicationContext(), "1-SUBMIT..." + query,
                                Toast.LENGTH_SHORT).show();
         // recreate the 'original' ActionBar (collapse the SearchBox)
         invalidateOptionsMenu();
         // clear searchView text
         txtSearchValue.setQuery("", false);
         return false;
      }

      @Override
3     public boolean onQueryTextChange(String newText) {
         // accept input one character at the time
         txtMsg.append("\n2-CHANGE..." + newText);
         return false;
      }
   });
   return true;
}
```

Example 3 – Search ActionBar Tile

4

```
   @Override
   public boolean onOptionsItemSelected(MenuItem item) {
      // Handle ActionBar item clicks here.
      // NOTE: Observe that SEARCH menuItem is NOT processed in this
      // method (it has its own listener set by onCreateOptionsMenu)

      int id = item.getItemId();

      if (id == android.R.id.home) {
         txtMsg.setText("Home...");
         return true;
      } else if (id == R.id.action_share) {
         txtMsg.setText("Share...");

         return true;
      } else if (id == R.id.action_download) {
         txtMsg.setText("Download...");
         return true;
      } else if (id == R.id.action_about) {
         txtMsg.setText("About...");
         return true;
      } else if (id == R.id.action_settings) {
         txtMsg.setText("Settings...");
         return true;
      }

      return false;
   } //onOptionsItemSelected

} //MainActivity
```

Example 3 – Search ActionBar Tile

Comments

1. During the execution of **onCreateOptionsMenu**() the items defined in the resource file *menu/main.xml* are added to the ActionBar. The statement
```
txtSearchValue = (SearchView) menu.findItem(R.id.action_search)
                                        .getActionView();
```
gives you access to the SearchView, which is by default shown as a *search* icon.

2. The next step consists in defining a **QueryTextListener** on top of the SearchView. The listener has two methods. The first is **onQueryTextSubmit**() which is executed after the user taps on the virtual keyboard's the '*search*' key. At this point, the text collected in the SearchView could be sent to a user-defined *search provider*. The statement *invalidateOptionsMenu*() closes the current search view and re-draws the ActionBar. The statement .*setQuery*(*"", false*) is used to clear the text area of the newly created SearchView (not yet visible).

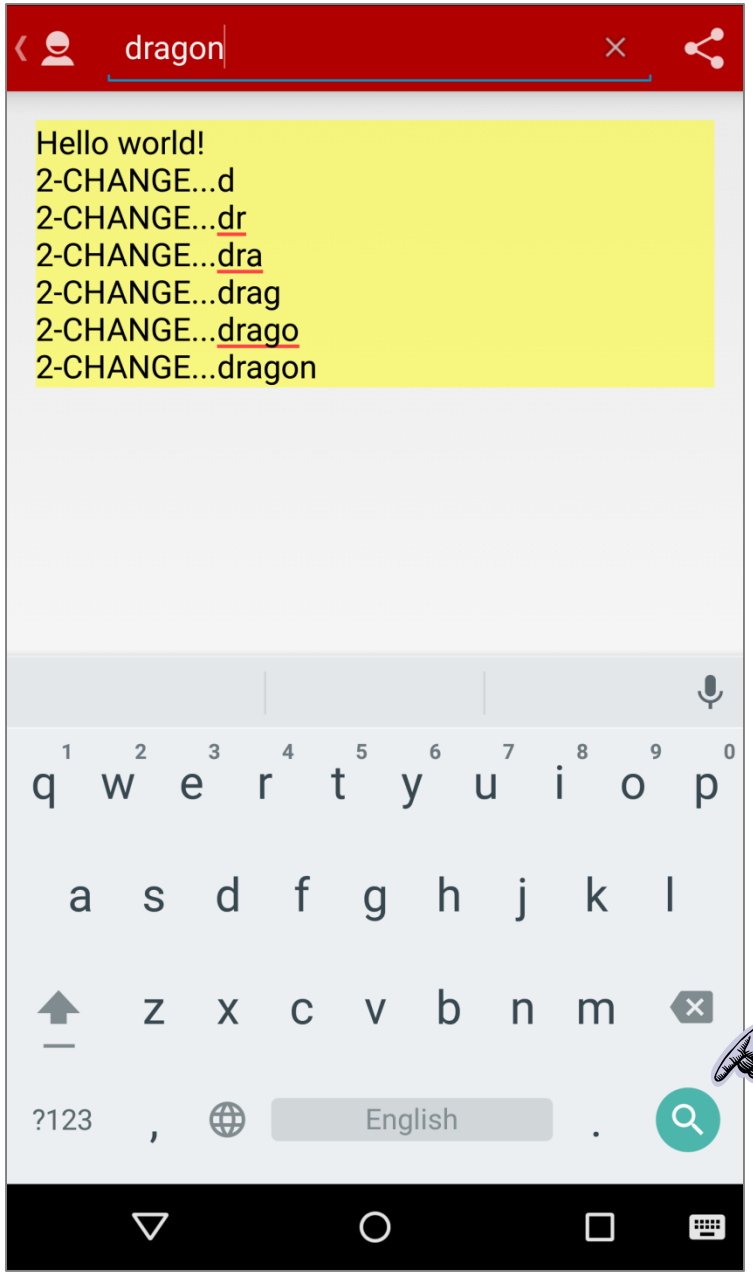
3. The second listening method **`onQueryTextChange`** is a text-watcher called after a new character is added to the SearchView. You may use this method to show suggestions progressively refined as more symbols are added to the query string.

Example 3 – Search ActionBar Tile

Compatibility

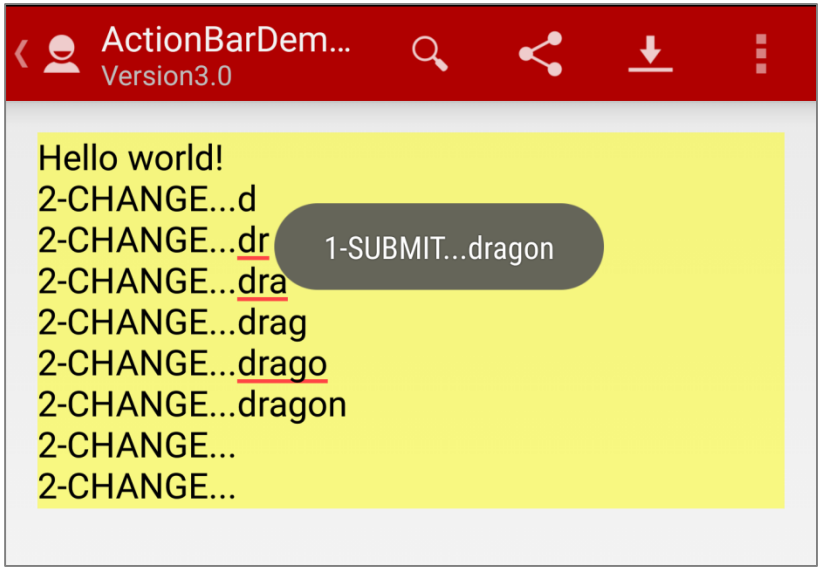
```
// Get action bar
ActionBar actionBar = getSupportActionBar();

// Set actionView as a SearchView
app:actionViewClass="android.support.v7.widget.SearchView"
```

Example 3 – Search ActionBar Tile



A sample screen illustrating the execution of Example3. Notice how the listener reacts to the typing of each new character into the query area of the SearchBox.

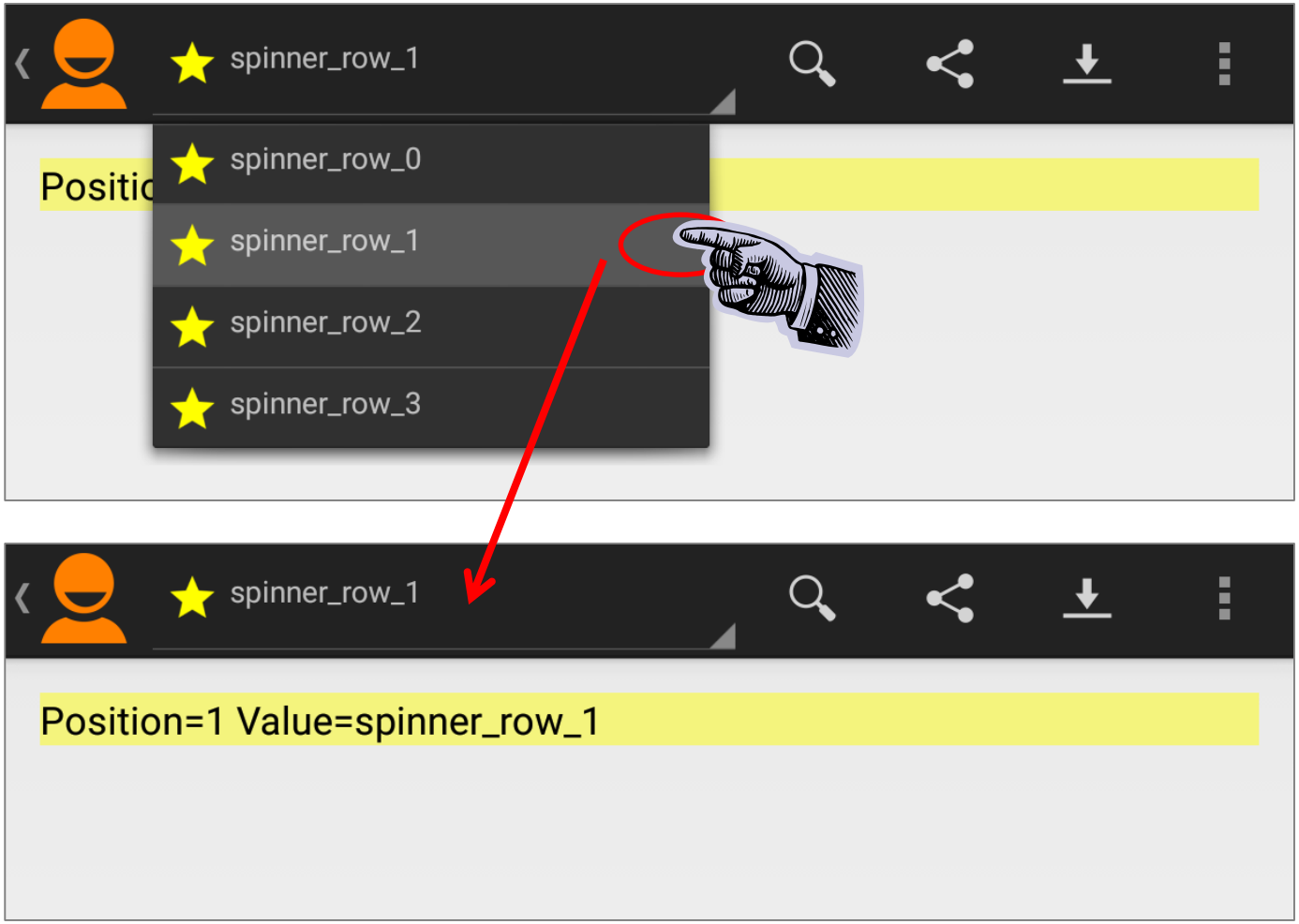
The toast-message appears after submitting the query string.



Example 4 – CustomView - Spinner

In this example a custom view showing a **Spinner** widget is added to the ActionBar. The app's **res/menu/main.xml** is the same used in Example1 (showing Search, Share, Download, and Overflow-Items).

For example, The **Weather Channel** app presents in its ActionBar a **spinner** widget to set location.



Example 4 – CustomView - Spinner

First, you need to define the XML layout for the custom view that is going to be added to the ActionBar. In our example the custom view is a simple Spinner specified as follows:

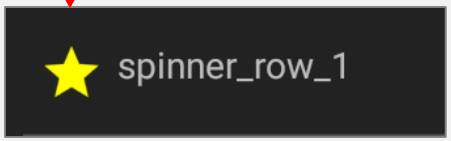
custom_spinner_view_on_actionbar.xml

```
<Spinner
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/spinner_data_row"
    android:layout_width="match_parent"
    android:layout_height="match_parent" />
```

In the next step , you state the layout of individual lines to be held by the Spinner.

custom_spinner_row_icon_caption.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent" android:layout_height="wrap_content"
    android:orientation="horizontal"    android:padding="6dp" >
    <ImageView
        android:id="@+id/imgSpinnerRowIcon"
        android:layout_width="25dp" android:layout_height="25dp"
        android:layout_marginRight="5dp"
        android:src="@drawable/ic_launcher" />
    <TextView
        android:id="@+id/txtSpinnerRowCaption"
        android:layout_width="wrap_content"  android:layout_height="wrap_content" />
</LinearLayout>
```



Example 4 – CustomView - Spinner

We have chosen the **onCreate** method to attach the spinner custom view to the ActionBar. Then you add a data adapter and an 'ItemSelected' listener to the spinner

```
@Override
protected void onResume() {
     super.onResume();
     actionBar = getActionBar();                    // setup the ActionBar
     actionBar.setDisplayShowCustomEnabled(true);  // allow custom views to be shown
     actionBar.setDisplayHomeAsUpEnabled(true);    // show 'UP' affordance < button
     actionBar.setDisplayShowHomeEnabled(true);    // allow app icon – logo to be shown
     actionBar.setHomeButtonEnabled(true);         // needed for API.14 or greater

     // move the spinner to the actionBar as a CustomView
     actionBar.setCustomView(R.layout.custom_spinner_view_on_actionbar);

     // create the custom adapter to feed the spinner
     customSpinnerAdapter = new SpinnerCustomAdapter(
                              getApplicationContext(),
                              SpinnerDummyContent.customSpinnerList);

     // plumbing - get access to the spinner widget shown on the actionBar
     customSpinner = (Spinner)
     actionBar.getCustomView().findViewById(R.id.spinner_data_row);

     // bind spinner and adapter
     customSpinner.setAdapter(customSpinnerAdapter);

     // put a listener to wait for spinner rows to be selected
     customSpinner.setOnItemSelectedListener(this);
     customSpinner.setSelection(selectedSpinnerRow);

}//onResume
```

