#io12 #AndroidMulti

Multiversioning Android User Interfaces

How to serve all desserts

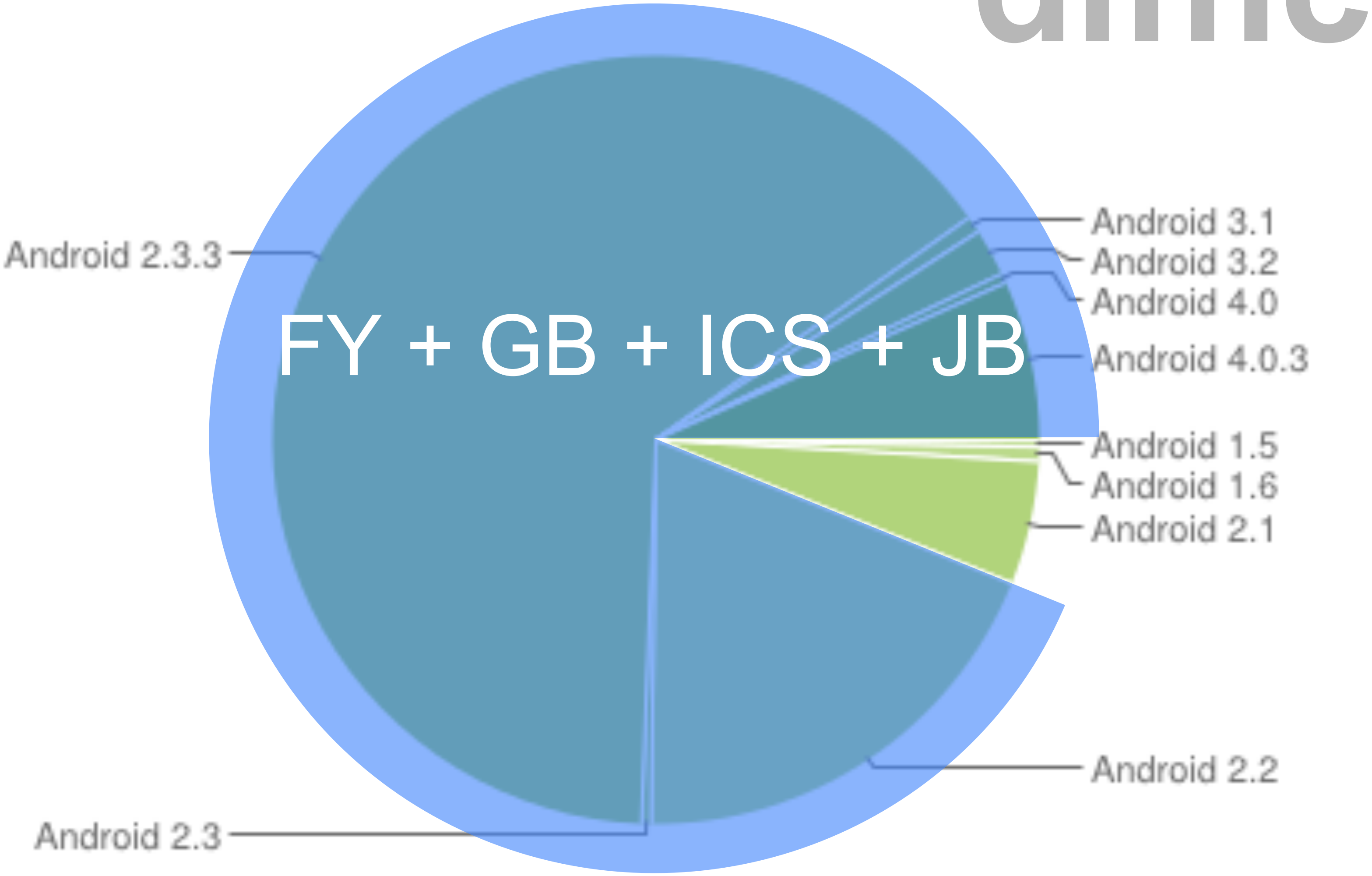
Bruno Oliveira
Android Developer Relations

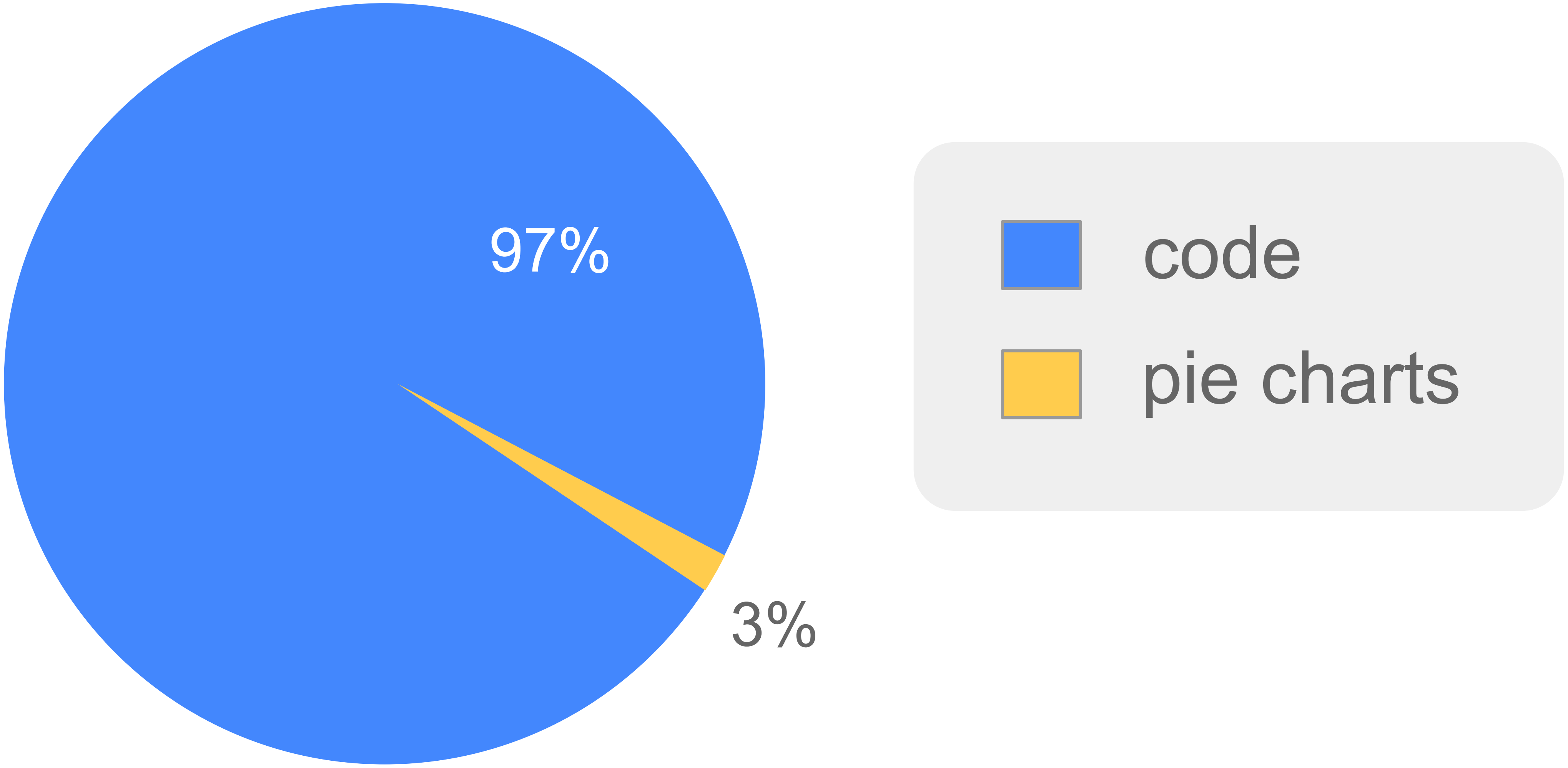
Adam Powell
Android Framework

y ?

Why should I?

difficult?



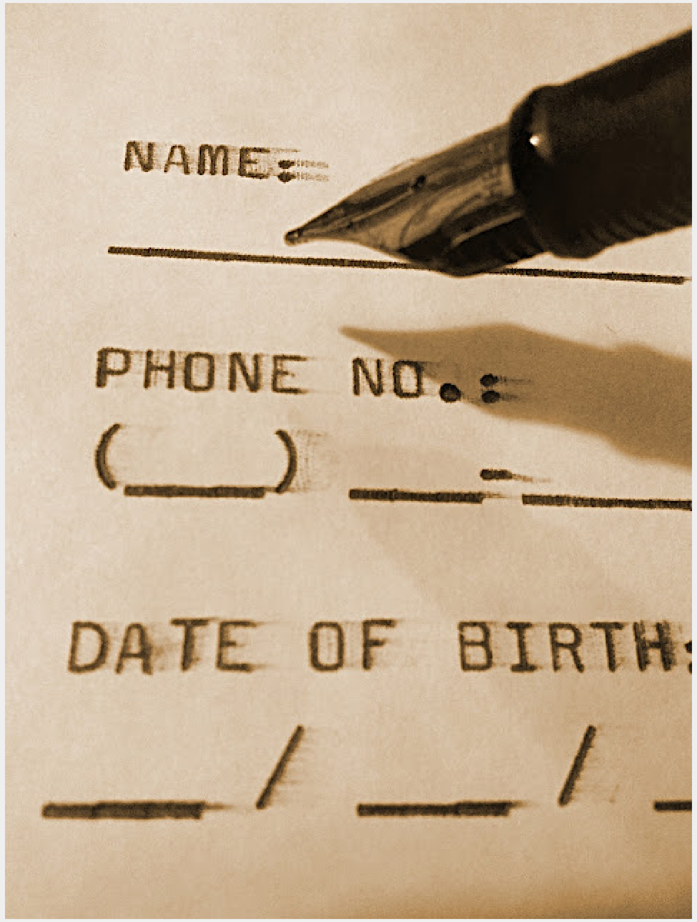


Warning: Percentages in this slide are 87% likely to be arbitrary

Being a n00b

Naïve approaches to multiversioning

naïve approach: avoid evolution



NAME:

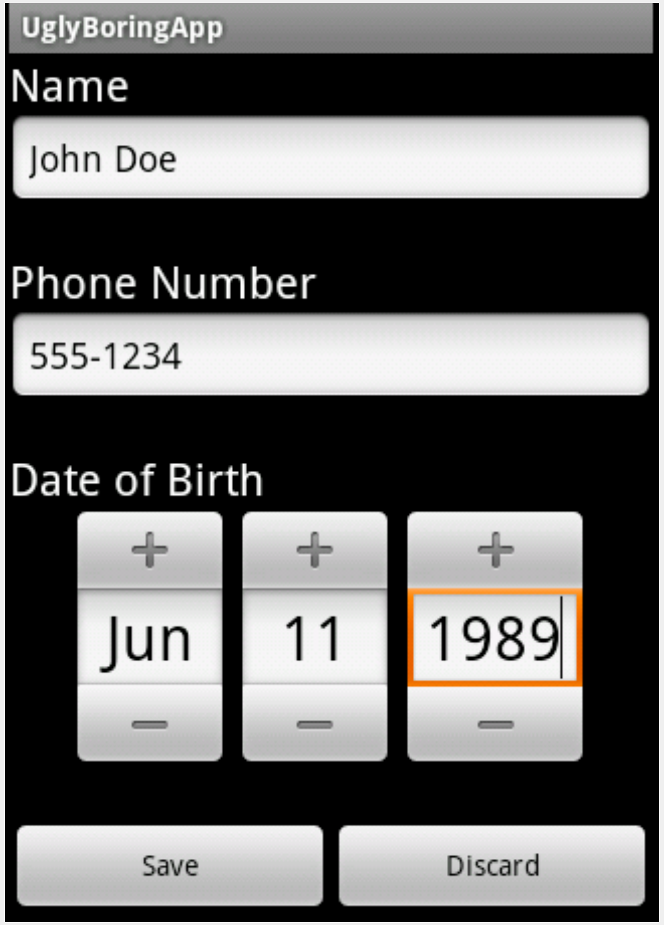
PHONE NO.:

( ) -

DATE OF BIRTH:

