Programming Handheld Systems

Adam Porter

User Interface Classes

Today's Topics

Views & View Events

View Groups, AdapterViews & Layouts

Menus & ActionBar

Dialogs

Android User Interfaces

Activities usually display a user interface

Android provides many classes for constructing user interfaces

View

Key building block for UI components

Occupy a rectangular space on screen

Responsible for drawing themselves and for handling events

Some Predefined Views

Button

ToggleButton

Checkbox

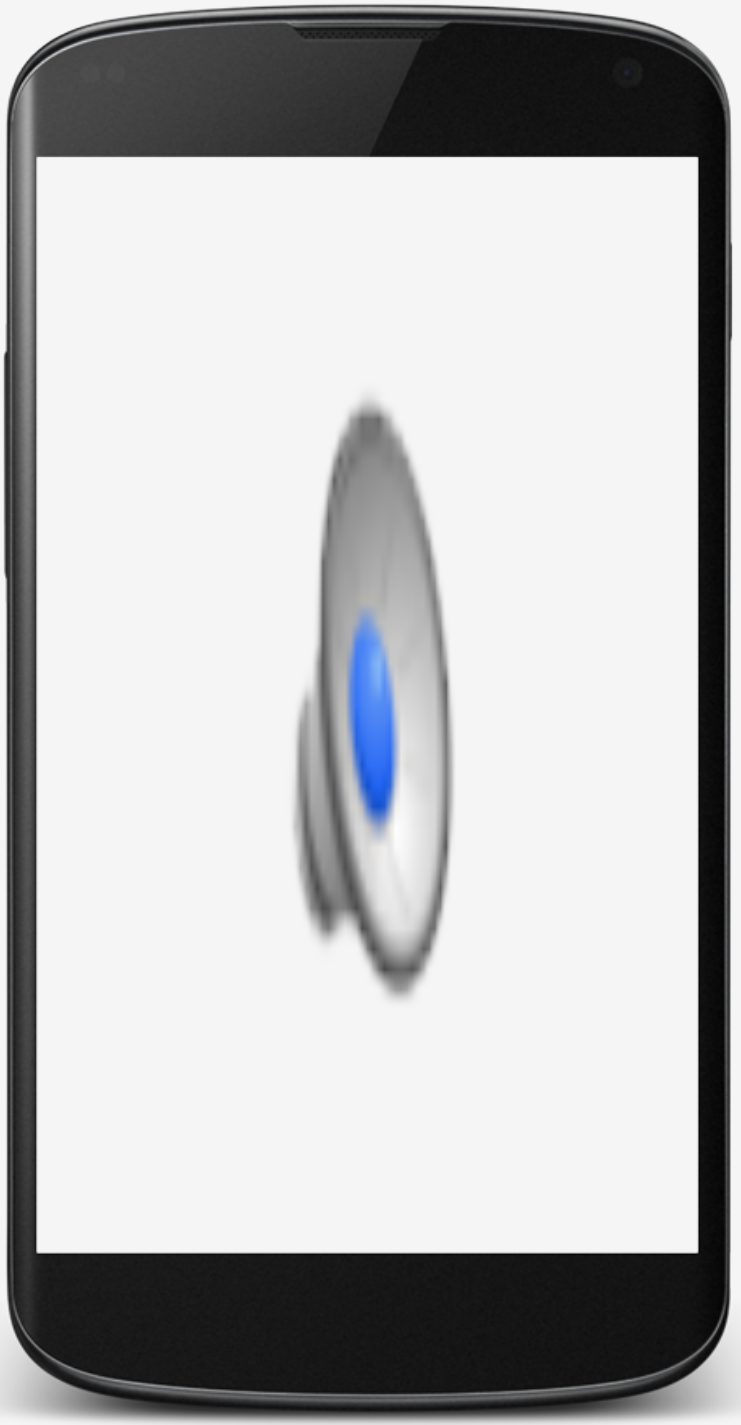
RatingBar

AutoCompleteTextView

Button

View that can be clicked on to perform an action

UIButton



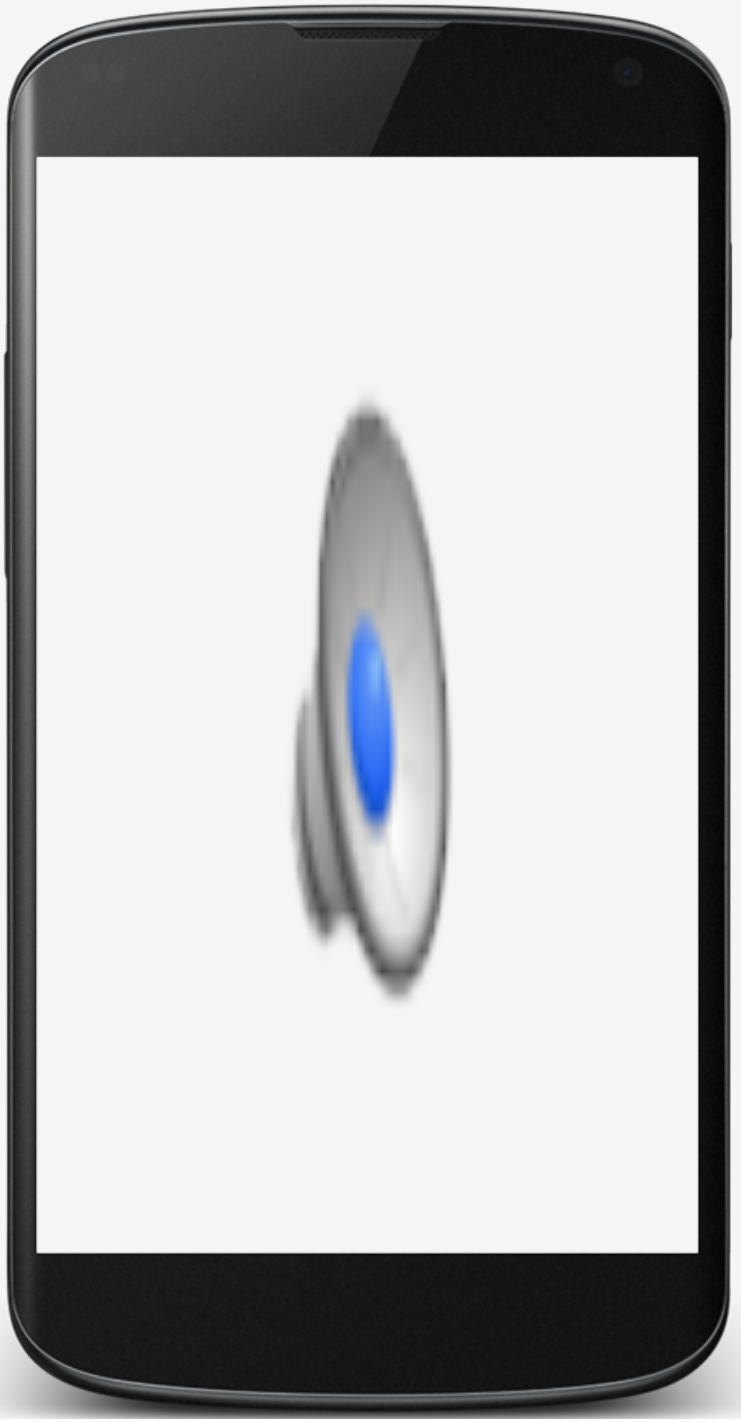
ToggleButton

A 2-state Button

checked/not checked state

Light indicator showing state

UIToggleButton

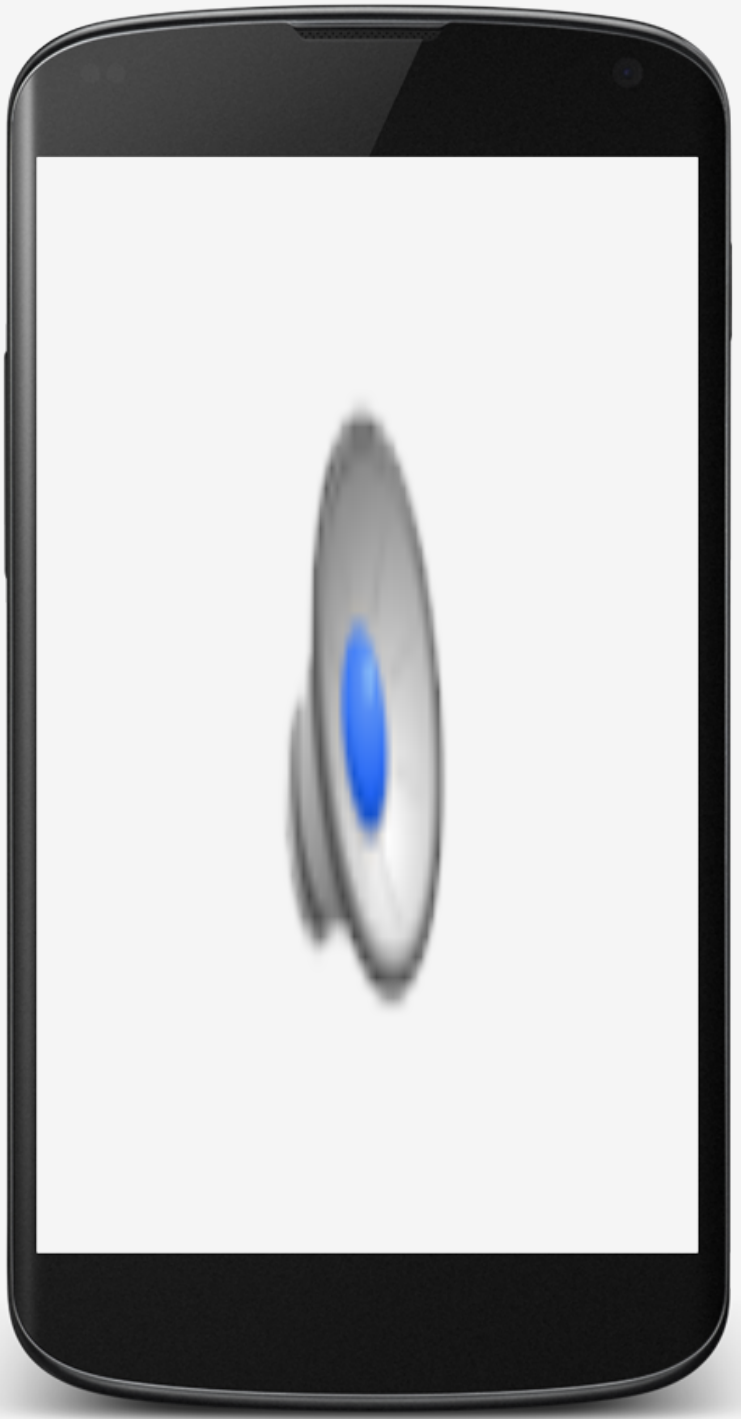


CHECKBOX

ANOTHER KIND OF 2-STATE BUTTON

CHECKED/NOT CHECKED

UICheckbox

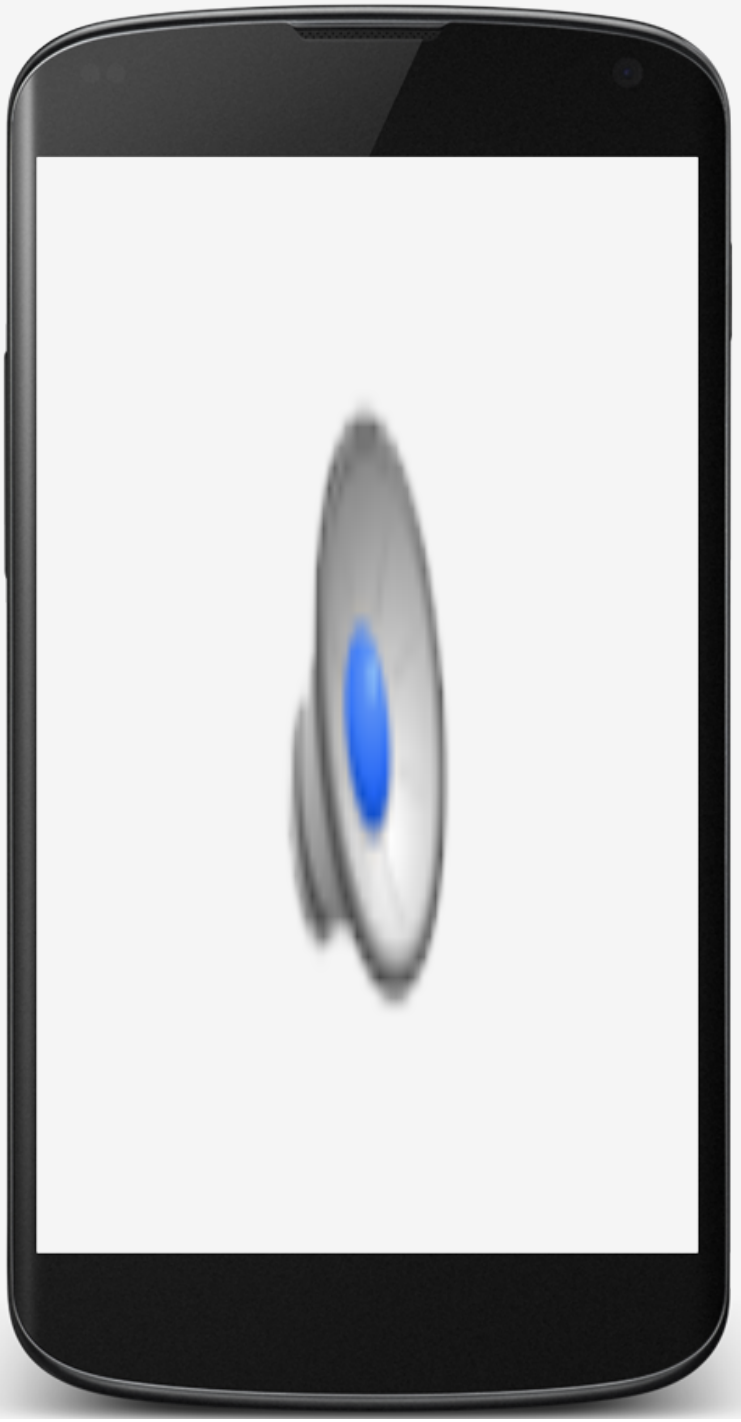


RatingBar

A view comprising a row of stars

The user can click or drag the stars to highlight some number of them

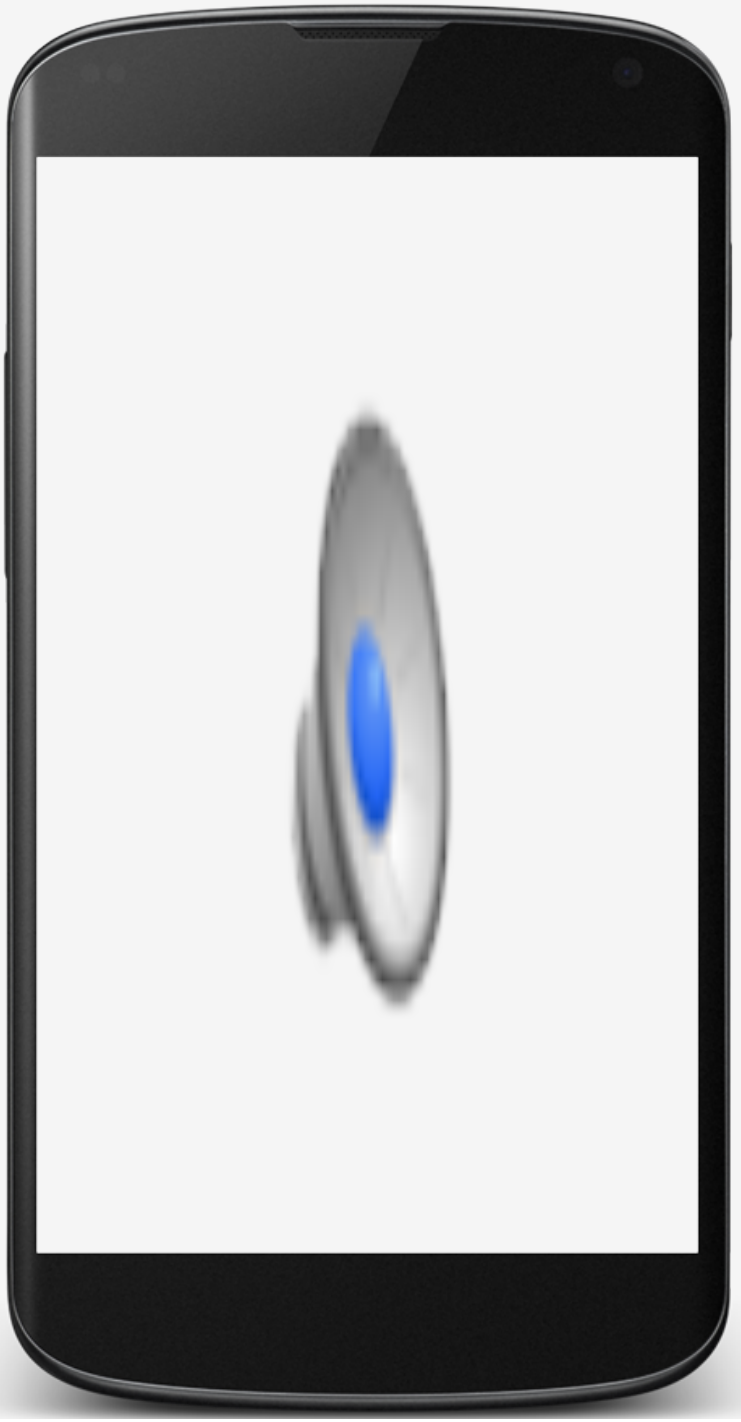
UIRatingBar



AutoCompleteTextView

An editable text field that provides completion suggestions as the user types in text