Example 4 – CustomView - Spinner

SpinnerCustomAdapter. The following is a custom adapter that inflates spinner rows. Each row holds an image and a caption as defined by **custom_spinner_row_icon_caption.xml.**

```
public class SpinnerCustomAdapter extends BaseAdapter {

  private ImageView spinnerRowIcon;
  private TextView spinnerRowCaption;
  private ArrayList<SpinnerRow> spinnerRows;
  private Context context;

  public SpinnerCustomAdapter(Context applicationContext,
                              ArrayList<SpinnerRow> customSpinnerList) {
    this.spinnerRows = customSpinnerList;
    this.context = applicationContext;
  }

  @Override
  public int getCount() {
    return spinnerRows.size();
  }

  @Override
  public Object getItem(int index) {
    return spinnerRows.get(index);
  }

  @Override
  public long getItemId(int position) {
    return position;
  }
```

Example 4 – CustomView - Spinner

SpinnerCustomAdapter. The following is a custom adapter that inflates spinner rows. Each row holds an image and a caption as defined by **custom_spinner_row_icon_caption.xml.**

```
  @Override
  public View getView(final int position, View convertView, ViewGroup parent) {

        if (convertView == null) {
          LayoutInflater mInflater = (LayoutInflater)  context.getSystemService(
                                       Activity.LAYOUT_INFLATER_SERVICE);
          convertView=mInflater.inflate(R.layout.custom_spinner_row_icon_caption, null);
        }

        spinnerRowIcon = (ImageView) convertView.findViewById(R.id.imgSpinnerRowIcon);
        spinnerRowCaption = (TextView)  convertView.findViewById(
                                       R.id.txtSpinnerRowCaption);

        spinnerRowIcon.setImageResource(spinnerRows.get(position).getIcon());

        spinnerRowCaption.setText(spinnerRows.get(position).getCaption());

        convertView.setId(position);

        return convertView;
  }

}
```

Example 4 – CustomView - Spinner

Dummy Data (SpinnerDummyContent.java). Use the following code fragment to generate spinner's data.

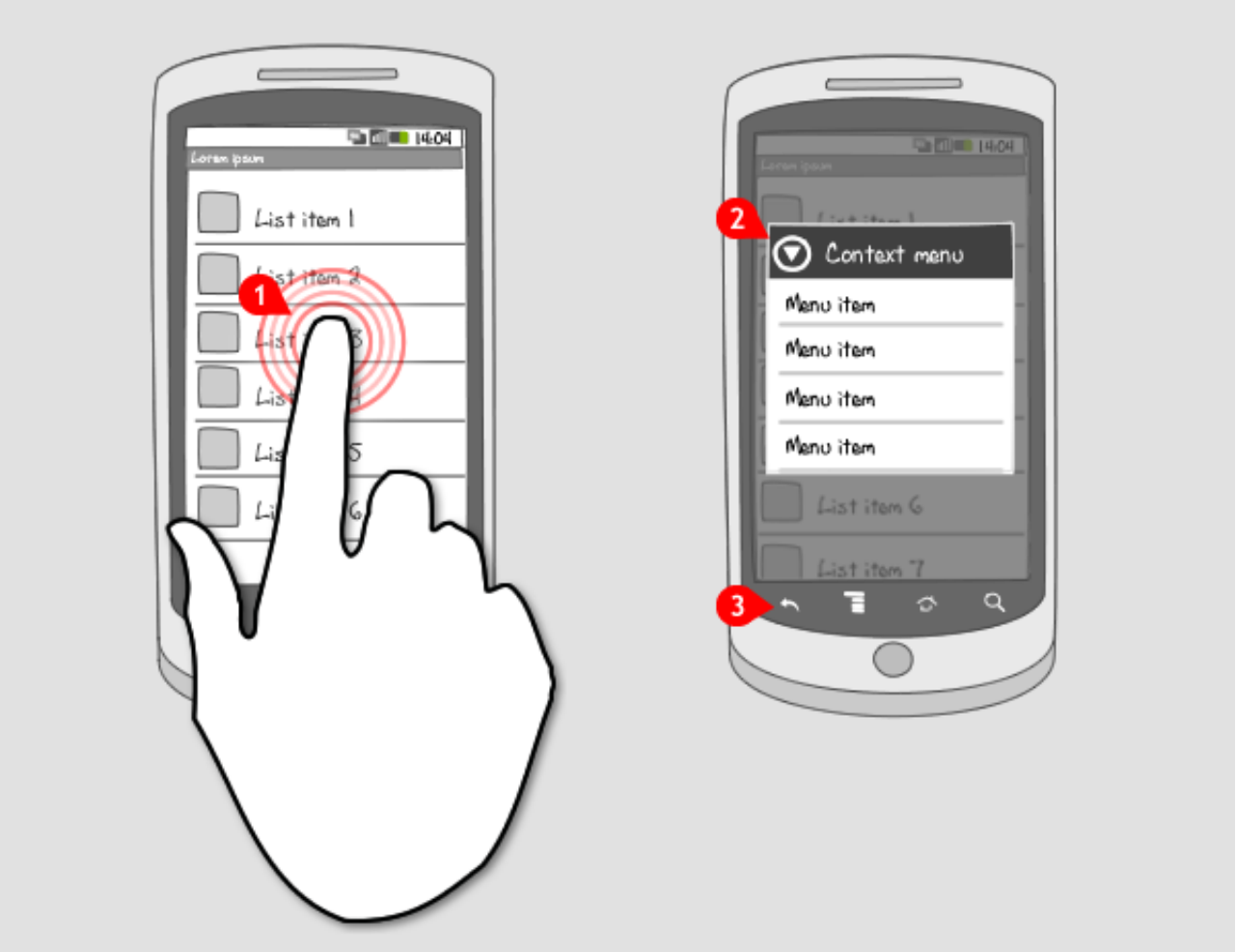
```
public class SpinnerDummyContent {

   public static ArrayList<SpinnerRow> customSpinnerList = new
                                       ArrayList<SpinnerRow>();
   static {

      // preparing spinner data (a set of [caption, icon] objects)
      customSpinnerList.add( new SpinnerRow("spinner_row_0",
                             R.drawable.ic_spinner_row_icon));
      customSpinnerList.add( new SpinnerRow("spinner_row_1",
                             R.drawable.ic_spinner_row_icon));
      customSpinnerList.add( new SpinnerRow("spinner_row_2",
                             R.drawable.ic_spinner_row_icon));
      customSpinnerList.add( new SpinnerRow("spinner_row_3",
                             R.drawable.ic_spinner_row_icon));

   }
```

Example 4 – CustomView - Spinner

Dummy Data (SpinnerDummyContent.java). Use the following code fragment to generate spinner's data.

```
   public static class SpinnerRow {  // each row consists of [caption, icon]
      private String caption;
      private int icon;

      public SpinnerRow(String caption, int icon) {
         this.caption = caption;  this.icon = icon;
      }

      public String getCaption() {
         return this.caption;
      }

      public int getIcon() {
         return this.icon;
      }

      @Override
      public String toString() {
         return caption;
      }
   }//SpinnerRow

}
```

Example 5 – Context Menu



Tap and hold on an item to open the context menu

Example 5 – Context Menu for single widget

```
registerForContextMenu(imageView);
```

```
@Override
public void onCreateContextMenu(ContextMenu menu, View v,
ContextMenu.ContextMenuInfo menuInfo) {
    super.onCreateContextMenu(menu, v, menuInfo);
    menu.setHeaderTitle("Select action");
    menu.add(0, CALL_ID, 0, "Call"); // groupId, itemId, order, title
    menu.add(0, SMS_ID, 0, "SMS");
}
```

```
@Override
public boolean onContextItemSelected(MenuItem item) {
    if(item.getTitle()=="Call"){
        Toast.makeText(getApplicationContext(),"calling code",
Toast.LENGTH_LONG).show();
    }
    else if(item.getTitle()=="SMS"){
        Toast.makeText(getApplicationContext(),"sending sms code",
Toast.LENGTH_LONG).show();
    }else{
        return false;
    }
    return true;
}
```

Example 5 – Context Menu for list view

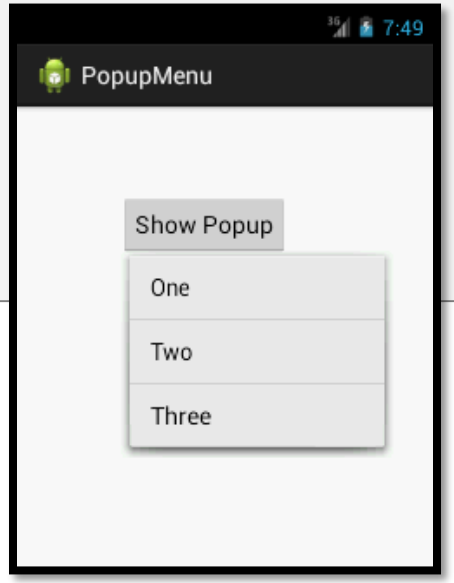
```
registerForContextMenu(listView);
listView.setLongClickable(true);
```

Get clicked item position:

```
AdapterView.AdapterContextMenuInfo info =
(AdapterView.AdapterContextMenuInfo)item.getMenuInfo();
Log.v("TAG", "onCreateContextMenu Position: " +
info.position);
```

Example 6 – Popup Menu

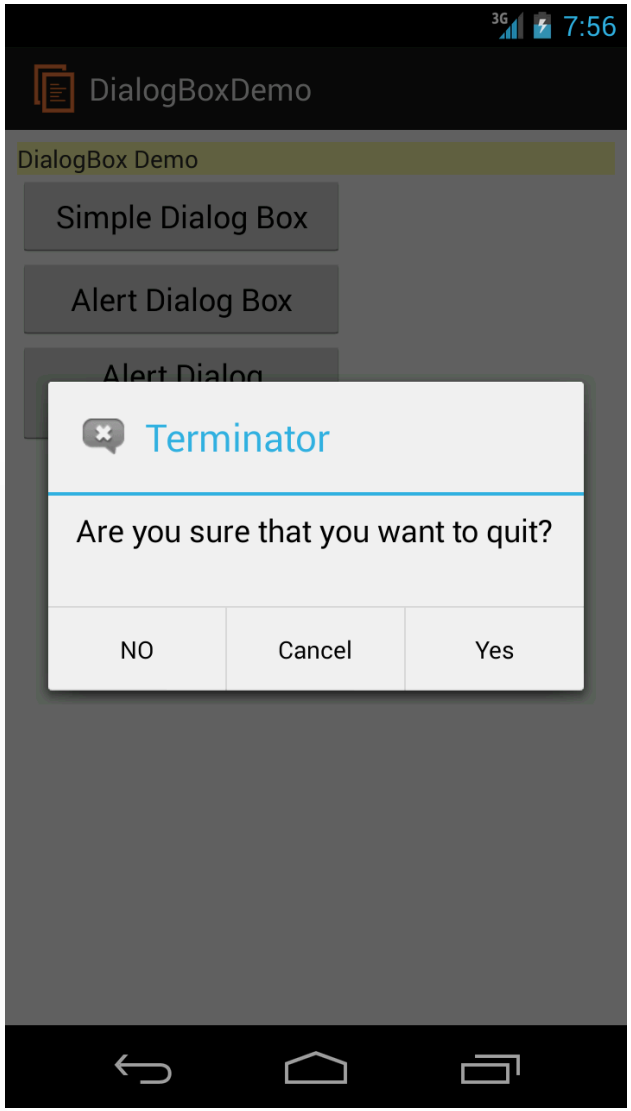
```
findViewById(R.id.buttonPopup).setOnClickListener(new
View.OnClickListener() {
    @Override
    public void onClick(View view) {
        PopupMenu popupMenu = new PopupMenu(MainActivity.this,
buttonPopup);
        popupMenu.getMenuInflater().inflate(R.menu.popup_menu,
popupMenu.getMenu());
        popupMenu.setOnMenuItemClickListener(new
PopupMenu.OnMenuItemClickListener() {
            @Override
            public boolean onMenuItemClick(MenuItem menuItem) {
                Toast.makeText(MainActivity.this, menuItem.getTitle() + "
is selected", Toast.LENGTH_SHORT).show();
                return true;
            }
        });
        popupMenu.show();
    }
});
```



Android DialogBoxes

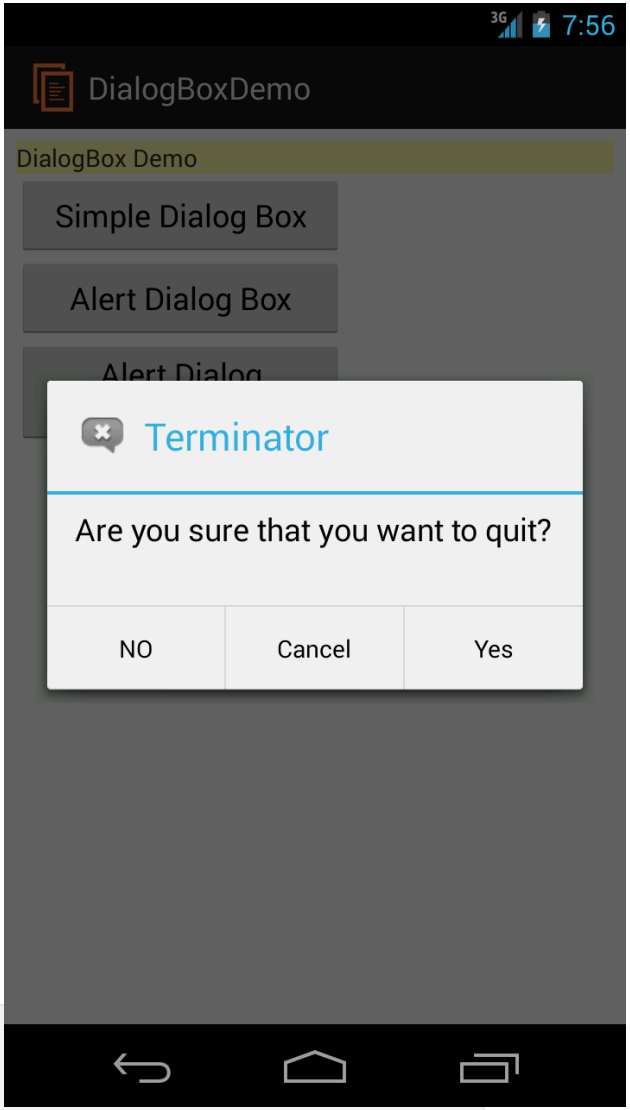
Android provides two primitive forms of dialog boxes:

1. **AlertDialog** boxes, and
2. **Toast** views



Toasts are transitory boxes that –for a few seconds- flash a message on the screen, and then vanish without user intervention.