/ /

1950



UglyBoringApp

Name

John Doe

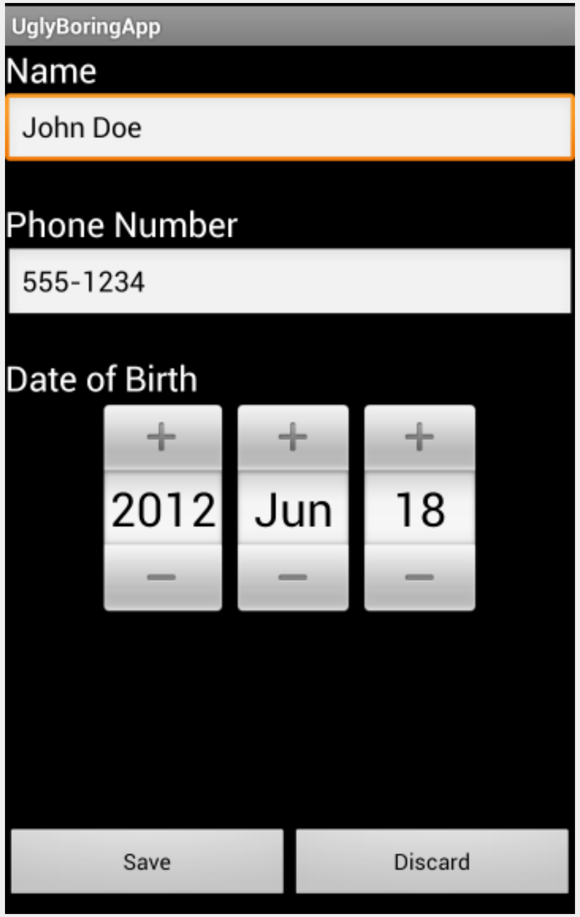
Phone Number

555-1234

Date of Birth

Jun 11 1989

Cupcake



UglyBoringApp

Name

John Doe

Phone Number

555-1234

Date of Birth

2012 Jun 18

ICS

naïve approach: We likes APKs. Want moar!

myapp_cupcake.apk

myapp_eclair.apk

myapp_froyo.apk

myapp_gingerbread.apk

myapp_ics_phones.apk

myapp_ics_tablet.apk

myapp_boss.apk

naïve approach: One APK, separate layouts/code

```
$ find res/layout -name mainscreen.xml
res/layout-v4/mainscreen.xml
res/layout-v4-land/mainscreen.xml
res/layout-v5/mainscreen.xml
res/layout-v5-land/mainscreen.xml
res/layout-v5-large/mainscreen.xml
res/layout-v8/mainscreen.xml
res/layout-v8-land/mainscreen.xml
res/layout-v8-large/mainscreen.xml
res/layout-v9/mainscreen.xml
res/layout-v9-land/mainscreen.xml
res/layout-v9-large/mainscreen.xml
res/layout-v11/mainscreen.xml
res/layout-v11-land/mainscreen.xml
res/layout-v14/mainscreen.xml
res/layout-v14-land/mainscreen.xml
res/layout-v14-sw600dp/mainscreen.xml
```

```
$ ls src/com/example/foo/bar
MainActivity_Cupcake.java
MainActivity_Donut.java
MainActivity_Eclair.java
MainActivity_Froyo.java
MainActivity_Gingerbread.java
MainActivity_GingerbreadMR1.java
MainActivity_Honeycomb.java
MainActivity_IceCreamSandwich.java
...
```

❤ Life: 🟥

Android Mana: 🟩

You are now a
Level 2 Multiversioner

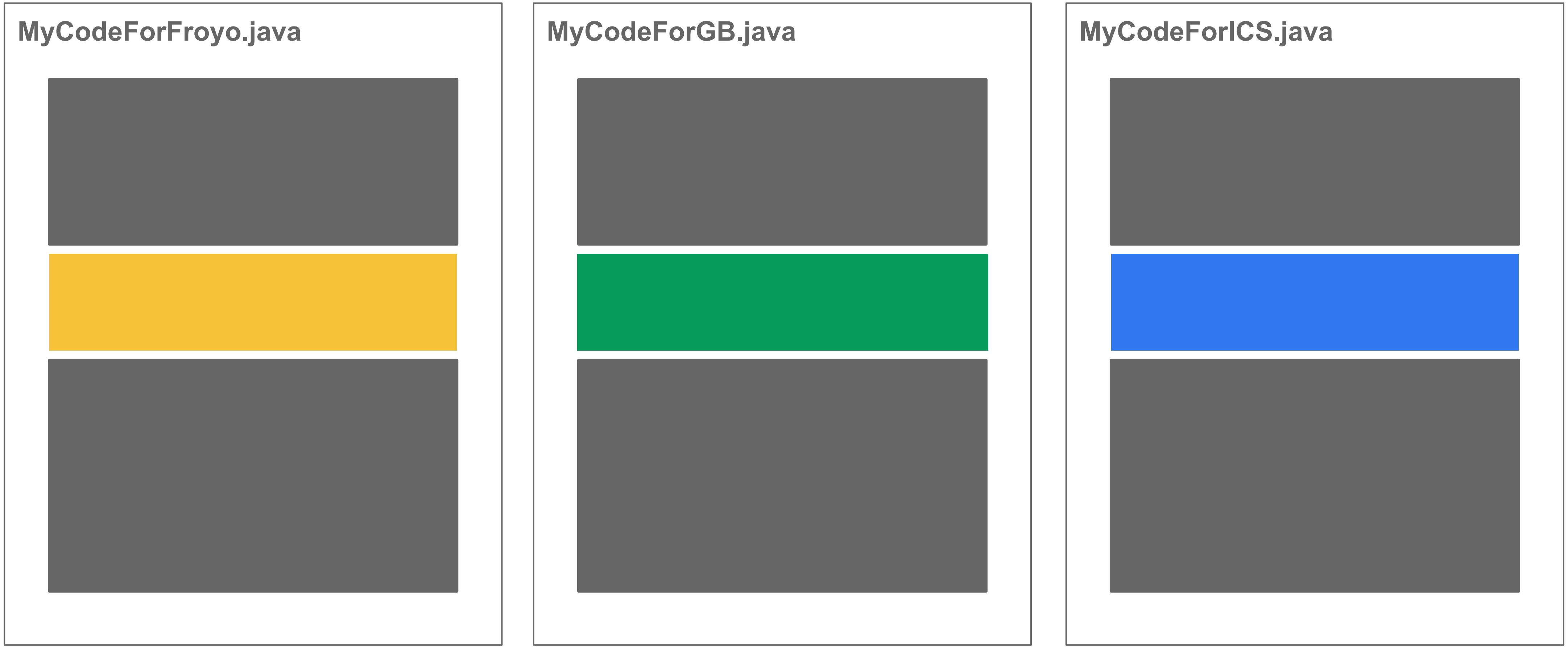
Basic multiversioning

#io12 #AndroidMulti

Parallel Activity Pattern

```
public void onCreate(Bundle savedInstanceBundle) {
   super.onCreate(savedInstanceBundle);
   Intent i = null;
   if (android.os.Build.VERSION.SDK_INT >=
       android.os.Build.VERSION_CODES.ICE_CREAM_SANDWICH)
 {
      i = new Intent(this, ShinyCoolActivity.class);
   }
   else {
      i = new Intent(this, LegacyActivity.class);
   }
   ...
```

watch out out for duplication duplication



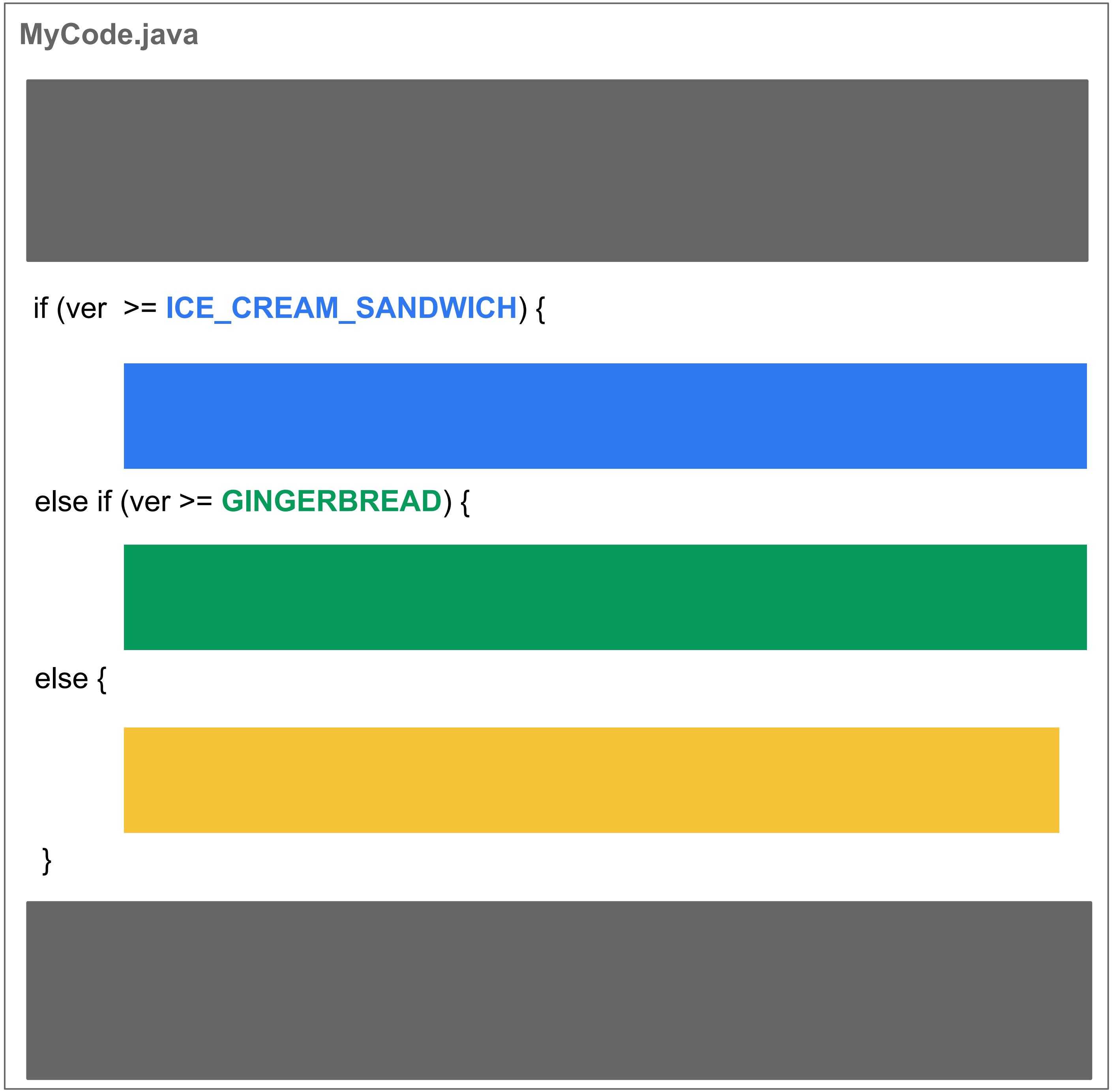
MyCodeForFroyo.java

MyCodeForGB.java

MyCodeForICS.java

if is your friend

- don't be afraid of if
- be afraid of if



MyCode.java

```
if (ver  >= ICE_CREAM_SANDWICH) {

else if (ver >= GINGERBREAD) {

else {

 }
```

lazy

Abstraction and lazy loading

- abstract class
- implementations
- load when needed

Abstraction and lazy loading

```
public abstract class VersionedLoremIpsum {
    public abstract String doLorem();
    public abstract int doIpsum();
}
```

Abstraction and lazy loading

```
public class EclairLoremIpsum
                  extends VersionedLoremIpsum {
   public String doLorem() {
      // do lorem, Eclair-style
   }
   public abstract int doIpsum() {
      // deliver ipsum, a là Eclair
   }
}
```

Abstraction and lazy loading

```
public class FroyoLoremIpsum
                     extends EclairLoremIpsum {
   public String doLorem() {
      String l = super.doLorem();
      // additional processing
      return l;
   }
   public abstract int doIpsum() {
      ...
```

Abstraction and lazy loading

```
VersionedLoremIpsum li;
int sdk = Build.VERSION.SDK_INT;
if (sdk <= Build.VERSION_CODES.ECLAIR) {
   li = new EclairLoremIpsum();
} else if (sdk <= Build.VERSION_CODES.FROYO) {
   li = new FroyoLoremIpsum();
} else {
   li = new GingerbreadLoremIpsum();
}
```