UIAutoComplete TextView



Common View operations

Set visibility: show or hide view

Set Checked state

Set Listeners: Code that should be executed when specific events occur

Set properties: opacity, background, rotation

Manage input focus: allow view to take focus, request focus

View Event Sources

- User interaction
  - Touch
  - Keyboard/trackball/D-pad
- System control
  - Lifecycle changes

Handling View Events

Often handle events with listeners

Numerous Listener interfaces defined by the View class

View Listener interfaces

OnClickListener.onClick()

View has been clicked

OnLongClickListener.onLongClick()

View has been pressed & held

View Listener interfaces

OnFocusChangeListener.onFocusChange()

View has received or lost focus

OnKeyListener.onKey()

View about to receive a hardware key press

Displaying Views

Views are organized in a Tree

Displaying has multiple steps

Measure – get dimensions of each View

Layout – Position each View

Draw – Draw each view

Handling View Events

Custom View subclasses can override various View methods

Handling View Events

onMeasure()

- Determine the size of this View and its children

onLayout()

- View must assign a size and position to all its children

onDraw()

- View should render its content

Handling View Events

onFocusChanged()

View's focus state has changed

onKeyUp(), onKeyDown()

A hardware key event has occurred

onWindowVisibilityChanged()

Window containing view has changed its visibility status

ViewGroup

An invisible View that contains other views

Used for grouping & organizing a set of views

Base class for view containers & layouts

Some Predefined ViewGroups

RadioGroup

TimePicker

DatePicker

WebView

MapView

Gallery

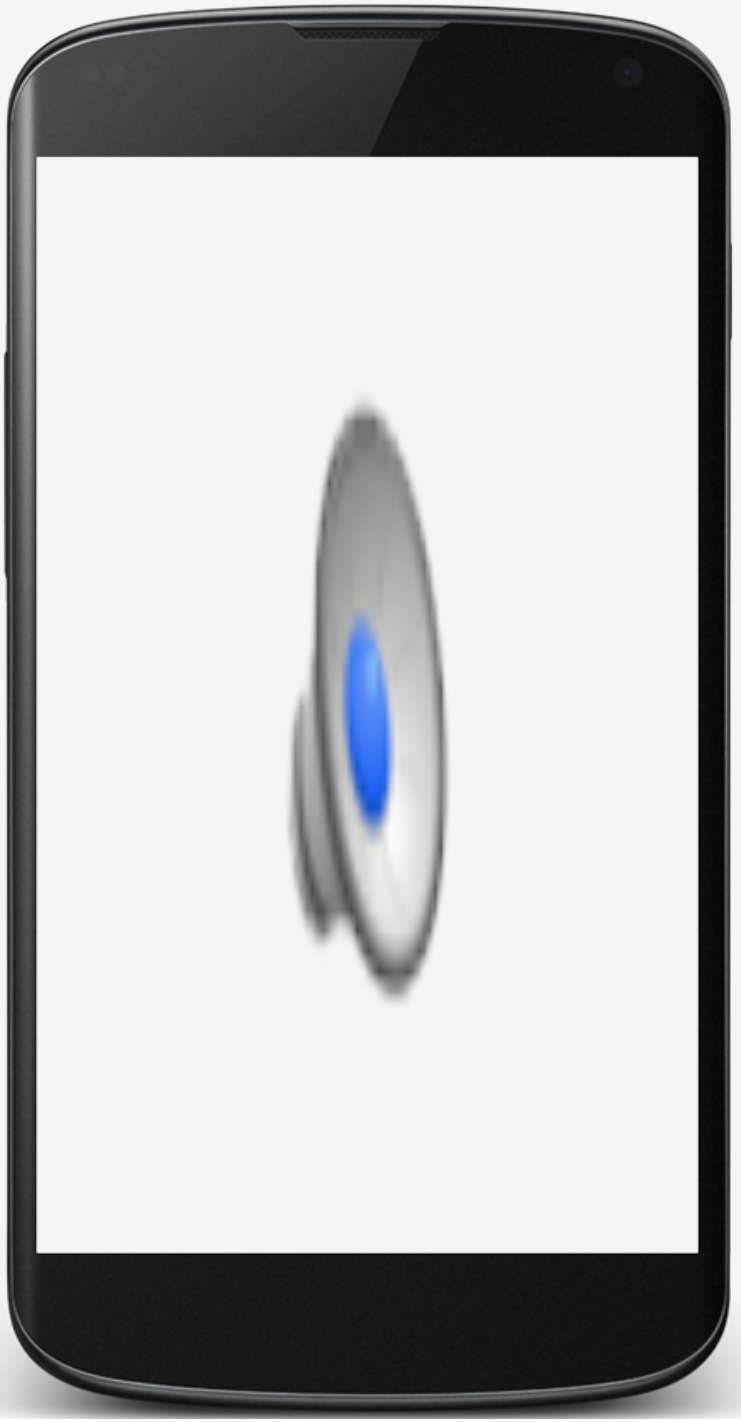
Spinner

RadioGroup

A ViewGroup containing a set of Radio Buttons (CheckBoxes)