The AlertDialog Box



The **AlertDialog** is a message box that:

(1) Displays as a small floating window on top of the (obscured) current UI.

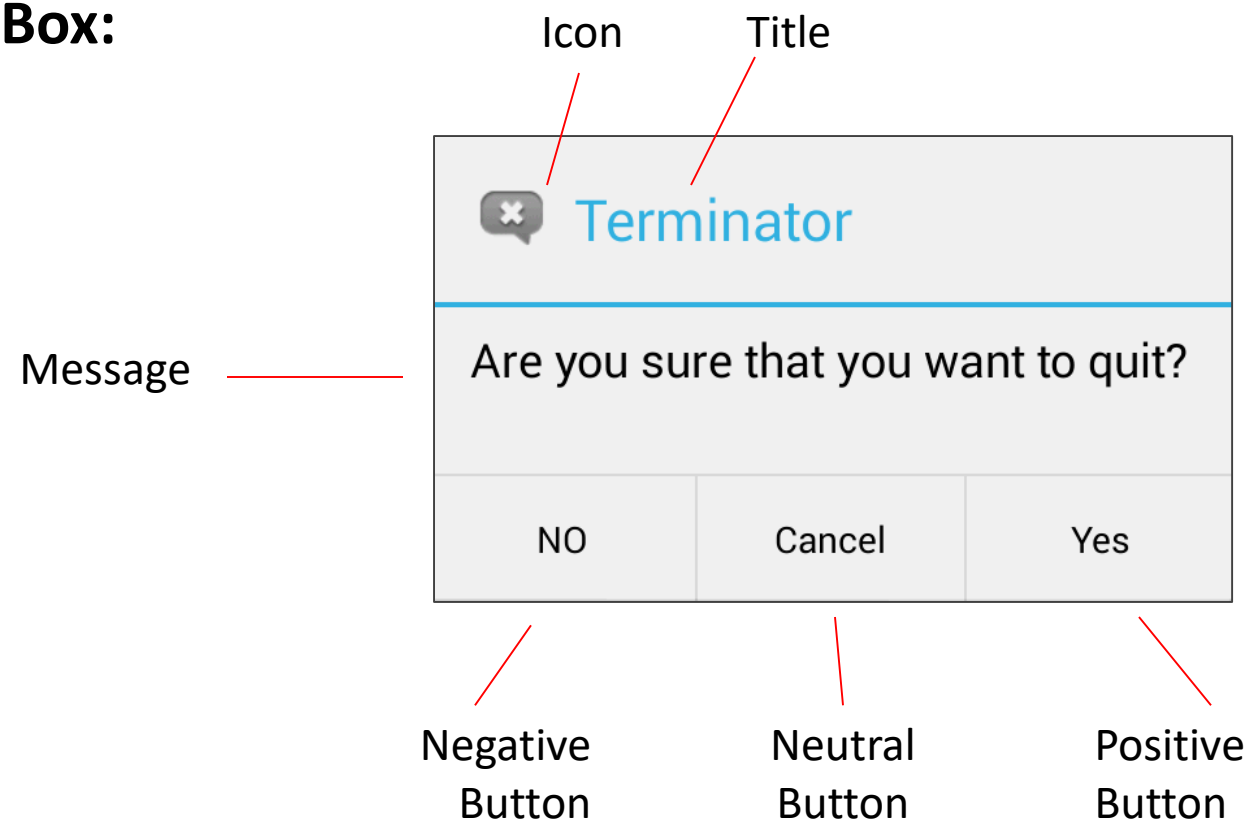
(2) The dialog window presents a message to the user as well as three optional buttons.

(3) The box is dismissed by either clicking on the exposed buttons or touching any portion of the UI outside the borders of the DialogBox.

Note:
Android's DialogBoxes are NOT modal views!
A fully *modal* view remains on the screen waiting for user's input while t*he rest of the application is on hold* (which is *not* the case of Android's DialogBoxes). A modal view (including Android's) has to be dismissed by an explicit user's action.

The AlertDialog

Dissecting an AlertDialog Box:



The image shown here uses:
Theme_Holo_Light_Dialog and *STYLE_NORMAL*

AlertDialog

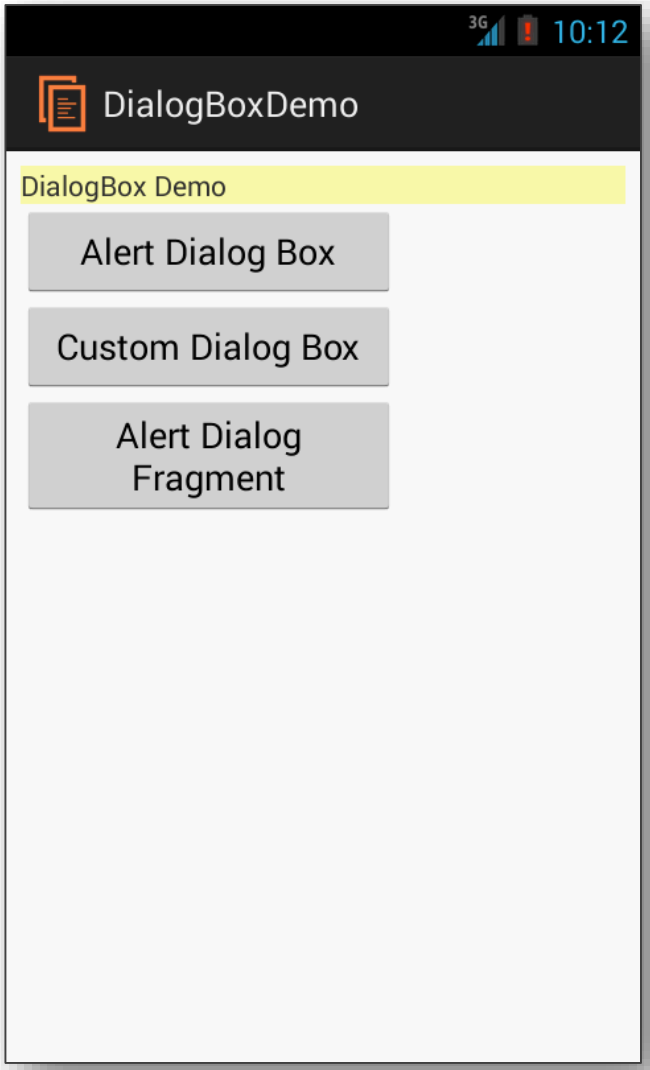
Example 1. AlertDialog Boxes

In this example the application's UI shows three buttons. When you click on them a different type of AlertDialog box is shown.

1. The first to be shown is a simple **AlertDialog** box with a message and buttons.

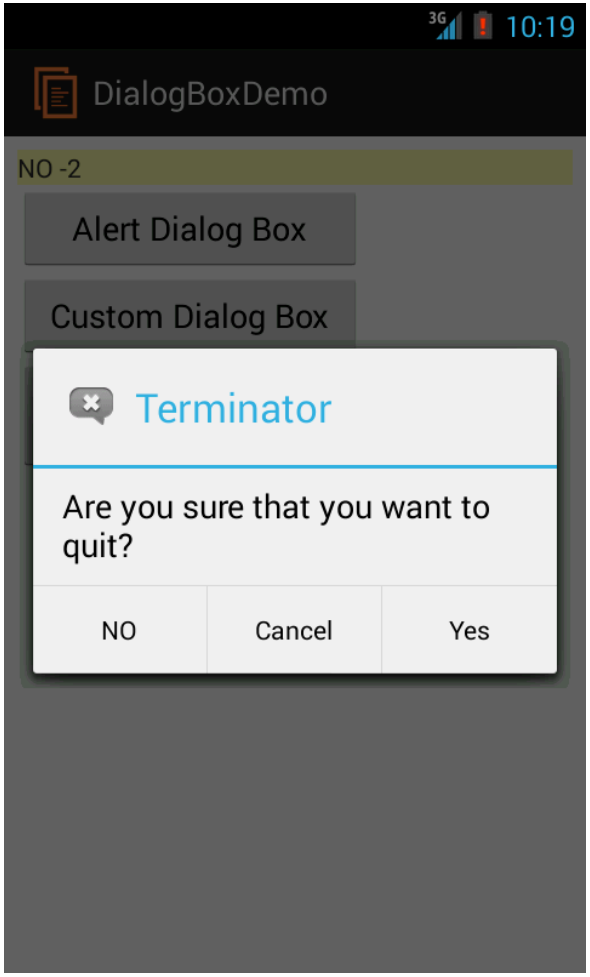
2. The second option is a **custom** DialogBox on which the user could type in a piece of data.

3. The last option shows a **DialogFragment** interacting with the main activity

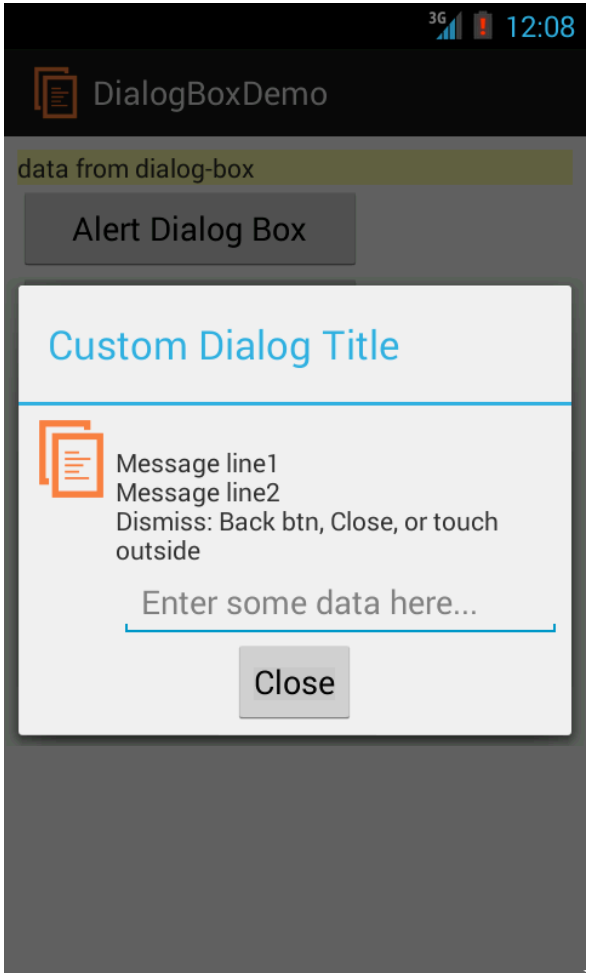


AlertDialog

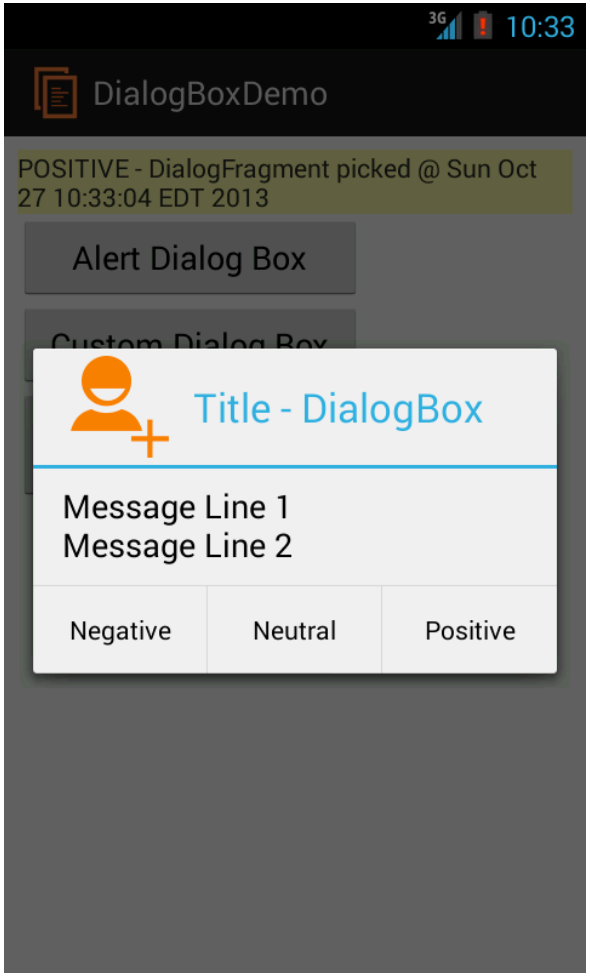
Example 1. AlertDialog Boxes



A simple **AlertDialog** offering three choices.