</lazy>

Using the Resource System

The -vN resource qualifier

res/**layout-v11**/foo.xml

res/**layout**/foo.xml

use boolean resources

res/values-v14/bools.xml

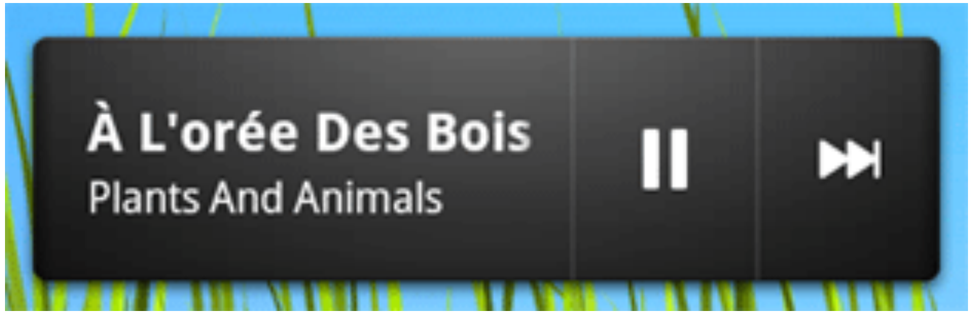
```xml
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <bool name="postICS">true</bool>
    <bool name="preICS">false</bool>
</resources>
```

res/values/bools.xml

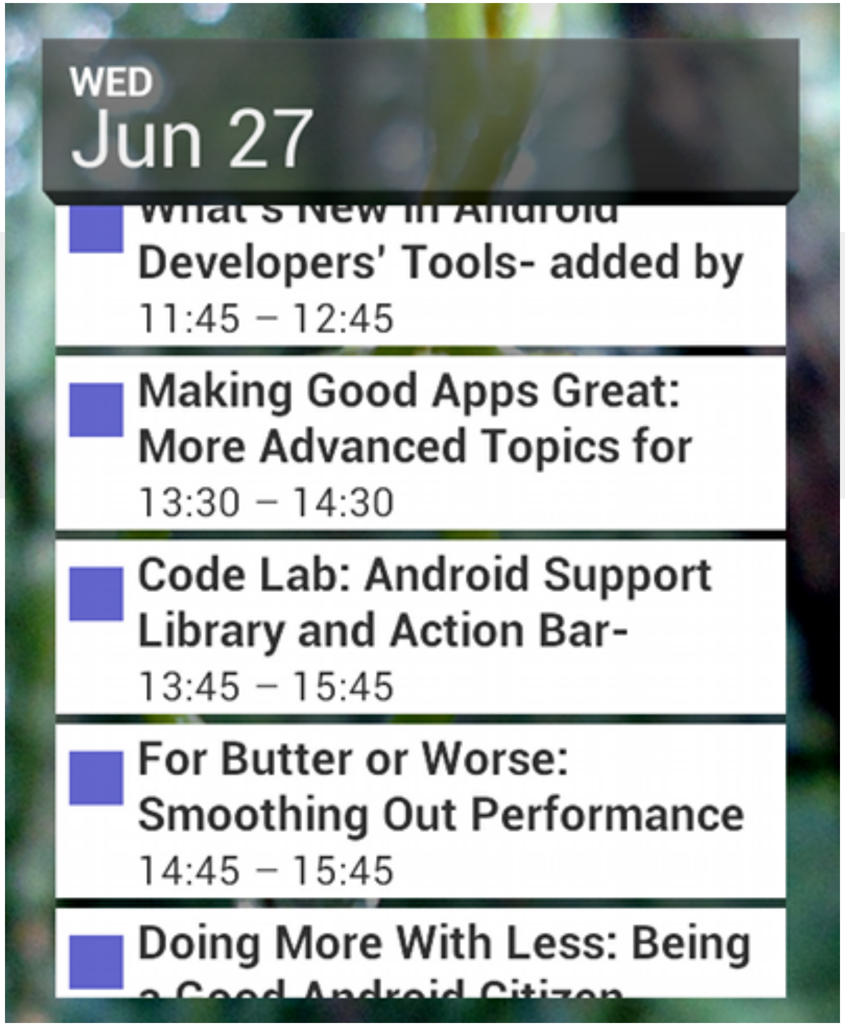
```xml
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <bool name="postICS">false</bool>
    <bool name="preICS">true</bool>
</resources>
```

```
Resources res = getResources();
boolean postICS =
         res.getBoolean(R.bool.postICS);

if (postICS) {
   // do something cool and cutting-edge
} else {
   // do something old-school but elegant!
}
```

App Widgets?



À L'orée Des Bois
Plants And Animals



WED
Jun 27

What's New in Android
Developers' Tools- added by
11:45 – 12:45

Making Good Apps Great:
More Advanced Topics for
13:30 – 14:30

Code Lab: Android Support
Library and Action Bar-
13:45 – 15:45

For Butter or Worse:
Smoothing Out Performance
14:45 – 15:45

Doing More With Less: Being
a Good Android Citizen

Example: App Widget

```
<receiver android:name="MyAppWidget">
   <intent-filter>
      <action android:name=
           "android.appwidget.action.APPWIDGET_UPDATE" />
   </intent-filter>
   <meta-data android:name="android.appwidget.provider"
              android:resource="@xml/my_appwidget_info"
/>
</receiver>
```

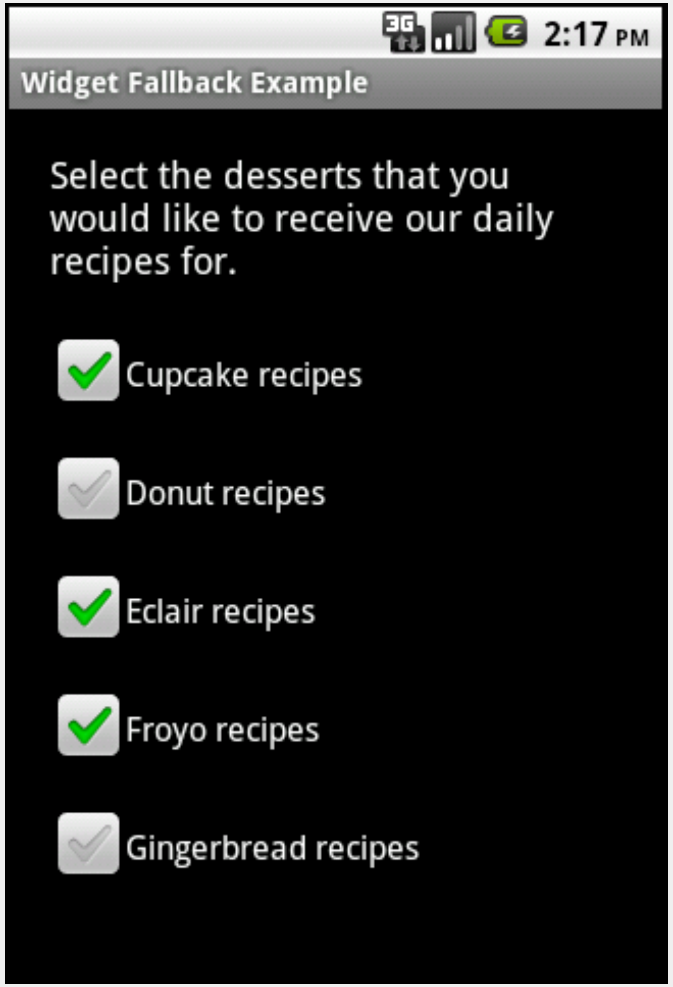
```
<receiver android:name="MyPreICSAppWidget"
          android:enabled="@bool/preICS">
   <intent-filter  ....
   <meta-data
    android:name="android.appwidget.provider"
    android:resource="@xml/my_pre_ics_info" />
</receiver>
```

```
<receiver android:name="MyPostICSAppWidget"
          android:enabled="@bool/postICS">
   <intent-filter  ....
   <meta-data
    android:name="android.appwidget.provider"
    android:resource="@xml/my_post_ics_info" />
</receiver>
```

```
<receiver android:name="MyPreICSAppWidget"
          android:enabled="@bool/preICS">
...
</receiver>
<receiver android:name="MyPostICSAppWidget"
          android:enabled="@bool/postICS">
 ...
</receiver>
```

Activity UI fallbacks

Example: Switch / Checkbox fallback



Widget Fallback Example

Select the desserts that you would like to receive our daily recipes for.

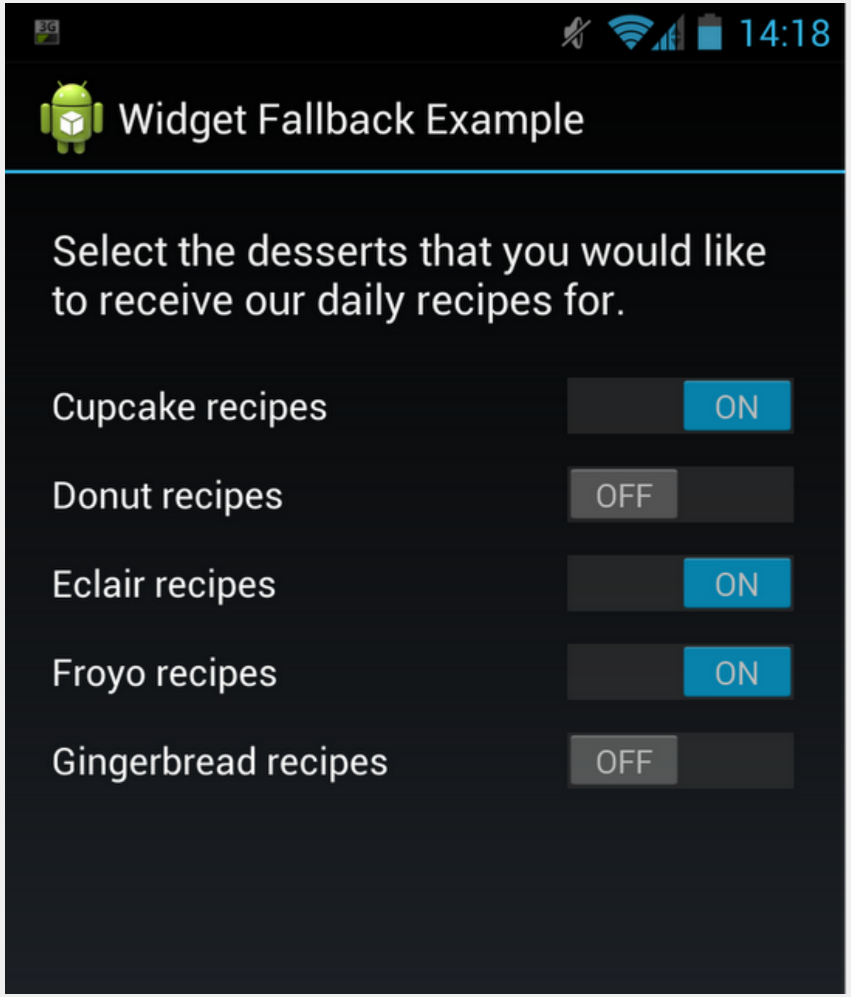
☑ Cupcake recipes

☐ Donut recipes

☑ Eclair recipes

☑ Froyo recipes

☐ Gingerbread recipes



Widget Fallback Example

Select the desserts that you would like to receive our daily recipes for.

Cupcake recipes ON

Donut recipes OFF

Eclair recipes ON

Froyo recipes ON

Gingerbread recipes OFF

res/layout/main.xml

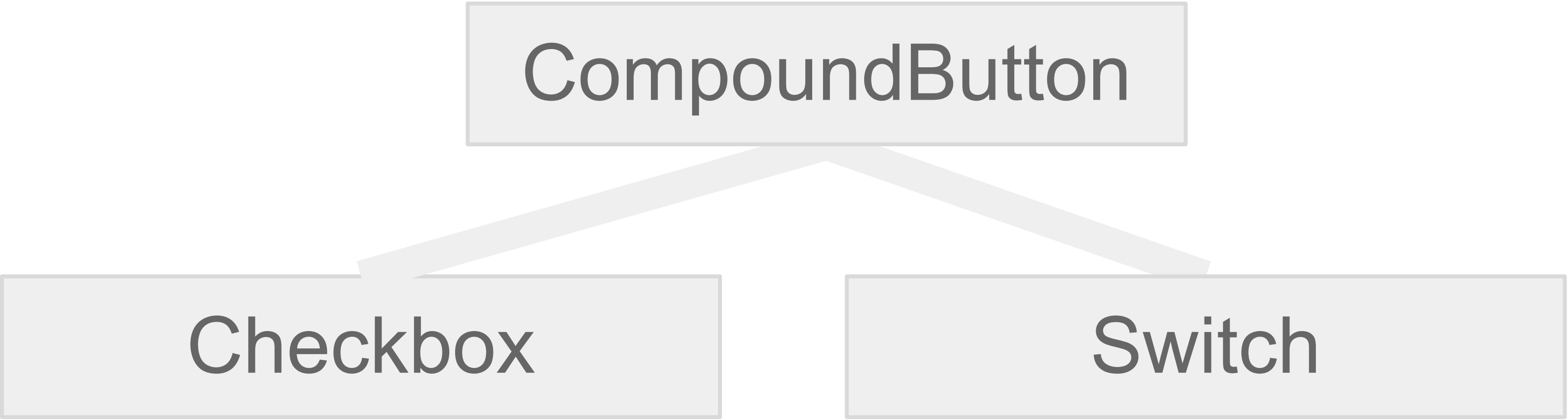
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout ...
    <!-- non multi-versioned stuff here -->

    <include layout="@layout/desserts" />

    <!-- more non multi-versioned stuff here -->
</LinearLayout>
```

res/layout/desserts.xml

```
<?xml ... ?>
<merge xmlns:android="...">
   <CheckBox ... />
   <CheckBox ... />
   <CheckBox ... />
   ...
</merge>
```

res/layout-v11/desserts.xml

