# Programming Handheld Systems

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# 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

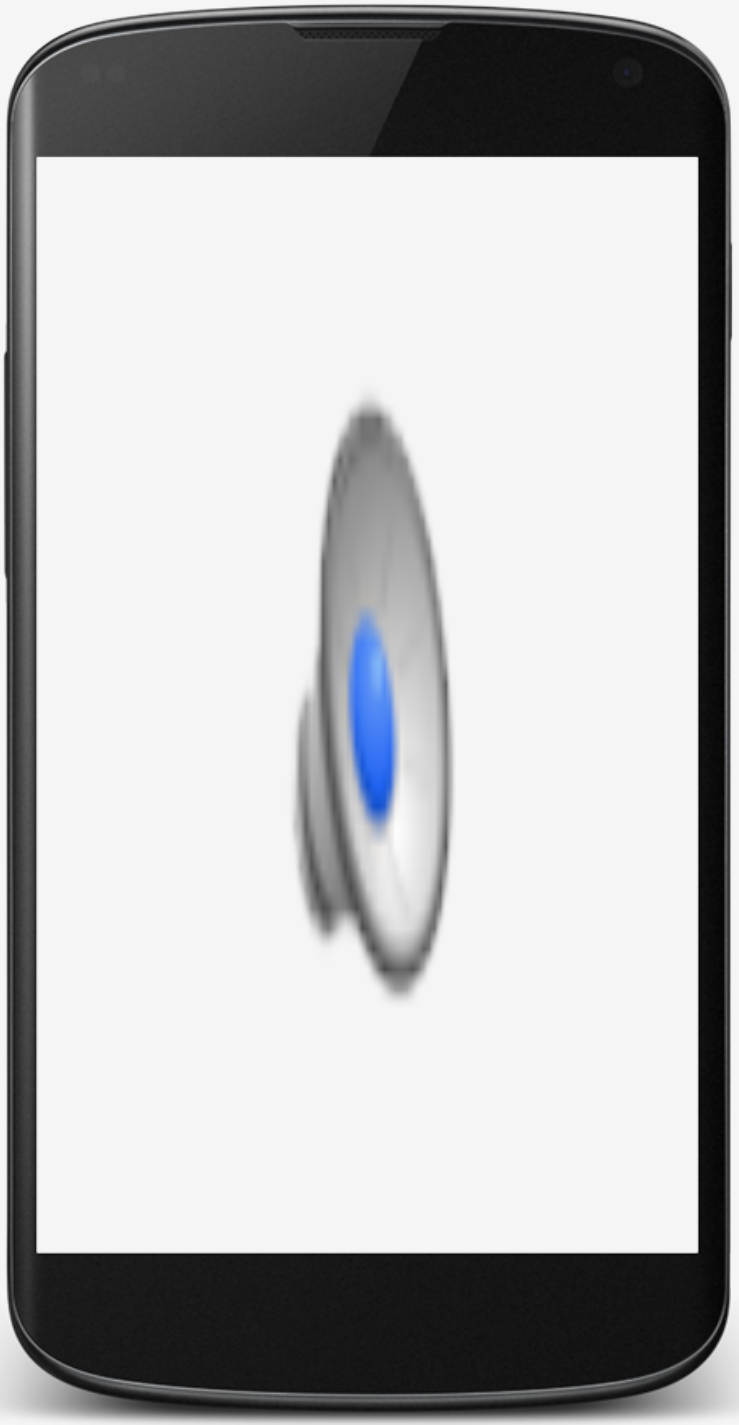
RatingBar

AutoCompleteTextView

# Button

View that can be clicked on to perform an action

# UIButton



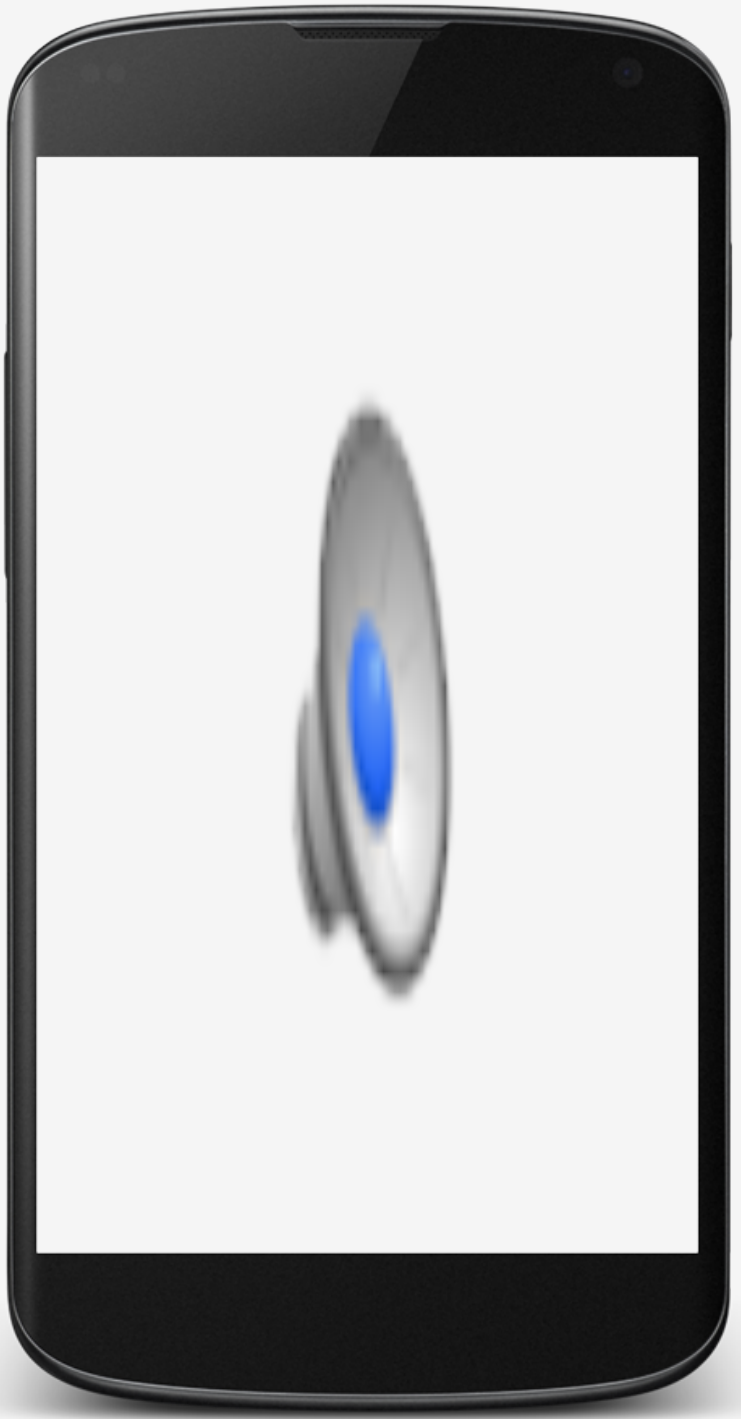
# ToggleButton

A 2-state Button

checked/not checked state

Light indicator showing state

# UIToggleButton

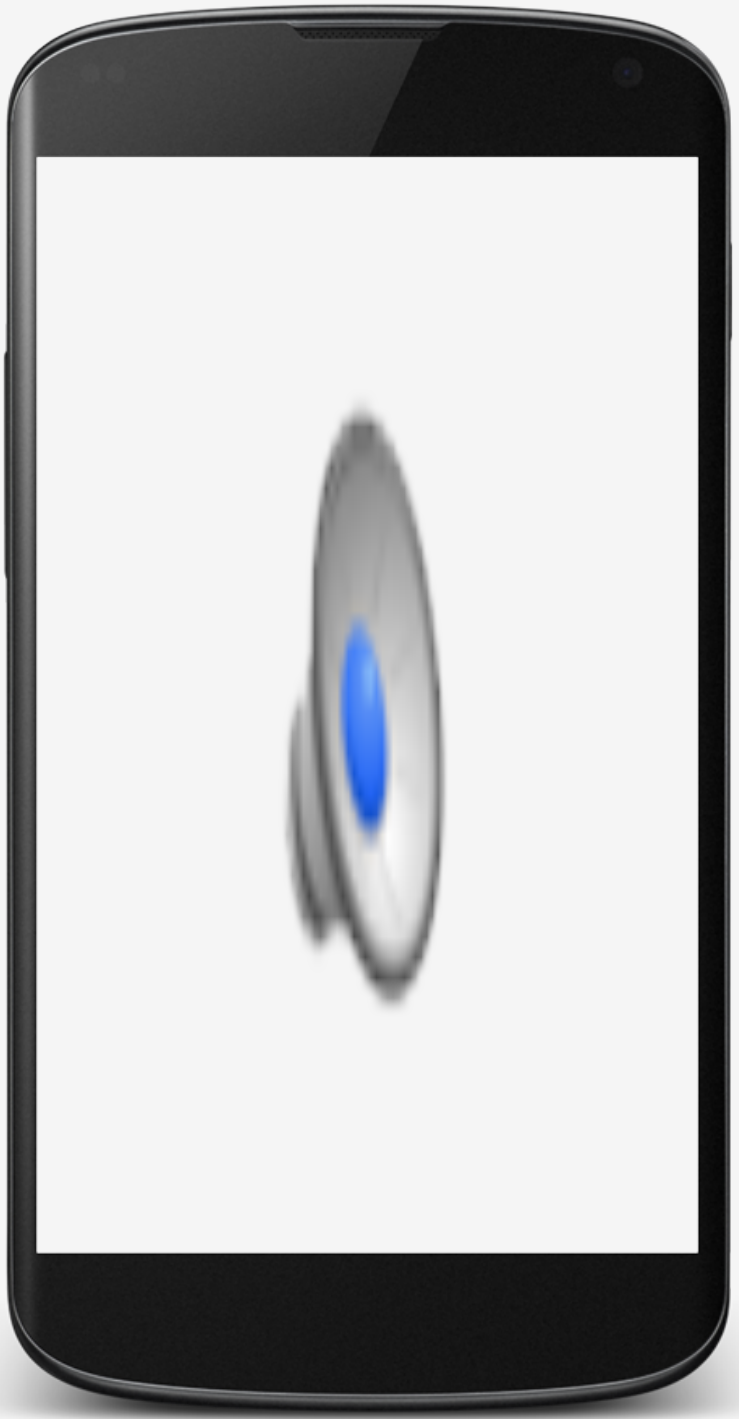


# CHECKBOX

Another kind of 2-state button

Checked/not checked

# UICheckbox

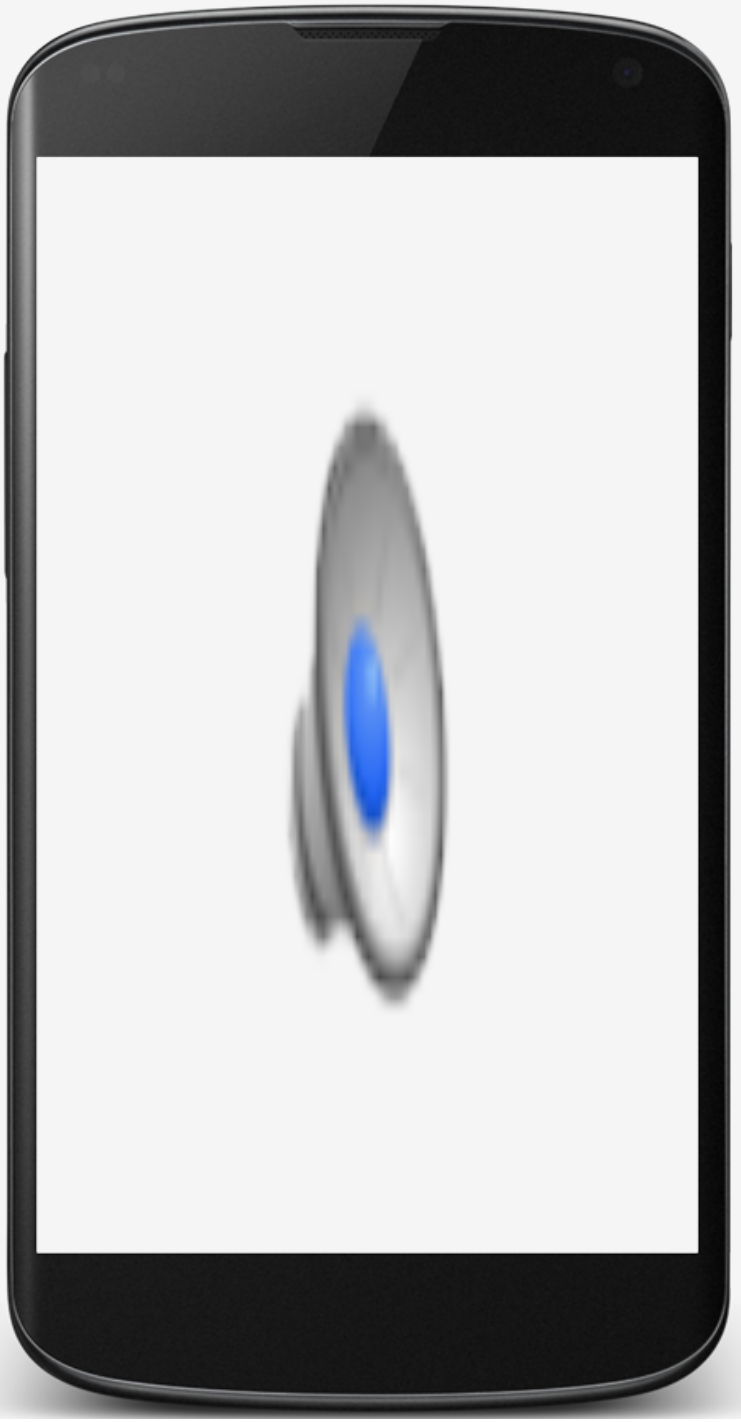


# RatingBar

A view comprising a row of stars

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

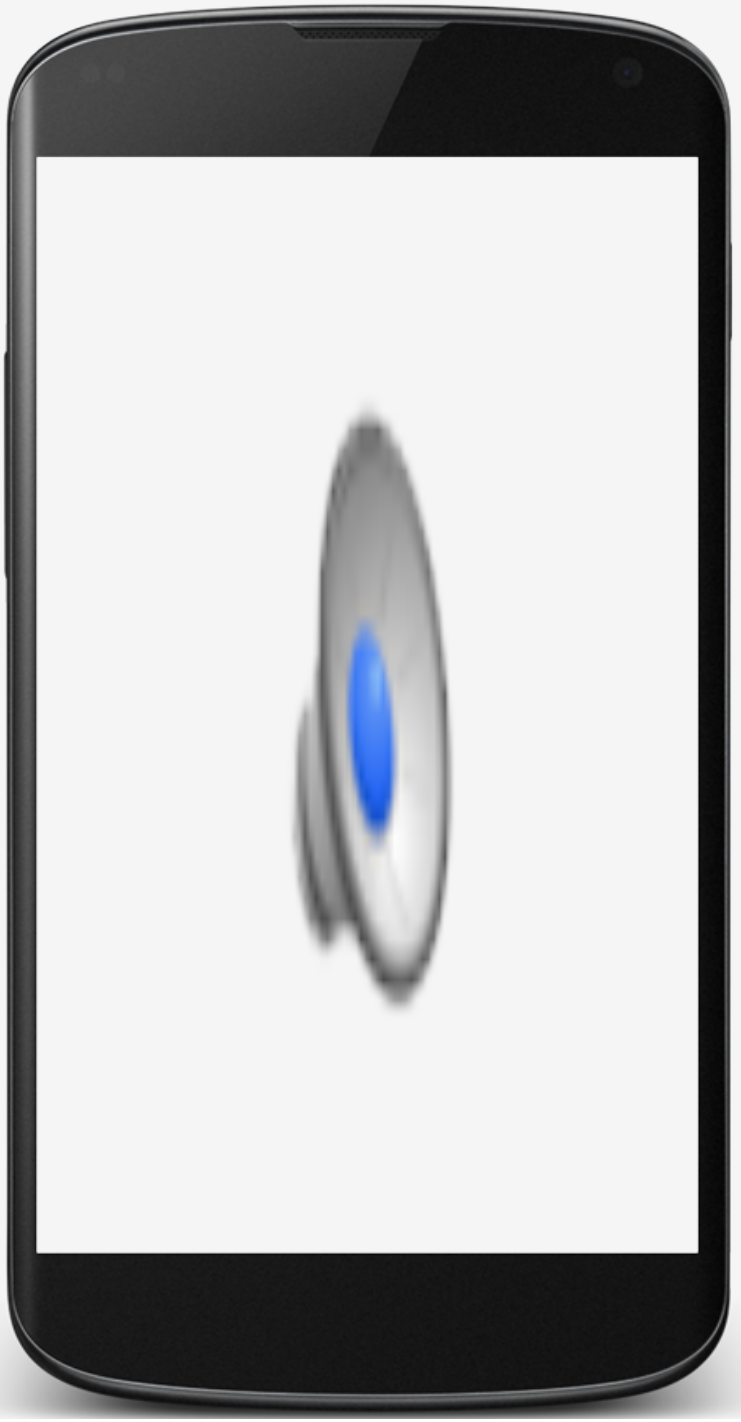
# UIRatingBar



# 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

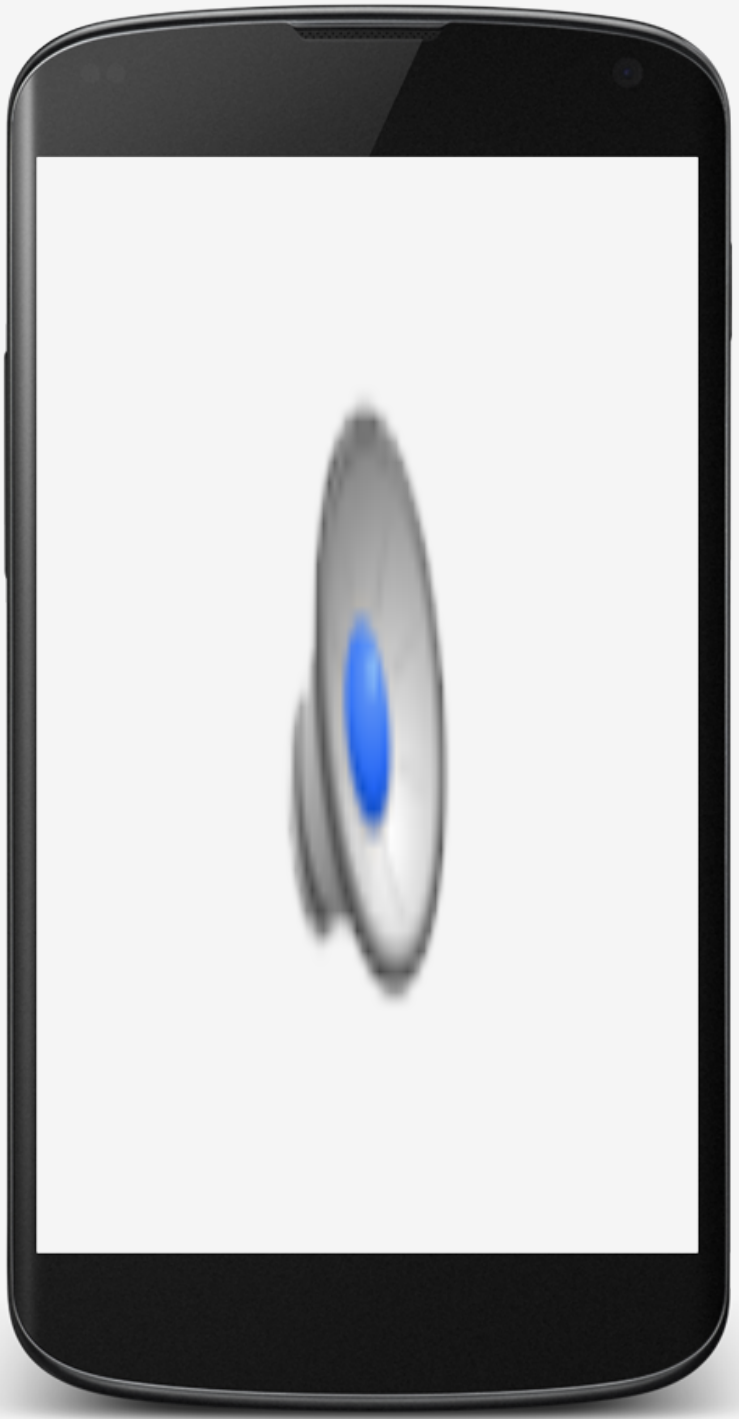
Spinner

# RadioGroup

A ViewGroup containing a set of Radio Buttons (CheckBoxes)