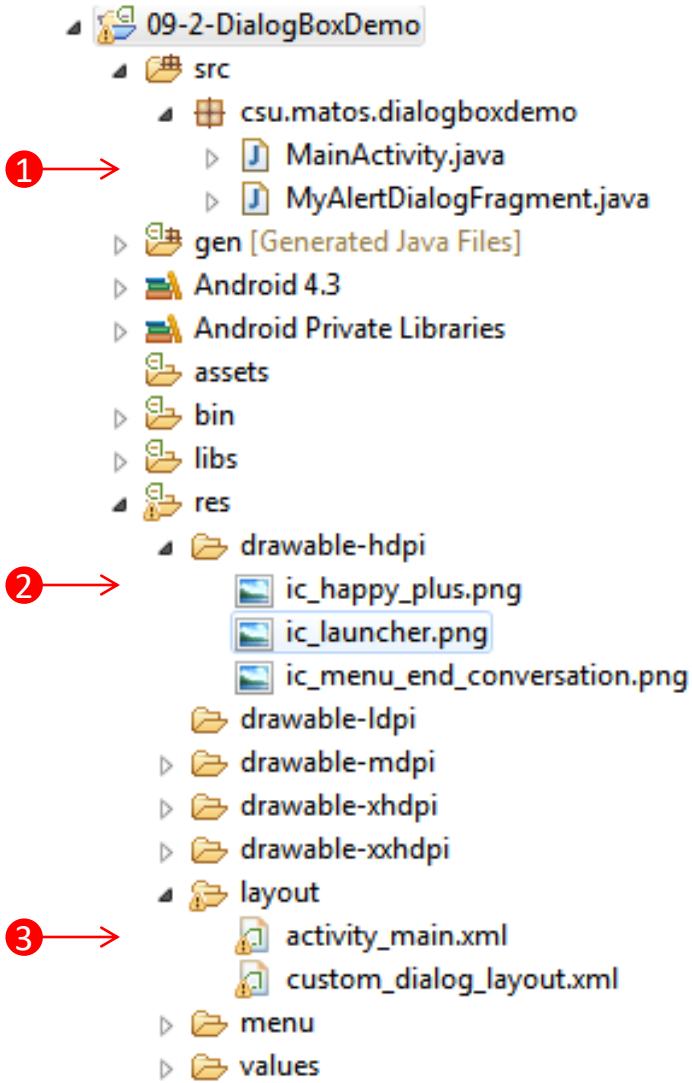
A **custom** AlertDialog allowing data to be typed.



A **DialogFragment** exposing three buttons.

AlertDialog

Example 1. App Structure



1. MainActivity shows main GUI and provides a frame for the DialogFragment to be displayed.

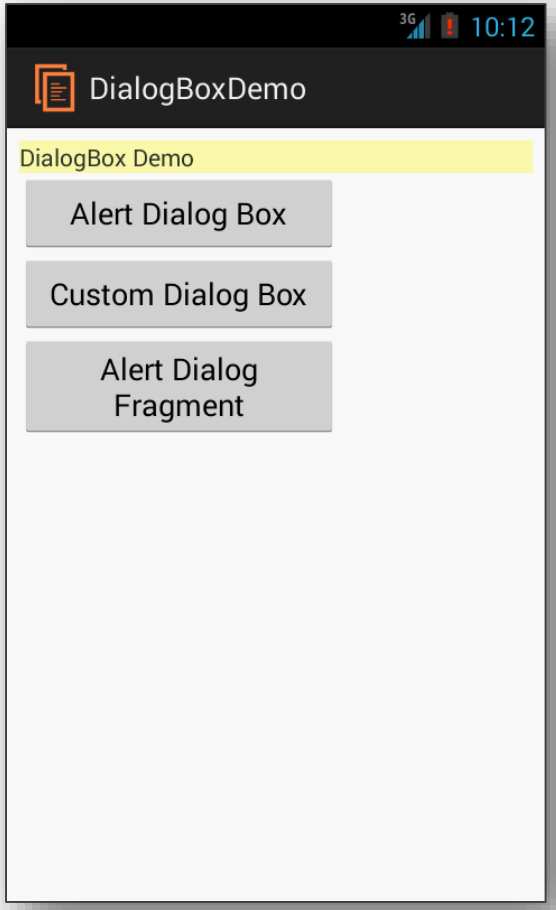
2. You want to enhance the appearance of dialog-boxes by adding meaningful icons. More details and tools at **Android Asset studio** (http://j.mp/androidassetstudio)

3. Add your XML design indicating the way your custom AlertDialog looks like.

AlertDialog

Example 1. XML Layout – activity_main.xml

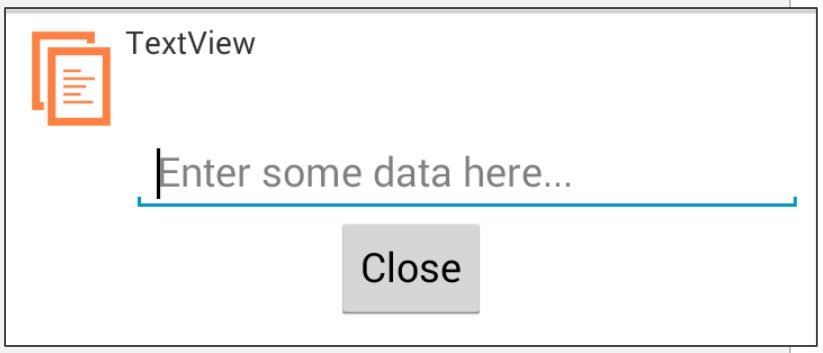
```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/LinearLayout1"
    android:layout_width="match_parent"     android:layout_height="match_parent"
    android:orientation="vertical"          android:padding="7dp"  >

    <TextView
        android:id="@+id/txtMsg"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:background="#55ffff00"
        android:text="DialogBox Demo" />

    <Button
        android:id="@+id/btn_alert_dialog1"
        android:layout_width="190dp"
        android:layout_height="wrap_content"
        android:text="Alert Dialog Box" />

    <Button
        android:id="@+id/btn_custom_dialog"
        android:layout_width="190dp"
        android:layout_height="wrap_content"
        android:text="Custom Dialog Box" />

    <Button
        android:id="@+id/btn_alert_dialog2"
        android:layout_width="190dp"
        android:layout_height="wrap_content"
        android:text="Alert Dialog Fragment" />
</LinearLayout>
```



AlertDialog

Example 1. XML Layout – custom_dialog_layout.xml

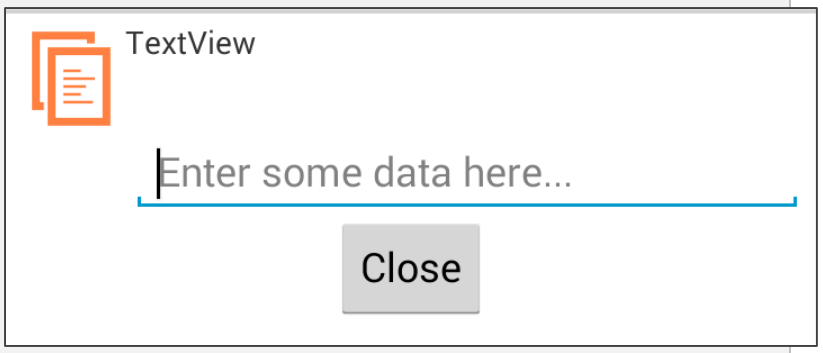
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="vertical"
    android:padding="5dp" >

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content" >

        <ImageView
            android:id="@+id/imageView1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:src="@drawable/ic_launcher" />

        <TextView
            android:id="@+id/sd_textView1"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="TextView" />
    </LinearLayout>
```



AlertDialog

Example 1. XML Layout – custom_dialog_layout.xml cont. 1

```
    <EditText
        android:id="@+id/sd_editText1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="50dp"
        android:ems="15"
        android:hint="Enter some data here..." >

        <requestFocus />
    </EditText>

    <Button
        android:id="@+id/sd_btnClose"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:text="Close" />

</LinearLayout>
```



AlertDialog

Example 1. MainActivity.java

```
// example adapted from:
// http://developer.android.com/reference/android/app/DialogFragment.html

public class MainActivity extends Activity implements OnClickListener {
   TextView txtMsg;
   Button btnCustomDialog;
   Button btnAlertDialog;
   Button btnDialogFragment;
   Context activityContext;
   String msg = "";

   @Override
   protected void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.activity_main);
      activityContext = this;

1  txtMsg = (TextView) findViewById(R.id.txtMsg);
      btnAlertDialog = (Button) findViewById(R.id.btn_alert_dialog1);
      btnCustomDialog = (Button) findViewById(R.id.btn_custom_dialog);
      btnDialogFragment = (Button) findViewById(R.id.btn_alert_dialog2);

      btnCustomDialog.setOnClickListener(this);
      btnAlertDialog.setOnClickListener(this);
      btnDialogFragment.setOnClickListener(this);

   }
```

AlertDialog

Example 1. MainActivity.java cont. 1

```
   @Override
   public void onClick(View v) {
2 →   if (v.getId() == btnAlertDialog.getId()) {
         showMyAlertDialog(this);
      }
      if (v.getId() == btnCustomDialog.getId()) {
         showCustomDialogBox();
      }
      if (v.getId() == btnDialogFragment.getId()) {
         showMyAlertDialogFragment(this);
      }
   }// onClick

   private void showMyAlertDialog(MainActivity mainActivity) {
      new AlertDialog.Builder(mainActivity)
3 →         .setTitle("Terminator")
            .setMessage("Are you sure that you want to quit?")
            .setIcon(R.drawable.ic_menu_end_conversation)

            // set three option buttons
            .setPositiveButton("Yes",
                  new DialogInterface.OnClickListener() {
                     public void onClick(DialogInterface dialog, int whichButton) {
                        // actions serving "YES" button go here
                        msg = "YES " + Integer.toString(whichButton);
                        txtMsg.setText(msg);
                     }
                  })// setPositiveButton
```

AlertDialog

Example 1. MainActivity.java cont. 2

```
            .setNeutralButton("Cancel",
                  new DialogInterface.OnClickListener() {
                     public void onClick(DialogInterface dialog,
                           int whichButton) {
                        // actions serving "CANCEL" button go here
                        msg = "CANCEL " + Integer.toString(whichButton);
                        txtMsg.setText(msg);
                     }// OnClick
                  })// setNeutralButton

            .setNegativeButton("NO", new DialogInterface.OnClickListener() {
               public void onClick(DialogInterface dialog, int whichButton) {
                  // actions serving "NO" button go here
                  msg = "NO " + Integer.toString(whichButton);
                  txtMsg.setText(msg);
               }
            })// setNegativeButton

            .create()
            .show();

      }// showMyAlertDialog
```

AlertDialog

Example 1. MainActivity.java cont. 3

```
private void showCustomDialogBox() {

   final Dialog customDialog = new Dialog(activityContext);
   customDialog.setTitle("Custom Dialog Title");

   // match customDialog with custom dialog layout
4  customDialog.setContentView(R.layout.custom_dialog_layout);

   ((TextView) customDialog.findViewById(R.id.sd_textView1))
               .setText("\nMessage line1\nMessage line2\n"
               +"Dismiss: Back btn, Close, or touch outside");

   final EditText sd_txtInputData = (EditText) customDialog
                                              .findViewById(R.id.sd_editText1);

   ((Button) customDialog.findViewById(R.id.sd_btnClose))
         .setOnClickListener(new OnClickListener() {
            @Override
            public void onClick(View v) {
               txtMsg.setText(sd_txtInputData.getText().toString());
               customDialog.dismiss();
            }
         });

   customDialog.show();

}
```

AlertDialog

Example 1. MainActivity.java cont. 4

```
    private void showMyAlertDialogFragment(MainActivity mainActivity) {

5 →     DialogFragment dialogFragment = MyAlertDialogFragment
                                        .newInstance(R.string.title);

        dialogFragment.show(getFragmentManager(), "TAG_MYDIALOGFRAGMENT1");

    }

6 →  public void doPositiveClick(Date time) {
        txtMsg.setText("POSITIVE - DialogFragment picked @ " + time);

    }

    public void doNegativeClick(Date time) {
        txtMsg.setText("NEGATIVE - DialogFragment picked @ " + time);

    }

    public void doNeutralClick(Date time) {
        txtMsg.setText("NEUTRAL - DialogFragment picked @ " + time);

    }

}
```

AlertDialog

Example 1. MainActivity.java

Comments

1. The main UI shows three buttons and a TextView on which data coming from the executing dialog-boxes is to be written.
2. When a button is clicked the proper DialogBox is shown.
3. **showMyAlertDialog** uses a builder class to create a new AlertDialog adding to it a title, icon, message and three action buttons. Each action button has an onClick() method responsible for services to be rendered on behalf of the selection. We update the main UI's top TextView with the button's id.
4. The **custom** dialog-box is *personalized* when the `.setContentView(R.layout.`*`custom_dialog_layout`*`)` method is executed. Later, its "Close" button is given a listener, so the data entered in the dialog's EditText view could be sent to the UI's top TextView and, the box is finally dismissed.
5. A **DialogFragment** is instanciated. It's title is supplied as an argument to be 'bundled' when the fragment is created. Later the dialog will be show on top of the containing activity.
6. **Callback** methods (doPositive(), doNegative()…) are provided to empower the DialogFragment to pass data (a timestamp) back to the main activity.

AlertDialog

Example 1. MyAlertDialogFragment.java

```
public class MyAlertDialogFragment extends DialogFragment {

  public static MyAlertDialogFragment newInstance(int title) {

    MyAlertDialogFragment frag = new MyAlertDialogFragment();