```
<?xml ... ?>
<merge xmlns:android="...">
   <Switch ... />
   <Switch ... />
   <Switch ... />
   ...
</merge>
```



CompoundButton

Checkbox

Switch

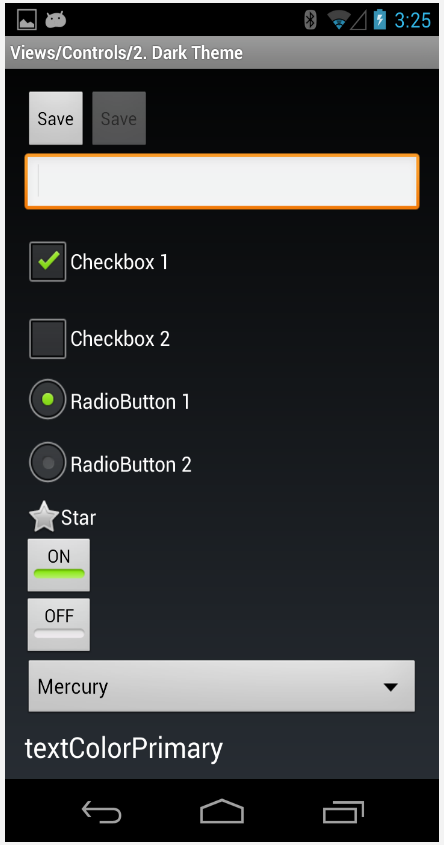
```
CompoundButton cb =
 (CompoundButton)findViewById(R.id.myoption);

checked = cb.isChecked();
```

`<include>` is your friend.

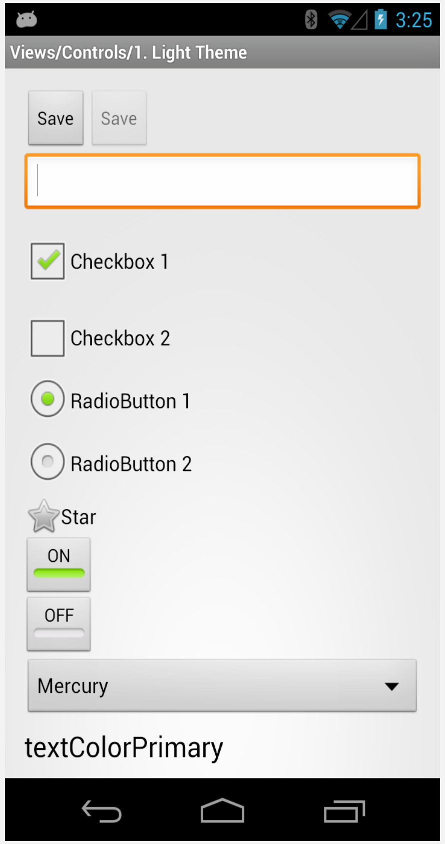
Multiversioning Themes

Android Themes

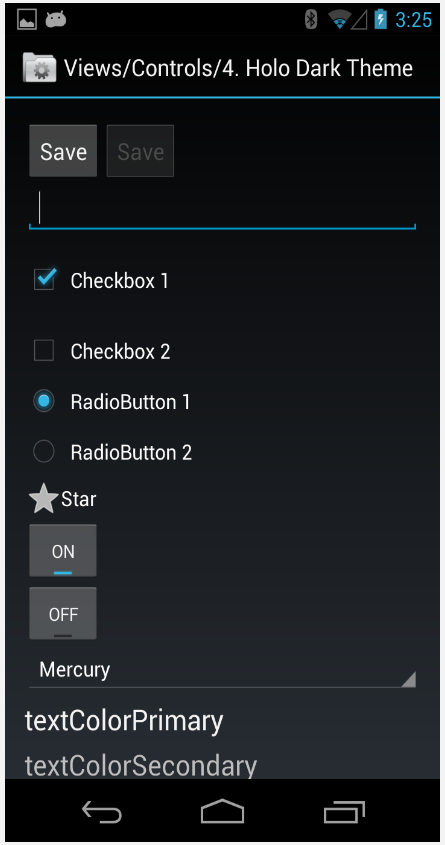
Theme



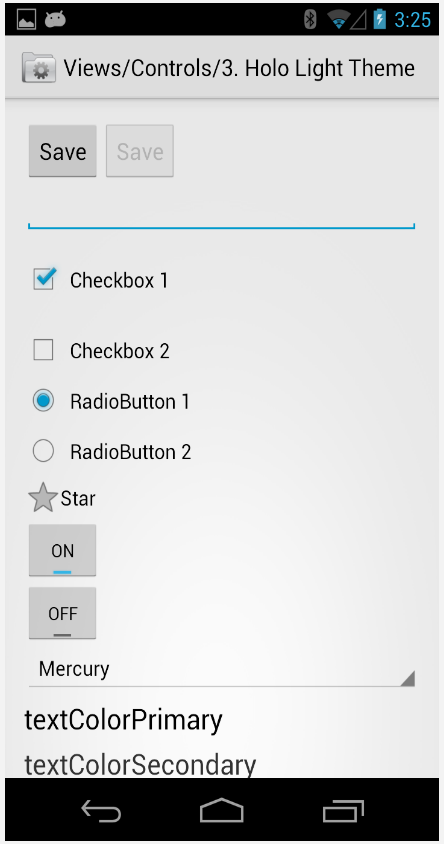
Theme.Light



Theme.Holo



Theme.Holo.Light



Don't hard-code, query!

```
android:textSize="20sp"
```

```
android:textAppearance=
  "?android:attr/textAppearanceLarge"
```

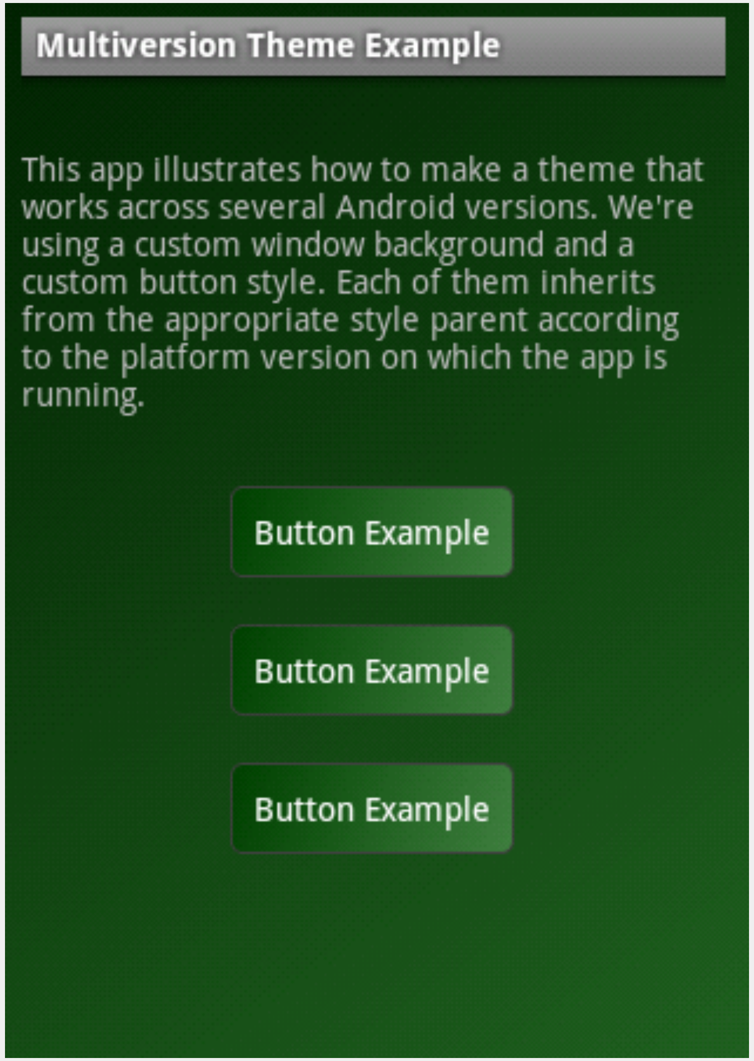
Don't reinvent, inherit!