Only one button can be selected at any one instant

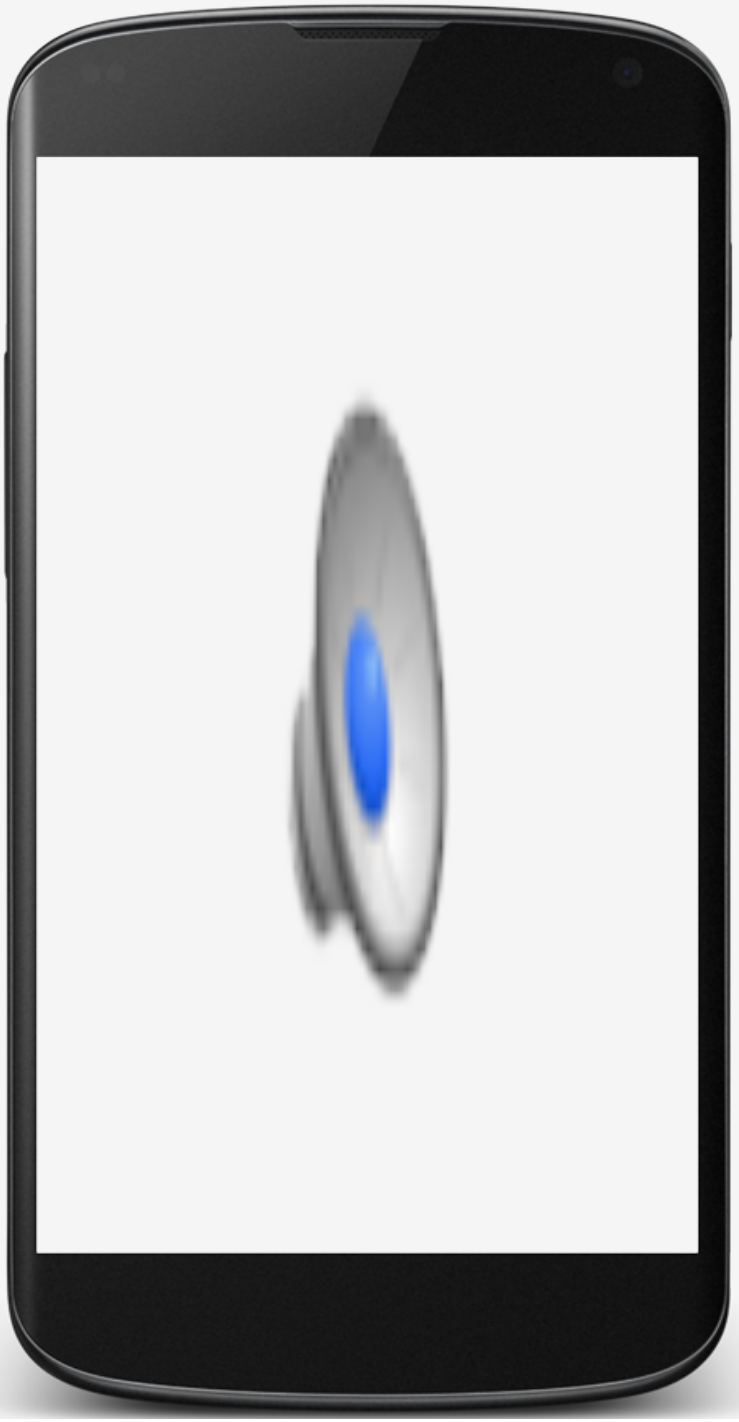
# UIRadioGroup



# TimePicker

A ViewGroup that allows the user to select a time

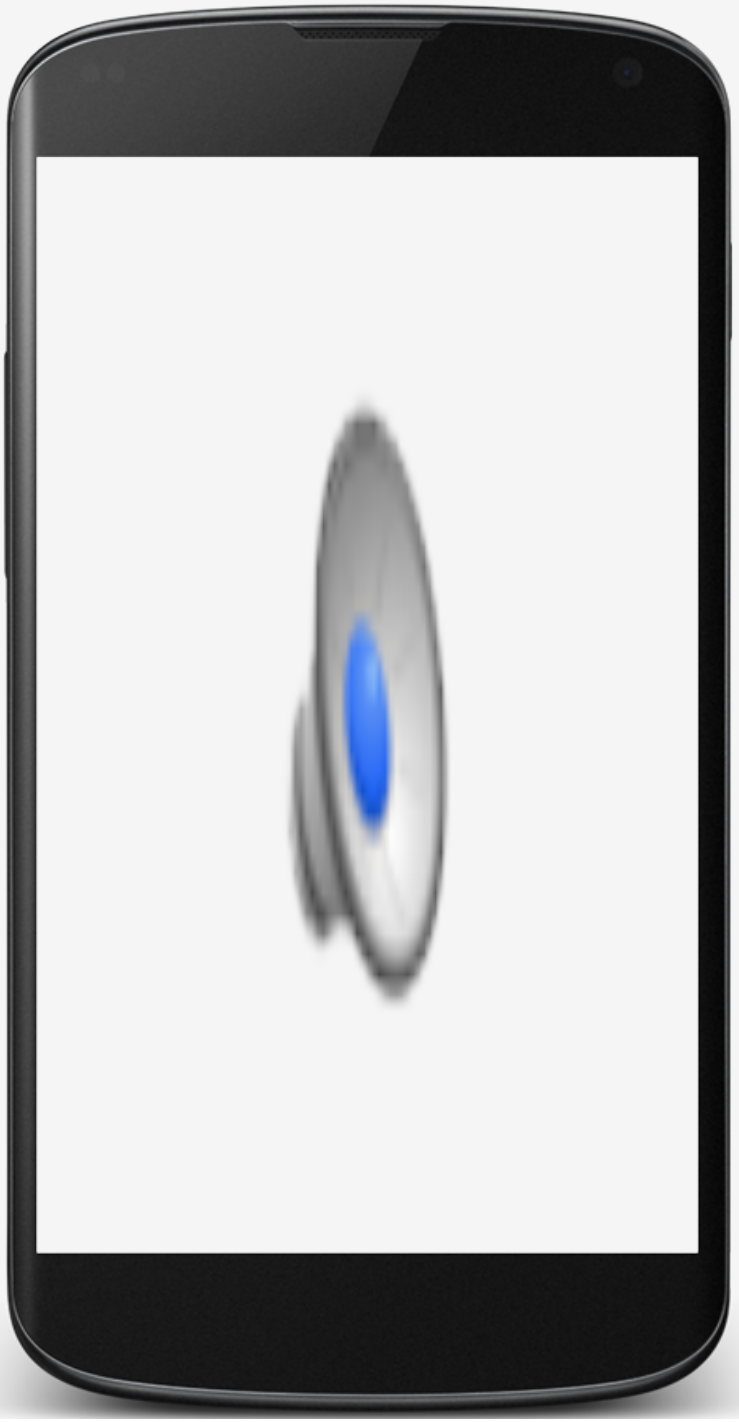
# UITimePicker



# DatePicker

A ViewGroup that allows the user to select a date

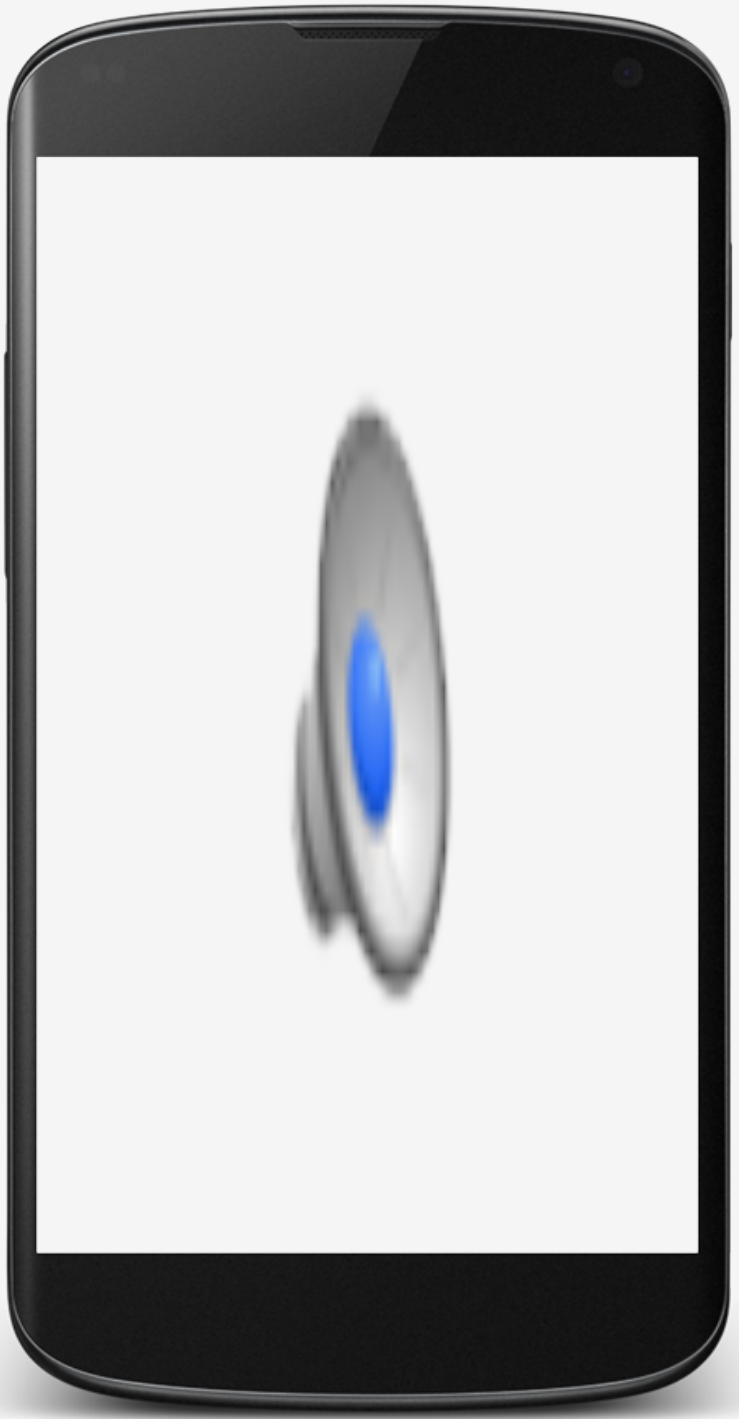
# UIDatePicker



# WebView

A ViewGroup that displays a web page

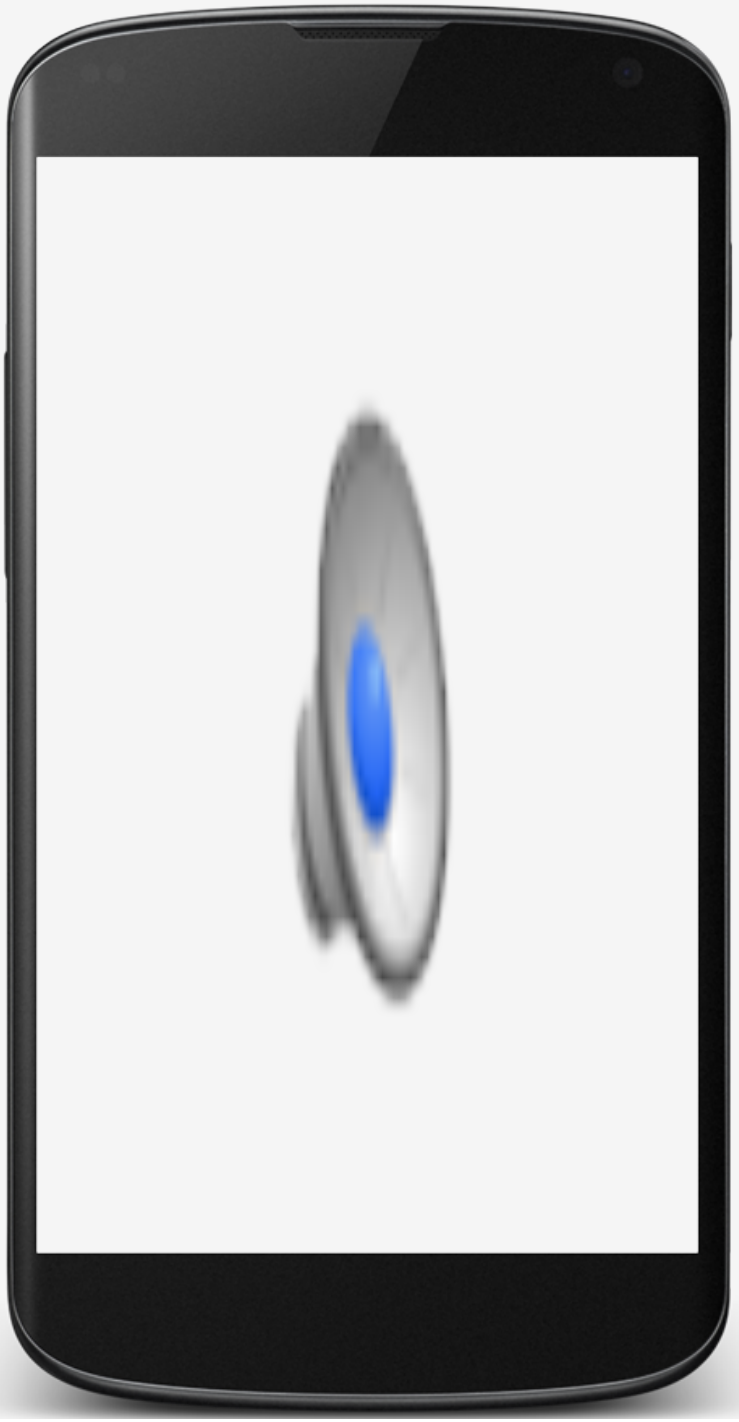