Only one button can be selected at any one instant

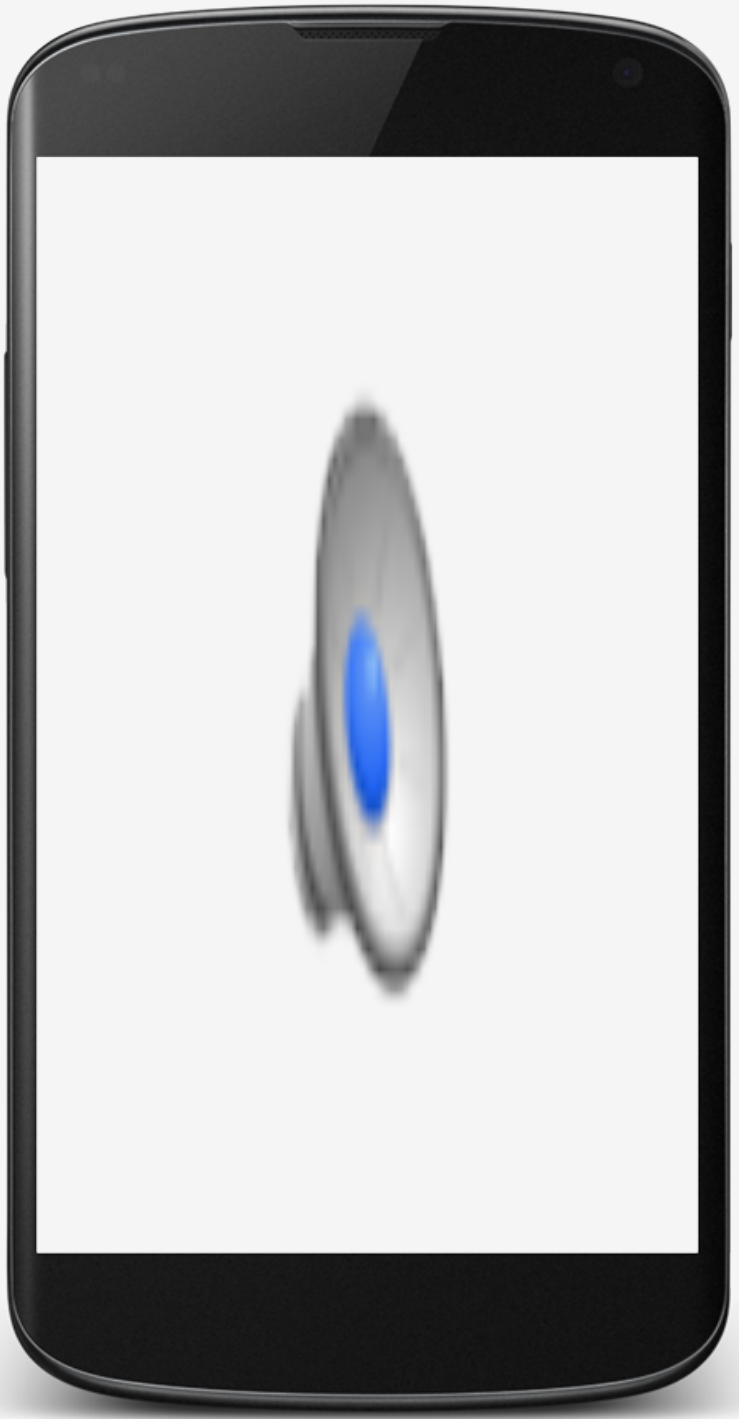
UIRadioGroup



TimePicker

A ViewGroup that allows the user to select a time

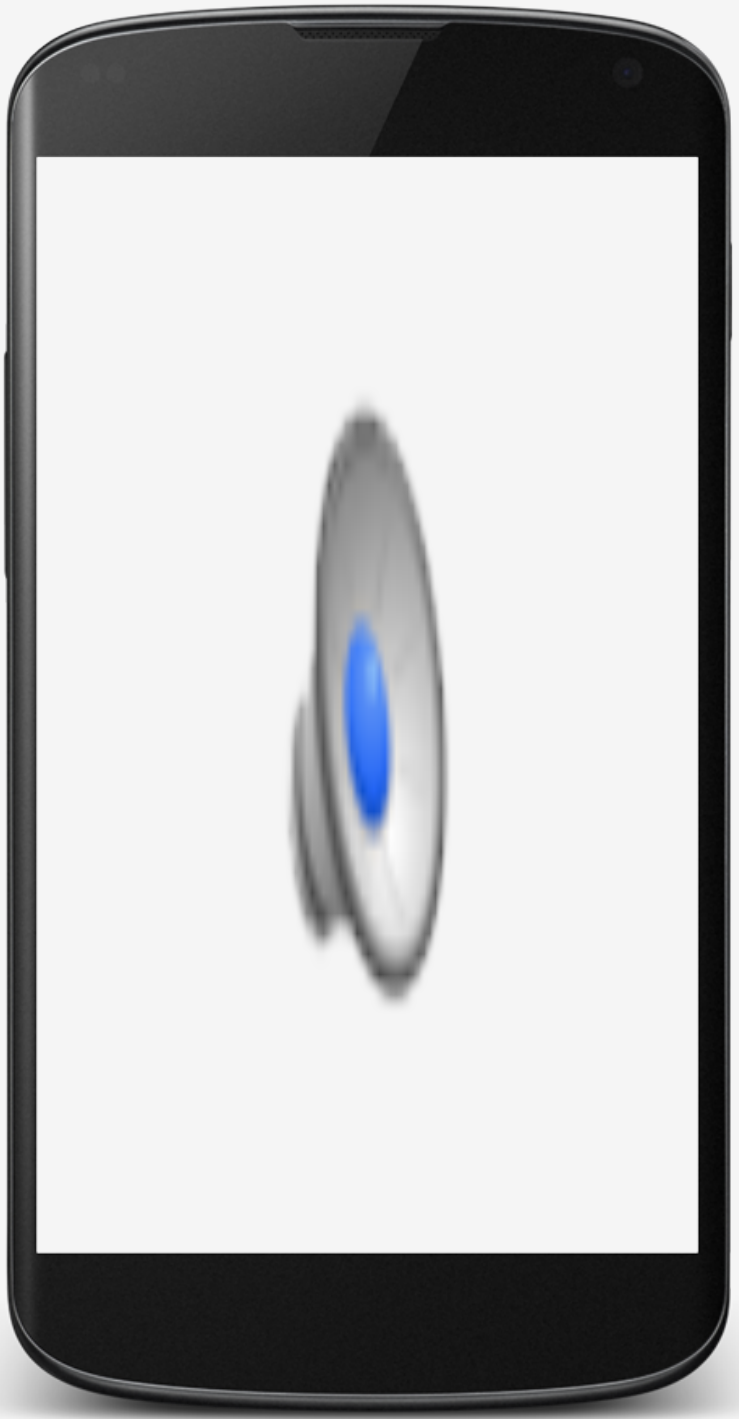
UITimePicker



DatePicker

A ViewGroup that allows the user to select a date

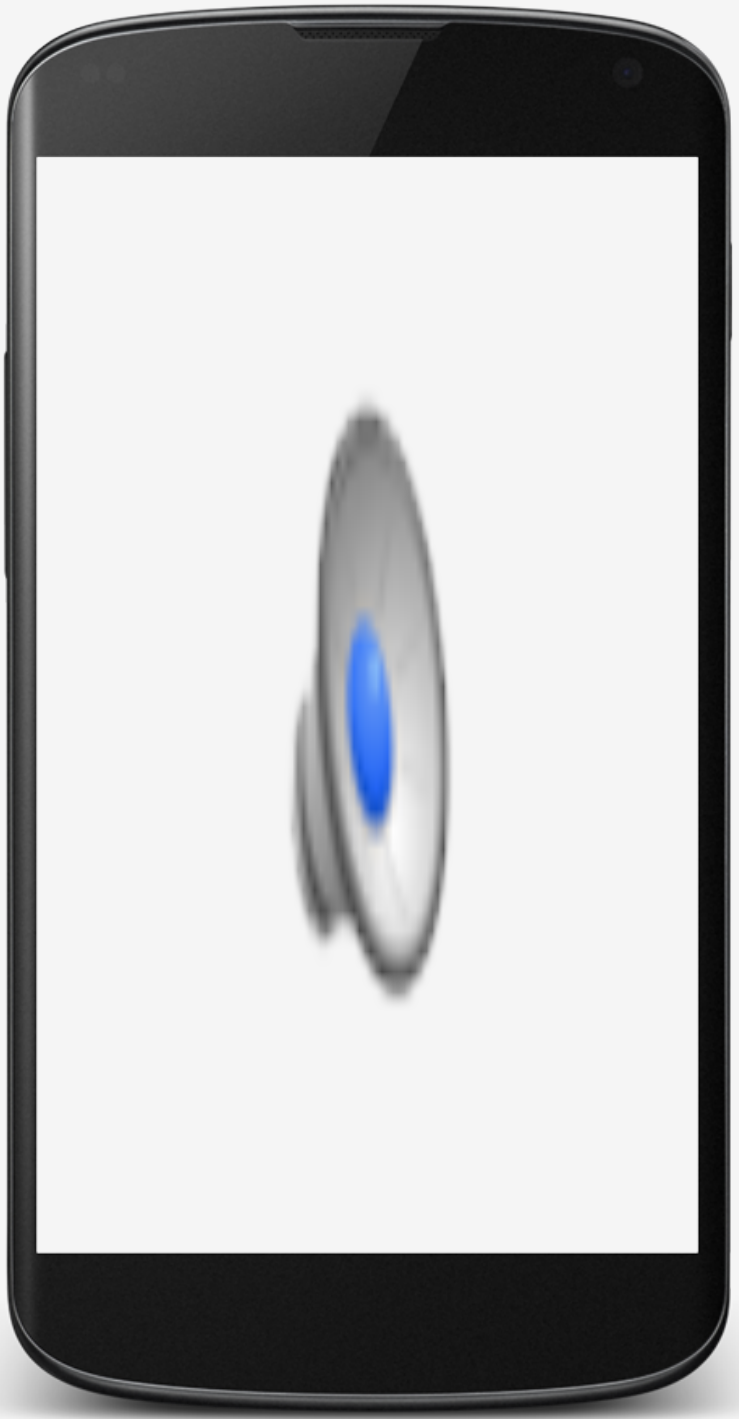
UIDatePicker



WebView

A ViewGroup that displays a web page

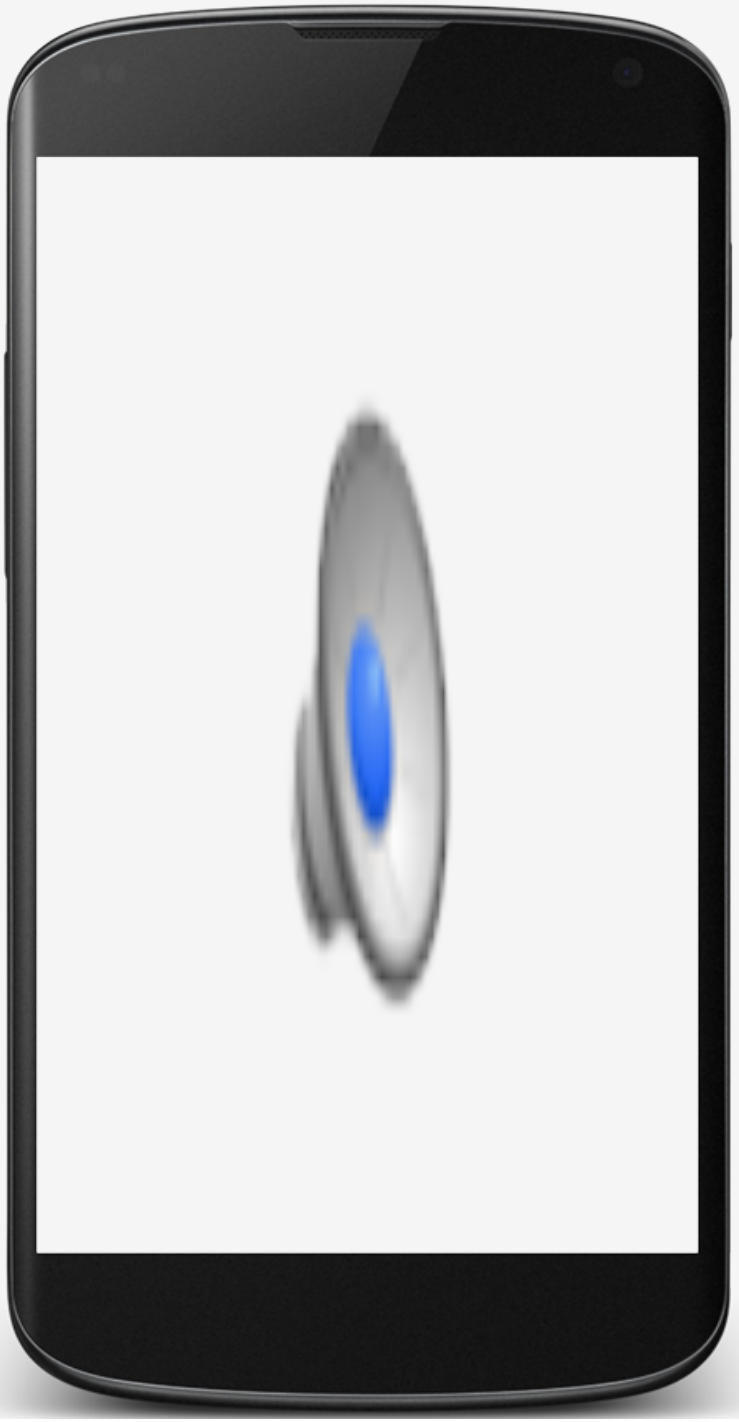
UIWebView



MapView

A ViewGroup that displays a Map

UIGoogleMaps



Adapters & AdapterViews

AdapterViews are views whose children and managed by an Adapter

Adapter manages the data and provides data views to AdapterView

AdapterView displays the data Views

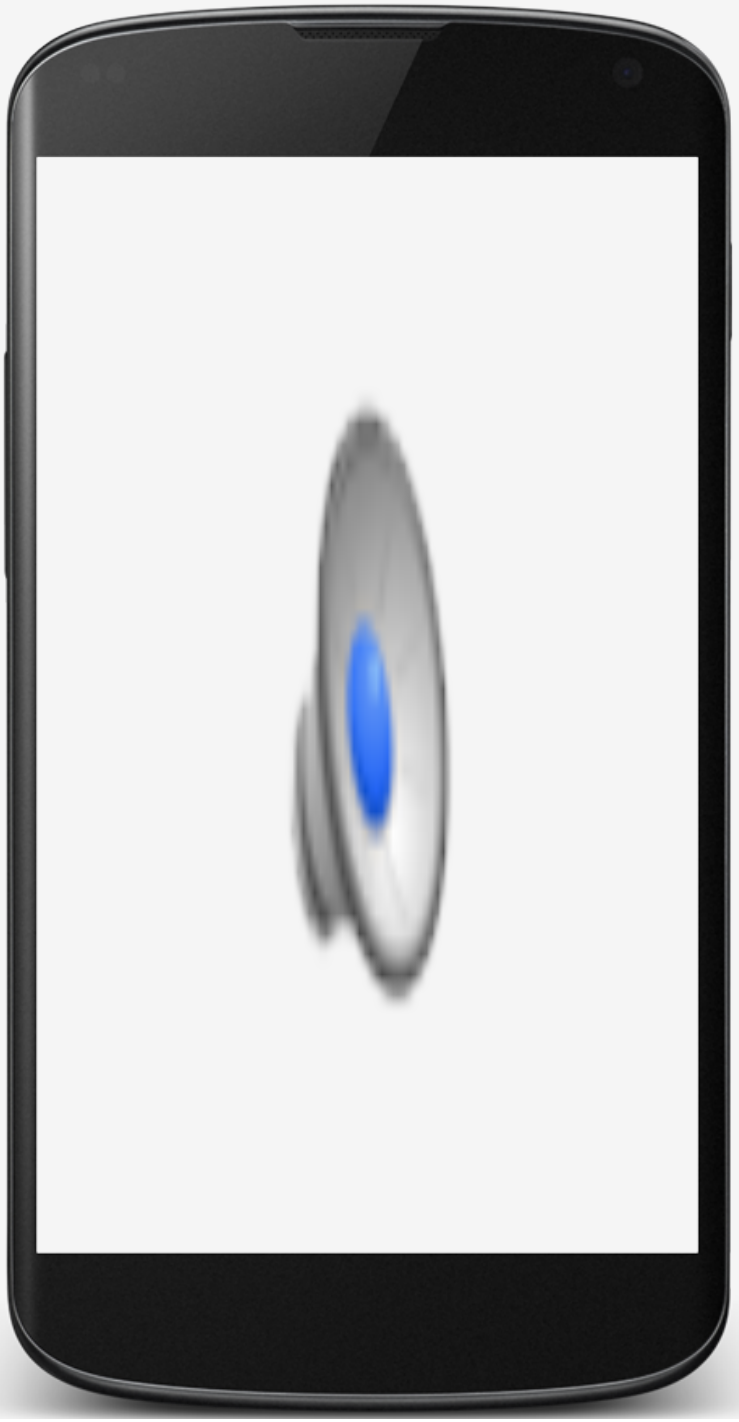
ListView

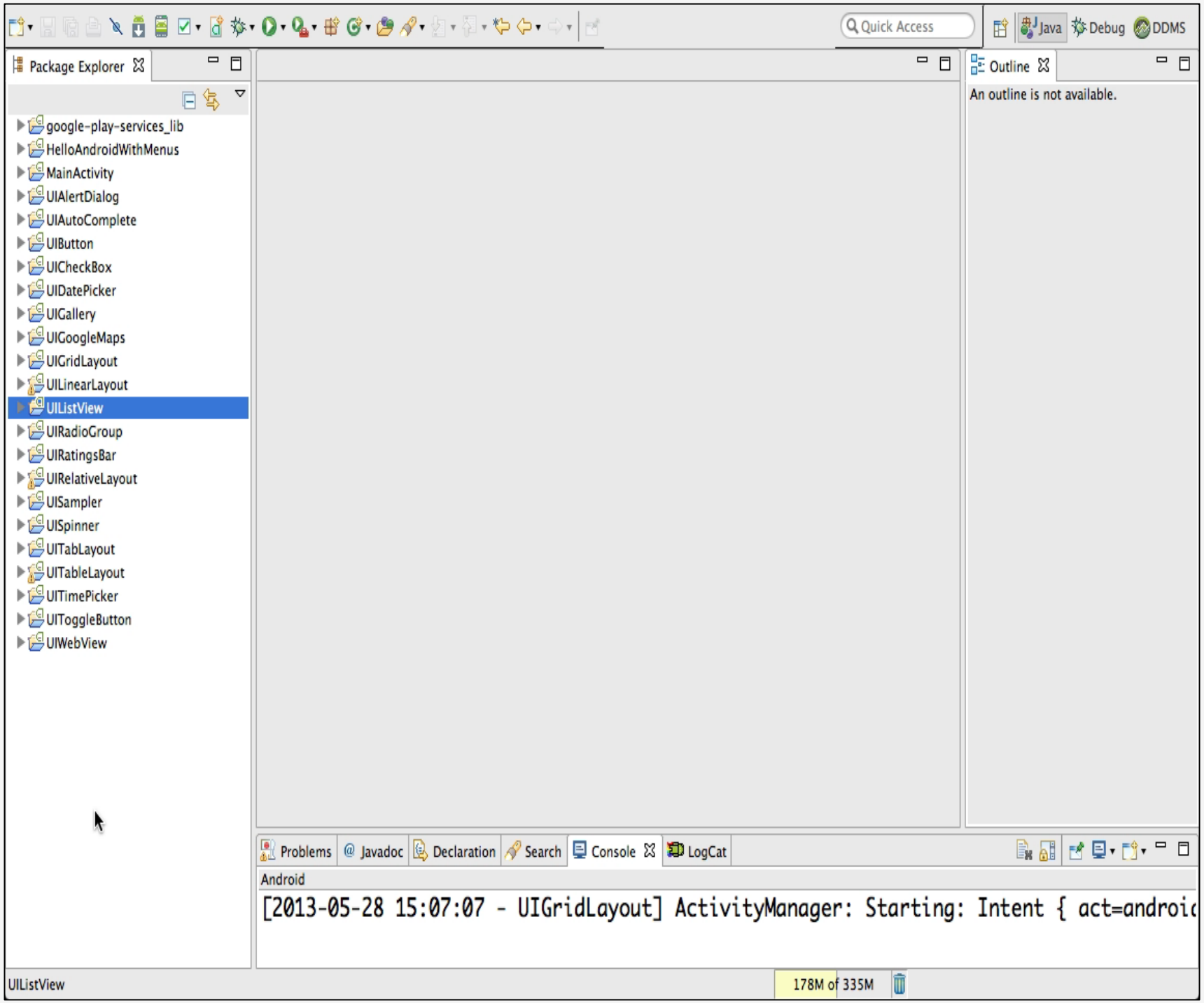
AdapterView displaying a scrollable list of selectable items

Items managed by a ListAdapter

ListView can filter the list of items based on text input

UIListView




Quick Access
Java
Debug
DDMS
Package Explorer
google-play-services_lib
HelloAndroidWithMenus
MainActivity
UIAlertDialog
UIAutoComplete
UIButton
UICheckBox
UIDatePicker
UIGallery
UIGoogleMaps
UIGridLayout
UILinearLayout
UIListView
UIRadioGroup
UIRatingsBar
UIRelativeLayout
UISampler
UISpinner
UITabLayout
UITableLayout
UITimePicker
UIToggleButton
UIWebView
Outline
An outline is not available.
Problems
Javadoc
Declaration
Search
Console
LogCat
Android
[2013-05-28 15:07:07 - UIGridLayout] ActivityManager: Starting: Intent { act=androi
UIListView
178M of 335M