```
<style name="MyButtonStyle">
...
```

```
<style name="MyButtonStyle"
       parent="@android:style/Widget.Holo.Button">
...
```

backward-compatible themes?

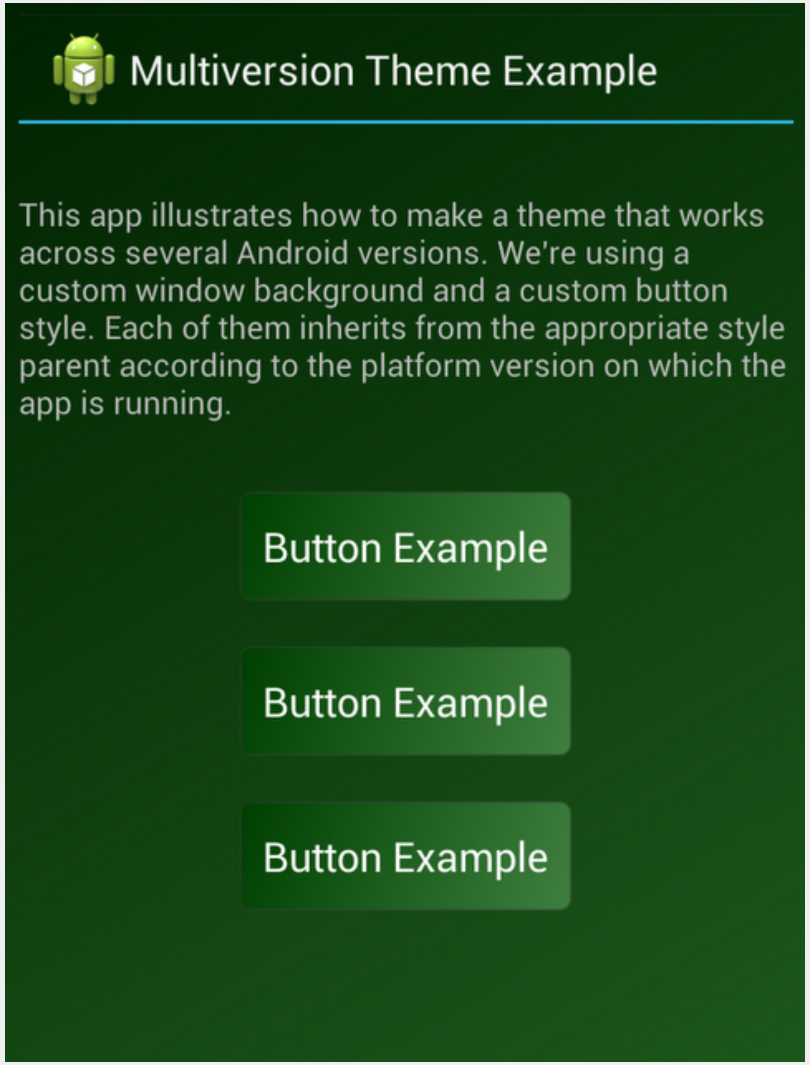
Froyo



Multiversion Theme Example

This app illustrates how to make a theme that works across several Android versions. We're using a custom window background and a custom button style. Each of them inherits from the appropriate style parent according to the platform version on which the app is running.

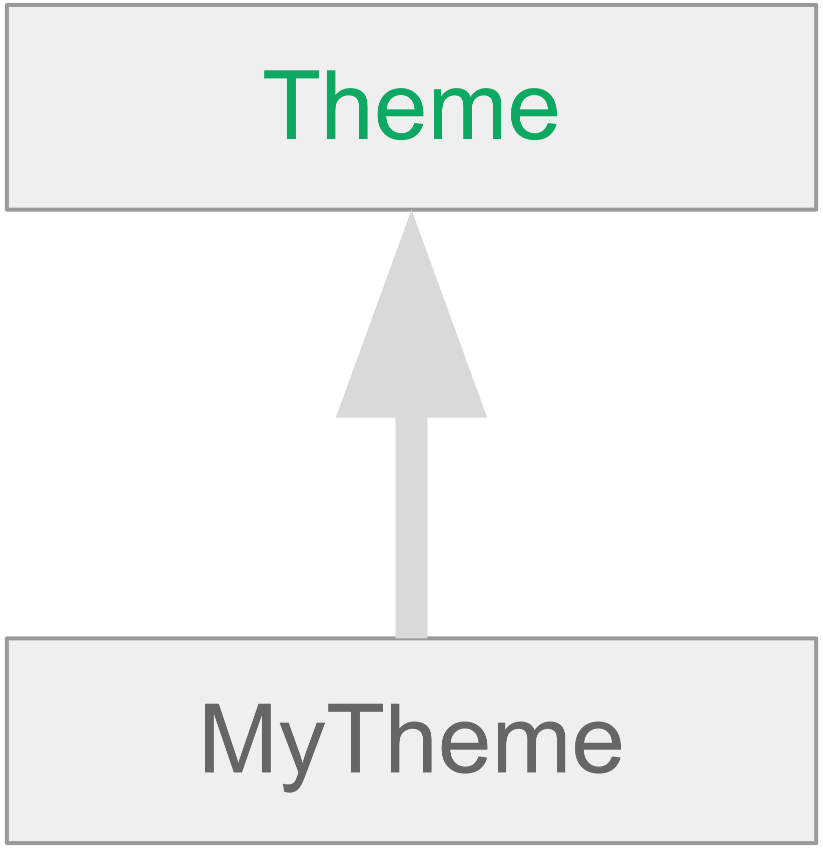
ICS



Multiversion Theme Example

This app illustrates how to make a theme that works across several Android versions. We're using a custom window background and a custom button style. Each of them inherits from the appropriate style parent according to the platform version on which the app is running.

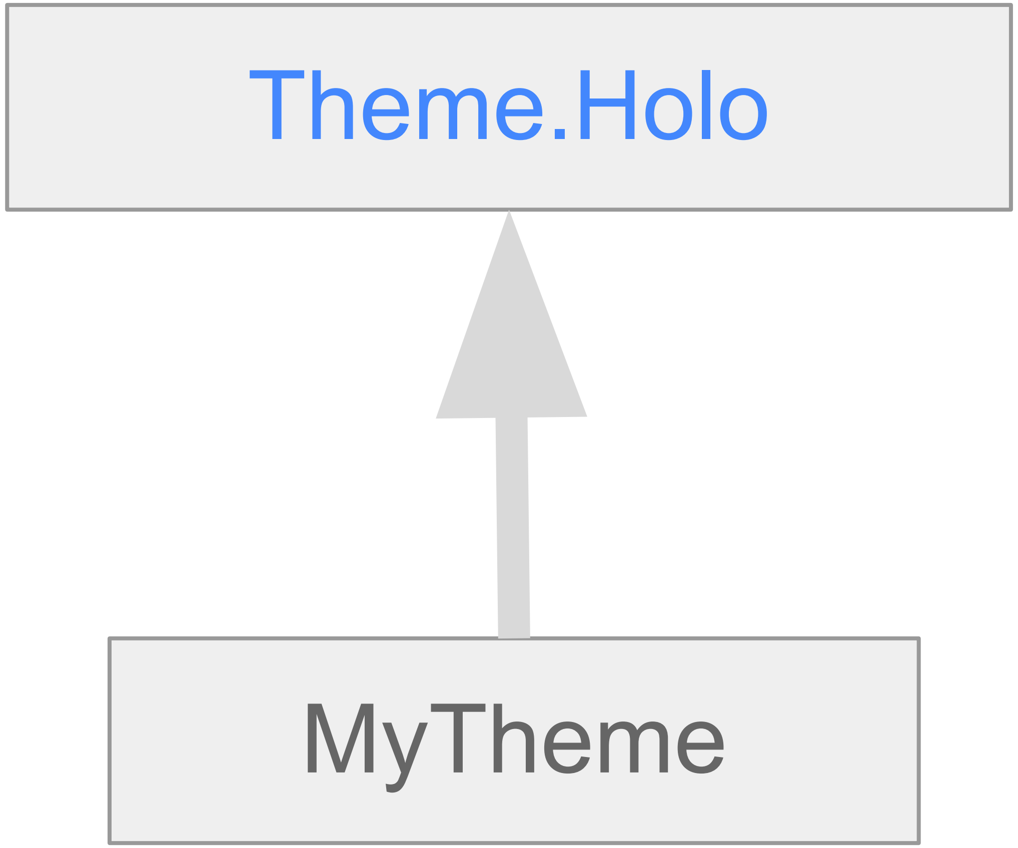
pre-HC



Theme

MyTheme

post-HC

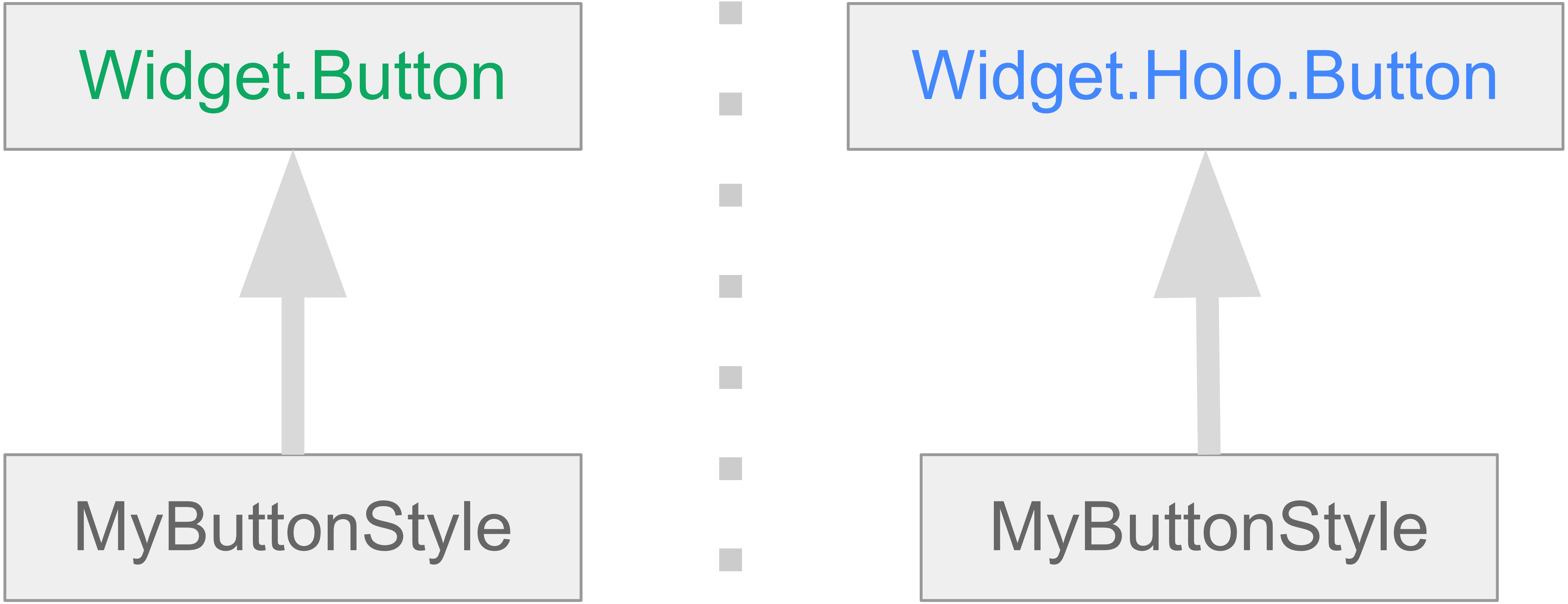


Theme.Holo

MyTheme

pre-HC

post-HC



Widget.Button

MyButtonStyle

Widget.Holo.Button

MyButtonStyle

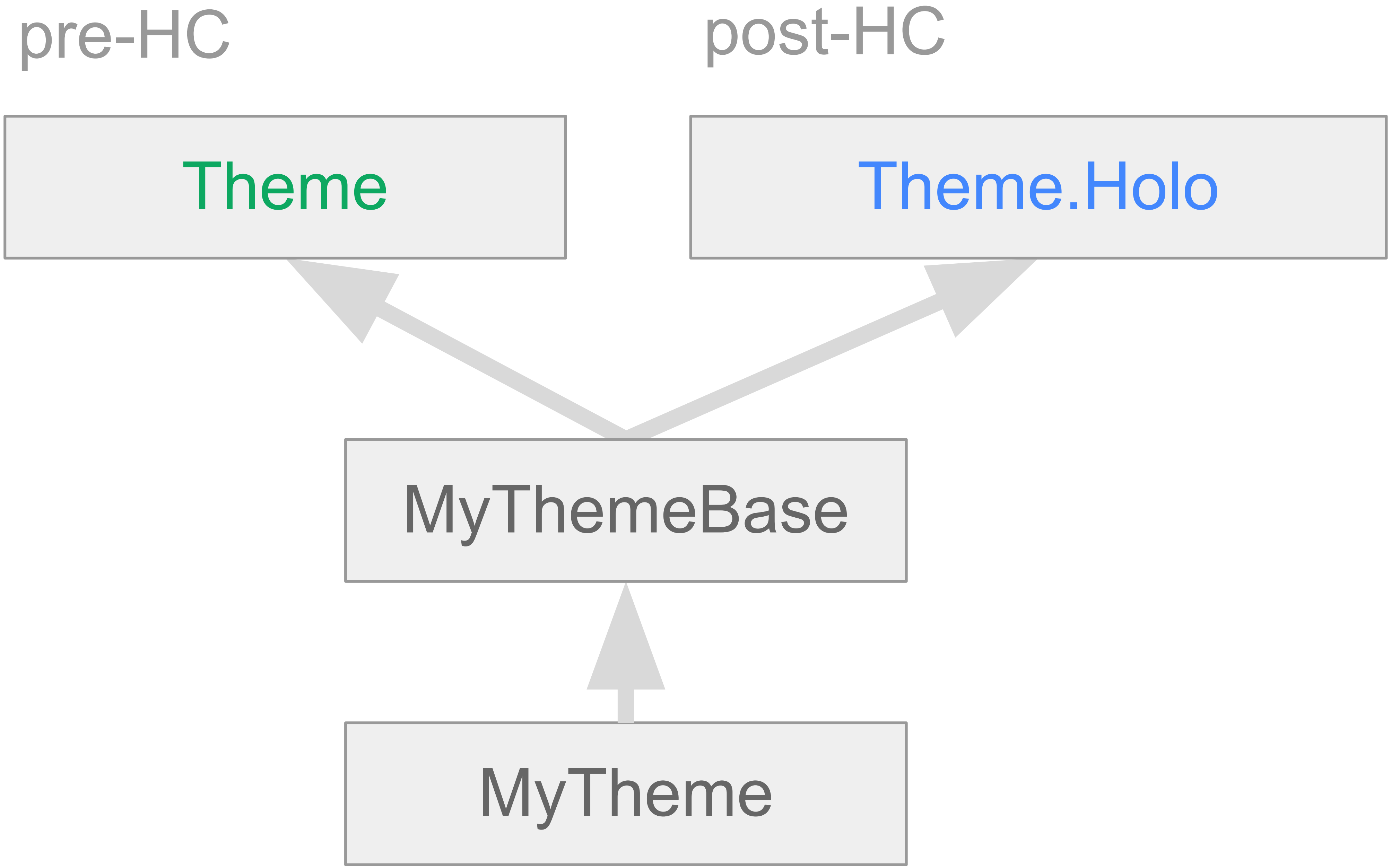
The naïve way:

res/values/styles.xml

```
<style name="MyButtonStyle"
       parent="@android:style/Widget.Button">
...
```

res/values-v11/styles.xml

```
<style name="MyButtonStyle"
       parent="@android:style/Widget.Holo.Button">
...
```



pre-HC

post-HC

Theme

Theme.Holo

MyThemeBase

MyTheme

res/values/themes.xml

```
<style name="MyAppThemeBase"
parent="@android:style/Theme" />
```

res/values-v11/themes.xml

```
<style name="MyAppThemeBase"
parent="@android:style/Theme.Holo" />
```

res/values/themes.xml

```
<style name="MyAppTheme"
       parent="MyAppThemeBase">
...
```

creating your own
theme attributes

Creating your theme attributes

...and use app-side shims to support Android versions that don't have the attribute.

res/values/attrs.xml

```
<attr name="selectableItemBackground"
      format="drawable" />
```

res/values/themes.xml

```
<item name="selectableItemBackground">
    @drawable/fallback_item_background</item>
```

res/values-v11/themes.xml