# UIWebView



# 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

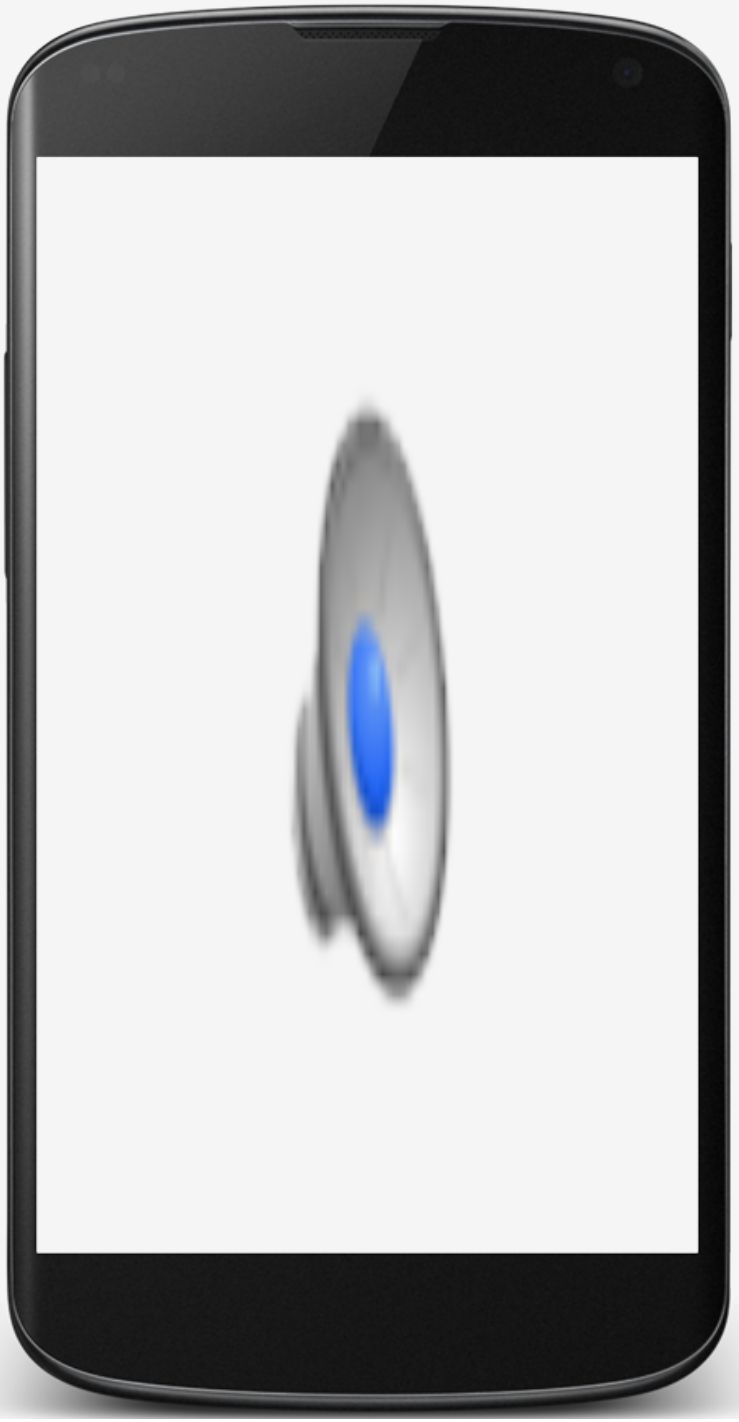
# ListView

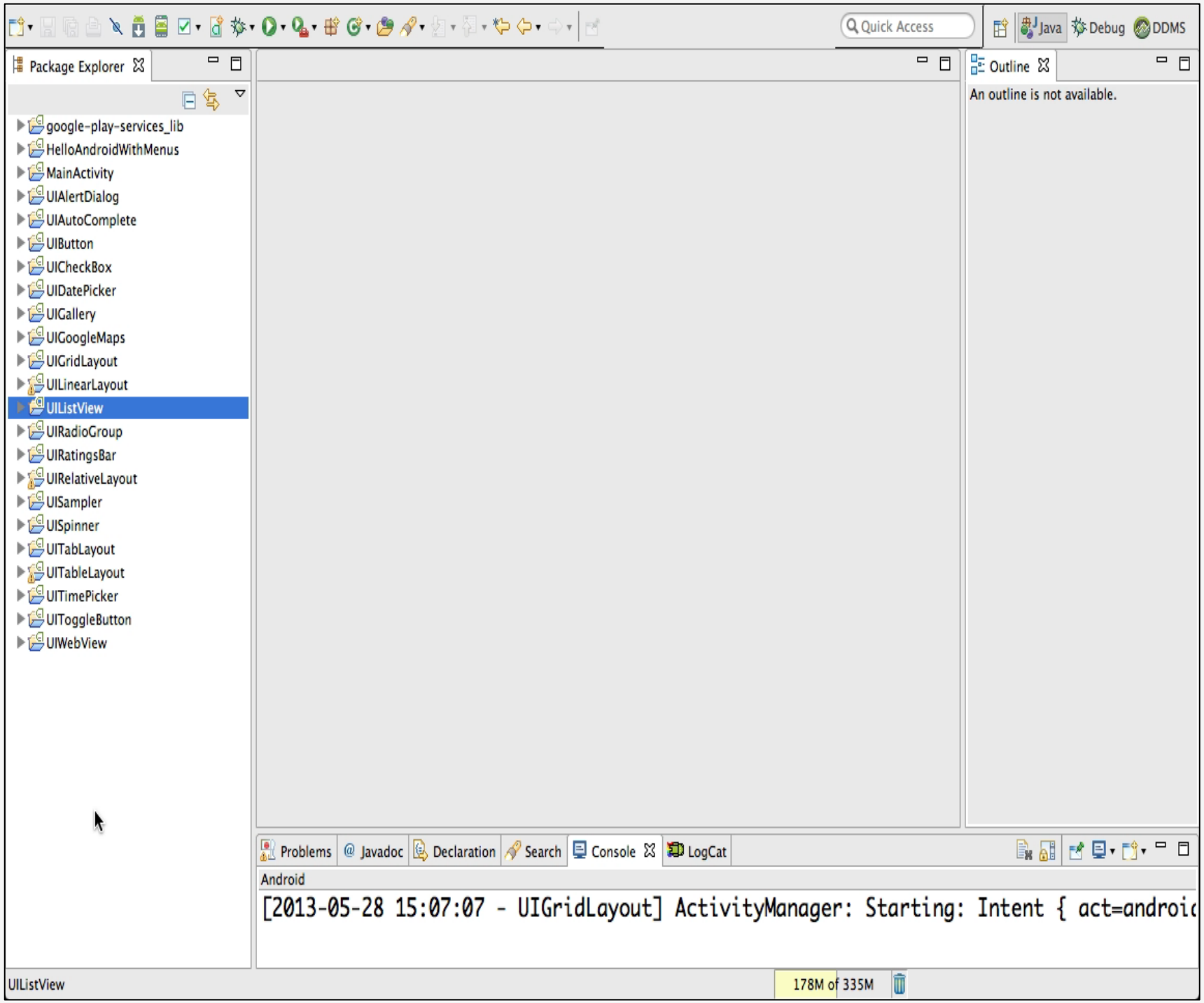
AdapterView displaying a scrollable list of selectable items

Items managed by a ListAdapter

ListView can filter the list of items based on text input

# UIListView

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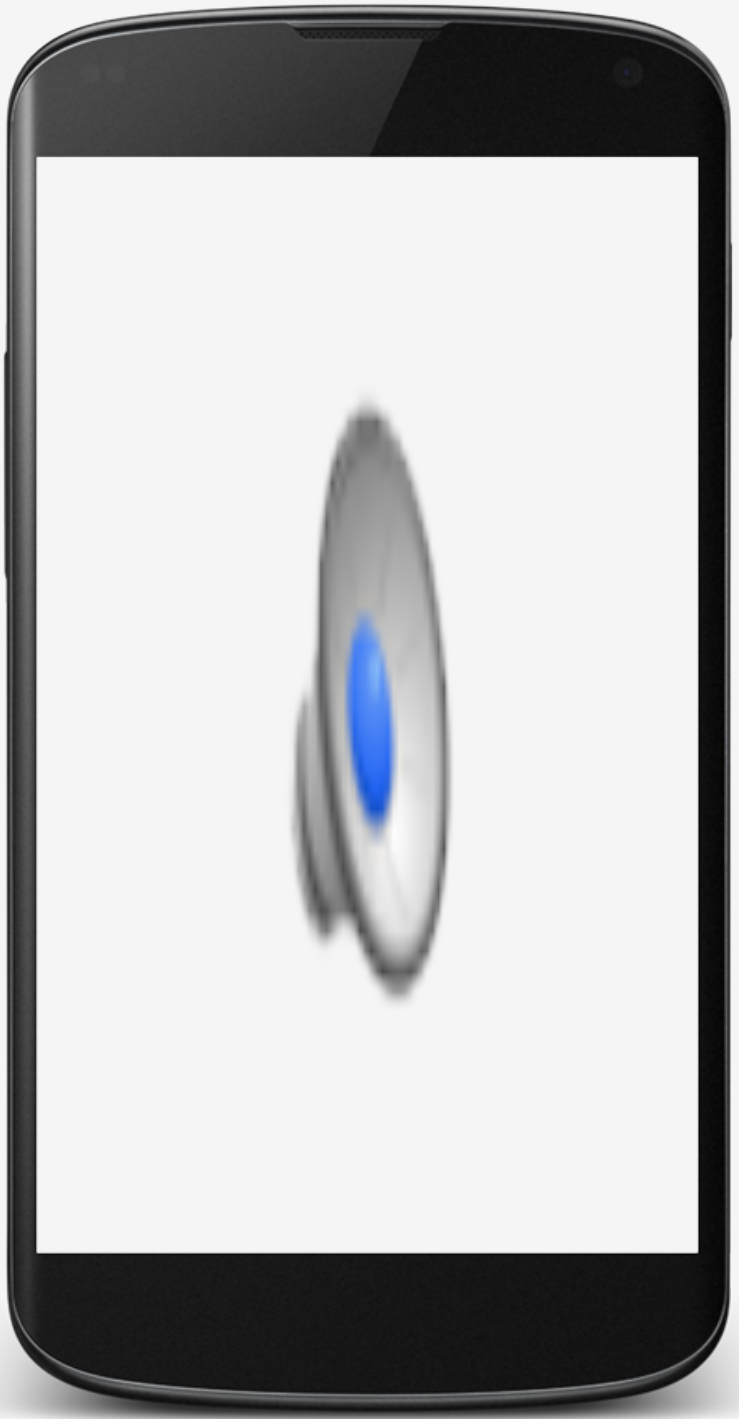
# Spinner