    Bundle args = new Bundle();
    args.putInt("title", title);
    args.putString("message", "Message Line 1\nMessage Line 2");
    args.putInt("icon", R.drawable.ic_happy_plus);

    frag.setArguments(args);
    return frag;
  }

  @Override
  public Dialog onCreateDialog(Bundle savedInstanceState) {

    int title = getArguments().getInt("title");
    int icon = getArguments().getInt("icon");
    String message = getArguments().getString("message");

    return new AlertDialog.Builder(getActivity())
        .setIcon(icon)
        .setTitle(title)
        .setMessage(message)
```

AlertDialog

Example 1. MyAlertDialogFragment.java cont. 1

```
        .setPositiveButton("Positive",
            new DialogInterface.OnClickListener() {
              public void onClick(DialogInterface dialog,
                  int whichButton) {
                ((MainActivity) getActivity())
                    .doPositiveClick(new Date());
              }
            })
        .setNegativeButton("Negative",
            new DialogInterface.OnClickListener() {
              public void onClick(DialogInterface dialog,
                  int whichButton) {
                ((MainActivity) getActivity())
                    .doNegativeClick(new Date());
              }
            })
        .setNeutralButton("Neutral",
            new DialogInterface.OnClickListener() {
              public void onClick(DialogInterface dialog,
                  int whichButton) {
                ((MainActivity) getActivity())
                    .doNeutralClick(new Date());
              }
            }).create();
  }
}
```

3

AlertDialog

Example 1. MyAlertDialogFragment.java

Comments

1. The class extends **DialogFragment**. It's *instantiator* accepts a title, message and icon arguments. As customary with fragments, the arguments are placed into a single bundle which is then associated to the fragment.

2. The **onCreateDialog** method extracts the arguments (title, icon, and message) from the DialogFragment's bundle. A common AlertDialog builder is called to prepare the dialog box using the supplied arguments.

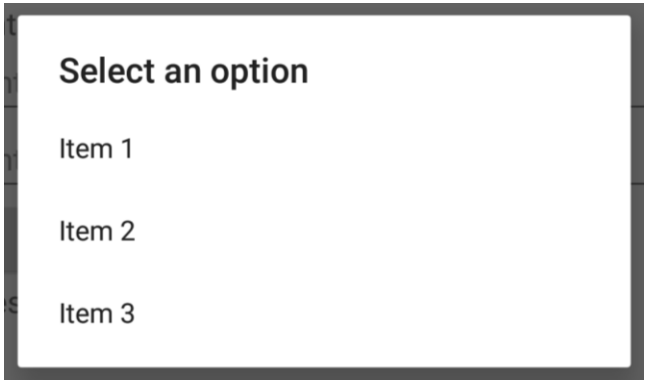
3. Three option buttons are added to the DialogFragment. Each has a listener that when activated, makes its onClick method interact with a callback method in the MainActivity. To illustrate that data from the fragment could be passed from the dialog-box, a timestamp is supplied to the callbacks.

AlertDialog

Adding a list on a dialog

There are three kinds of lists available with the AlertDialog APIs:

- A traditional single-choice list
- A persistent single-choice list (radio buttons)
- A persistent multiple-choice list (checkboxes)



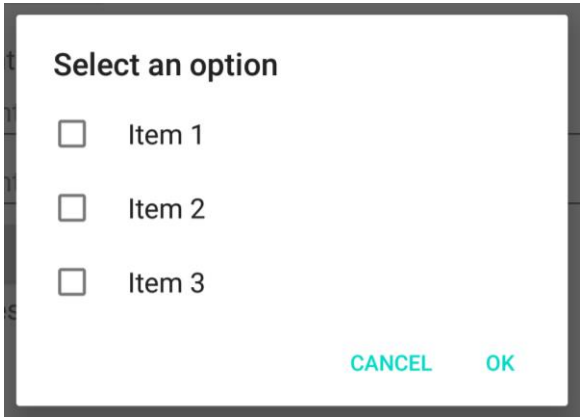
To create a single-choice list like the one in figure 3, use the **setItems()** method:

```
AlertDialog.Builder builder = new AlertDialog.Builder(this);
builder.setTitle("Select an option");
builder.setItems(R.array.items, new DialogInterface.OnClickListener() {
    @Override
    public void onClick(DialogInterface dialogInterface, int i) {

    }
});
builder.create().show();
```

AlertDialog

Adding a list on a dialog

Adding a persistent multiple-choice or single-choice list:
To add a list of multiple-choice items (checkboxes) or single-choice items (radio buttons), use the **setMultiChoiceItems()** or **setSingleChoiceItems()** methods, respectively.

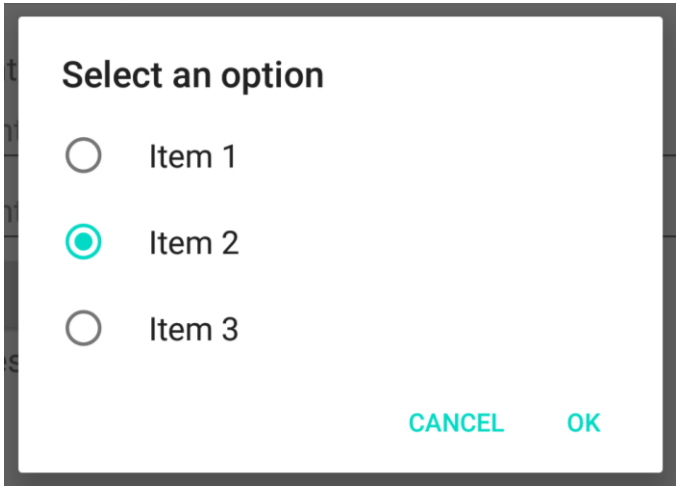



```
AlertDialog.Builder builder = new AlertDialog.Builder(this);
builder.setTitle("Select an option");
String[] items = getResources().getStringArray(R.array.items);
boolean[] checked = new boolean[items.length];
builder.setMultiChoiceItems(items, checked, new
DialogInterface.OnMultiChoiceClickListener() {
    @Override
    public void onClick(DialogInterface dialogInterface, int i, boolean b) {

    }
});
builder.setPositiveButton("OK", null);
builder.setNegativeButton("Cancel", null);
builder.create().show();
```

AlertDialog

Adding a list on a dialog

Adding a persistent multiple-choice or single-choice list:
To add a list of multiple-choice items (checkboxes) or single-choice items (radio buttons), use the **setMultiChoiceItems()** or **setSingleChoiceItems()** methods, respectively.




```
AlertDialog.Builder builder = new AlertDialog.Builder(this);
builder.setTitle("Select an option");
builder.setSingleChoiceItems(R.array.items, 1, new
DialogInterface.OnClickListener() {
    @Override
    public void onClick(DialogInterface dialogInterface, int i) {

    }
});
builder.setPositiveButton("OK", null);
builder.setNegativeButton("Cancel", null);
builder.create().show();
```

AlertDialog

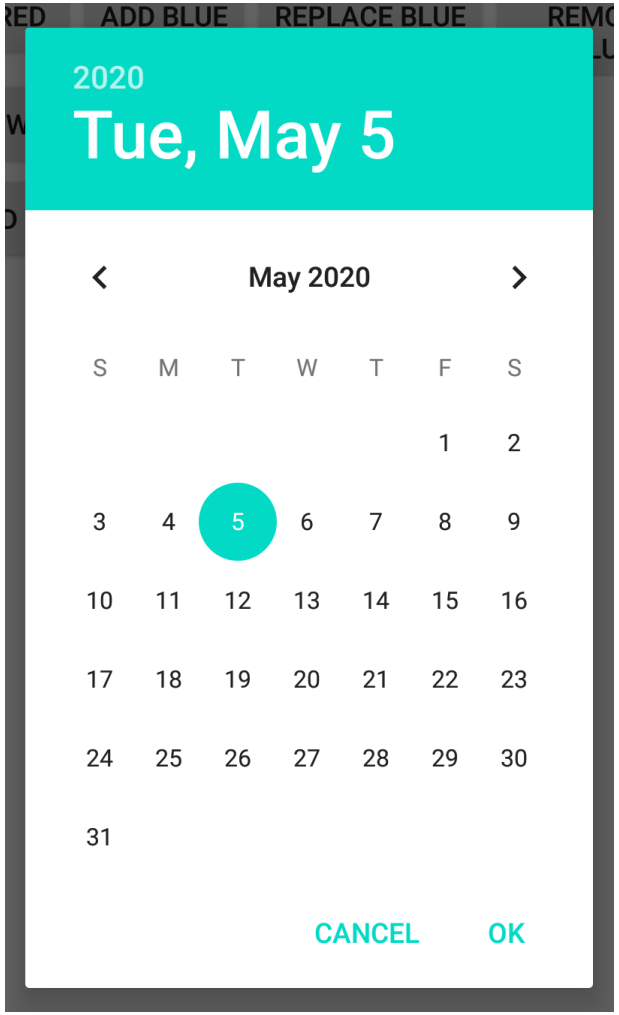
Adding a list on a dialog

```
List<String> items = new ArrayList<>();
for (int i = 0; i < 20; i++)
    items.add("Item " + i);
ArrayAdapter<String> adapter = new ArrayAdapter<>(this,
android.R.layout.simple_list_item_1, items);

AlertDialog.Builder builder = new AlertDialog.Builder(this);
builder.setTitle("Select an option");
builder.setAdapter(adapter, new DialogInterface.OnClickListener() {
    @Override
    public void onClick(DialogInterface dialogInterface, int i) {

    }
});
builder.setPositiveButton("OK", null);
builder.setNegativeButton("Cancel", null);
builder.create().show();
```

TimePickerDialog & DatePickerDialog

DatePickerDialog

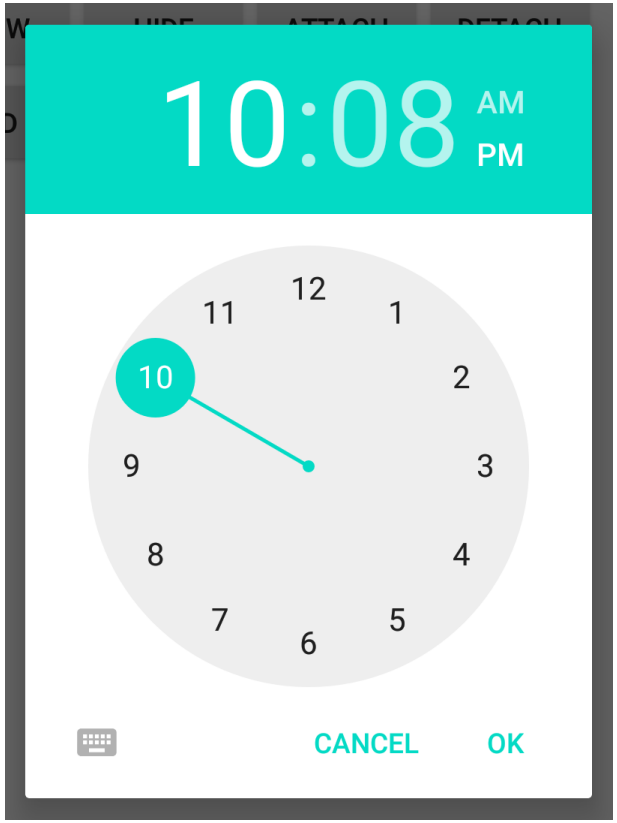
```
// Get current date
final Calendar c = Calendar.getInstance();
int mYear = c.get(Calendar.YEAR);
int mMonth = c.get(Calendar.MONTH);
int mDay = c.get(Calendar.DAY_OF_MONTH);

// Show dialog
DatePickerDialog datePickerDialog = new
DatePickerDialog(this,
        new DatePickerDialog.OnDateSetListener() {
            @Override
            public void onDateSet(DatePicker view, int
year, int monthOfYear, int dayOfMonth) {

            }
        }, mYear, mMonth, mDay);
datePickerDialog.show();
```



TimePickerDialog & DatePickerDialog

TimePickerDialog

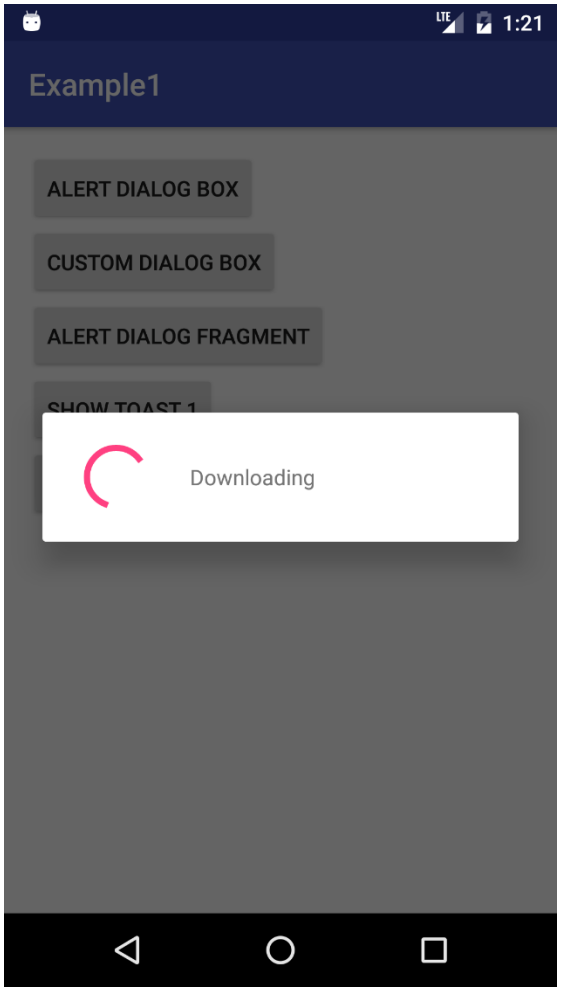
```
// Get current time
final Calendar c = Calendar.getInstance();
int mHour = c.get(Calendar.HOUR_OF_DAY);
int mMinute = c.get(Calendar.MINUTE);