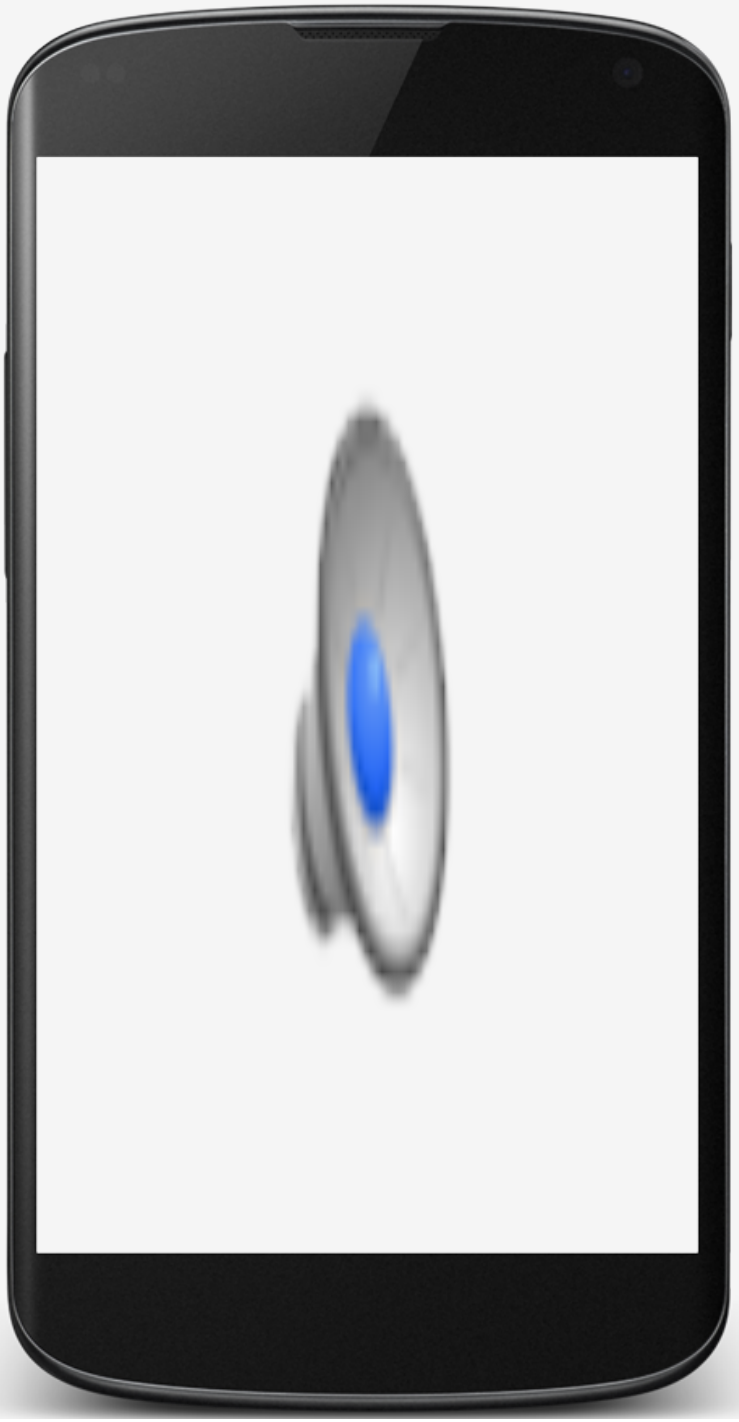
Spinner

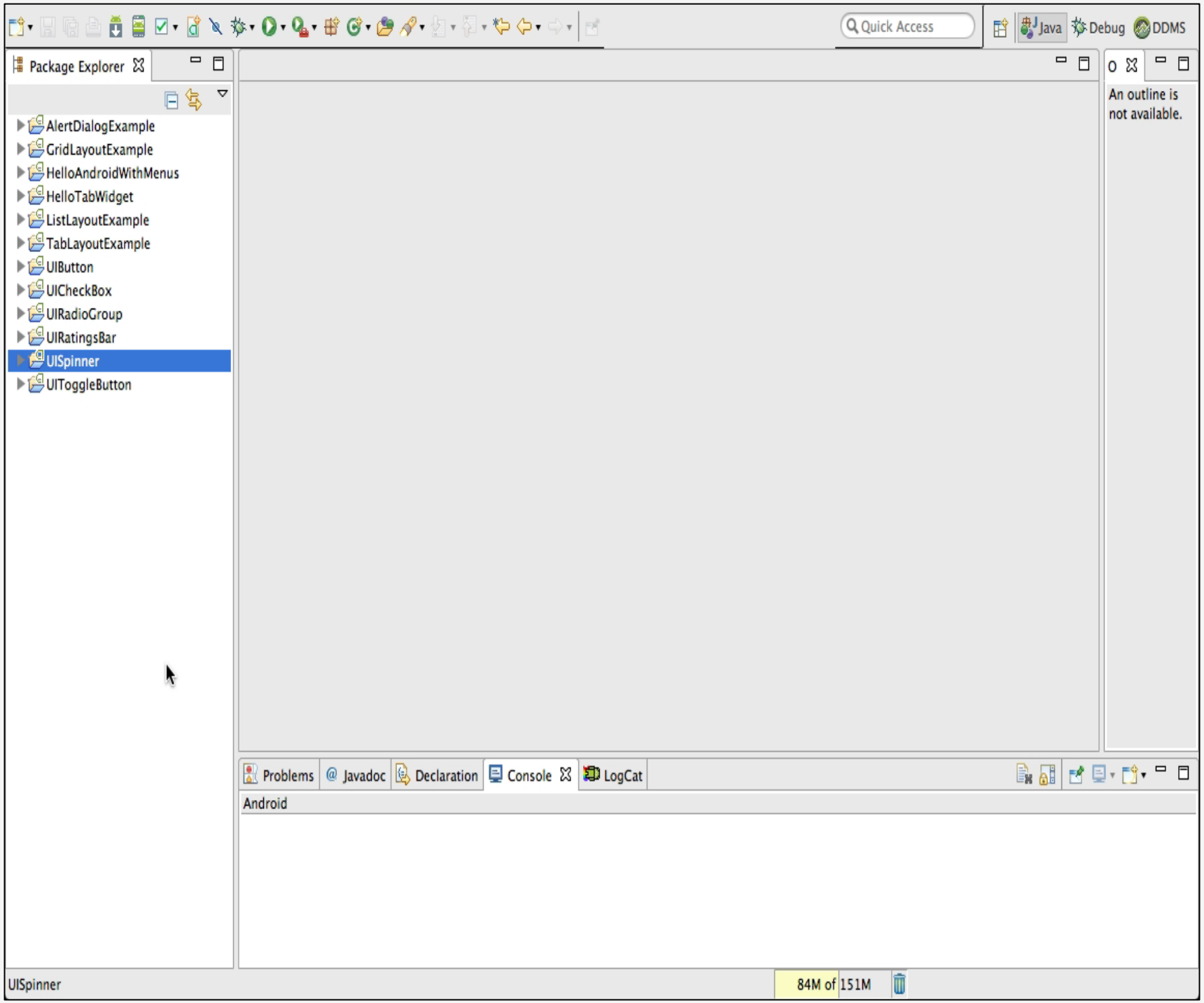
An AdapterView that provides a scrollable list of items

User can select one item from the list

Items managed by a SpinnerAdapter

UISpinner



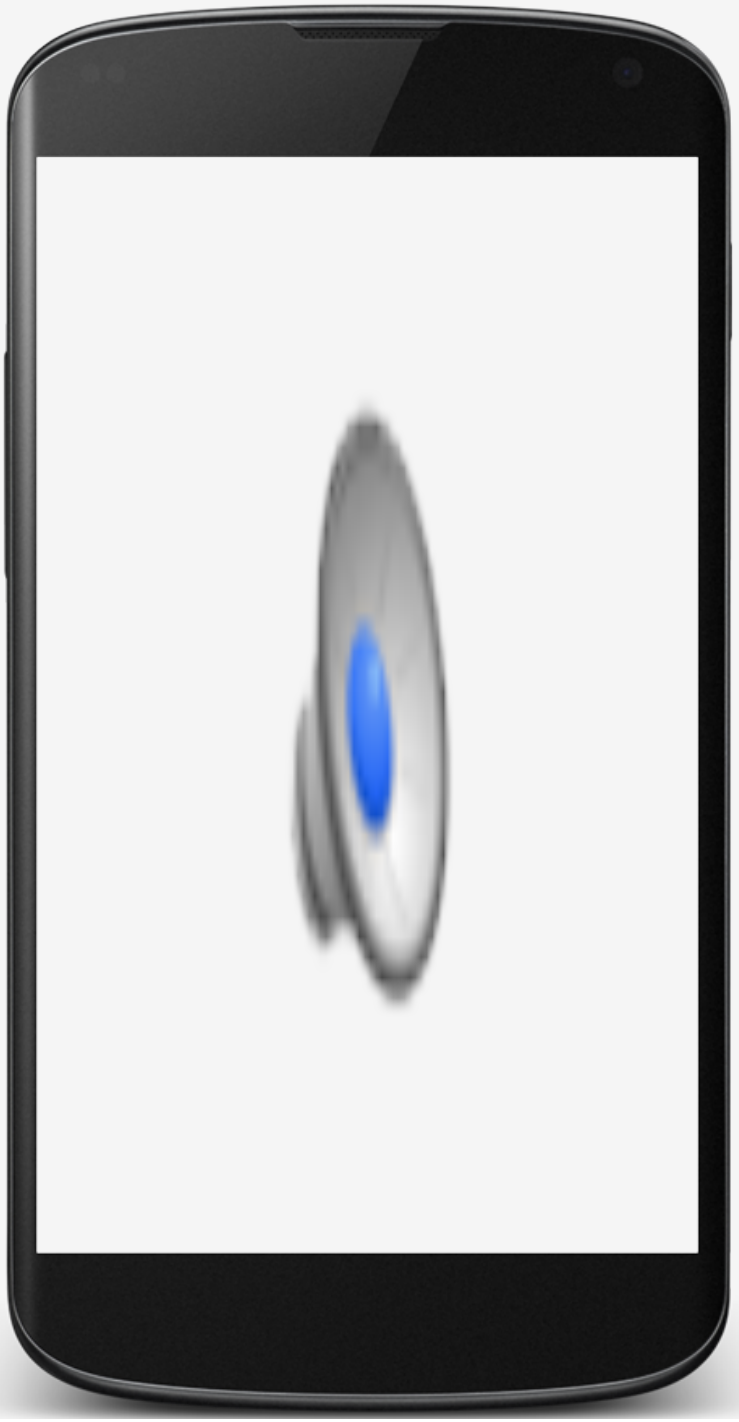

Quick Access
Java
Debug
DDMS
Package Explorer
AlertDialogExample
GridLayoutExample
HelloAndroidWithMenus
HelloTabWidget
ListLayoutExample
TabLayoutExample
UIButton
UICheckBox
UIRadioGroup
UIRatingsBar
UISpinner
UIToggleButton
An outline is not available.
Problems
Javadoc
Declaration
Console
LogCat
Android
UISpinner
84M of 151M

Gallery

A ViewGroup showing a horizontally scrolling list

Items managed by a SpinnerAdapter

UIGallery



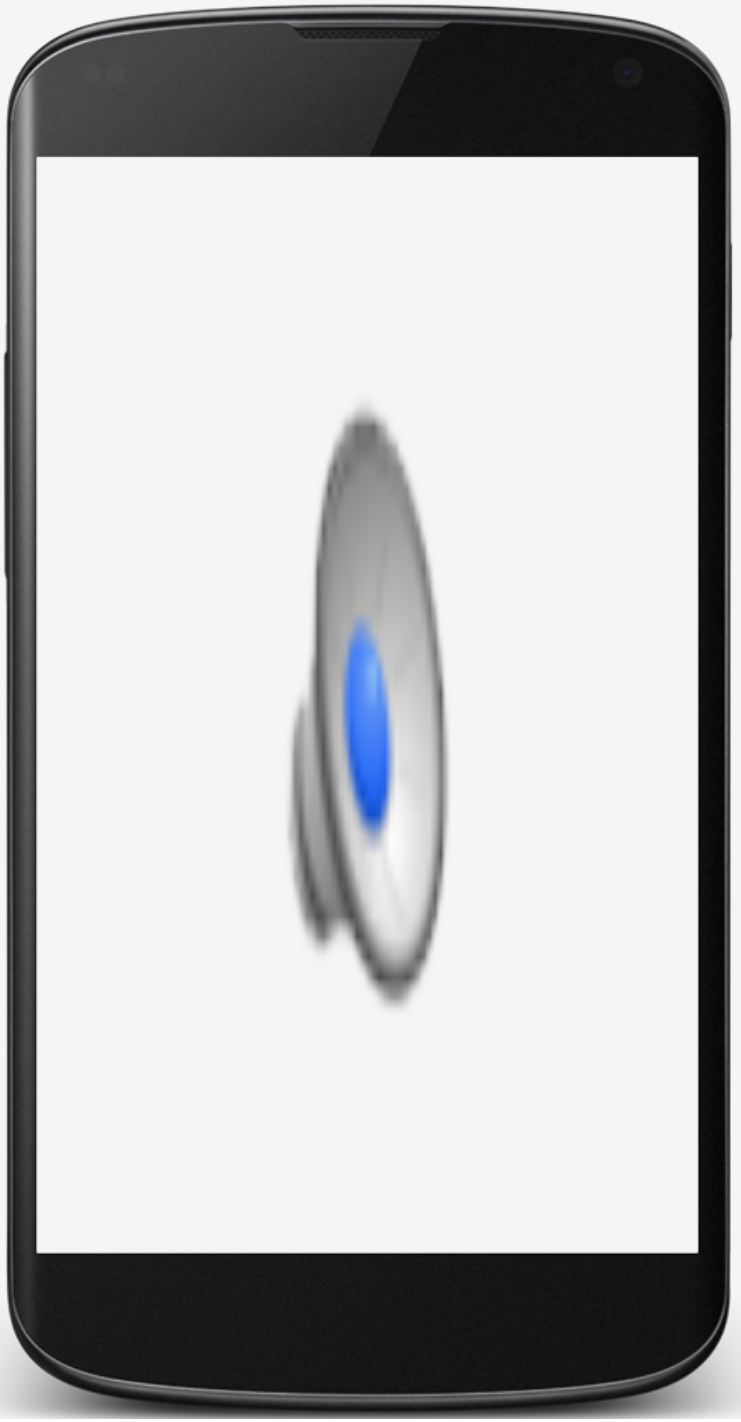
Layouts

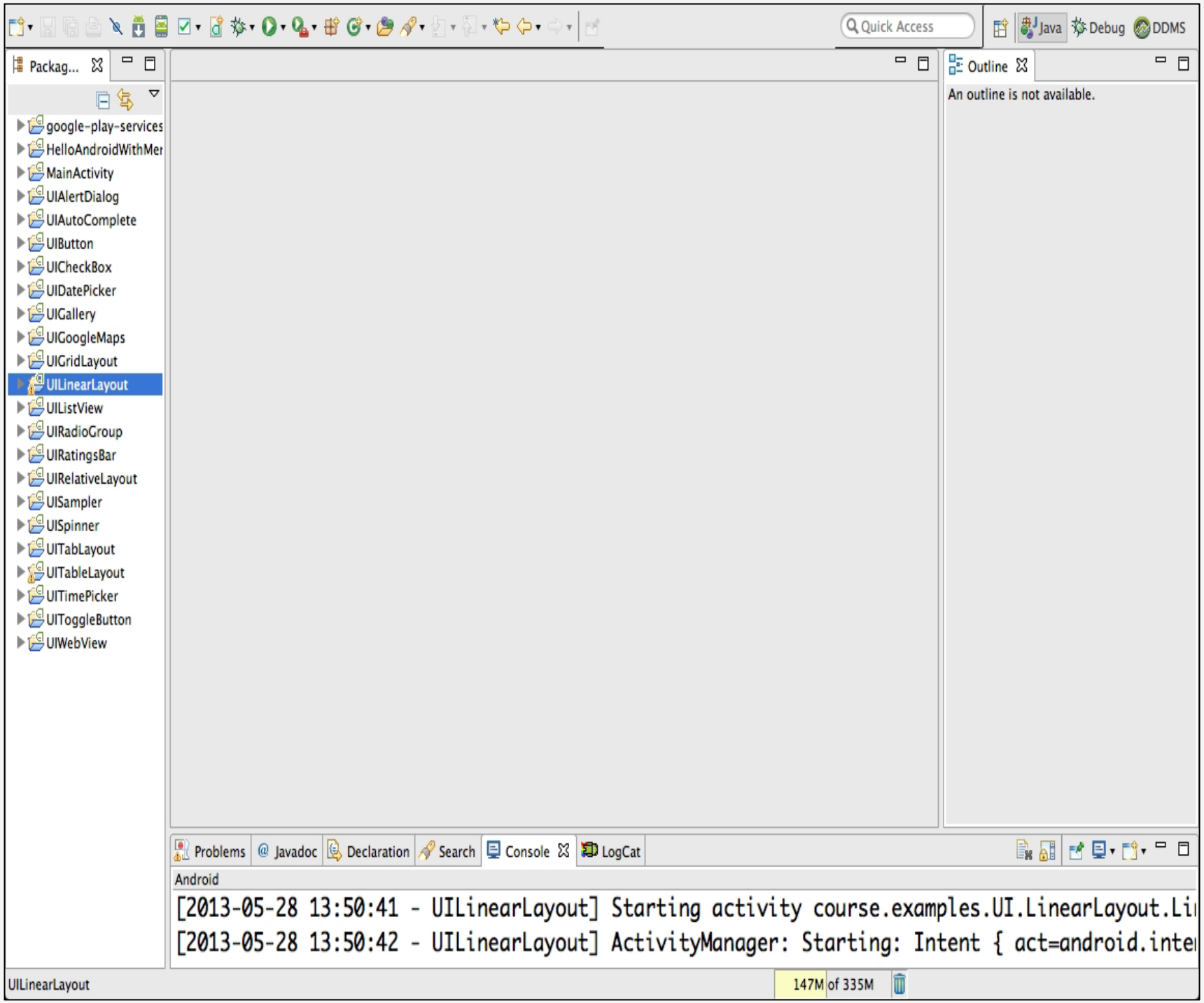
A generic ViewGroup that defines a structure for the Views it contains