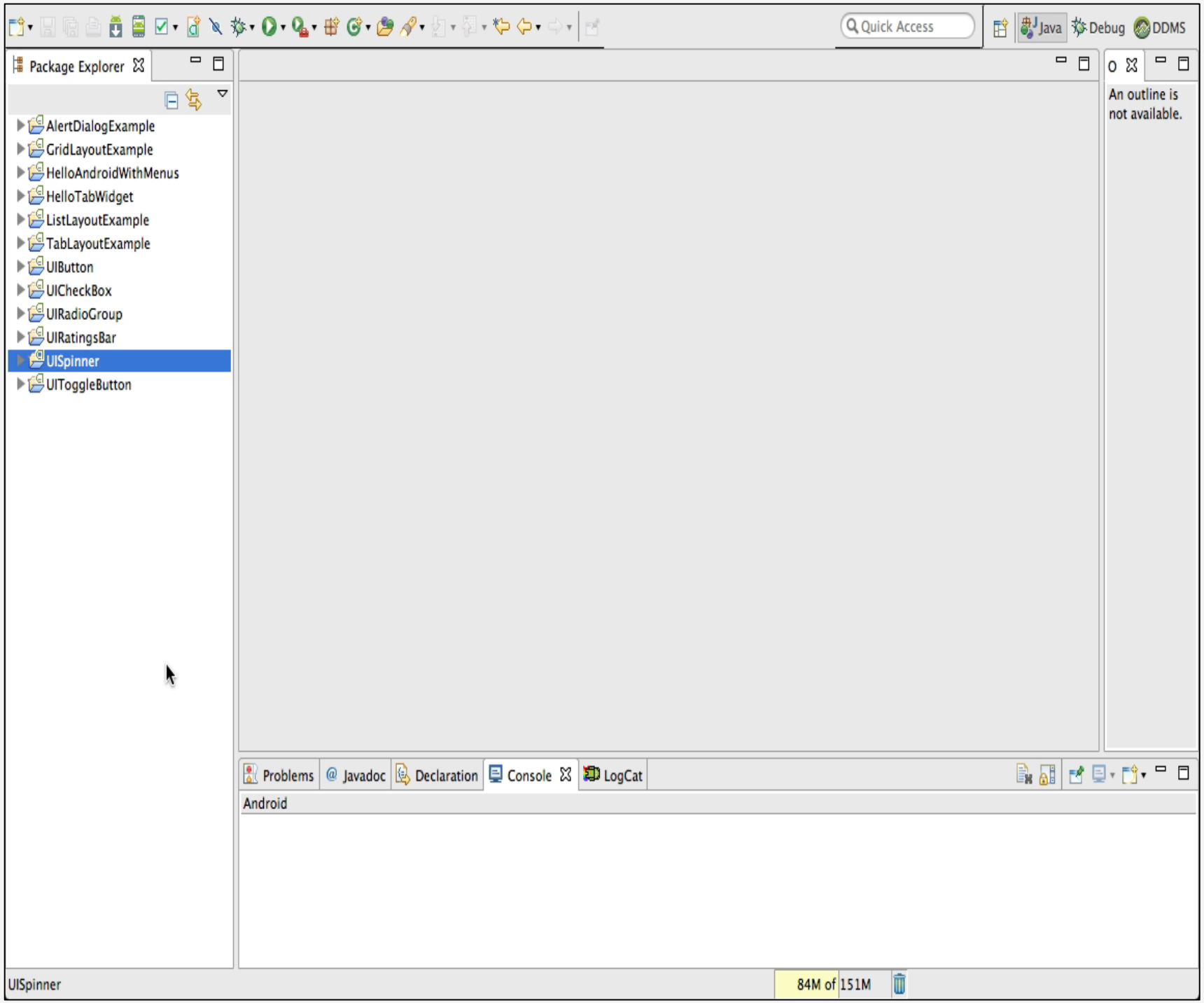
An AdapterView that provides a scrollable list of items

User can select one item from the list

Items managed by a SpinnerAdapter

# UISpinner

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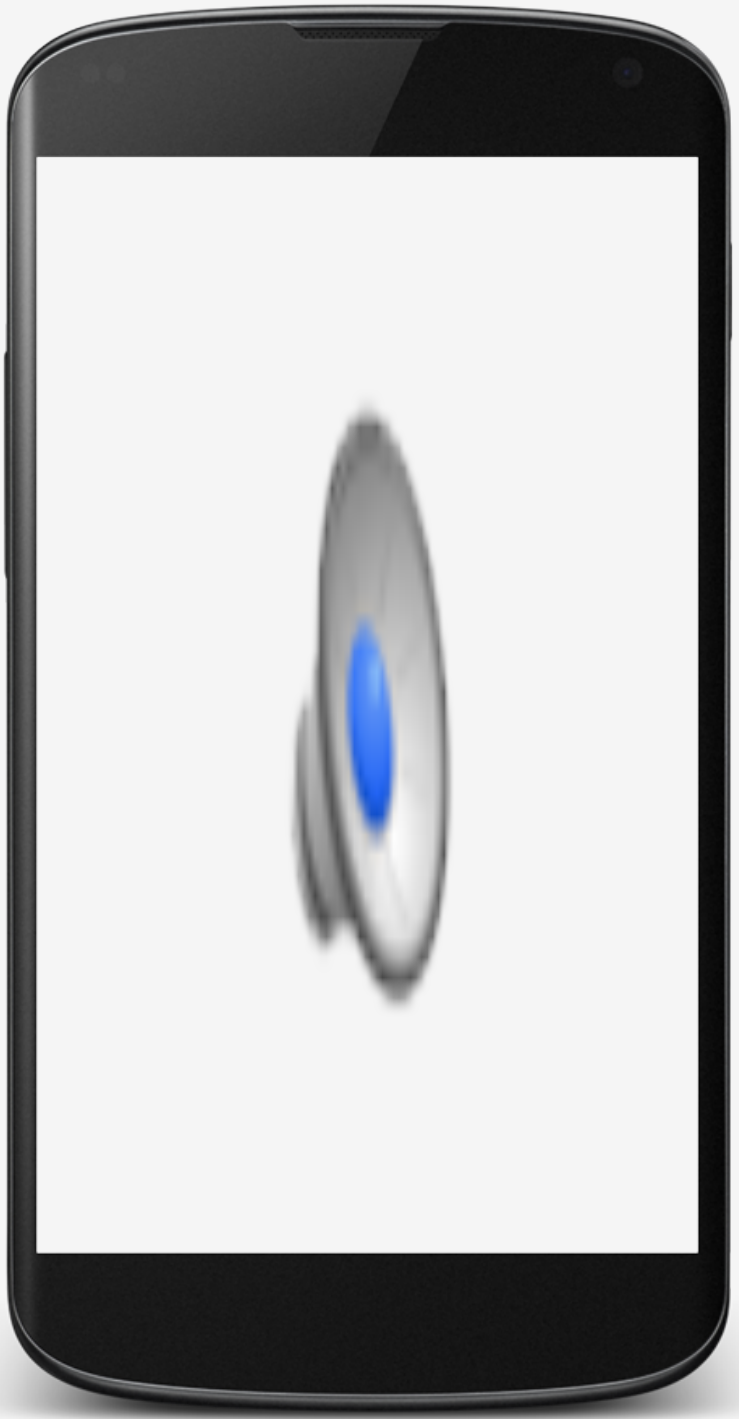
# Gallery

A ViewGroup showing a horizontally scrolling list

Items managed by a SpinnerAdapter

# UIGallery



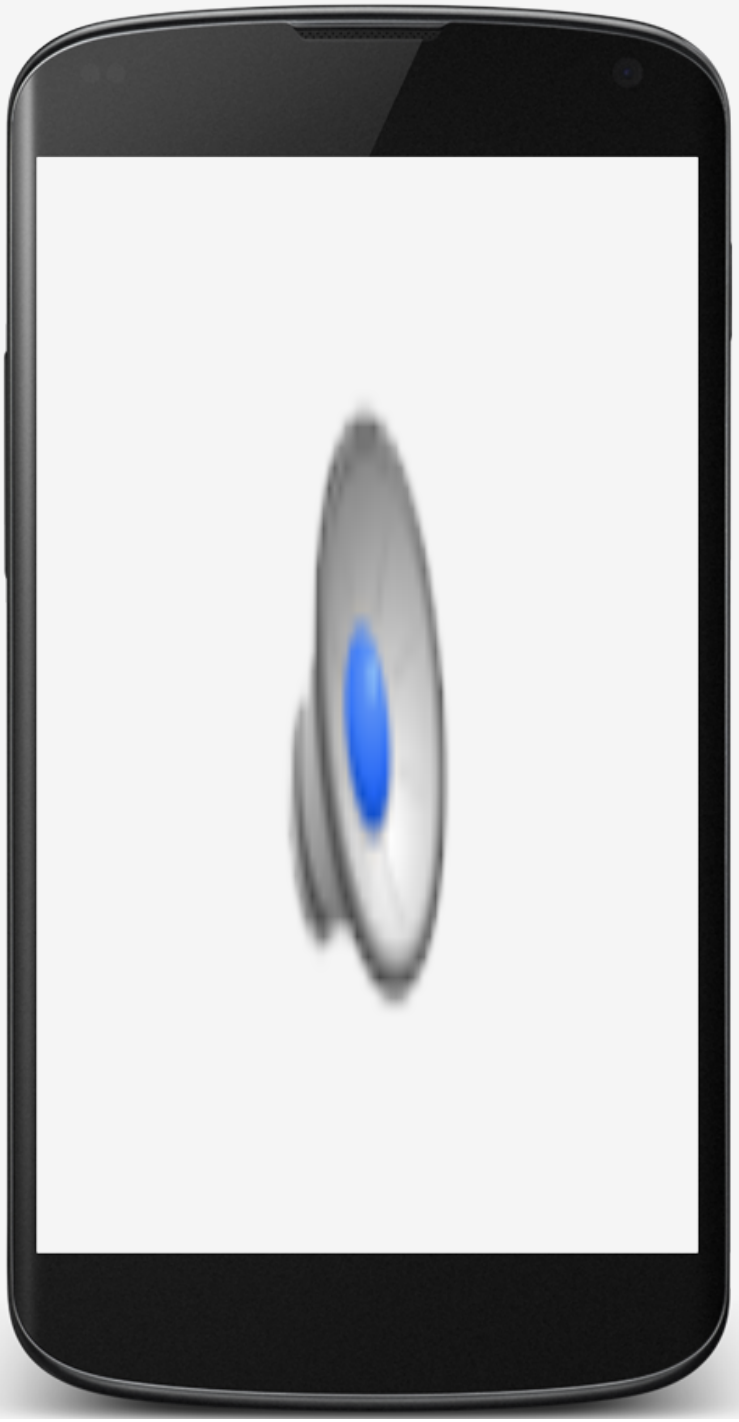
# Layouts

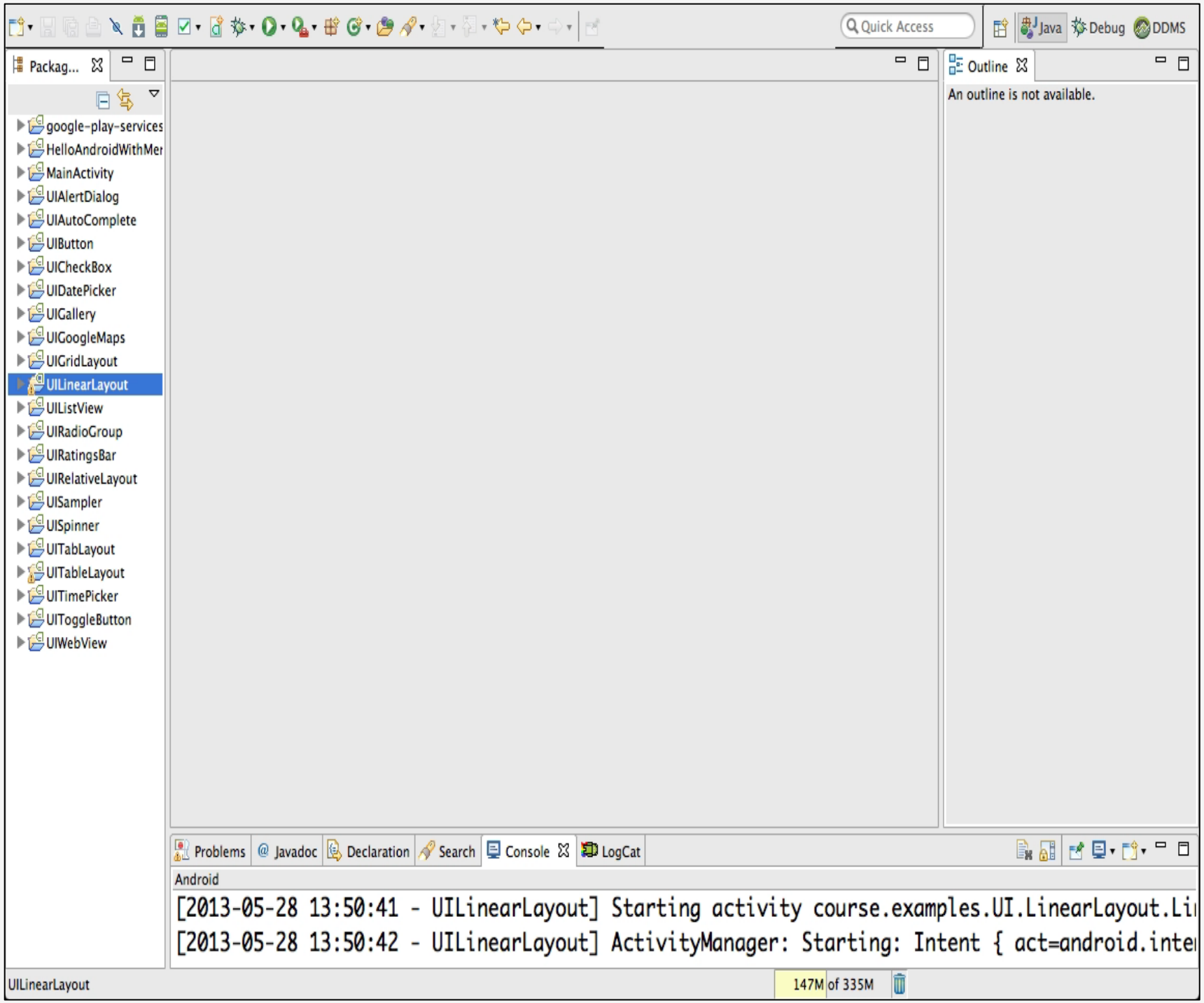
A generic ViewGroup that defines a structure for the Views it contains