// Show dialog
TimePickerDialog timePickerDialog = new
TimePickerDialog(this,
        new TimePickerDialog.OnTimeSetListener() {
            @Override
            public void onTimeSet(TimePicker view, int
hourOfDay, int minute) {

            }
        }, mHour, mMinute, false);
timePickerDialog.show();
```



ProgressDialog

Example 5. ProgressDialog

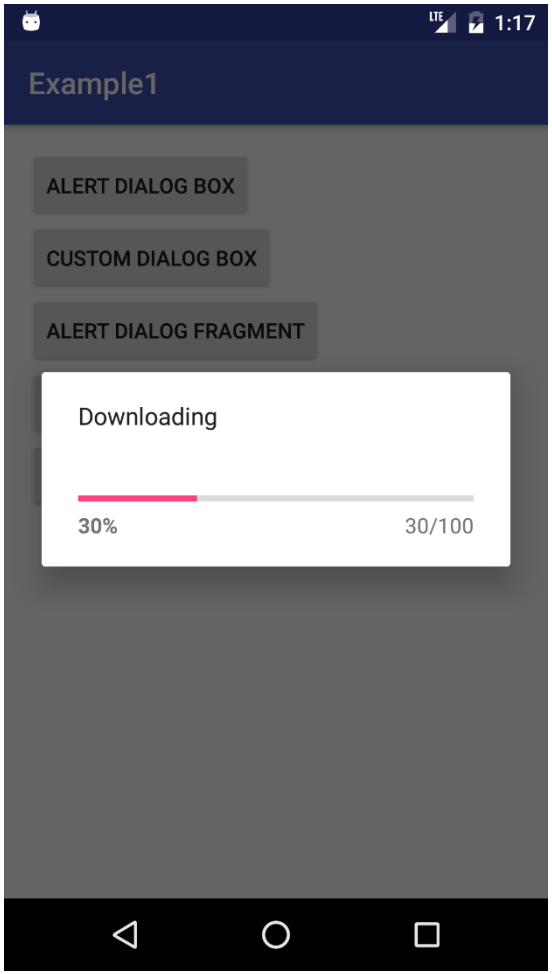
```
private class DownloadTask extends AsyncTask<Void, Integer, Boolean> {

    ProgressDialog progressDialog;

    @Override
    protected Boolean doInBackground(Void... voids) {
        try {
            Thread.sleep(5000);
        } catch (Exception ex) {
            ex.printStackTrace();
        }
        return true;
    }

    @Override
    protected void onPreExecute() {
        progressDialog = new ProgressDialog(MainActivity.this);
        progressDialog.setMessage("Downloading");
        progressDialog.setCanceledOnTouchOutside(false);
        progressDialog.show();
    }

    @Override
    protected void onPostExecute(Boolean aBoolean) {
        if (progressDialog.isShowing())
            progressDialog.dismiss();
    }
}
```



ProgressDialog

Example 5. ProgressDialog

```
private class DownloadTask extends AsyncTask<Void, Integer, Boolean> {

    ProgressDialog progressDialog;

    @Override
    protected Boolean doInBackground(Void... voids) {
        try {
            for (int i = 0; i < 10; i++) {
                Thread.sleep(500);
                publishProgress(i * 10);
            }
        } catch (Exception ex) {
            ex.printStackTrace();
        }
        return true;
    }

    @Override
    protected void onPreExecute() {
        progressDialog = new ProgressDialog(MainActivity.this);
        progressDialog.setMessage("Downloading");
        progressDialog.setCanceledOnTouchOutside(false);
        progressDialog.setProgressStyle(ProgressDialog.STYLE_HORIZONTAL);
        progressDialog.setMax(100);
        progressDialog.show();
    }

    @Override
    protected void onPostExecute(Boolean aBoolean) {
        if (progressDialog.isShowing())
            progressDialog.dismiss();
    }

    @Override
    protected void onProgressUpdate(Integer... values) {
        progressDialog.setProgress(values[0]);
    }
}
```



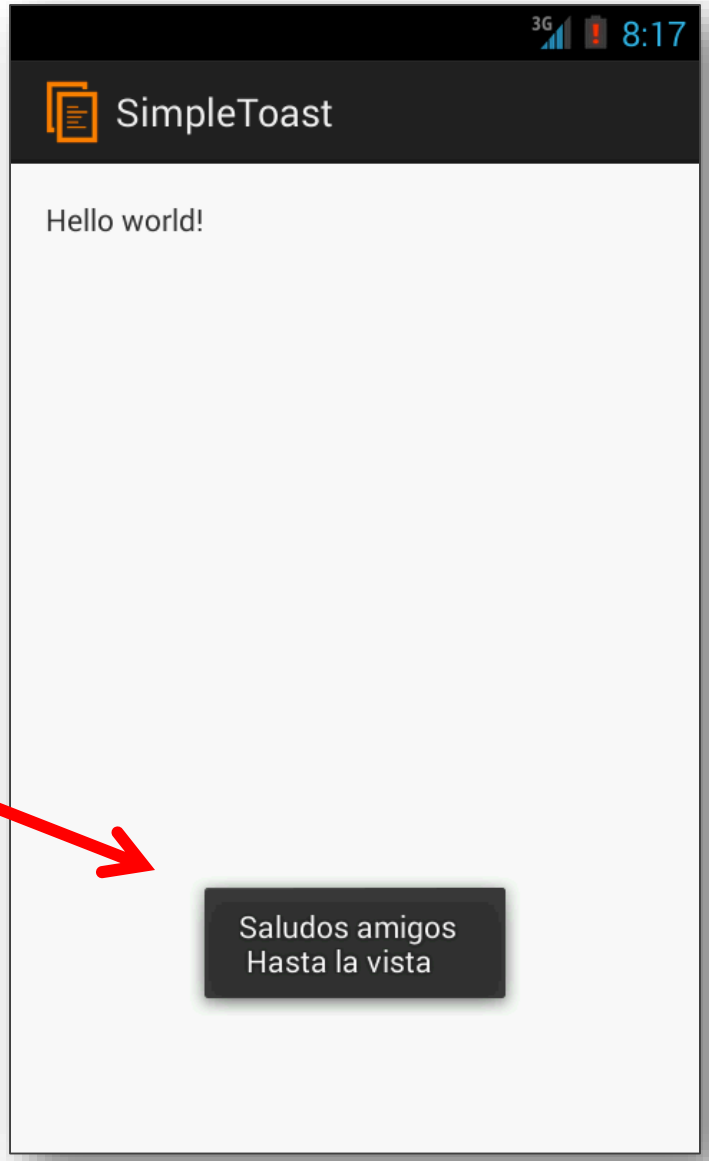
The Toast Widget

Toasts are very simple one-way message boxes.

Typically they are used in situations in which a **brief message** should be flashed to the user.

A toast is shown as a semi-opaque floating view over the application 's UI. It's lifetime is between 2-4 sec.

Notoriously, *Toasts never receive focus !*



The Toast Widget

Example 2. Toast's Syntax

```
Toast.makeText ( context,  message,  duration ).show();
```

Context: A reference to the view's environment (where am I, what is around me…)

Message: The message you want to show

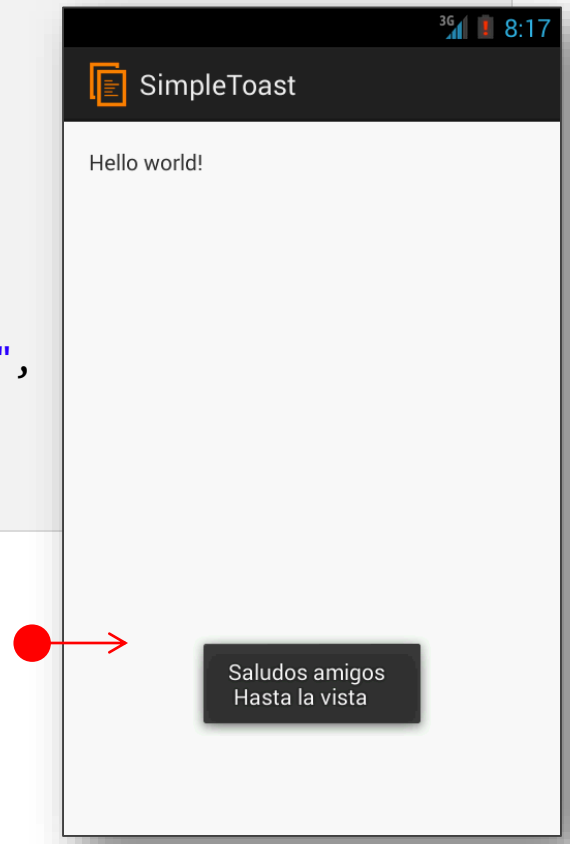
Duration: Toast.*LENGTH_SHORT* (0) about 2 sec
Toast.*LENGTH_* LONG (1) about 3.5 sec

The Toast class has only a few methods including: *makeText*, *show, setGravity,* and *setMargin.*

The Toast Widget

Example 2. A Simple Toast

```
public class MainActivity extends Activity {

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

        Toast.makeText( getApplicationContext(),
                        "Saludos amigos \n Hasta la vista",
                        Toast.LENGTH_LONG).show();
    }
}
```



In this simple application, passing the **context** variable could be done using: `getApplicationContext()`, `MainActivity.this`, or simply using **`this`**.

The Toast Widget

Example 3. Re-positioning a Toast View

- By **default** Toast views are displayed at the **center-bottom** of the screen.
- However the user may change the placement of a Toast view by using either of the following methods:

```
void setGravity (int gravity, int xOffset, int yOffset)