LinearLayout

Child views arranged in a single horizontal or vertical row

UILinearLayout

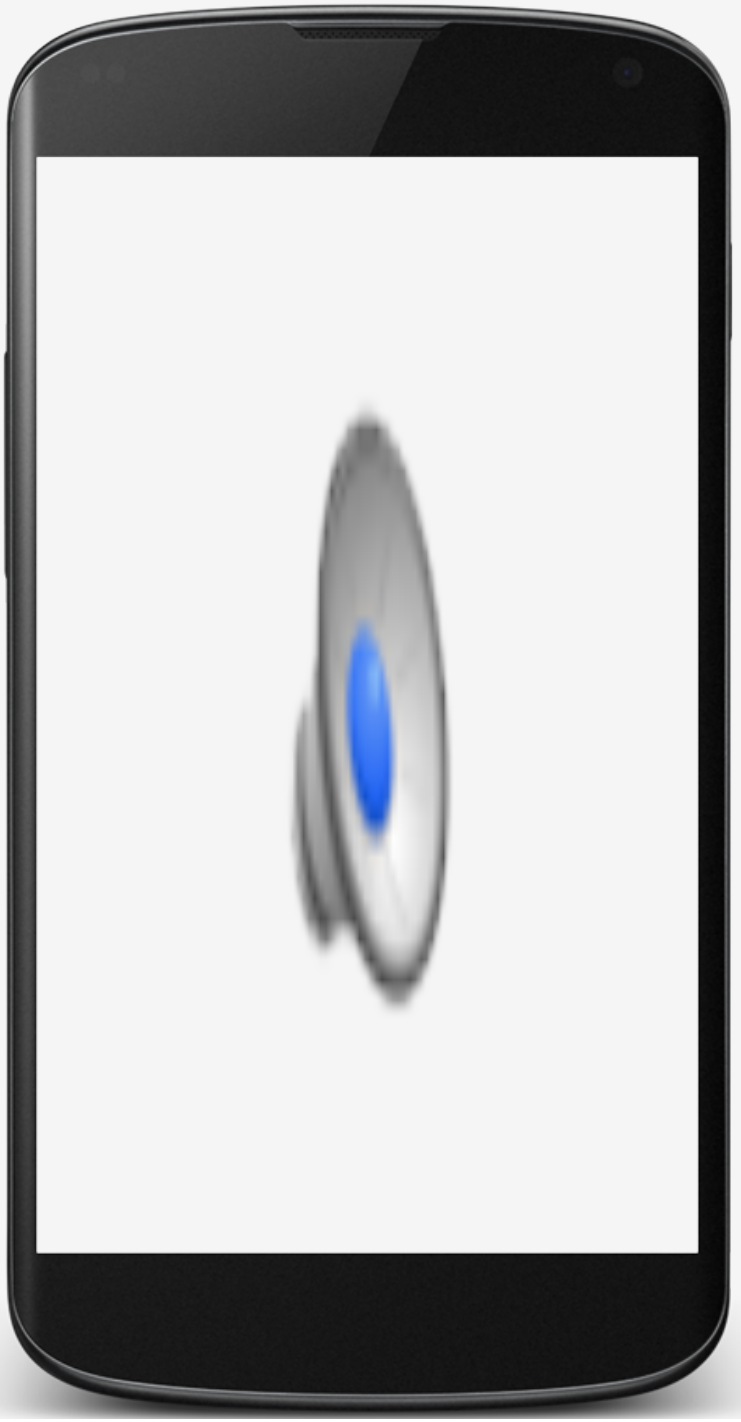


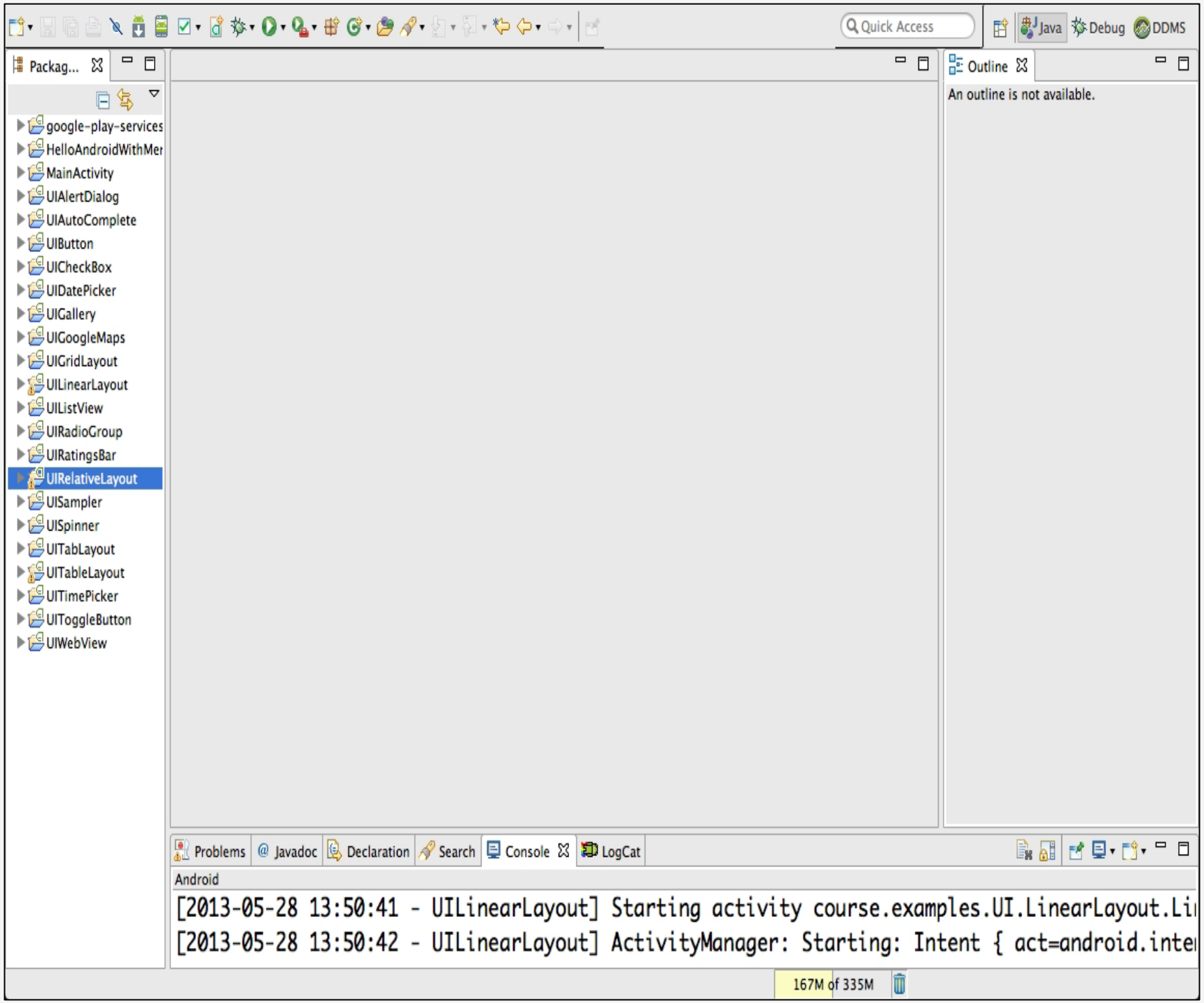

Quick Access
Java
Debug
DDMS
Packag...
google-play-services
HelloAndroidWithMer
MainActivity
UIAlertDialog
UIAutoComplete
UIButton
UICheckBox
UIDatePicker
UIGallery
UIGoogleMaps
UIGridLayout
UILinearLayout
UIListView
UIRadioGroup
UIRatingsBar
UIRelativeLayout
UISampler
UISpinner
UITabLayout
UITableLayout
UITimePicker
UIToggleButton
UIWebView
Outline
An outline is not available.
Problems
Javadoc
Declaration
Search
Console
LogCat
Android
[2013-05-28 13:50:41 - UILinearLayout] Starting activity course.examples.UI.LinearLayout.Li
[2013-05-28 13:50:42 - UILinearLayout] ActivityManager: Starting: Intent { act=android.inte
UILinearLayout
147M of 335M

RelativeLayout

Child views are positioned relative to each other and to parent view

UIRelativeLayout

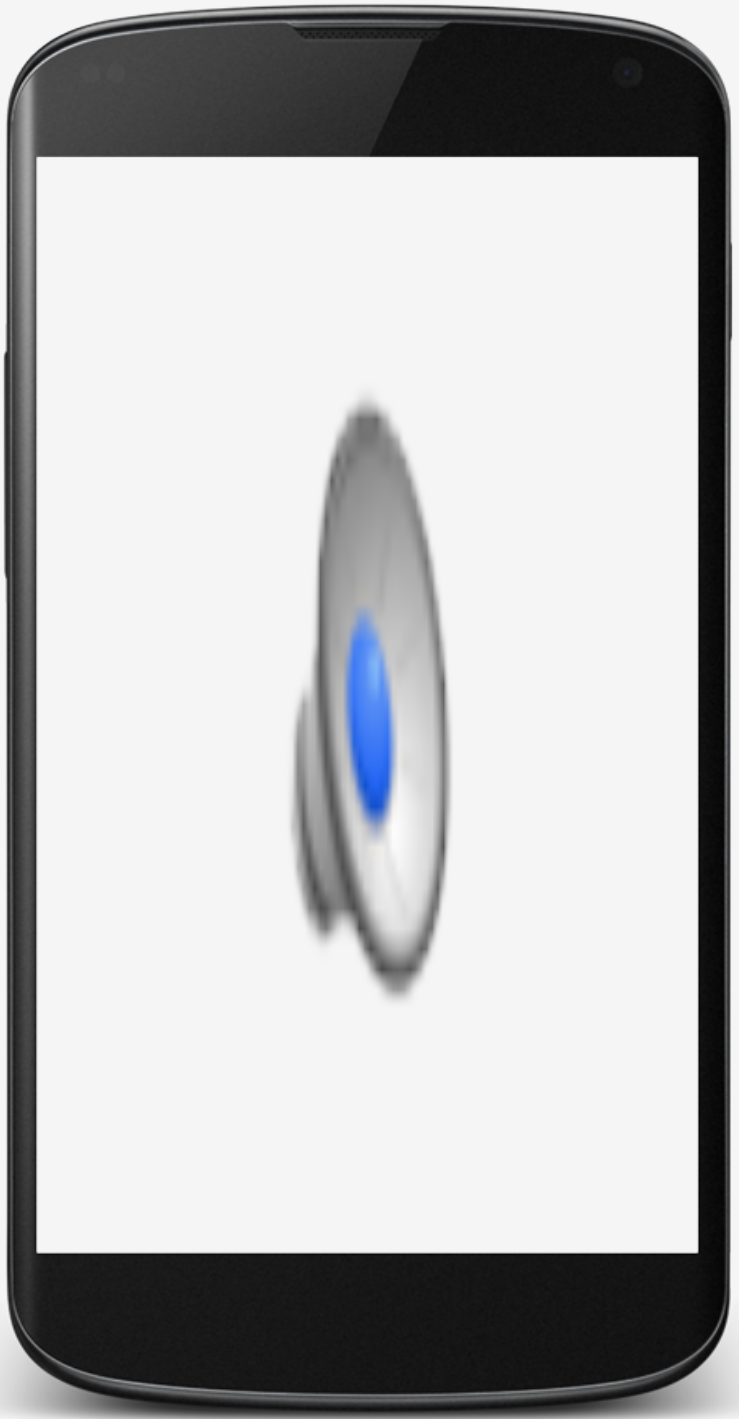


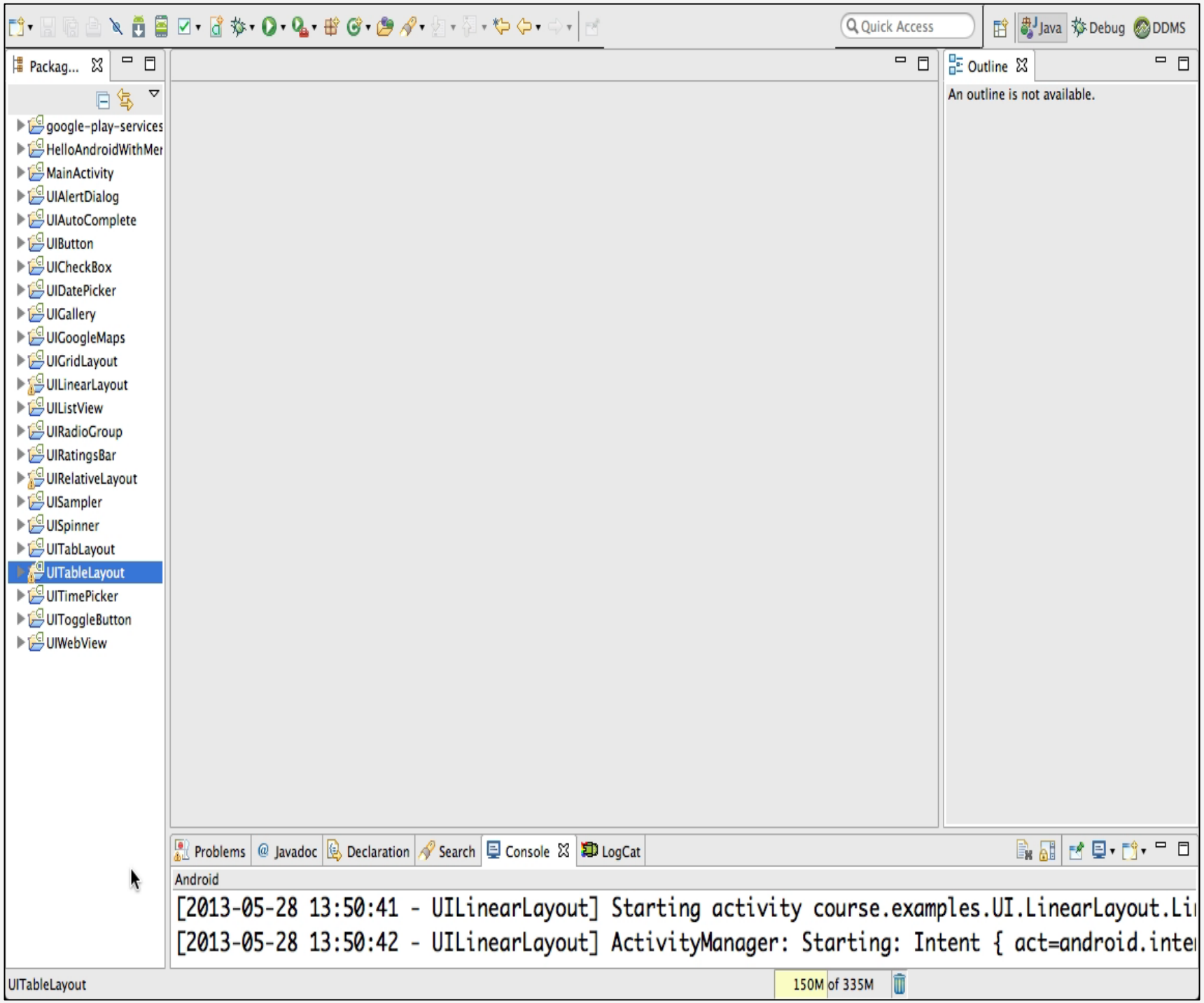

Quick Access
Java
Debug
DDMS
Packag...
google-play-services
HelloAndroidWithMer
MainActivity
UIAlertDialog
UIAutoComplete
UIButton
UICheckBox
UIDatePicker
UIGallery
UIGoogleMaps
UIGridLayout
UILinearLayout
UIListView
UIRadioGroup
UIRatingsBar
UIRelativeLayout
UISampler
UISpinner
UITabLayout
UITableLayout
UITimePicker
UIToggleButton
UIWebView
Outline
An outline is not available.
Problems
Javadoc
Declaration
Search
Console
LogCat
Android
[2013-05-28 13:50:41 - UILinearLayout] Starting activity course.examples.UI.LinearLayout.Li
[2013-05-28 13:50:42 - UILinearLayout] ActivityManager: Starting: Intent { act=android.inte
167M of 335M