# LinearLayout

Child views arranged in a single horizontal or vertical row

# UILinearLayout

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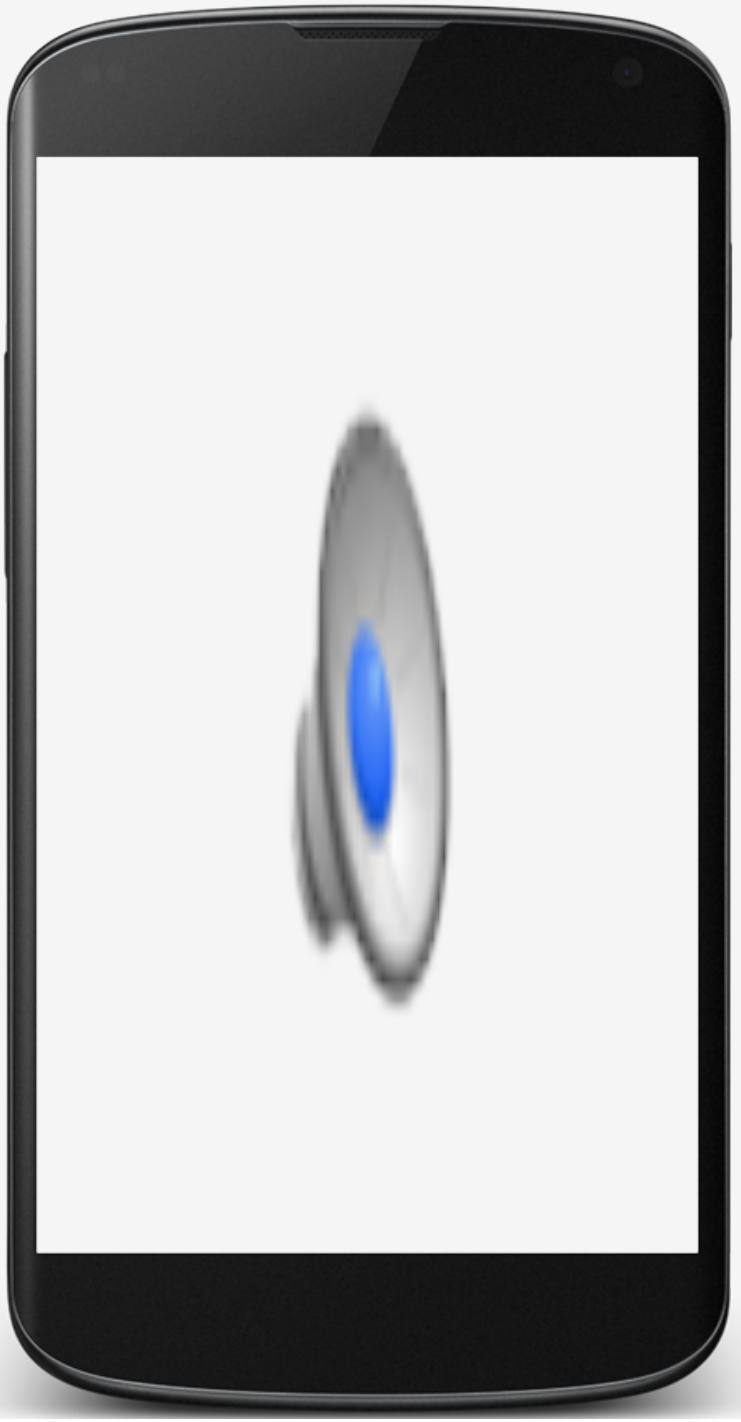
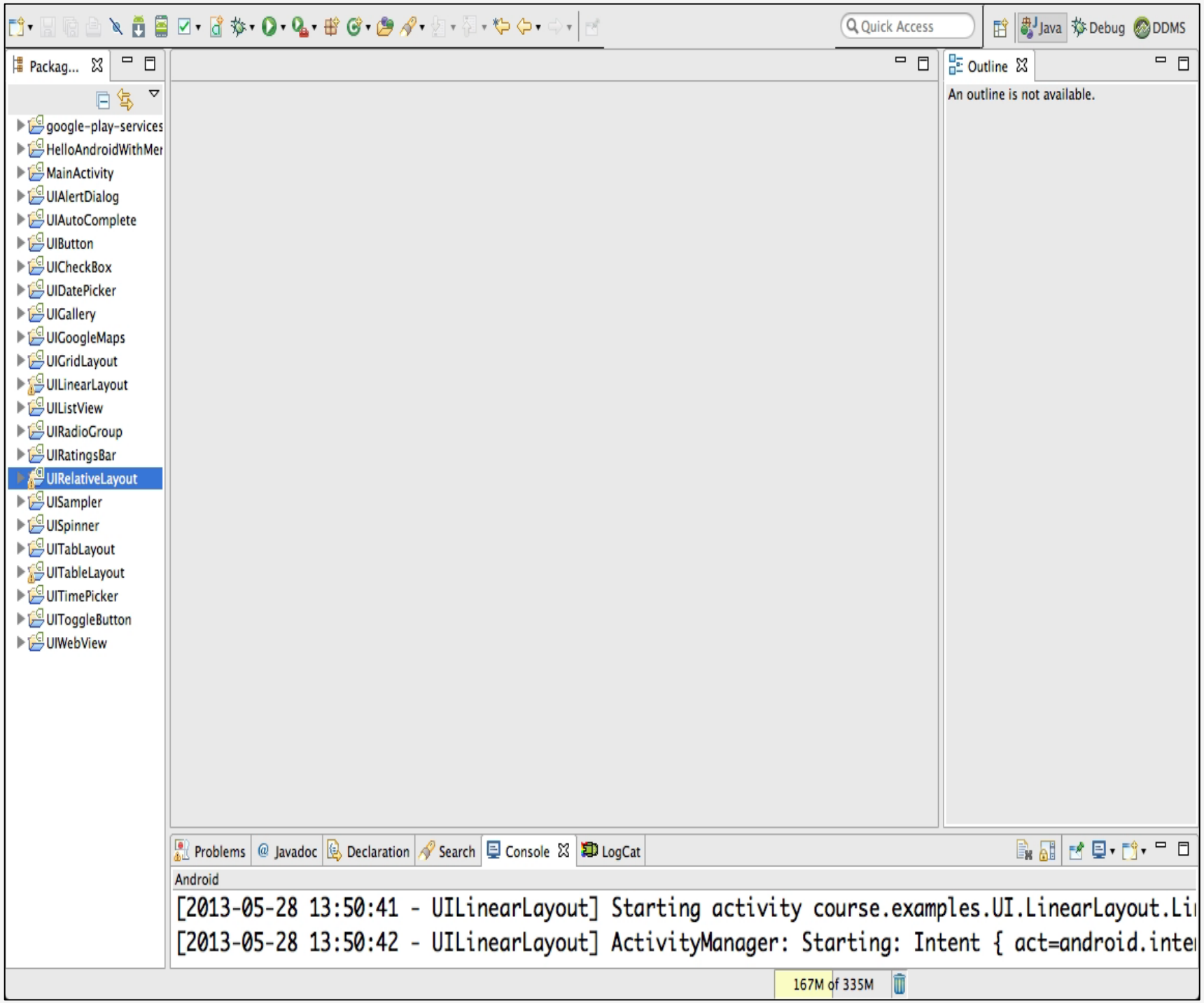
# RelativeLayout

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

# UIRelativeLayout

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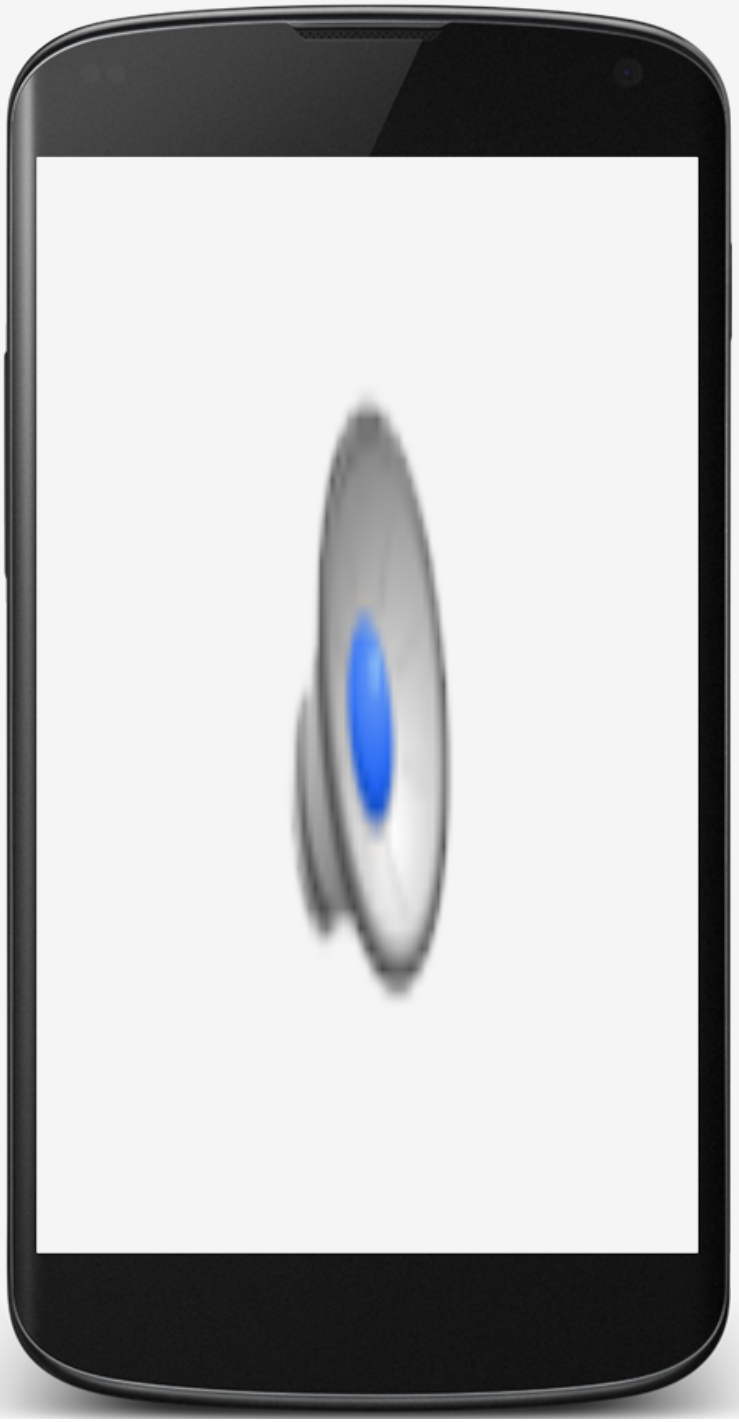
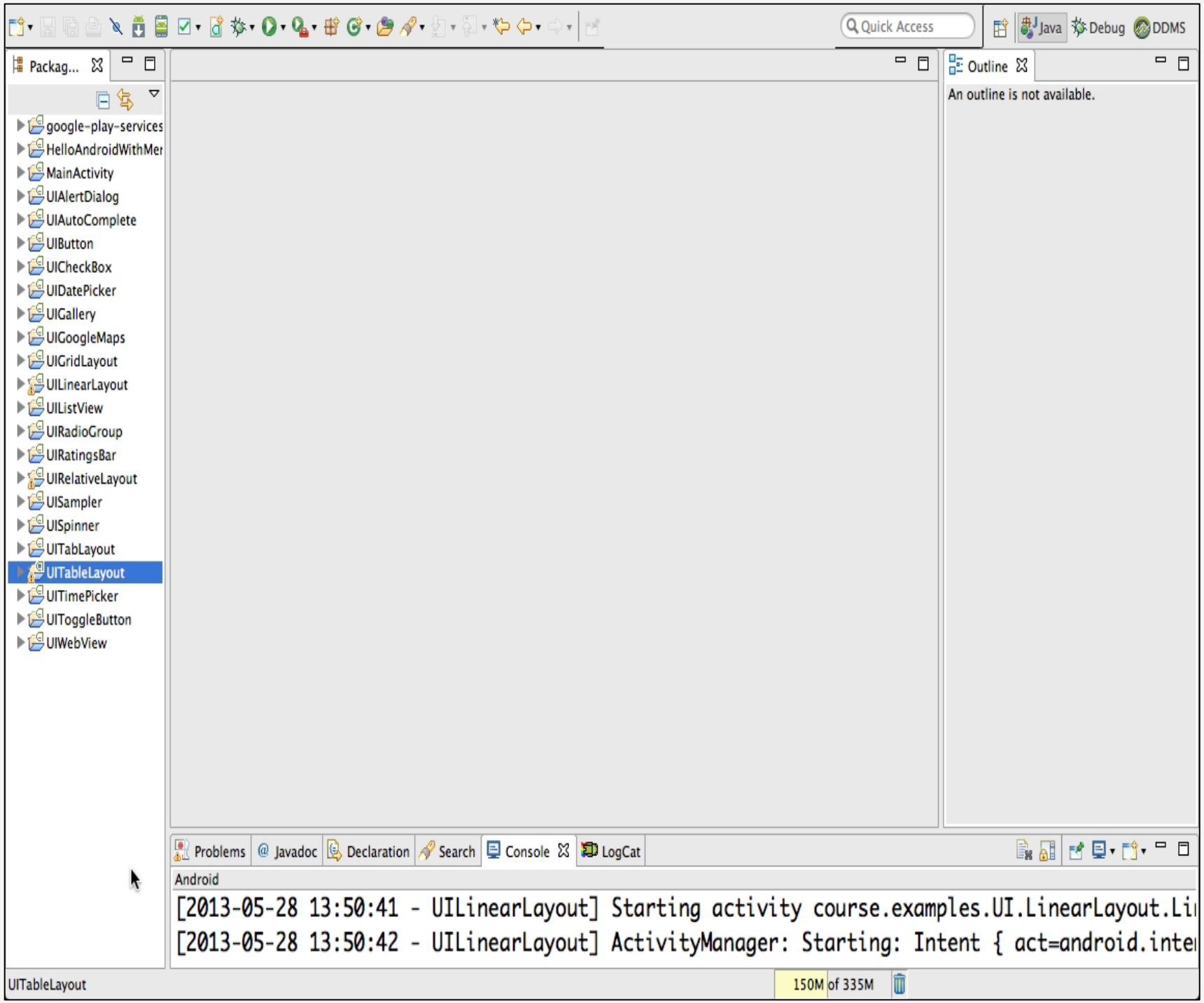
# TableLayout