```
<item name="selectableItemBackground">
    ?android:attr/selectableItemBackground</item>
```

which theme should I extend?

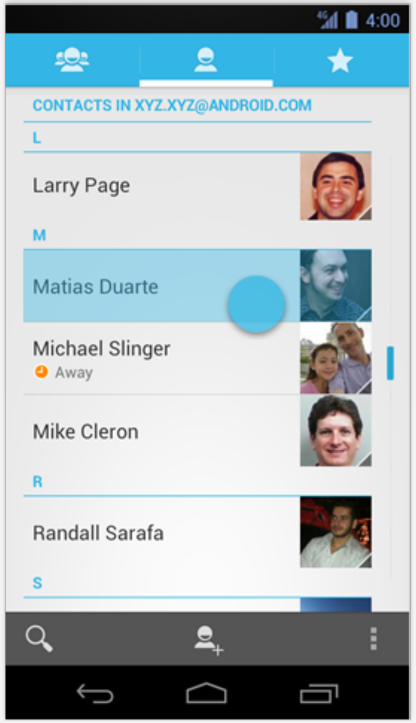
Themes:

- **Holo** - stable/easy
- **Device Default** - tighter integration
- **Activity Content:** holo-ish

Support Library and Beyond

Fragments

units of compositions



4:00

CONTACTS IN XYZ.XYZ@ANDROID.COM

L

Larry Page

M

Matias Duarte

Michael Slinger
Away

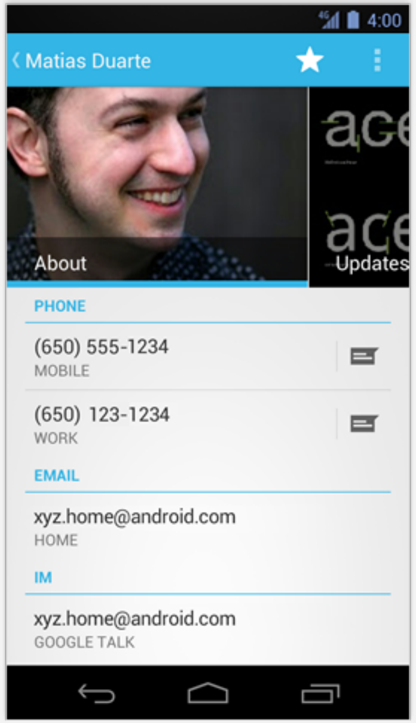
Mike Cleron

R

Randall Sarafa

S

List view



4:00

Matias Duarte

About

Updates

PHONE

(650) 555-1234
MOBILE

(650) 123-1234
WORK

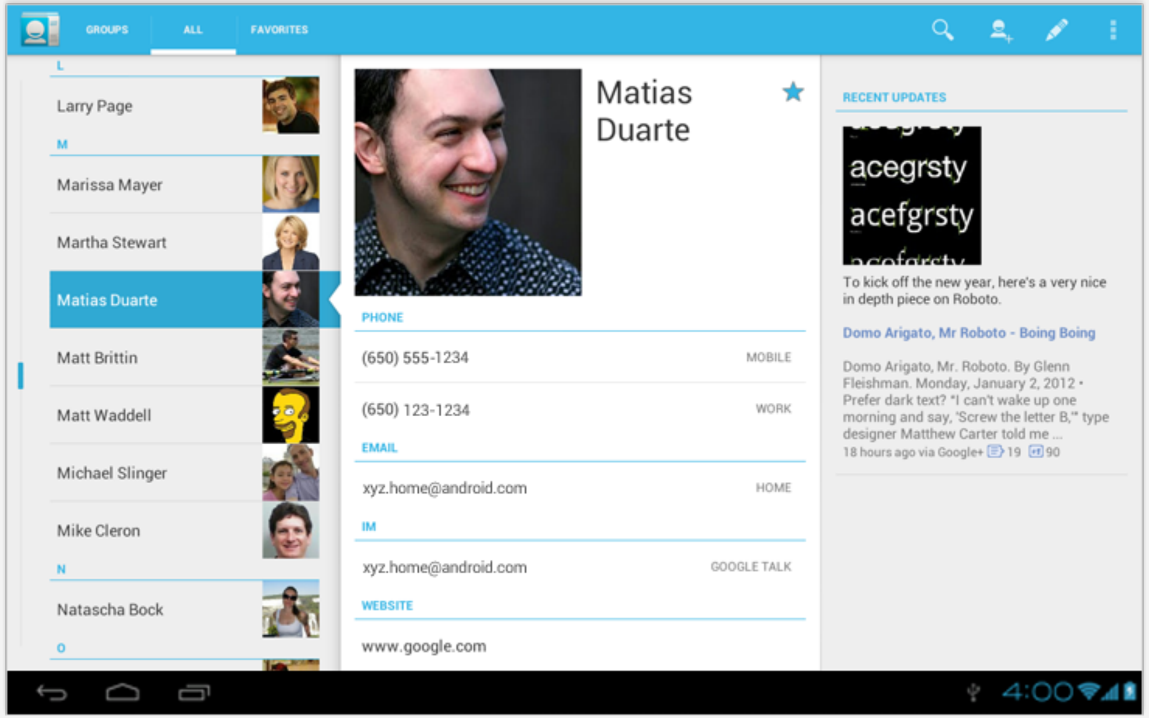
EMAIL

xyz.home@android.com
HOME

IM

xyz.home@android.com
GOOGLE TALK

Detail view



GROUPS ALL FAVORITES

L

Larry Page

M

Marissa Mayer

Martha Stewart

Matias Duarte

Matt Brittin

Matt Waddell

Michael Slinger

Mike Cleron

N

Natascha Bock

O

Matias Duarte

PHONE

(650) 555-1234	MOBILE
(650) 123-1234	WORK

EMAIL

xyz.home@android.com	HOME

IM

xyz.home@android.com	GOOGLE TALK

WEBSITE

www.google.com

RECENT UPDATES

To kick off the new year, here's a very nice in depth piece on Roboto.

Domo Arigato, Mr Roboto - Boing Boing

Domo Arigato, Mr. Roboto. By Glenn Fleishman. Monday, January 2, 2012 • Prefer dark text? "I can't wake up one morning and say, 'Screw the letter B,'" type designer Matthew Carter told me ...

18 hours ago via Google+ 19 90

4:00

Fragments Availability

CC	DO	EC	FY	GB	HC	ICS
					🟩	🟩

oh noes!

Fragments in the Support Library

1. add Support Library
2. import classes
3. receive happiness

```
import android.support.v4.app.Fragment;
import android.support.v4.app.FragmentManager;
```

Implementing the Fragment

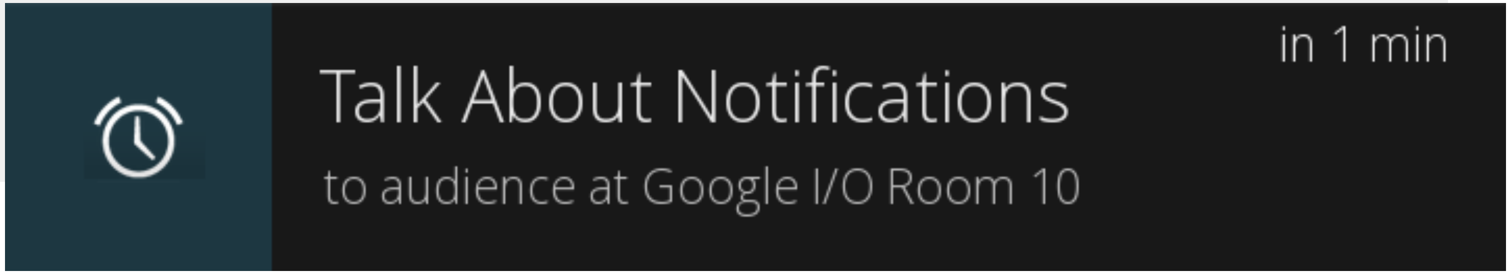
```
public class FooFragment extends Fragment {
    @Override
    public View onCreateView(LayoutInflater inflater,
                             ViewGroup container,
                             Bundle savedInstanceState) {
        // Inflate the layout for this fragment
        return inflater.inflate(
              R.layout.foo_view, container, false);
    }
}
```

Adding Fragments to the Layout

```
<LinearLayout ...>
    <fragment android:name="com.example.foo.FooFragment"
              android:id="@+id/headlines_fragment"
              android:layout_weight="1"
              android:layout_width="0dp"
              android:layout_height="match_parent" />

    <fragment android:name="com.example.foo.BarFragment"
              ... />
</LinearLayout>
```

Extend FragmentActivity, not Activity!

```
import android.support.v4.app.FragmentActivity;

public class MainActivity extends FragmentActivity {
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.news_articles);
    }
}
```



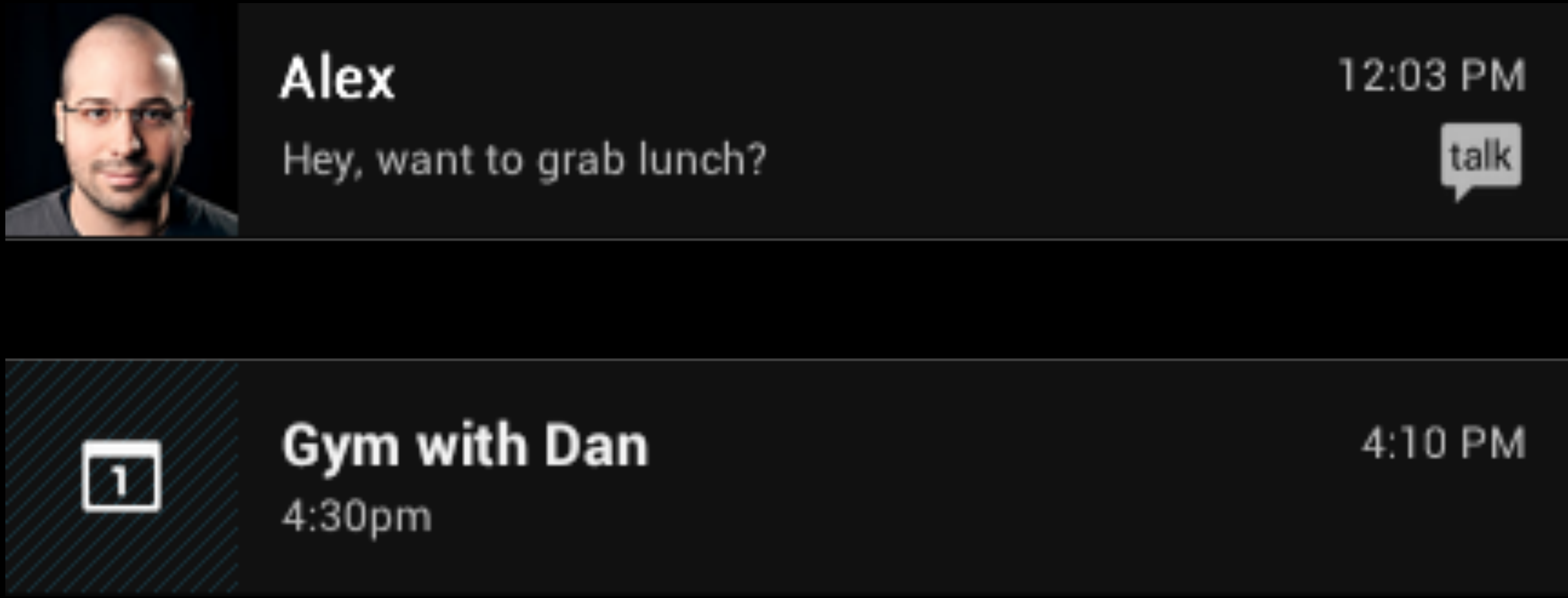
in 1 min

Talk About Notifications

to audience at Google I/O Room 10

Notifications

stuff that matters to the user



Alex 12:03 PM

Hey, want to grab lunch?

Gym with Dan 4:10 PM

4:30pm

Notifications: pre-HC

```
Notification notif =
     new Notification(icon, tickerText, when);

notif.setLatestEventInfo(
    context, contentTitle,
    contentText, contentIntent);

mNotificationManager.notify(
    MY_NOTIF_ID, notification);
```

Notifications: post-HC