TableLayout

Child views arranged into rows & columns

UITableLayout

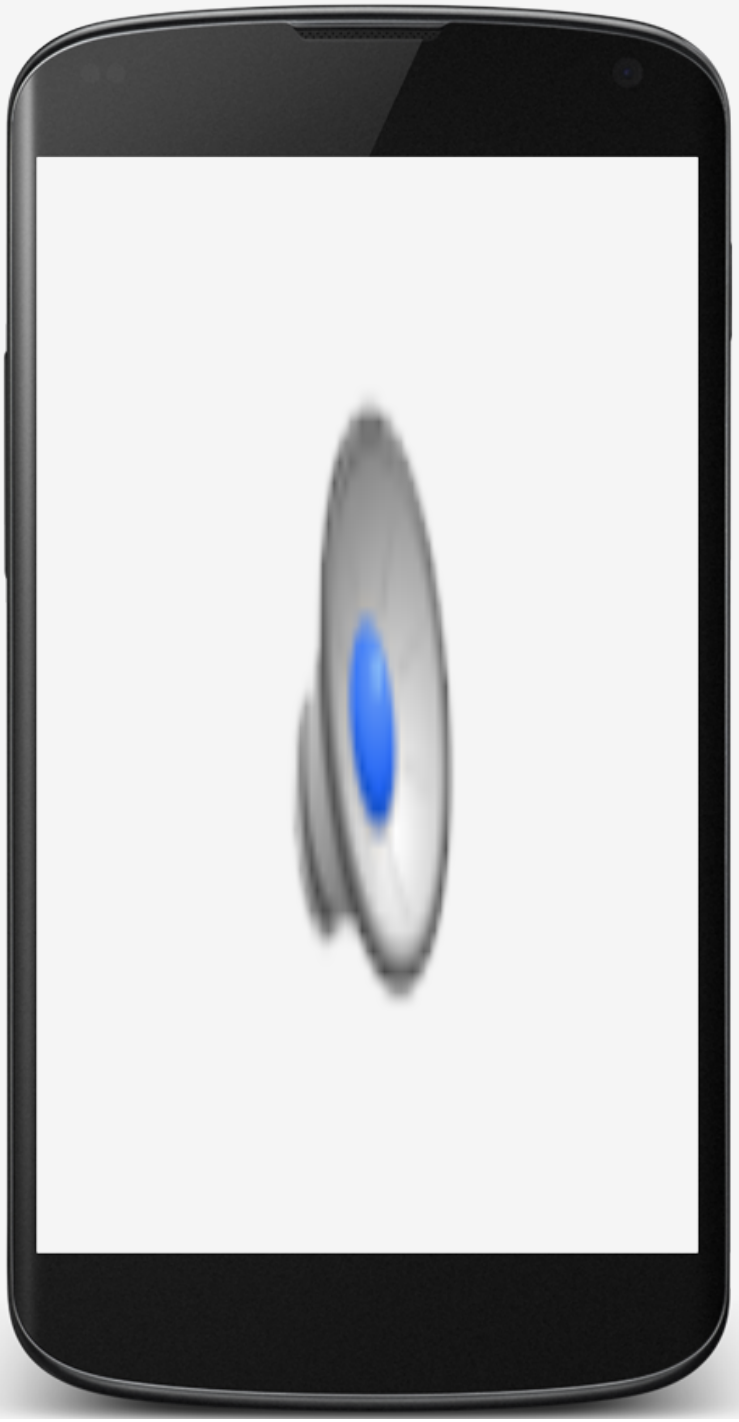


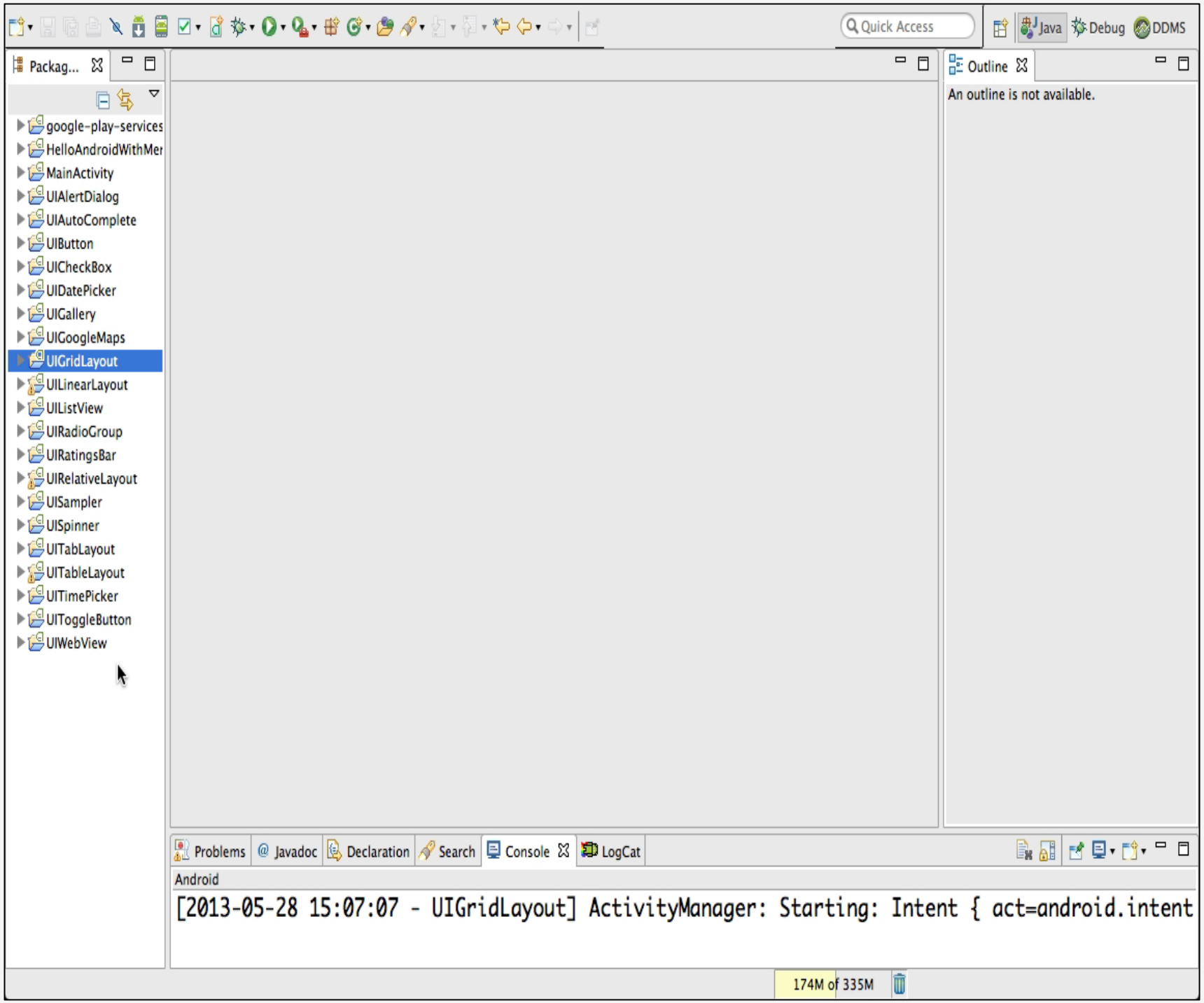

Quick Access
Java
Debug
DDMS
Packag...
google-play-services
HelloAndroidWithMer
MainActivity
UIAlertDialog
UIAutoComplete
UIButton
UICheckBox
UIDatePicker
UIGallery
UIGoogleMaps
UIGridLayout
UILinearLayout
UIListView
UIRadioGroup
UIRatingsBar
UIRelativeLayout
UISampler
UISpinner
UITabLayout
UITableLayout
UITimePicker
UIToggleButton
UIWebView
Outline
An outline is not available.
Problems
Javadoc
Declaration
Search
Console
LogCat
Android
[2013-05-28 13:50:41 - UILinearLayout] Starting activity course.examples.UI.LinearLayout.Li
[2013-05-28 13:50:42 - UILinearLayout] ActivityManager: Starting: Intent { act=android.inte
UITableLayout
150M of 335M

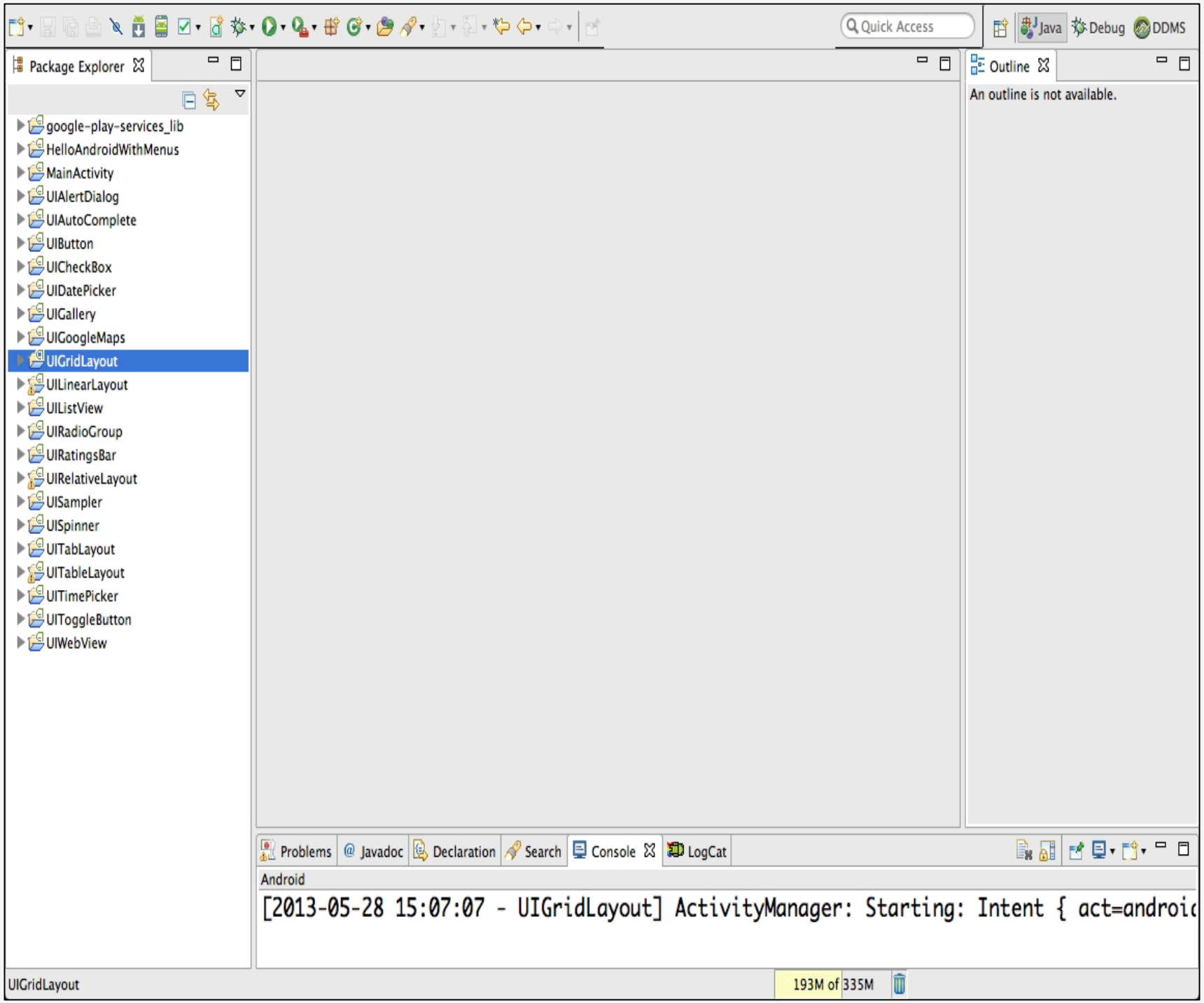
GridView

Child views arranged in a two-dimensional, scrollable grid

UIGridView




Quick Access
Java
Debug
DDMS
Packag...
google-play-services
HelloAndroidWithMer
MainActivity
UIAlertDialog
UIAutoComplete
UIButton
UICheckBox
UIDatePicker
UIGallery
UIGoogleMaps
UIGridLayout
UILinearLayout
UIListView
UIRadioGroup
UIRatingsBar
UIRelativeLayout
UISampler
UISpinner
UITabLayout
UITableLayout
UITimePicker
UIToggleButton
UIWebView
Outline
An outline is not available.
Problems
Javadoc
Declaration
Search
Console
LogCat
Android
[2013-05-28 15:07:07 - UIGridLayout] ActivityManager: Starting: Intent { act=android.intent
174M of 335M


Quick Access
Java
Debug
DDMS
Package Explorer
google-play-services_lib
HelloAndroidWithMenus
MainActivity
UIAlertDialog
UIAutoComplete
UIButton
UICheckBox
UIDatePicker
UIGallery
UIGoogleMaps
UIGridLayout
UILinearLayout
UIListView
UIRadioGroup
UIRatingsBar
UIRelativeLayout
UISampler
UISpinner
UITabLayout
UITableLayout
UITimePicker
UIToggleButton
UIWebView
Outline
An outline is not available.
Problems
Javadoc
Declaration
Search
Console
LogCat
Android
[2013-05-28 15:07:07 - UIGridLayout] ActivityManager: Starting: Intent { act=androi
UIGridLayout
193M of 335M

Menus and ActionBar

- Activities support menus
- Activities can
  - Add items to a menu
  - handle clicks on the menu items