Child views arranged into rows & columns

# UITableLayout

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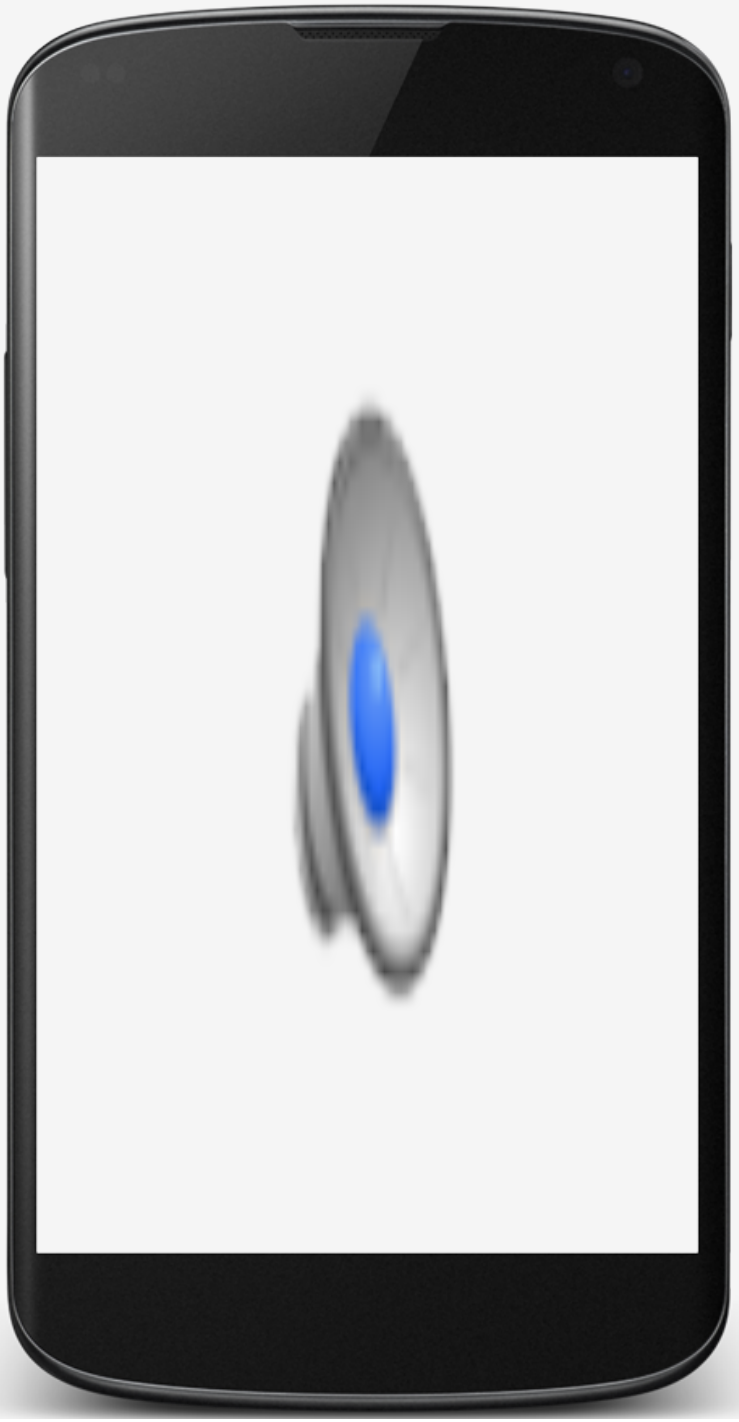
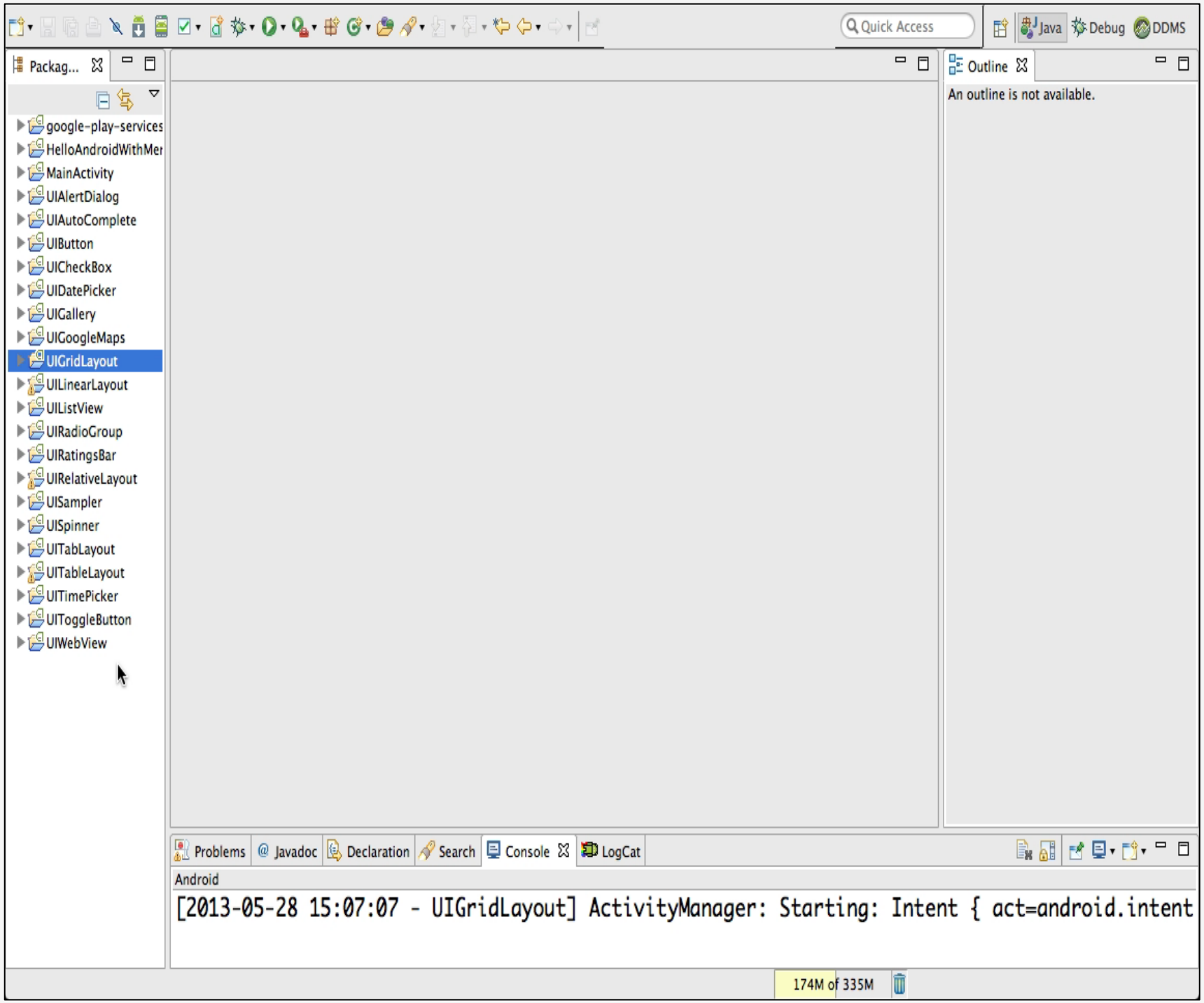
# GridView

Child views arranged in a two-dimensional, scrollable grid

# UIGridView

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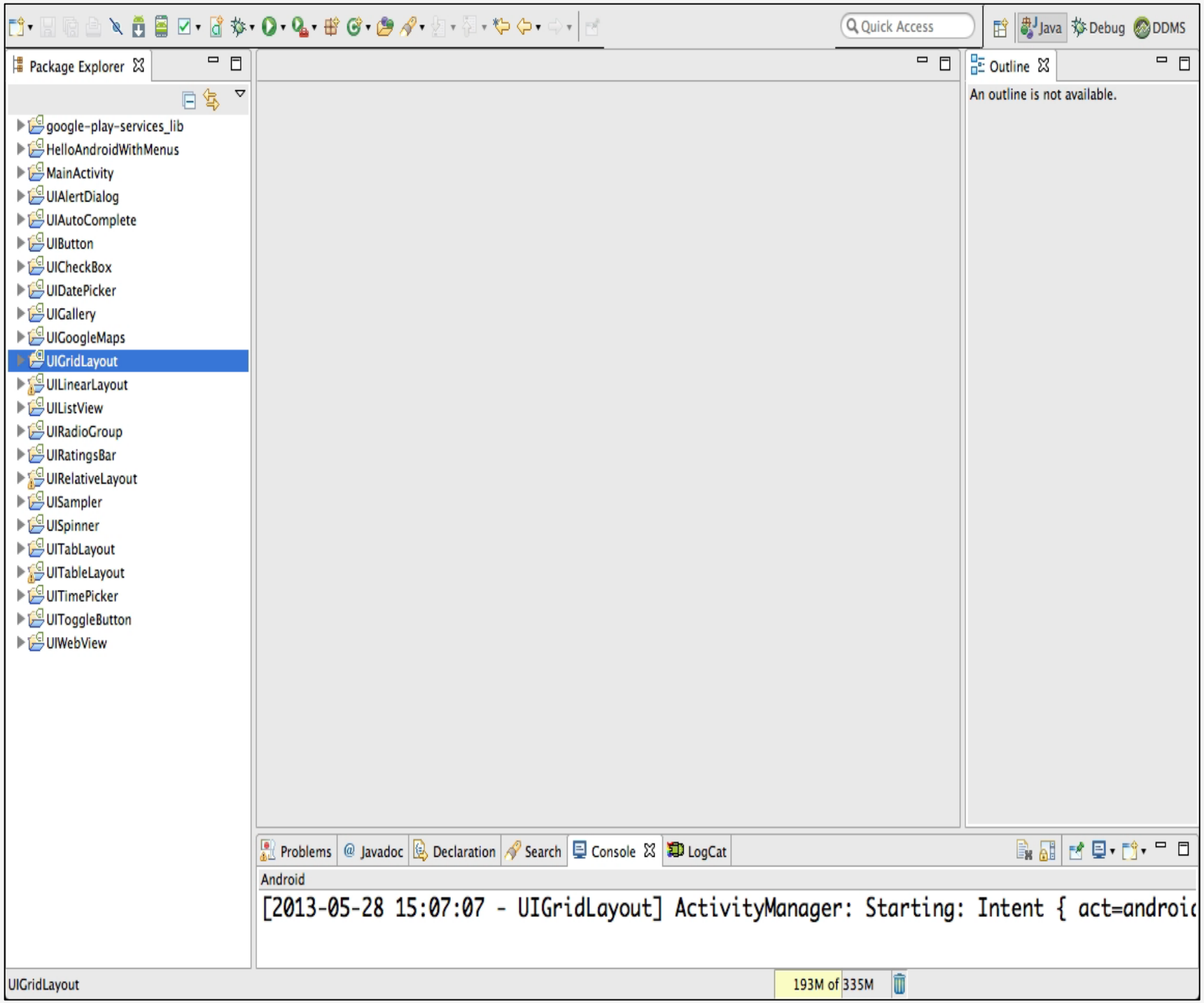
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# Menus and ActionBar