```
Notification notif =  new Notification.Builder(this)
   .setSmallIcon(R.drawable.ic_stat_notify_example)
   .setAutoCancel(true)
   .setTicker(getString(R.string.notification_text))
   .setContentIntent(myContentIntent)
   .setNumber(7)
   .setContentTitle(getString(R.string.app_name))
   .setContentText(getString(R.string.notif_text))
   .getNotification();
```

Notification.Builder <3

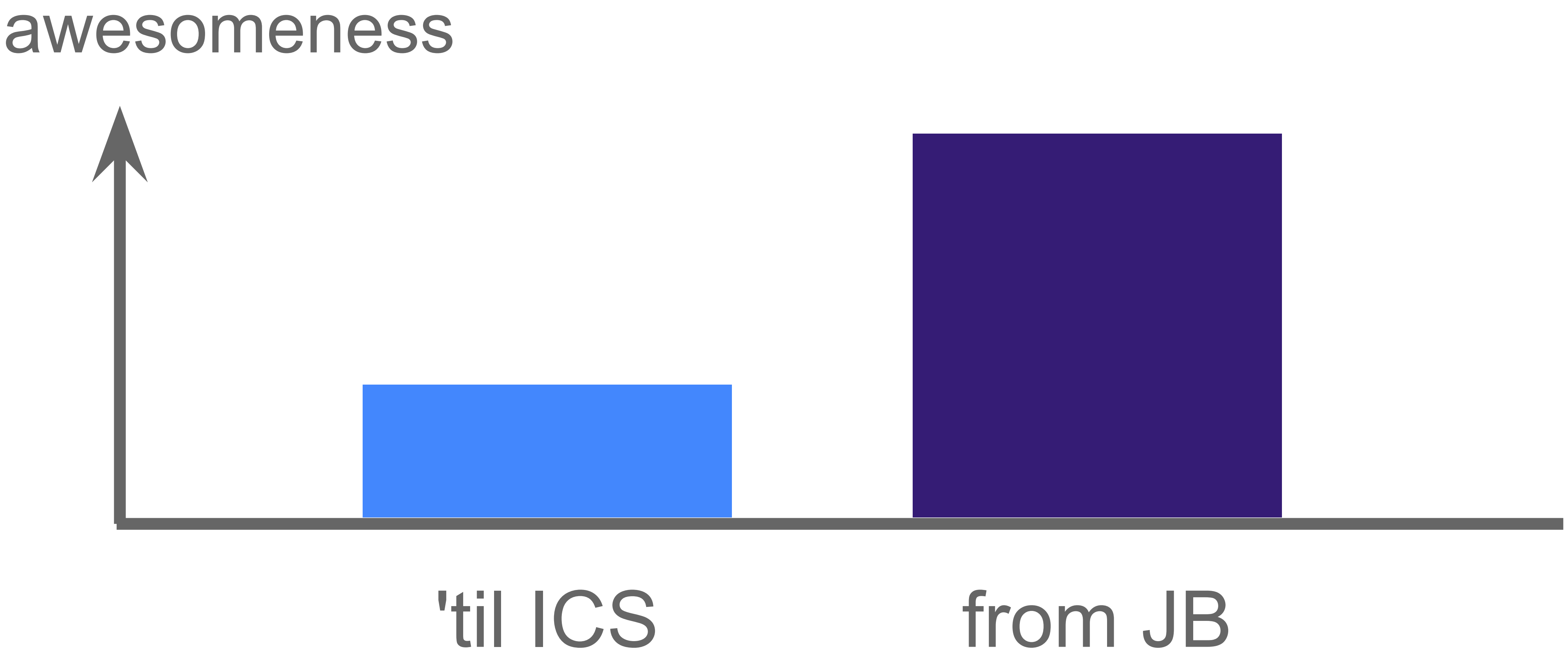
only on API 11+ :'(

Support Lib! :-D

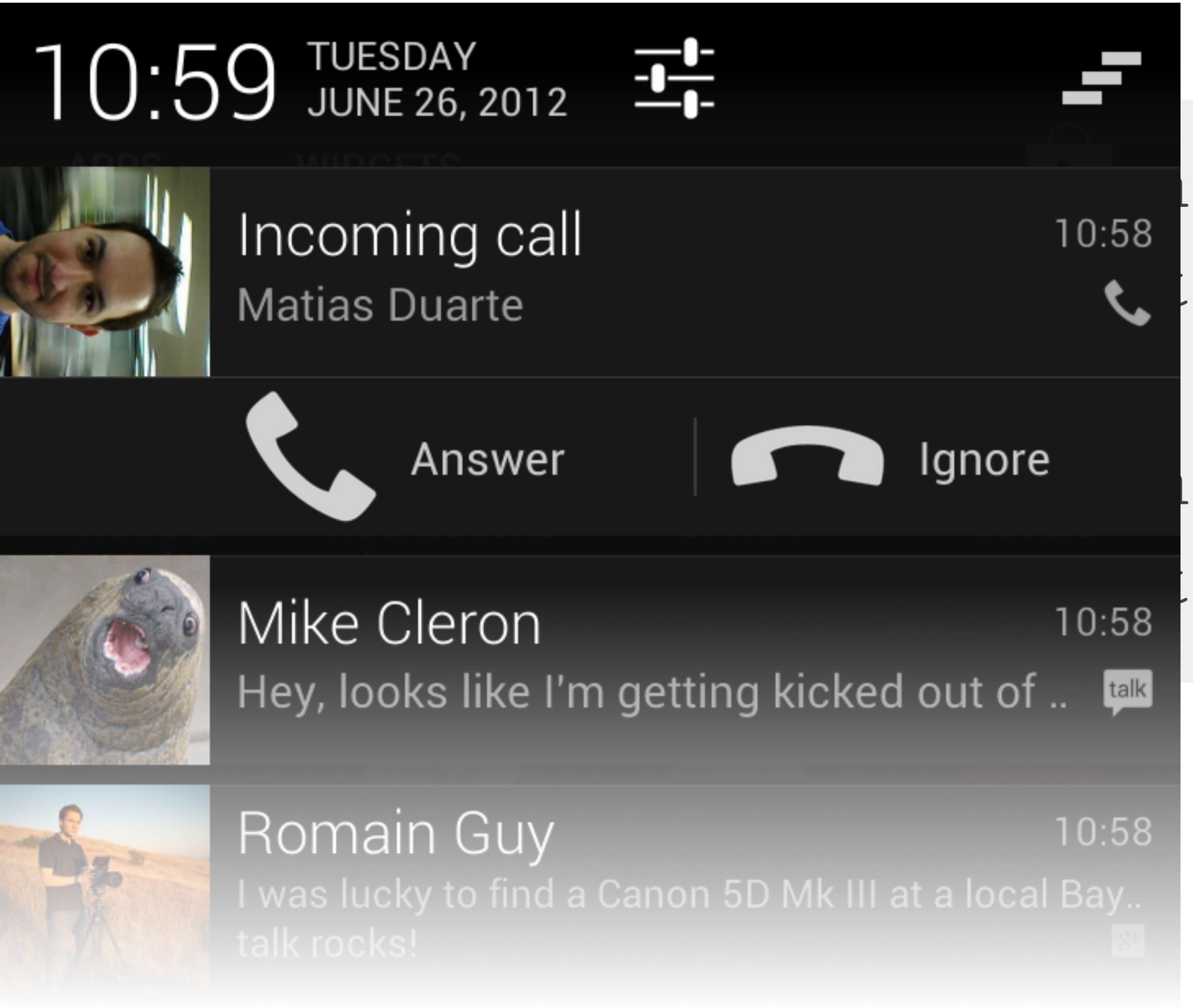
```
android.support.v4.app.NotificationCompat.Builder
```

But what about **JellyBean**?

Notification Builder in Jellybean



Notification.Builder in JellyBean



10:59 TUESDAY JUNE 26, 2012

Incoming call 10:58
Matias Duarte

Mike Cleron 10:58
Hey, looks like I'm getting kicked out of ..

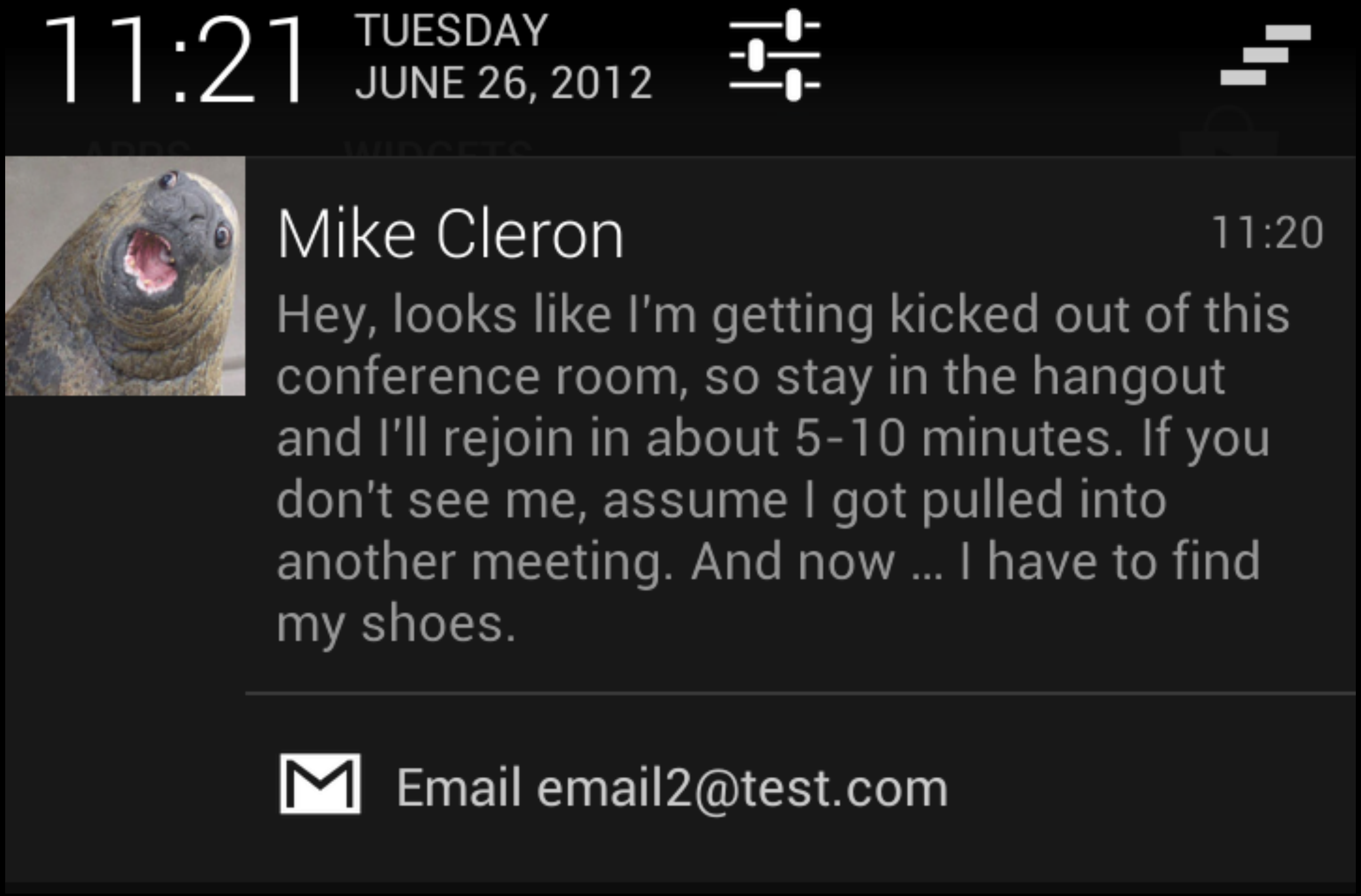
Romain Guy 10:58
I was lucky to find a Canon 5D Mk III at a local Bay..
talk rocks!

```
wable.ic_dial,
ent);