Menu Types

Options

menu shown when user presses the menu button

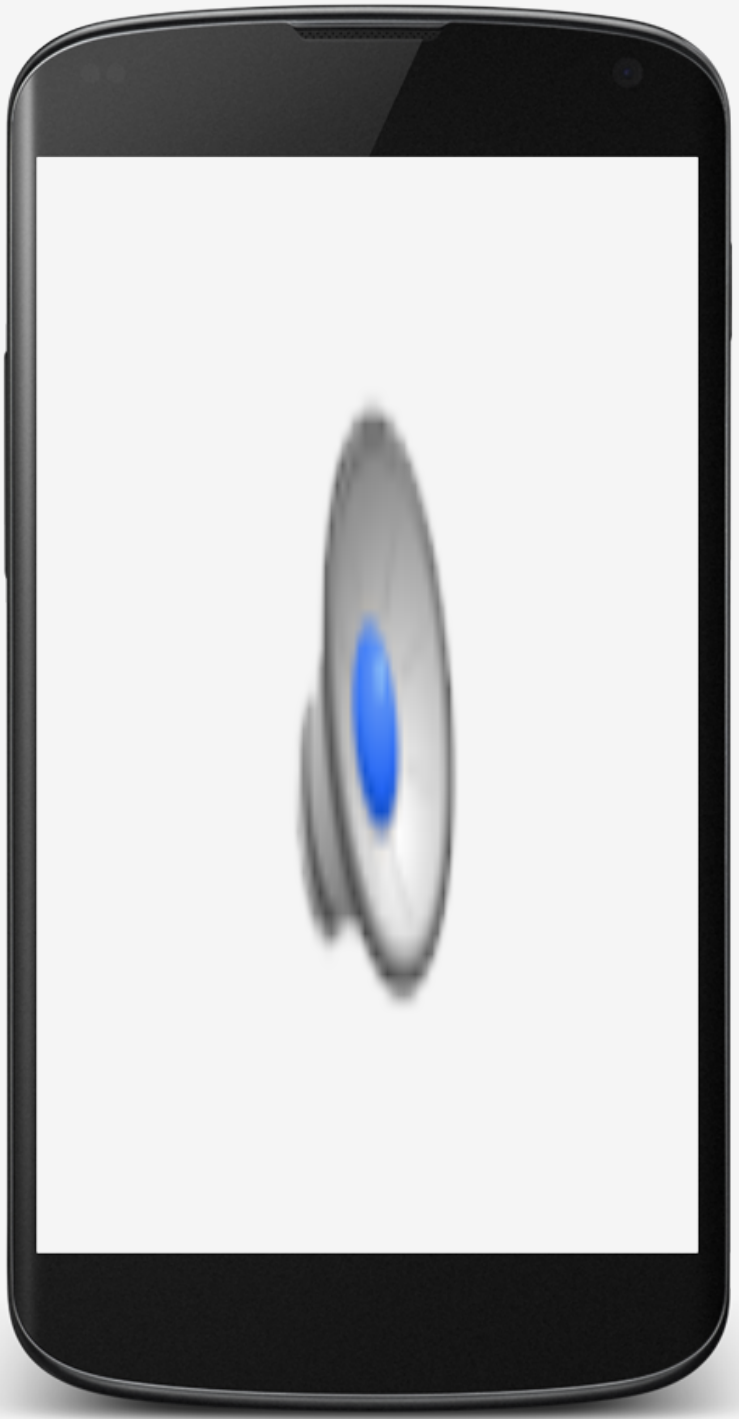
Context

View-specific menu shown when user touches and holds the view

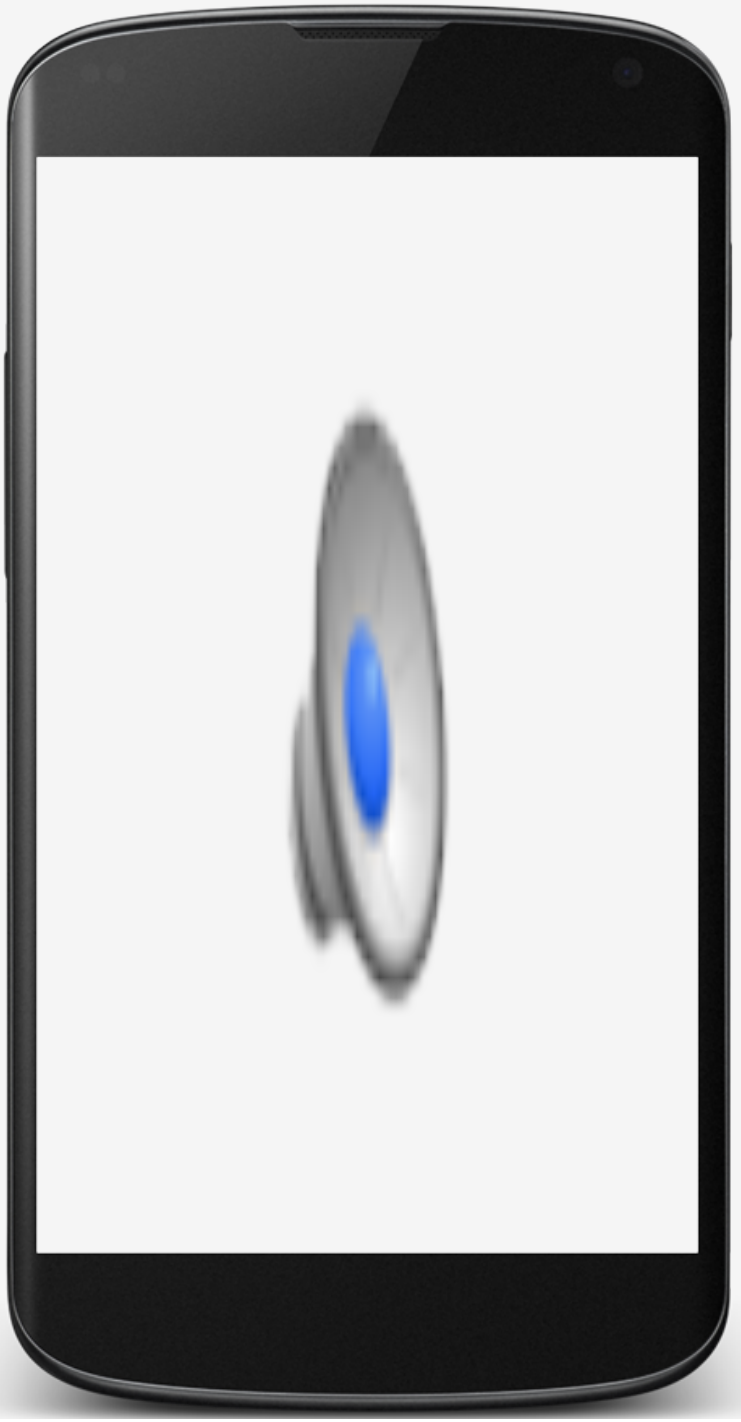
Submenu

A menu activated when user touches a visible menu item

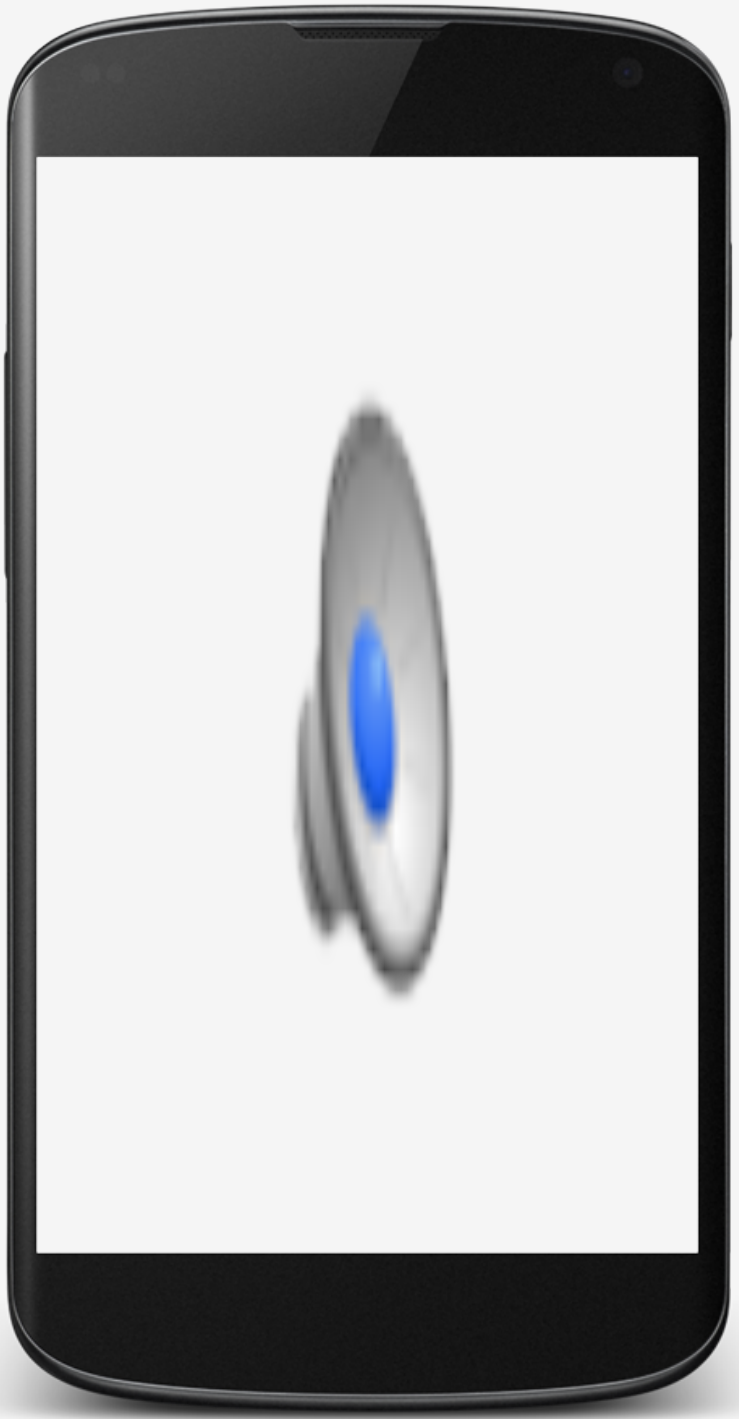
Options Menus



Context Menus



SubMenus



Creating Menus

Define menu resource in XML file

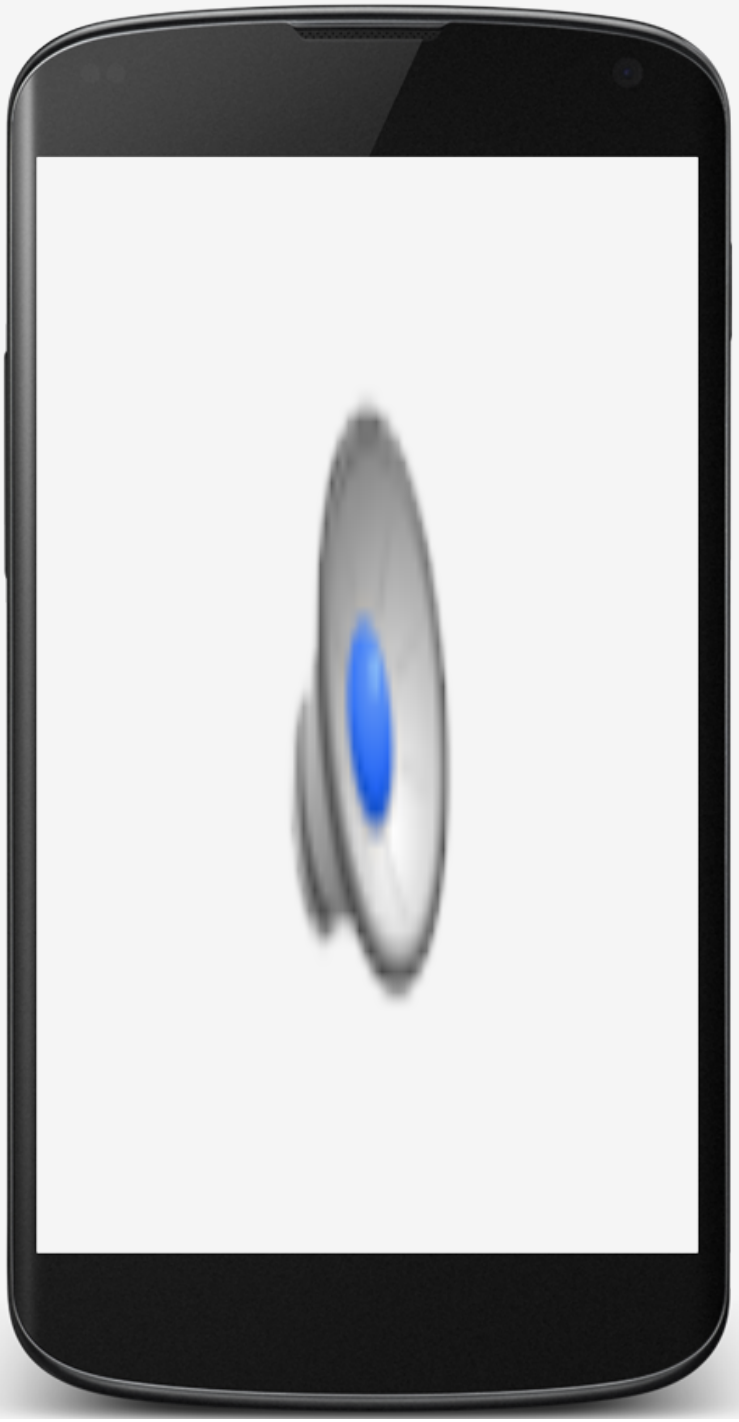
- Store in res/menu/filename.xml

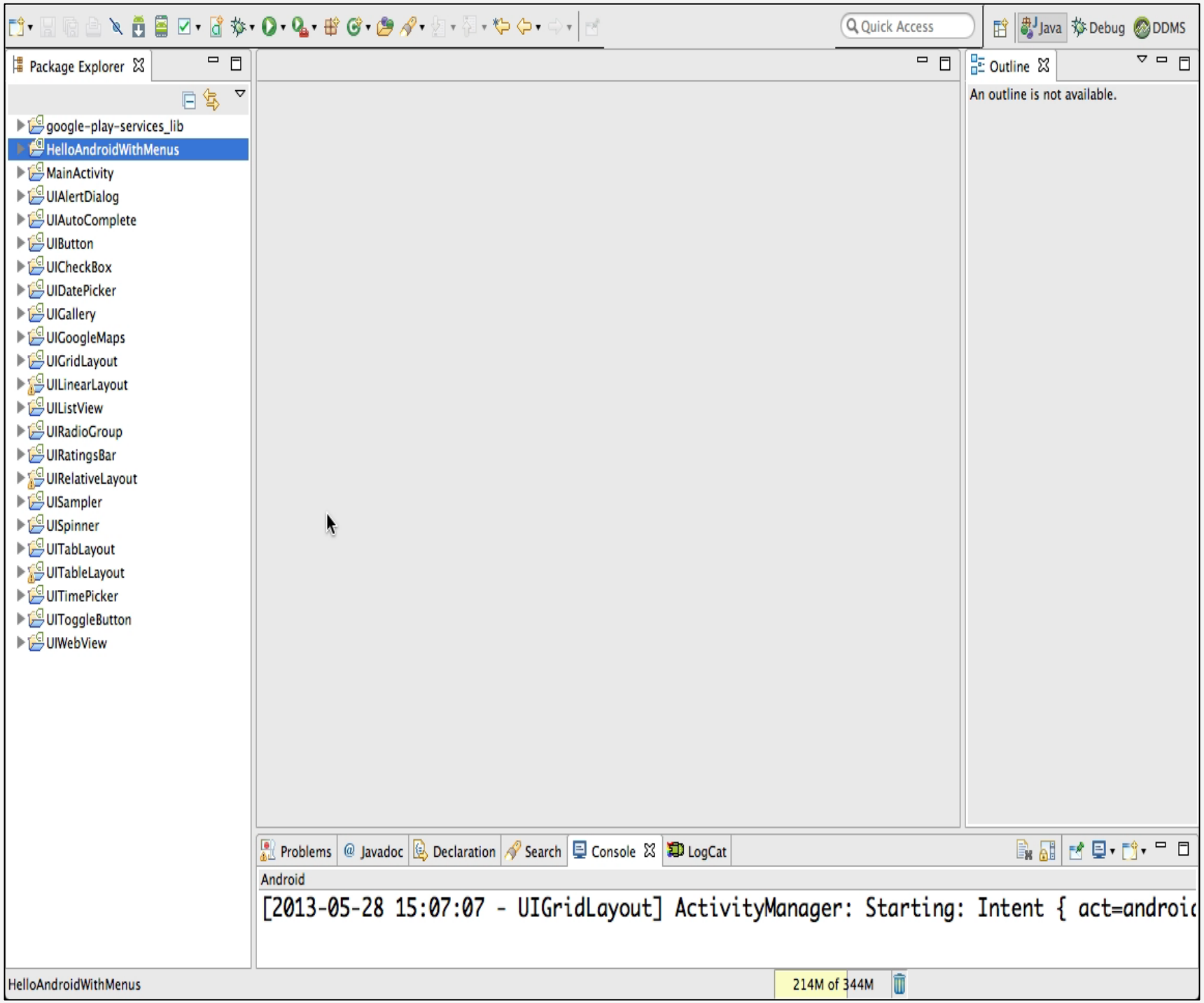
Creating Menus

Inflate menu resource using Menu Inflater in onCreate...Menu() methods

Handling item selection in appropriate on...ItemsSelected() methods

HelloAndroid WithMenus




Quick Access
Java
Debug
DDMS
Package Explorer
google-play-services_lib
HelloAndroidWithMenus
MainActivity
UIAlertDialog
UIAutoComplete
UIButton
UICheckBox
UIDatePicker
UIGallery
UIGoogleMaps
UIGridLayout
UILinearLayout
UIListView
UIRadioGroup
UIRatingsBar
UIRelativeLayout
UISampler
UISpinner
UITabLayout
UITableLayout
UITimePicker
UIToggleButton
UIWebView
Outline
An outline is not available.
Problems
Javadoc
Declaration
Search
Console
LogCat
Android
[2013-05-28 15:07:07 - UIGridLayout] ActivityManager: Starting: Intent { act=androi
HelloAndroidWithMenus
214M of 344M

Menus

Many other features supported

- Grouping menu items
- Binding shortcut keys to menu items
- Binding Intents to menu items