- 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

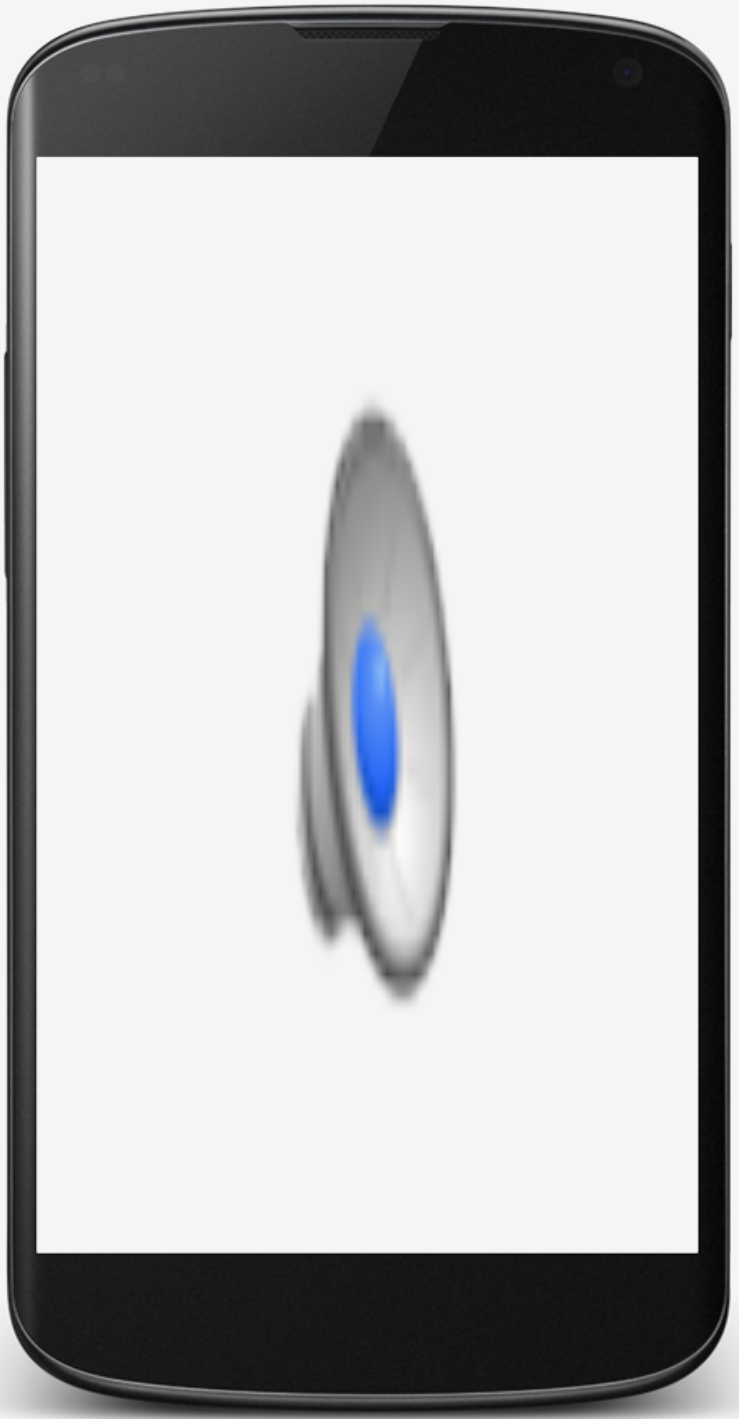
## Context

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

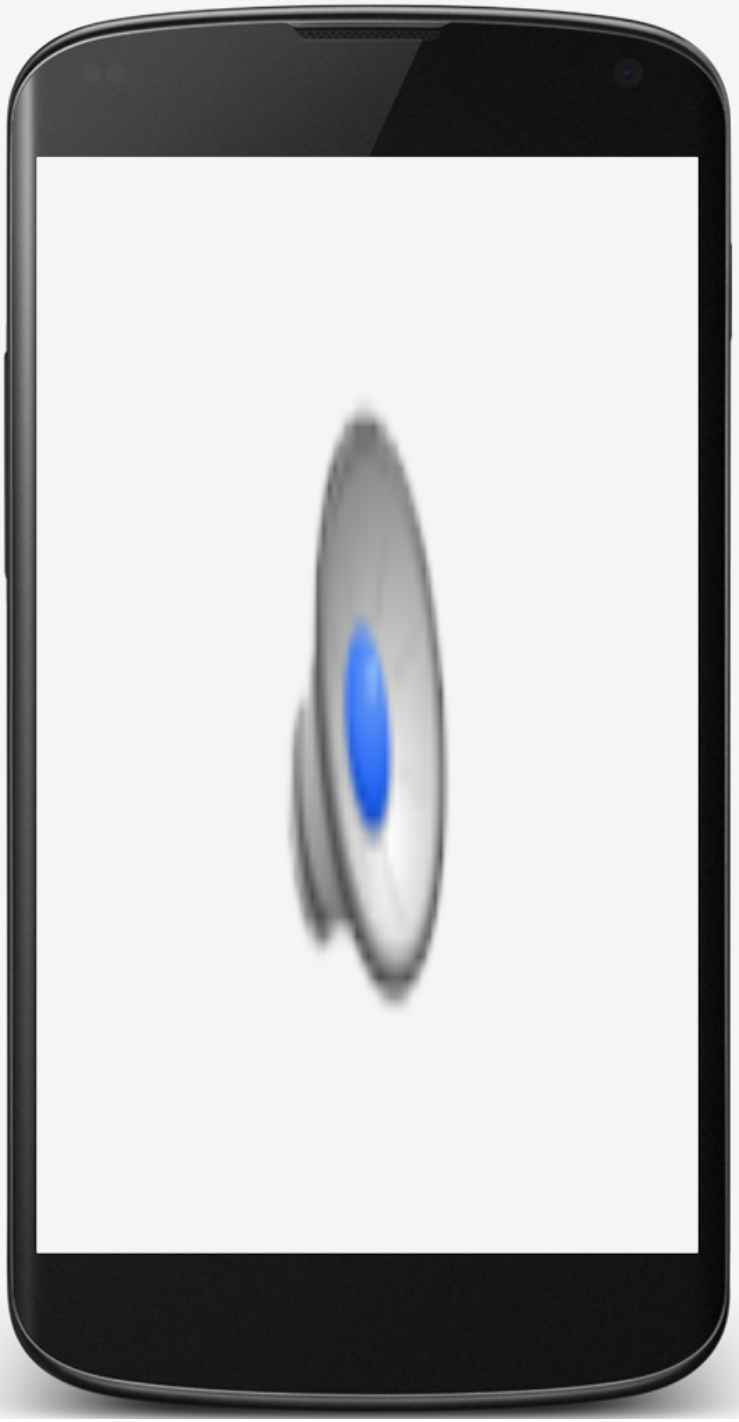
## Submenu

A menu activated when user touches a visible menu item

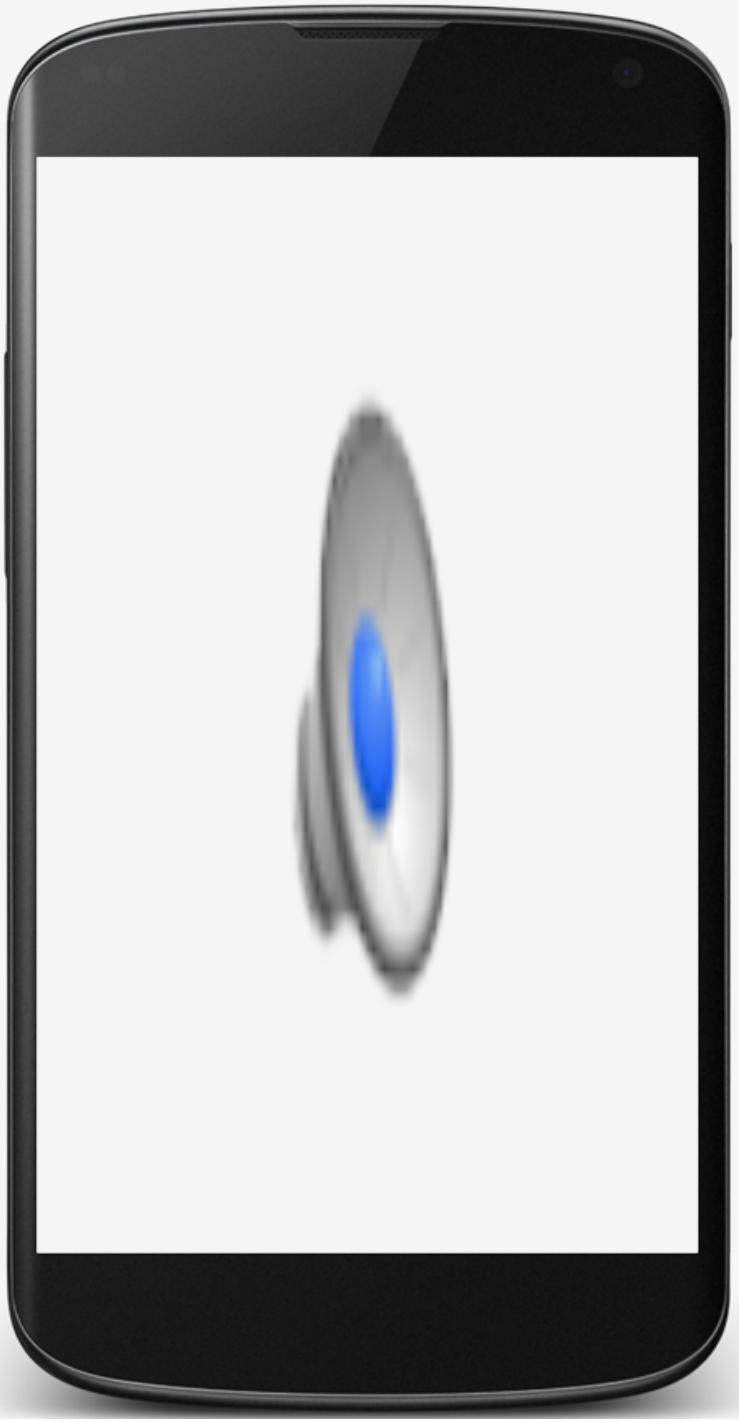
# Options Menus



# Context Menus



# SubMenus



# Creating Menus

## Define menu resource in XML file

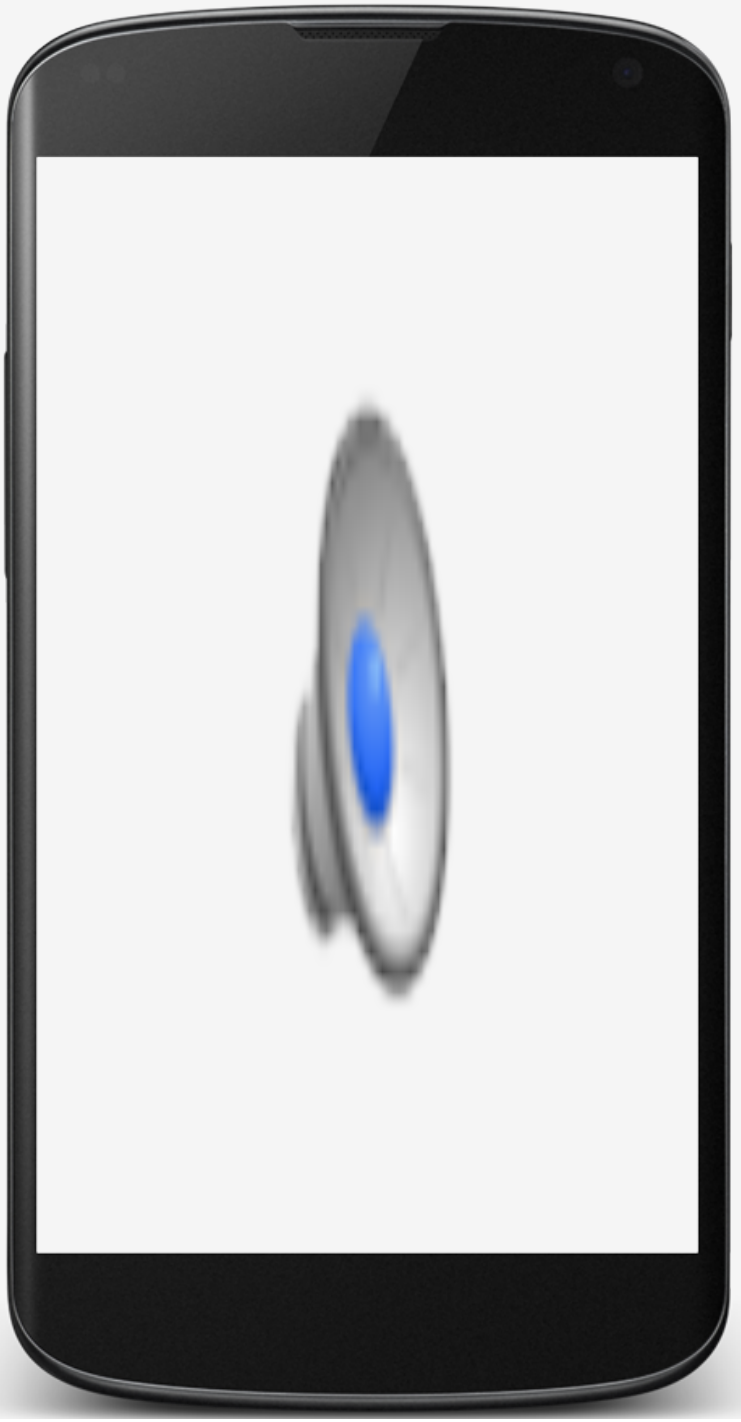
- Store in res/menu/filename.xml

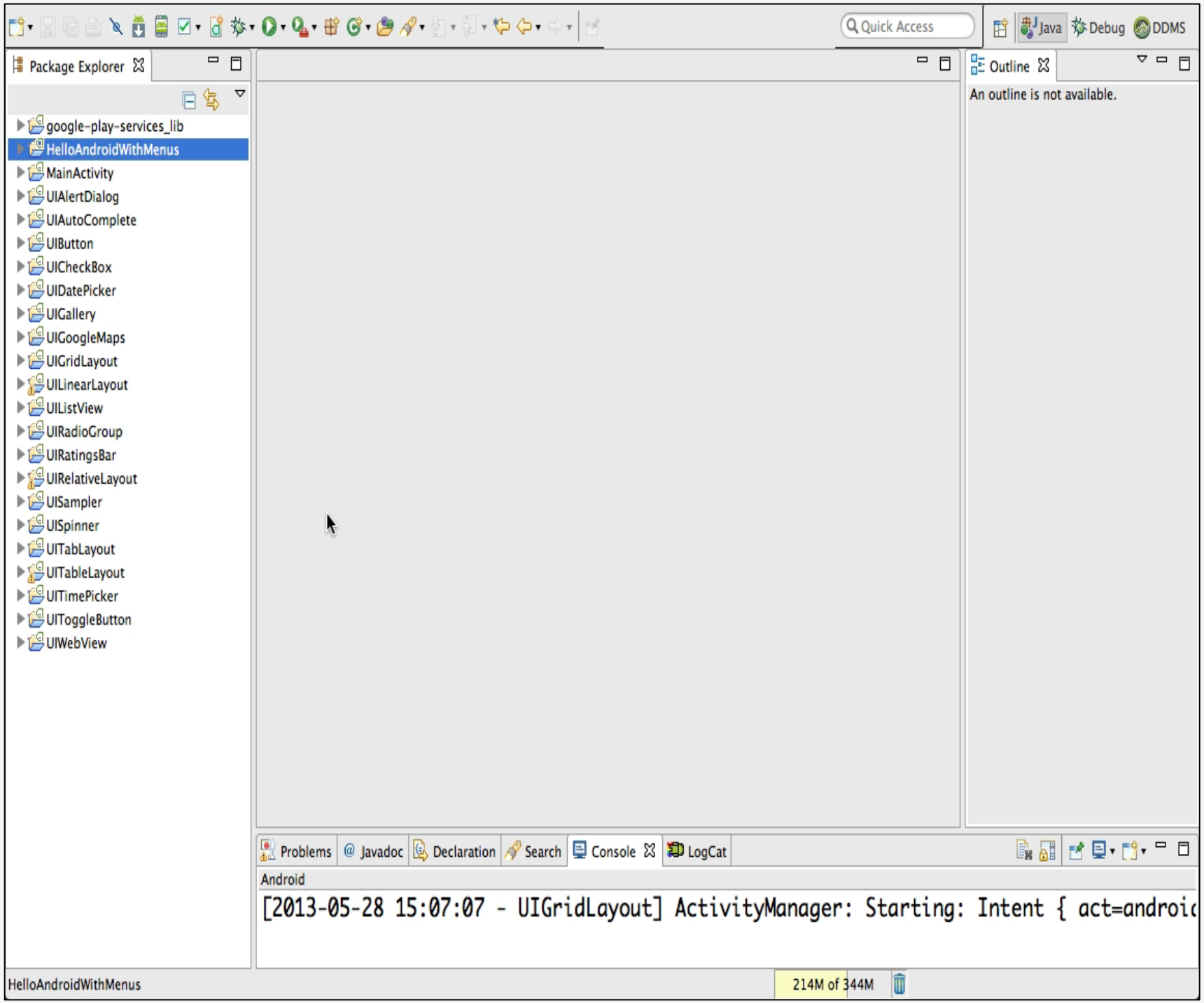
# Creating Menus

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

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

# HelloAndroid WithMenus

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# 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