void setMargin (float horizontalMargin, float verticalMargin)
```

The Toast Widget

Example 3. Re-positioning a Toast View

Method 1

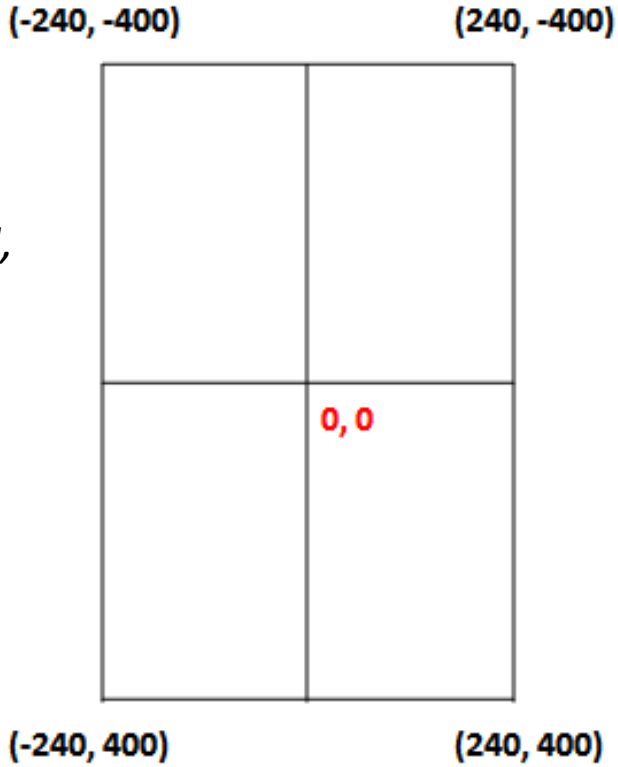
```
void setGravity (int gravity, int xOffset, int yOffset)
```

(Assume the phone has a **480x800** screen density)

gravity: Overall placement. Typical values include: *Gravity.CENTER, Gravity.TOP, Gravity.BOTTOM, (see Apendix B)*

xOffset: The *xOffset* range is -240,…,0,…240
left, center, right

yOffset: The *yOffset* range is: -400,…,0,…400
top, center, bottom



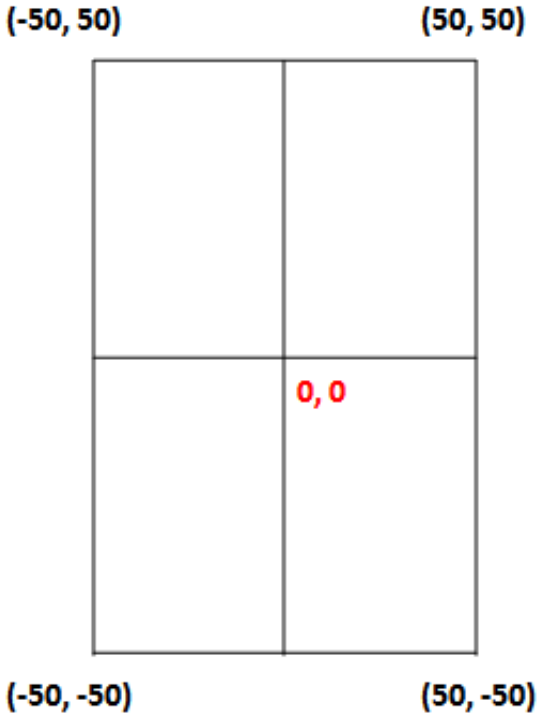
The Toast Widget

Example 3. Re-positioning a Toast View

Method 2

- The (0,0) point – *Center of the screen* –occurs where horizontal and vertical center lines cross each other.
- There is 50% of the screen to each side of that center point
- Margins are expressed as a percent value between: -50,…, 0, …, 50.

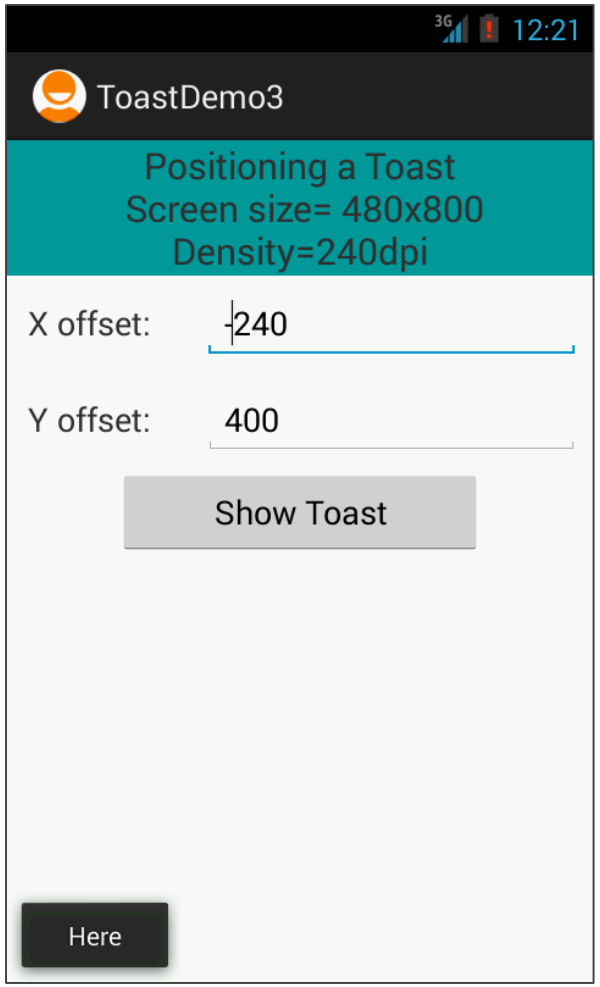
```
void setMargin (float horizontalMargin,
                float verticalMargin)
```

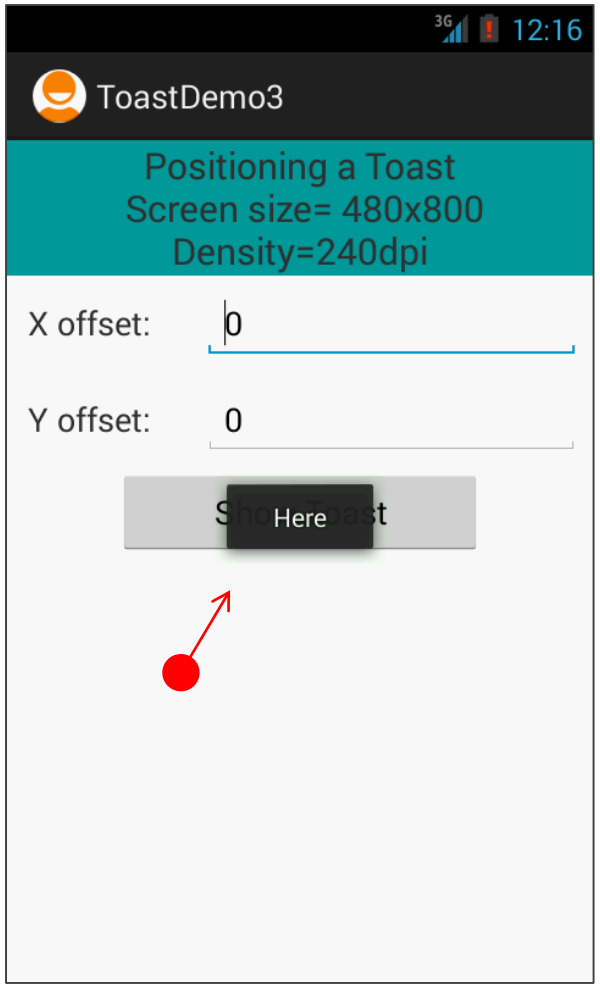


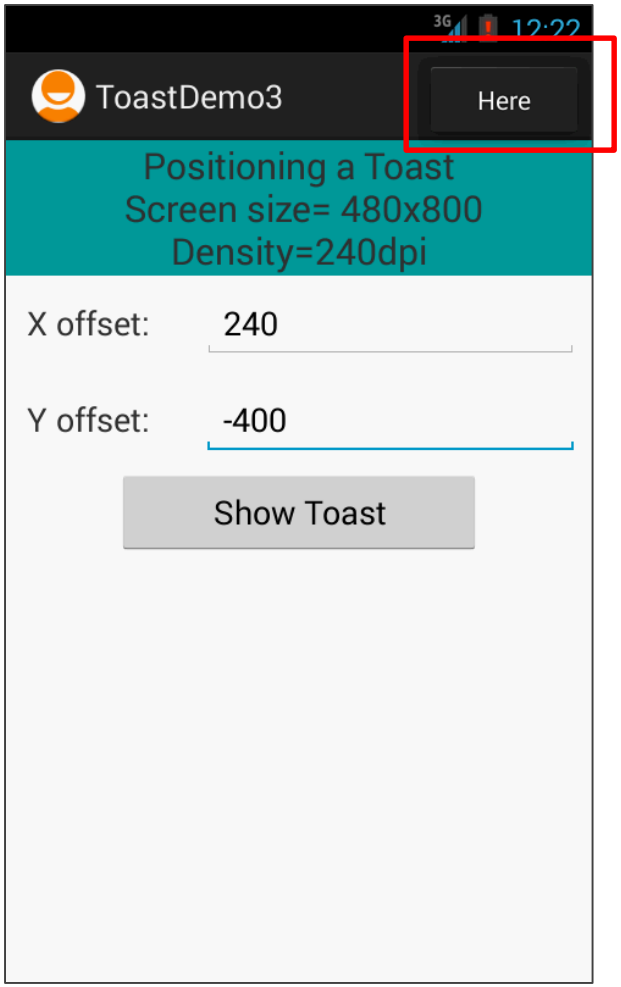
Note: The pair of margins:
(-50, -50) represent the lower-left corner of the screen,
(0, 0) is the center, and
(50, 50) the upper-right corner.

The Toast Widget

Example 3. Re-positioning a Toast View



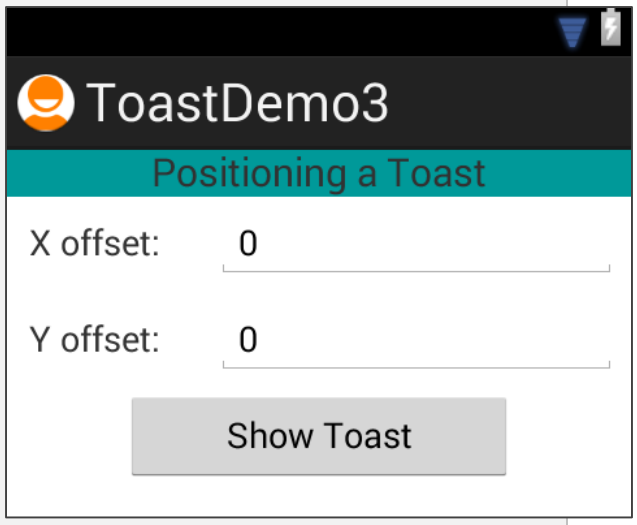




The Toast Widget

Example 3. XML Layout: activity_main.xml

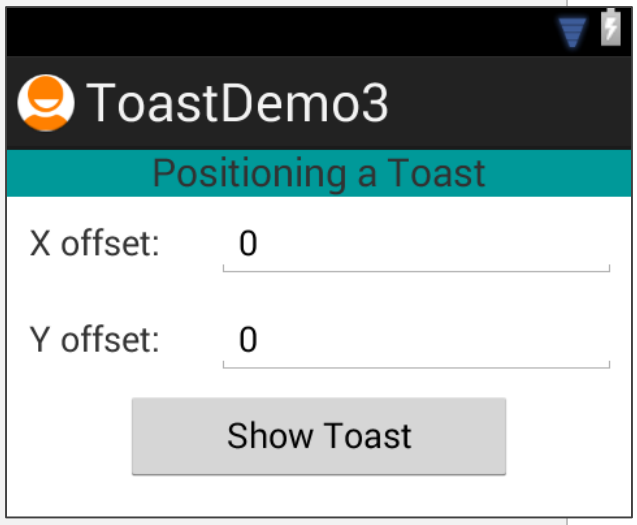
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical" >

    <TextView
        android:id="@+id/txtCaption"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:background="#ff009999"
        android:gravity="center"
        android:text="Positioning a Toast"
        android:textSize="20sp" />

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:padding="10dp" >

        <TextView
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text=" X offset: "
            android:textSize="18sp" />

 <EditText
            android:id="@+id/txtXCoordinate"
```



The Toast Widget

Example 3. XML Layout: activity_main.xml cont. 1

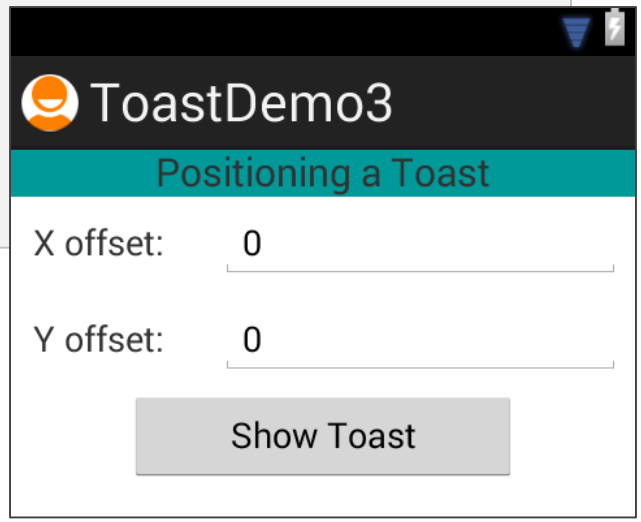
```
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="2"
            android:inputType="numberSigned"
            android:text="0"
            android:textSize="18sp" />
    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:padding="10dp" >

        <TextView
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text=" Y offset: "
            android:textSize="18sp" />

        <EditText
            android:id="@+id/txtYCoordinate"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="2"
            android:inputType="numberSigned"
            android:text="0"
            android:textSize="18sp" />
    </LinearLayout>
```



The Toast Widget

Example 3. XML Layout: activity_main.xml cont. 2

```
    <Button
        android:id="@+id/btnShowToast"
        android:layout_width="200dp"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:text=" Show Toast " >
    </Button>

</LinearLayout>
```



The Toast Widget

Example 3. MainActivity: ToastDemo3.java

```
public class ToastDemo3 extends Activity {
   EditText txtXCoordinate;
   EditText txtYCoordinate;
   TextView txtCaption;

   Button btnShowToast;

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

1 →   // bind GUI and Java controls
      txtCaption = (TextView) findViewById(R.id.txtCaption);
      txtXCoordinate = (EditText) findViewById(R.id.txtXCoordinate);
      txtYCoordinate = (EditText) findViewById(R.id.txtYCoordinate);
      btnShowToast = (Button) findViewById(R.id.btnShowToast);

2 →   // find screen-size and density(dpi)
      int dpi  = Resources.getSystem().getDisplayMetrics().densityDpi;
      int width=  Resources.getSystem().getDisplayMetrics().widthPixels;
      int height = Resources.getSystem().getDisplayMetrics().heightPixels;
      txtCaption.append("\n Screen size= " + width + "x" + height
                     +" Density=" + dpi + "dpi");
```

The Toast Widget

Example 3. MainActivity: ToastDemo3.java cont. 1

```
      // show toast centered around selected X,Y coordinates
      btnShowToast.setOnClickListener(new OnClickListener() {
         @Override
         public void onClick(View v) {
            try {
3 →            Toast myToast = Toast.makeText(getApplicationContext(),
                  "Here", Toast.LENGTH_LONG);

               myToast.setGravity(
                  Gravity.CENTER,
                  Integer.valueOf(txtXCoordinate.getText().toString()),
                  Integer.valueOf(txtYCoordinate.getText().toString()));

               myToast.show();

            } catch (Exception e) {
               Toast.makeText(getApplicationContext(), e.getMessage(),
                  Toast.LENGTH_LONG).show();
            }
         }
      });


   }// onCreate

}// class
```

The Toast Widget

Example 3. MainActivity: ToastDemo3.java

Comments

1. Plumbing. GUI objects are bound to their corresponding Java controls. When the button is clicked a Toast is to be shown.

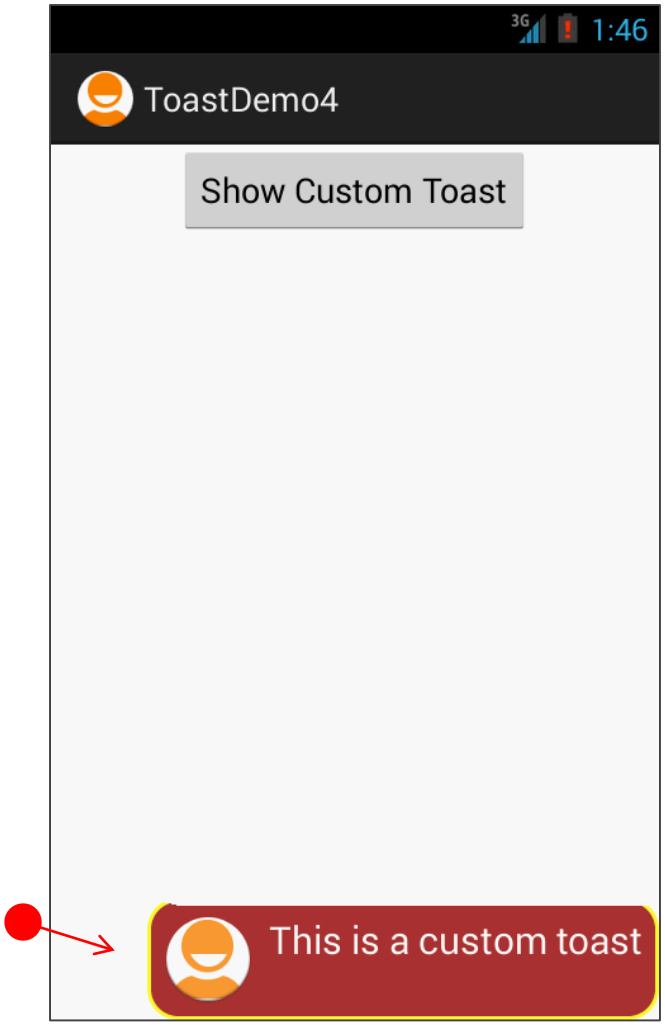
2. The call `Resources.getSystem().getDisplayMetrics()` is used to determine the screen size (Height, Width) in pixels, as well as its density in dip units.