ActionBar

Similar to Application Bar in many desktop applications

Enables quick Access to common operations

FragmentDynamicLayout WithActionBar

Shows play titles and one quote from the selected play

Provides actions for the ActionBar

Three main objects

- QuoteViewerActivity
- TitleFragment
- QuoteFragment

ActionBar.Tab

Screen is divided into tab & content areas

Allows multiple Fragments to share single content area

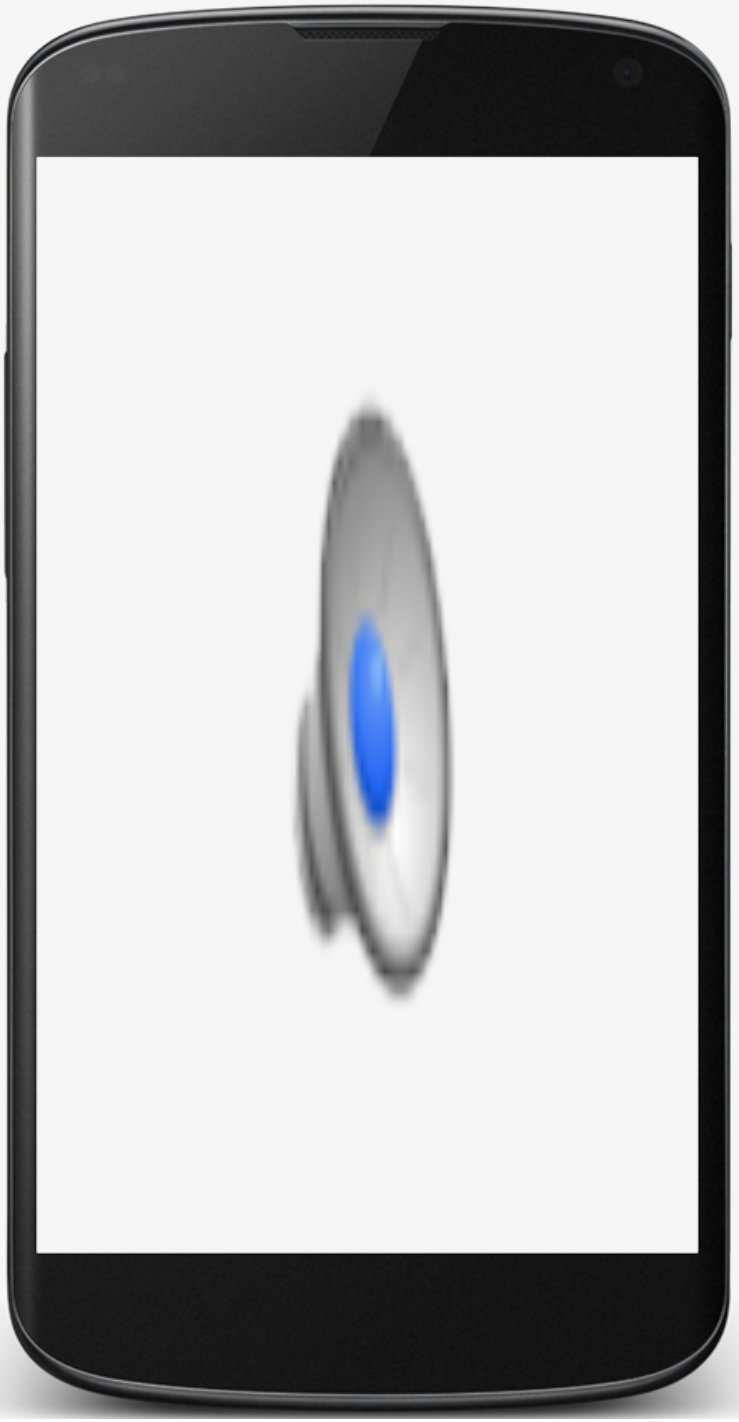
ActionBar.Tab

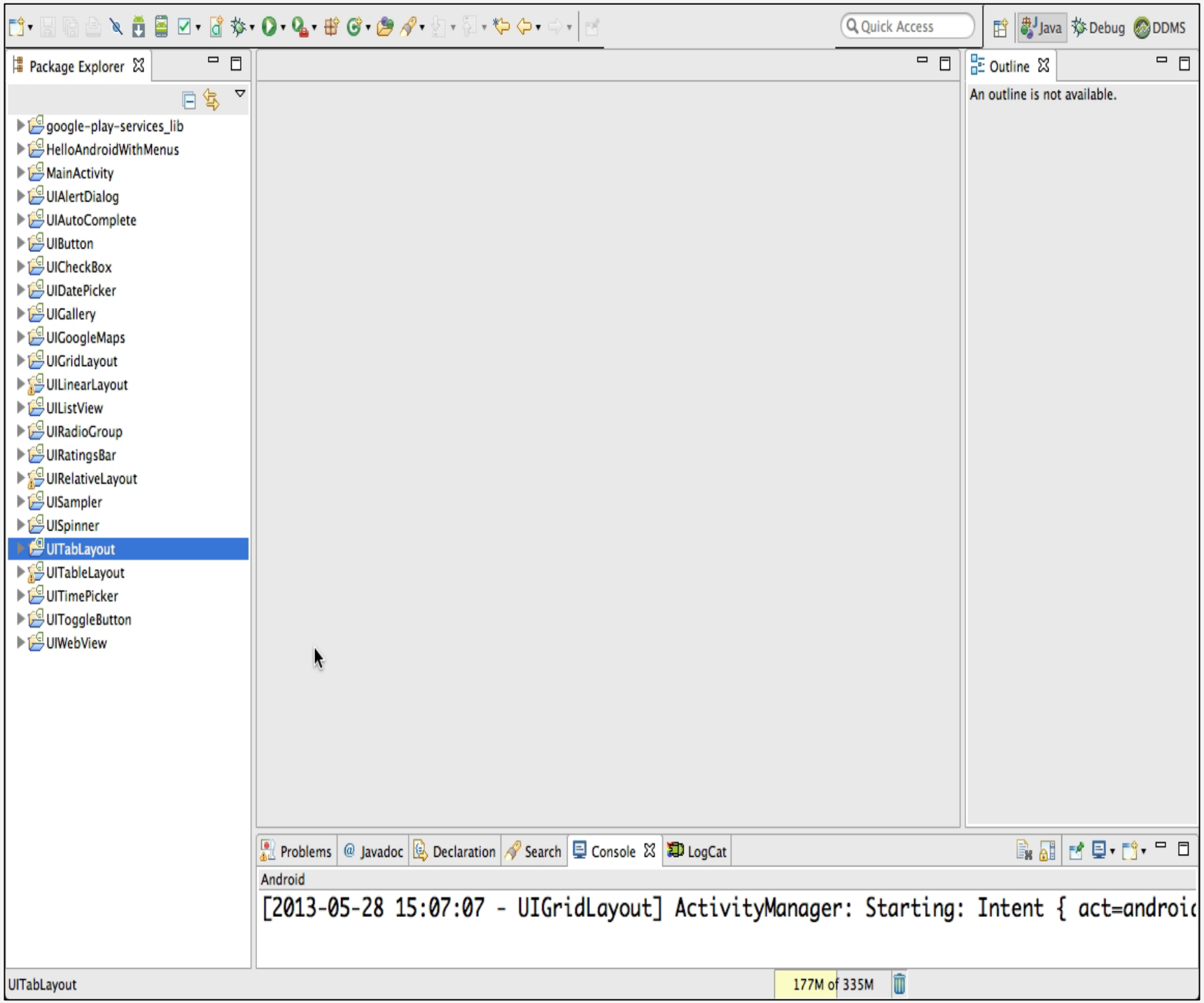
Each tab is associated with one Fragment

Exactly one tab is selected at any given time

Fragment corresponding to the selected tab is visible in the content area

UITabLayout




Quick Access
Java
Debug
DDMS
Package Explorer
google-play-services_lib
HelloAndroidWithMenus
MainActivity
UIAlertDialog
UIAutoComplete
UIButton
UICheckBox
UIDatePicker
UIGallery
UIGoogleMaps
UIGridLayout
UILinearLayout
UIListView
UIRadioGroup
UIRatingsBar
UIRelativeLayout
UISampler
UISpinner
UITabLayout
UITableLayout
UITimePicker
UIToggleButton
UIWebView
Outline
An outline is not available.
Problems
Javadoc
Declaration
Search
Console
LogCat
Android
[2013-05-28 15:07:07 - UIGridLayout] ActivityManager: Starting: Intent { act=androi
UITabLayout
177M of 335M

Dialogs

Independent subwindows used by Activities to communicate with user

Dialog subclasses

AlertDialog

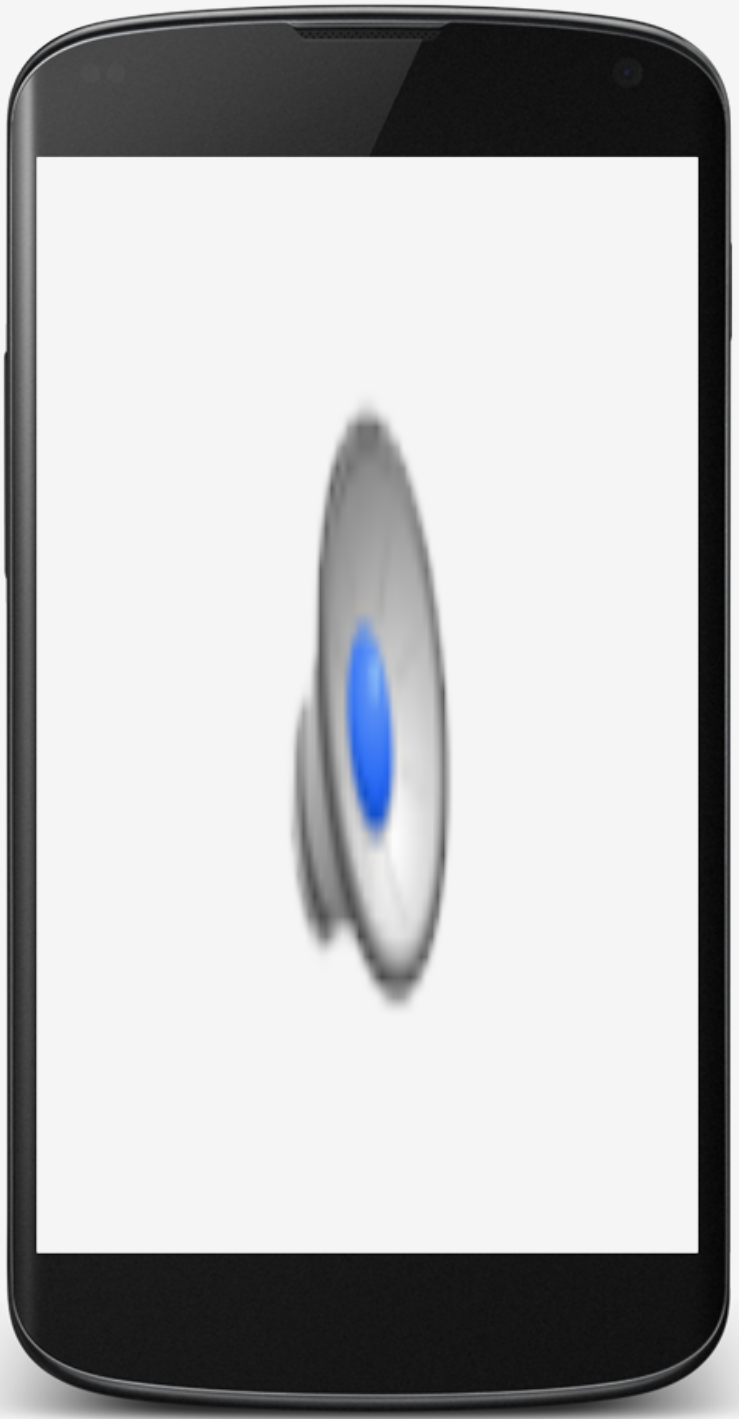
ProgressDialog

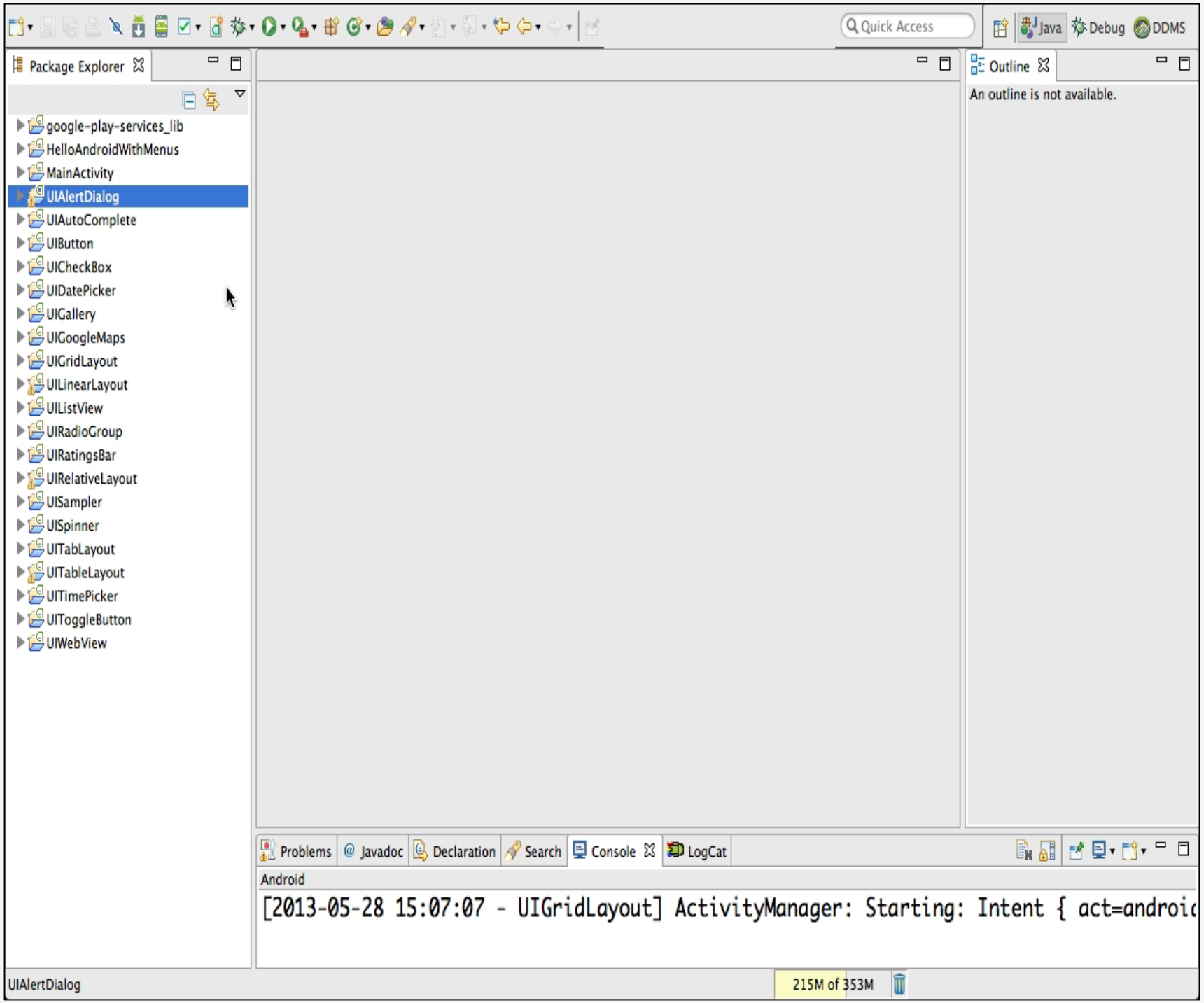
DatePickerDialog

TimePickerDialog

UIAlertDialog

ProgressDialog




Quick Access
Java
Debug
DDMS
Package Explorer
google-play-services_lib
HelloAndroidWithMenus
MainActivity
UIAlertDialog
UIAutoComplete
UIButton
UICheckBox
UIDatePicker
UIGallery
UIGoogleMaps
UIGridLayout
UILinearLayout
UIListView
UIRadioGroup
UIRatingsBar
UIRelativeLayout
UISampler
UISpinner
UITabLayout
UITableLayout
UITimePicker
UIToggleButton
UIWebView
Outline
An outline is not available.
Problems
Javadoc
Declaration
Search
Console
LogCat
Android
[2013-05-28 15:07:07 - UIGridLayout] ActivityManager: Starting: Intent { act=androi
UIAlertDialog
215M of 353M

Next Time

User Notifications