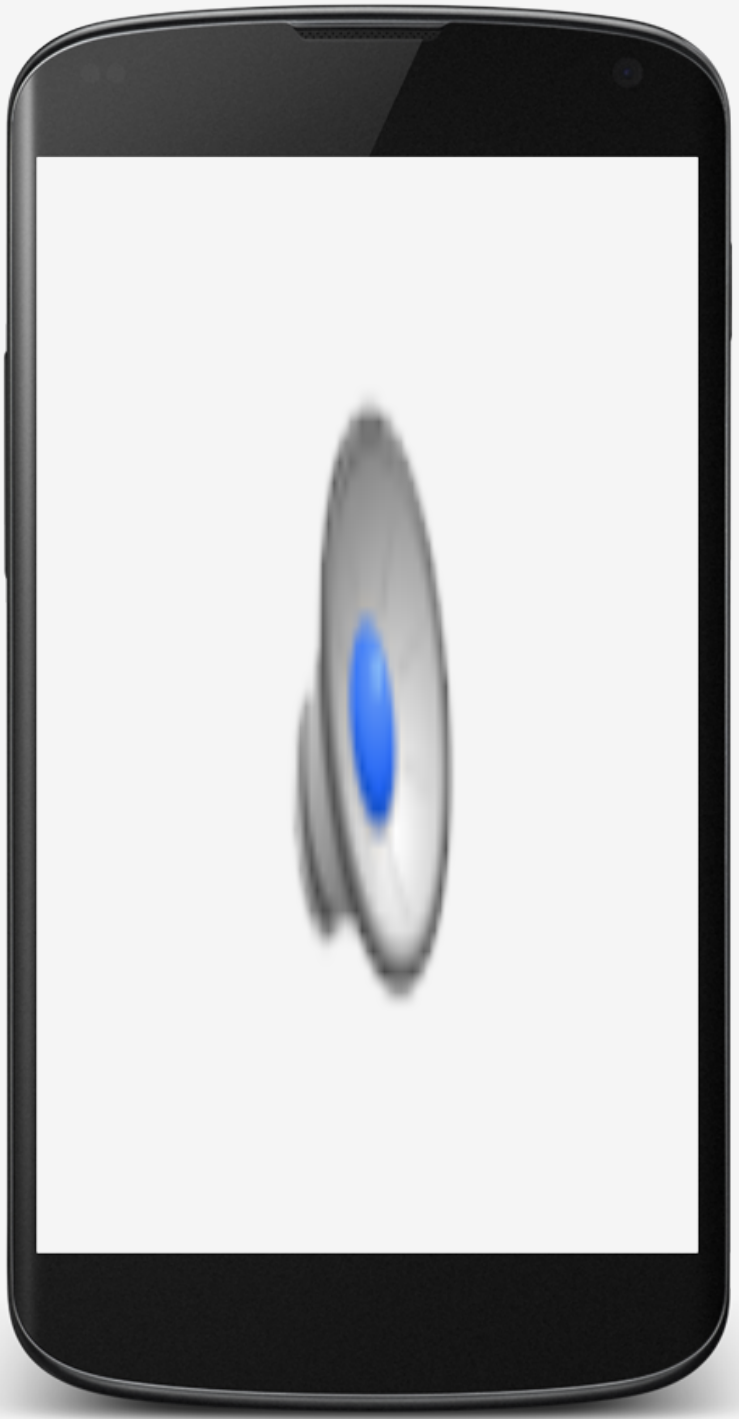
# ActionBar.Tab

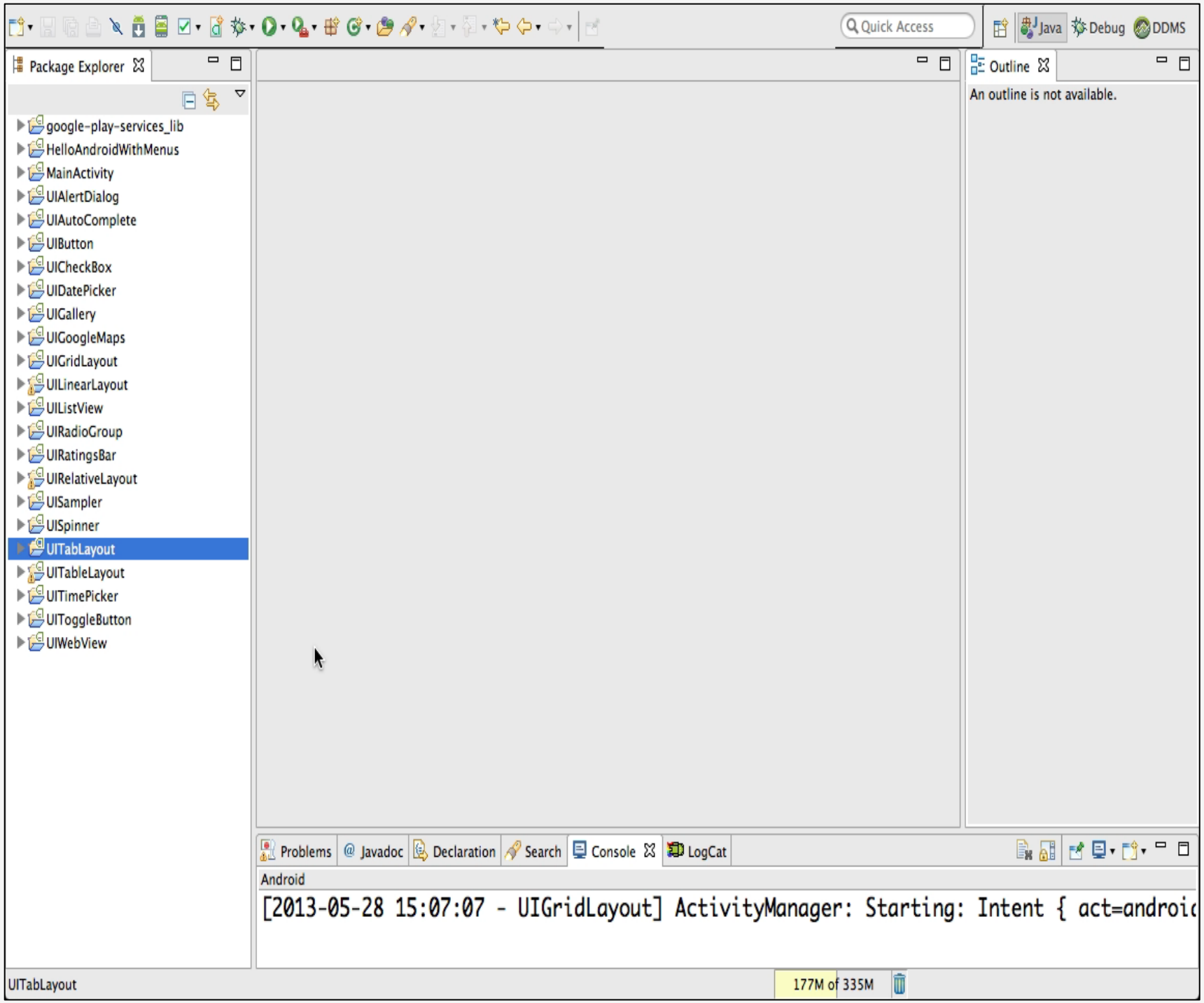
Each tab is associated with one Fragment

Exactly one tab is selected at any given time

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

# UITabLayout

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# Dialogs

Independent subwindows used by Activities to communicate with user

# Dialog subclasses

AlertDialog

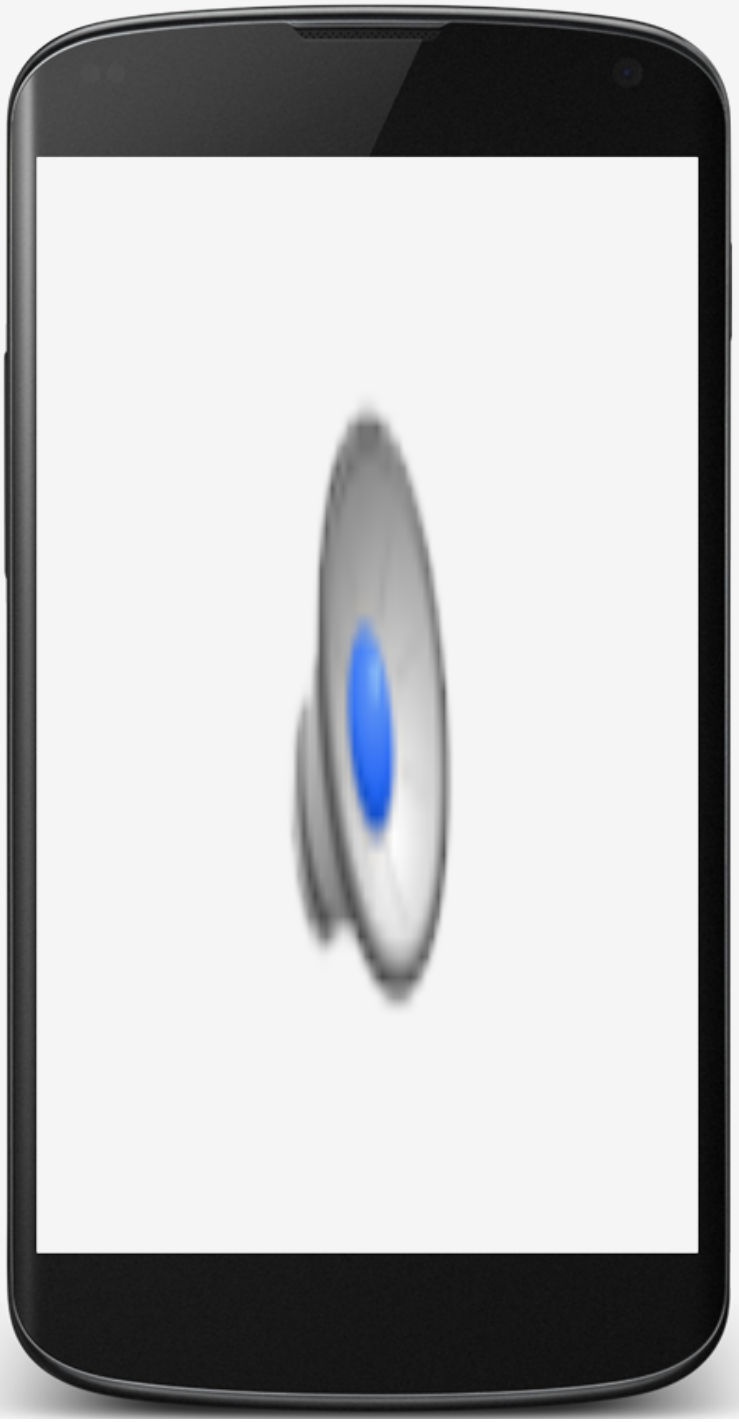
ProgressDialog

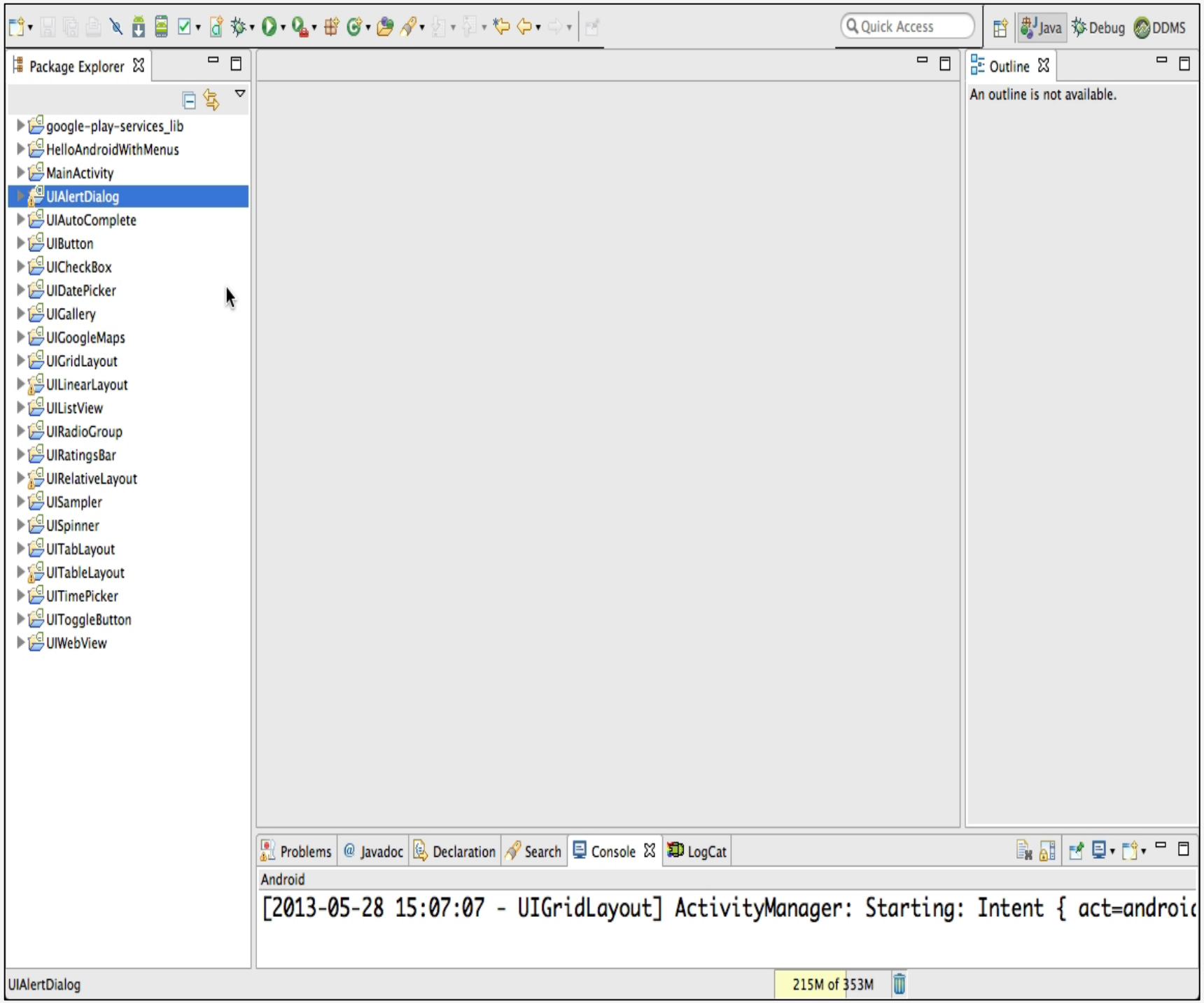
DatePickerDialog

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
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# Next Time

## User Notifications