3. An instance of a Toast is created with the *makeText* method. The call to `setGravity` is used to indicate the (X,Y) coordinates where the toast message is to be displayed. X and Y refer to the actual horizontal/vertical pixels of a device's screen.

The Toast Widget

Example 4. A Custom-Made Toast View

Toasts could be modified to display a custom combination of color, shape, text, image, and background.



Steps

To create a custom Toast do this:

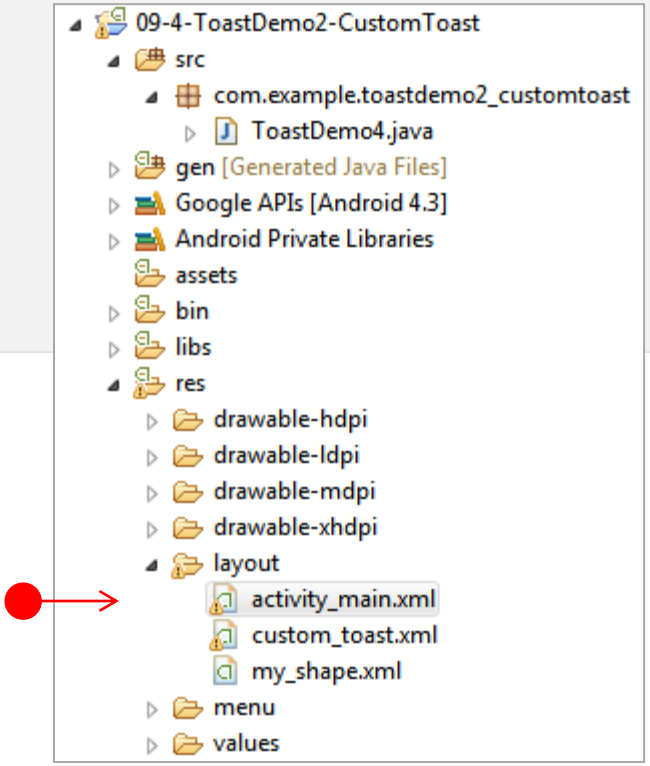
1. Define the XML layout you wish to apply to the custom toasts.
2. In addition to a TextView where the toast's message will be shown, you may add other UI elements such as an image, background, shape, etc.
3. Inflate the XML layout. Attach the new view to the toast using the `setView()` method.

Example based on:
http://hustleplay.wordpress.com/2009/07/23/replicating-default-android-toast/
http://developer.android.com/guide/topics/ui/notifiers/toasts.html

The Toast Widget

Example 4. XML Layout - activity_main.xml

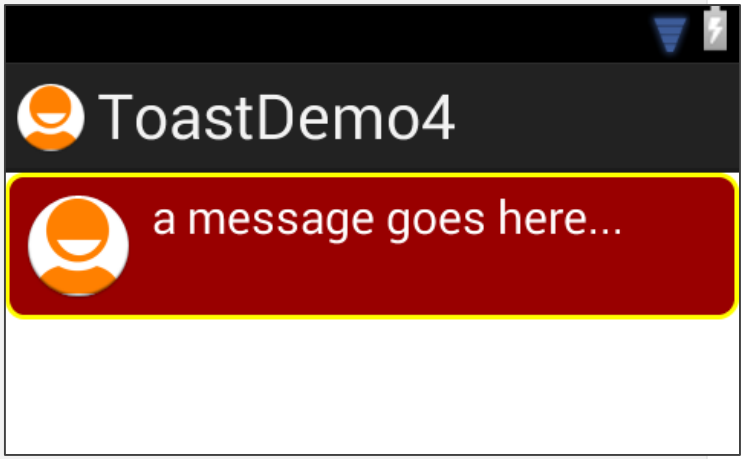
```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/LinearLayout1"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical" >

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:onClick="showCustomToast"
        android:text="Show Custom Toast"
        android:layout_gravity="center"
        tools:context=".ToastDemo4" />

</LinearLayout>
```



The Toast Widget

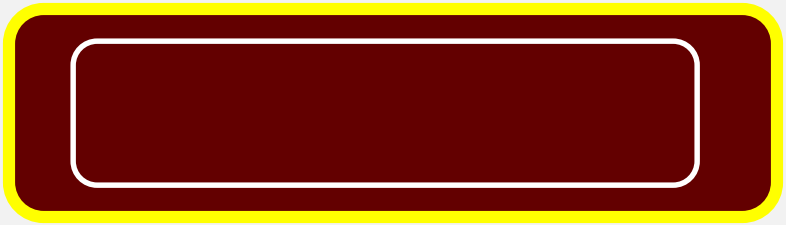
Example 4. XML Layout - custom_toast.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"

    android:background="@layout/my_shape"

    android:orientation="horizontal"
    android:padding="8dp" >

    <ImageView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginRight="8dp"
        android:src="@drawable/ic_launcher" />

    <TextView
        android:id="@+id/toast_text"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="a message goes here..."
        android:textColor="#ffffffff"
        android:textSize="20sp" />

</LinearLayout>
```



Example 4. XML Layout - my_shape.xml

```xml
<?xml version="1.0" encoding="UTF-8"?>
<shape xmlns:android="http://schemas.android.com/apk/res/android"
    android:shape="rectangle" >

    <stroke
        android:width="2dp"
        android:color="#ffffff00" />

    <solid android:color="#ff990000" />

    <padding
        android:bottom="4dp"
        android:left="10dp"
        android:right="10dp"
        android:top="4dp" />

    <corners android:radius="15dp" />

</shape>
```

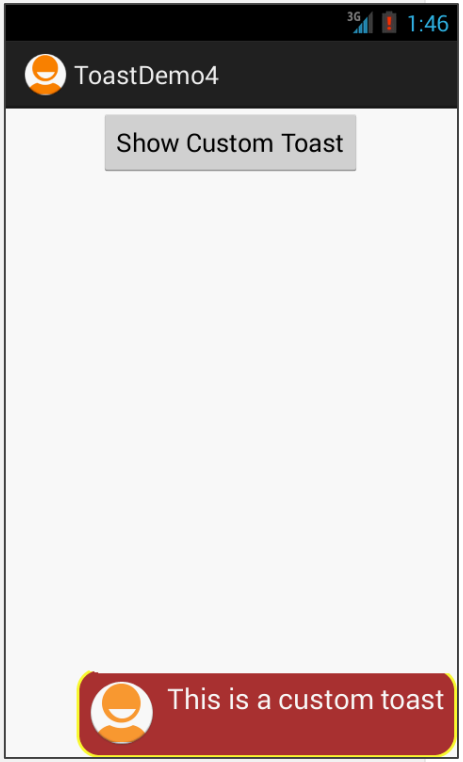


Note: A basic shape is a drawable such as a rectangle or oval. Defining attributes are stroke(border) , solid(interior part of the shape), corners, padding, margins, etc. Save this file in the **res/layout** folder. For more information see **Appendix A**.

The Toast Widget

Example 4. MainActivity - ToastDemo4.java

```
public class ToastDemo4 extends Activity {

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

    }//onCreate
    public void showCustomToast(View v){
      // ////////////////////////////////////////////////
      // this fragment creates a custom Toast showing
      // image + text + shaped_background
      // triggered by XML button's android:onClick=...

      Toast customToast = makeCustomToast(this);

      customToast.show();

    }
```



The Toast Widget

Example 4. MainActivity - ToastDemo4.java cont. 1

```
   protected Toast makeCustomToast(Context context) {
      // Reference:
      // http://developer.android.com/guide/topics/ui/notifiers/toasts.html

      LayoutInflater inflater = getLayoutInflater();
1 →

      View layout = inflater.inflate( R.layout.custom_toast, null);

      TextView text = (TextView) layout.findViewById(R.id.toast_text);
      text.setText("This is a custom toast");

      Toast toast = new Toast(context);
2 →   toast.setMargin(50,-50); //lower-right corner
      toast.setDuration(Toast.LENGTH_LONG);

3 →   toast.setView(layout);

      return toast;

   }//makeCustomToast

}//ToastDemo2
```

The Toast Widget

Example 4. MainActivity - ToastDemo4.java

Comments

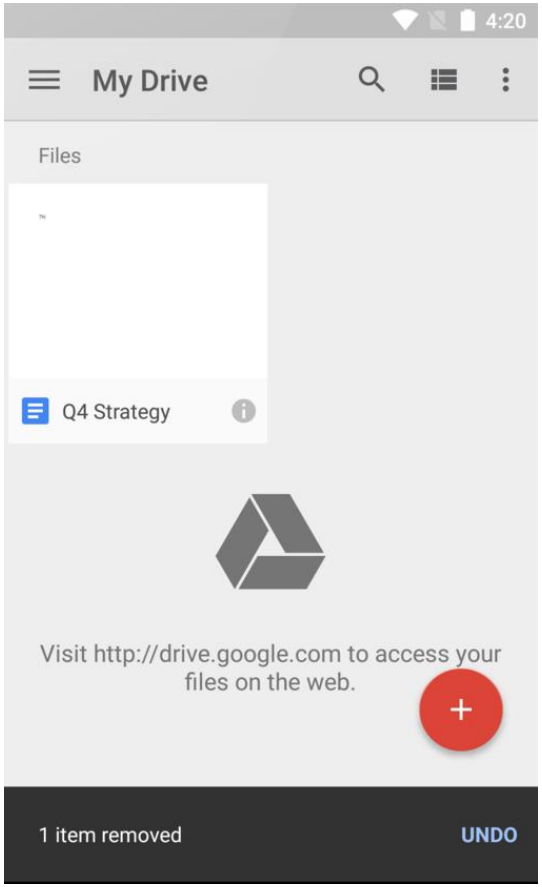
1. After the custom toast layout is inflated, you gain control to its TextView in which the user's message will be held.

2. The toast is positioned using the `setMargin()` method to the lower right corner of the screen (50, -50)

3. The inflated view is attached to the newly created Toast object using the `.setView()` method.

Show pop-up message using Snackbar

- There are many situations where you might want your app to show a quick message to the user, without necessarily waiting for the user to respond.
- A **Snackbar** provides a quick pop-up message to the user. The current activity remains visible and interactive while the **Snackbar** is displayed. After a short time, the Snackbar automatically dismisses itself.
- The **Snackbar** class supersedes **Toast**.



Show pop-up message using Snackbar

Build and display a pop-up message

A **Snackbar** is attached to a view. The **Snackbar** provides basic functionality if it is attached to any object derived from the View class, such as any of the common layout objects. However, if the **Snackbar** is attached to a **CoordinatorLayout**, the **Snackbar** gains additional features:

- The user can dismiss the **Snackbar** by swiping it away.
- The layout moves some other UI elements when the Snackbar appears.

Show pop-up message using Snackbar

Build and display a pop-up message

```
<android.support.design.widget.CoordinatorLayout
    android:id="@+id/myCoordinatorLayout"
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <!-- Here are the existing layout elements, now wrapped in
         a CoordinatorLayout -->
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical">

        <!-- …Toolbar, other layouts, other elements… -->

    </LinearLayout>

</android.support.design.widget.CoordinatorLayout>
```

Show pop-up message using Snackbar

Build and display a pop-up message

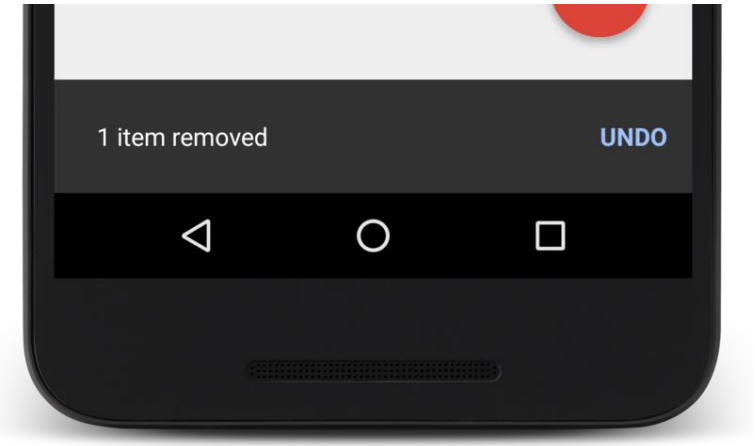
If you just want to show a message to the user and won't need to call any of the Snackbar object's utility methods, you don't need to keep the reference to the Snackbar after you call show(). For this reason, it's common to use method chaining to create and show a Snackbar in one statement:

```
Snackbar.make(findViewById(R.id.myCoordinatorLayout), R.string.email_sent,
                    Snackbar.LENGTH_SHORT)
        .show();
```

Show pop-up message using Snackbar

Add an action to a message

You can add an action to a Snackbar, allowing the user to respond to your message. If you add an action to a Snackbar, the Snackbar puts a button next to the message text. The user can trigger your action by pressing the button.




```
Snackbar mySnackbar =
Snackbar.make(findViewById(R.id.myCoordinatorLayout),
        R.string.email_archived, Snackbar.LENGTH_SHORT);
mySnackbar.setAction(R.string.undo_string, new View.OnClickListener());
mySnackbar.show();
```