wable.ic_end_call,
ent);
```

Notification.Builder in JellyBean

```
builder.setStyle(style);
```

- Notification.BigTextStyle
- Notification.InboxStyle
- Notification.BigPictureStyle



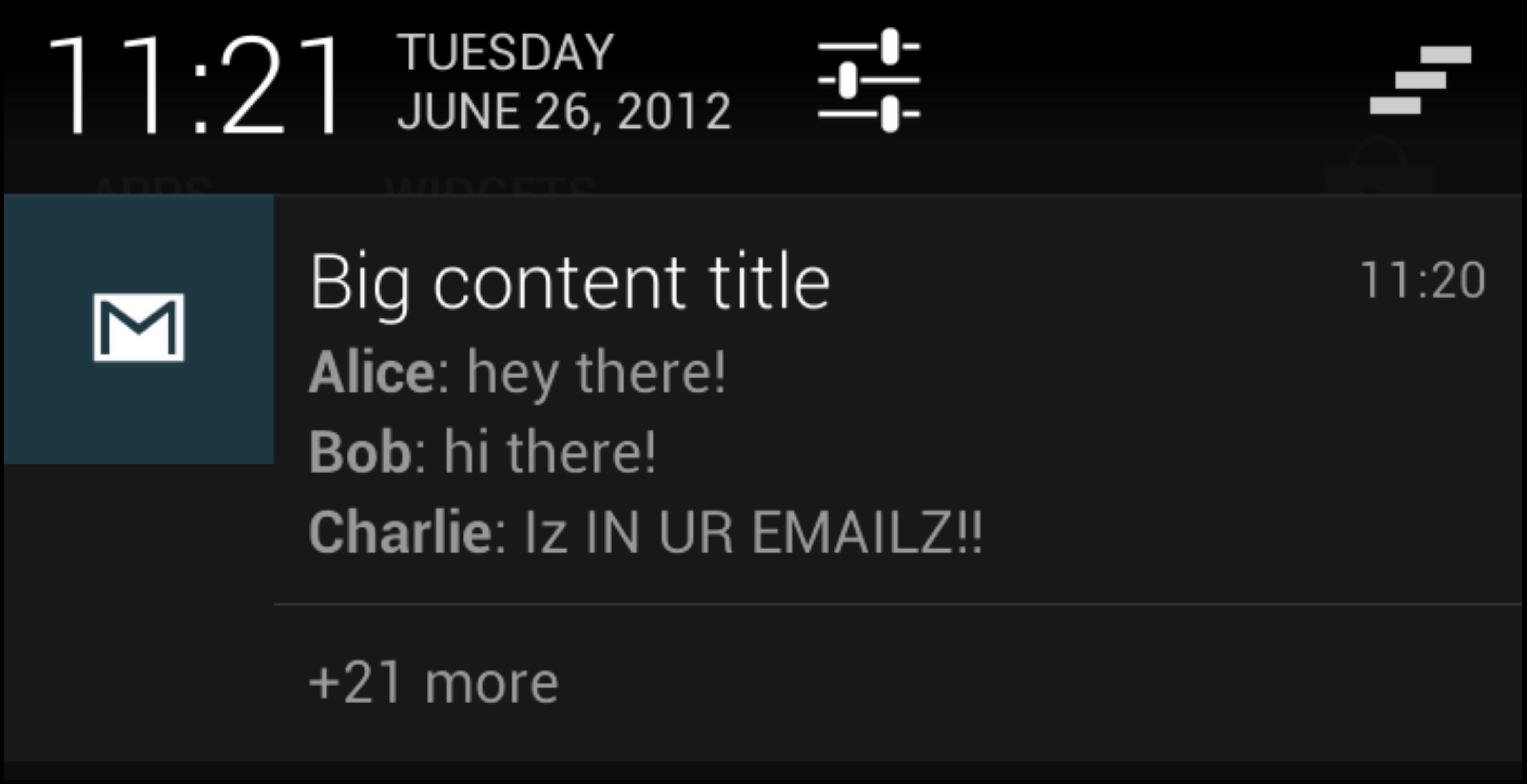
11:21 TUESDAY
JUNE 26, 2012

Mike Cleron 11:20

Hey, looks like I'm getting kicked out of this conference room, so stay in the hangout and I'll rejoin in about 5-10 minutes. If you don't see me, assume I got pulled into another meeting. And now ... I have to find my shoes.

Email email2@test.com

Notification.BigTextStyle



Big content title 11:20

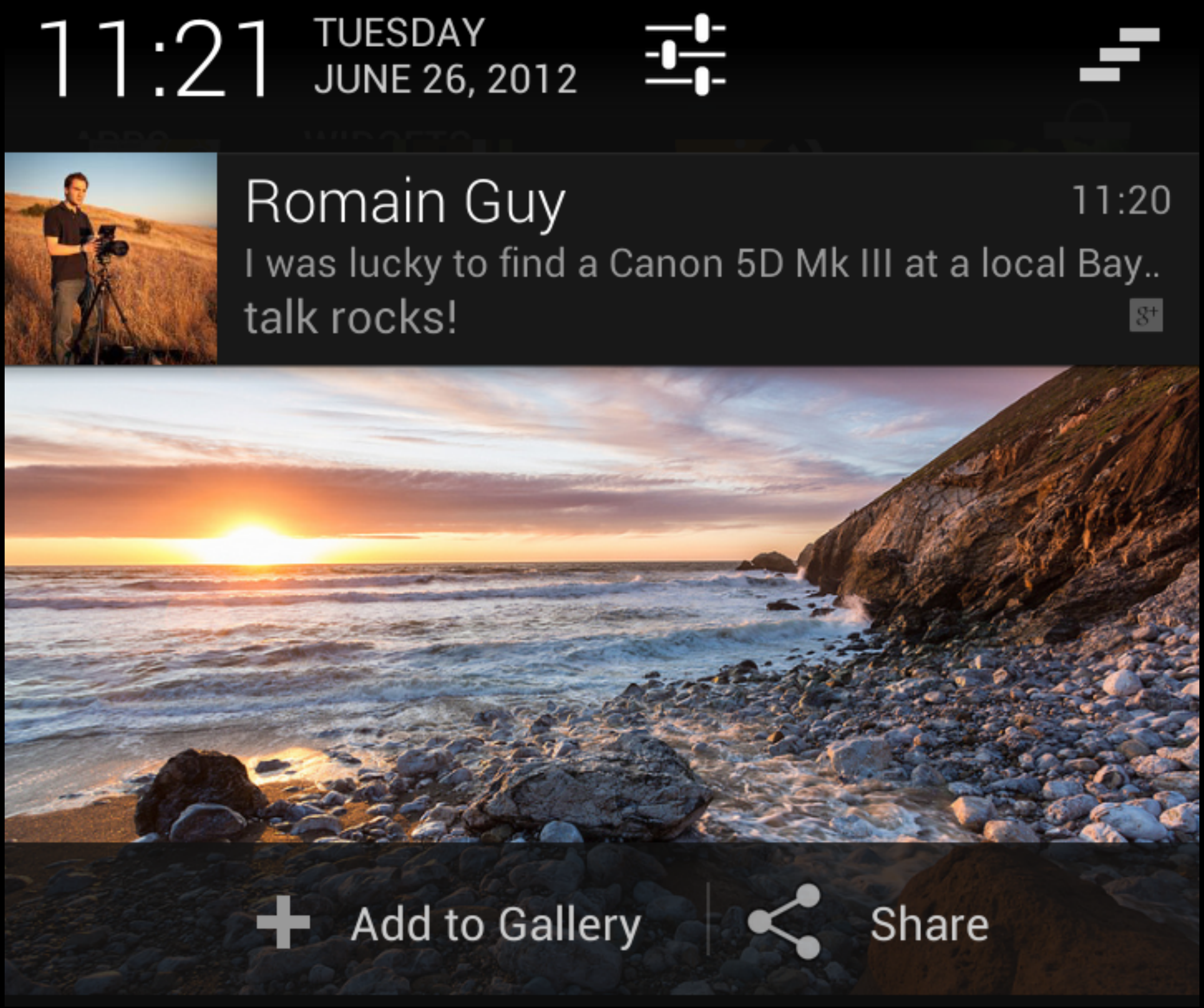
Alice: hey there!

Bob: hi there!

Charlie: Iz IN UR EMAILZ!!

+21 more

Notification.InboxStyle



11:21 TUESDAY
JUNE 26, 2012

Romain Guy 11:20

I was lucky to find a Canon 5D Mk III at a local Bay.. talk rocks!

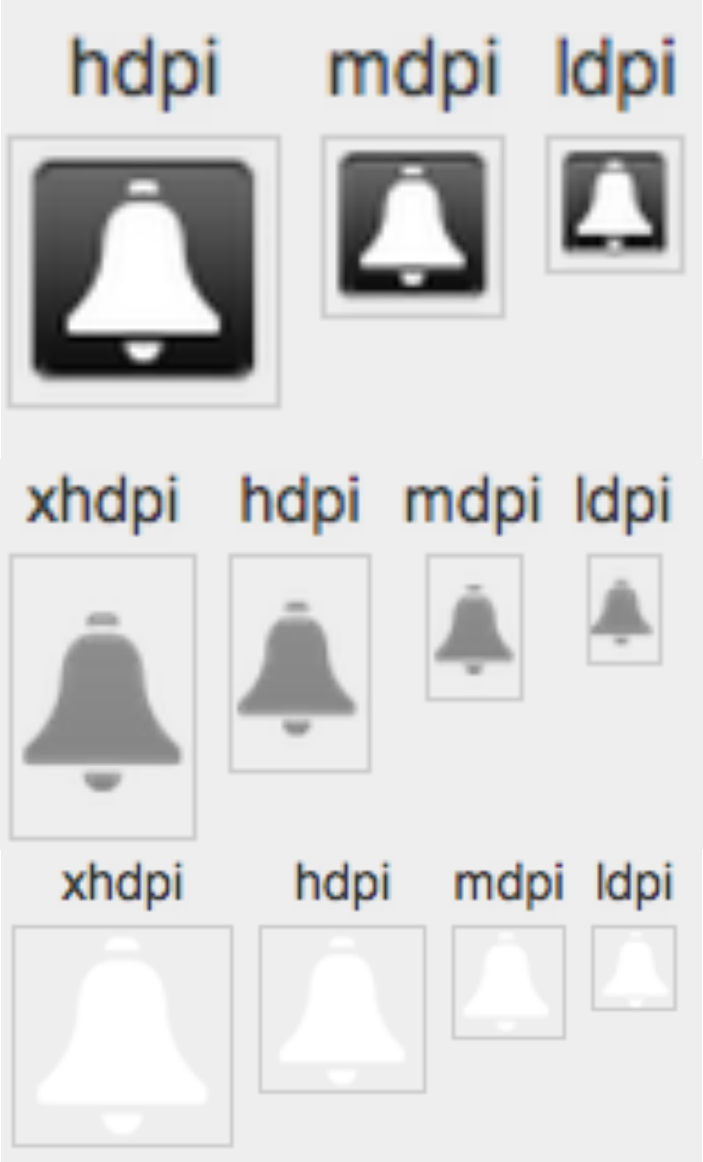
Notification.BigPictureStyle

Notification.Builder in JellyBean

- setPriority
- setUsesChronometer
- setSubText
- etc.

Multi-versioning Notification.Builder

- if version >= JellyBean
  - use Notification.Builder
- else
  - use NotificationCompat.Builder

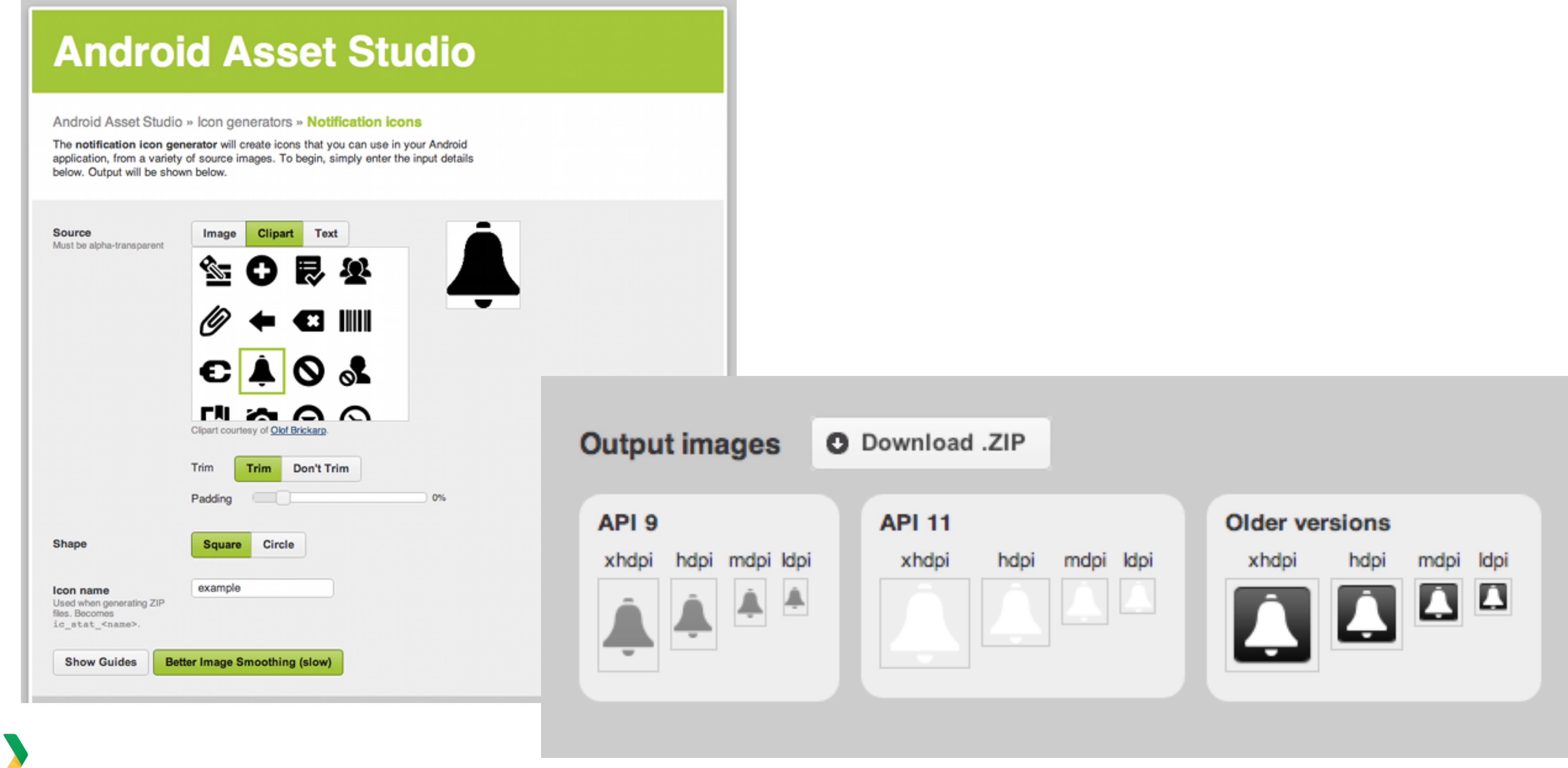


API 8 and older

API 9, 10

API 11+

Use Android Asset Studio j.mp/androidassetstudio



Android Asset Studio

Android Asset Studio » Icon generators » **Notification icons**

The **notification icon generator** will create icons that you can use in your Android application, from a variety of source images. To begin, simply enter the input details below. Output will be shown below.

Source
Must be alpha-transparent

Clipart courtesy of Olof Brickarp.

Shape

Icon name
Used when generating ZIP files. Becomes `ic_stat_<name>`.

example

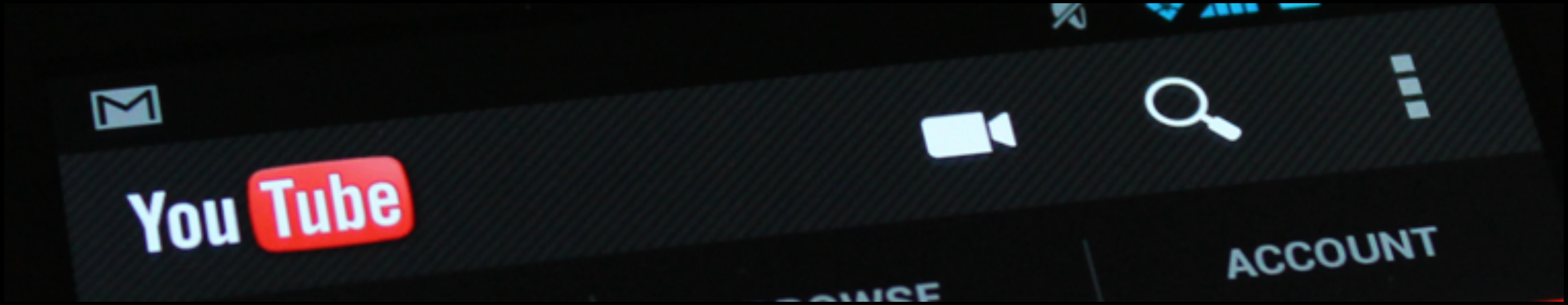
Output images

API 9

API 11

Older versions

Action Bar



- navigation
- actions
- **FIT** rule

Action Bar: Compatibility

- Native: **Honeycomb (3.0)+**
- Pre-HC:
  - ActionBarCompat sample
  - 3rd party libraries

Coming soon to AppCompat library

Action Bar through AppCompat Library

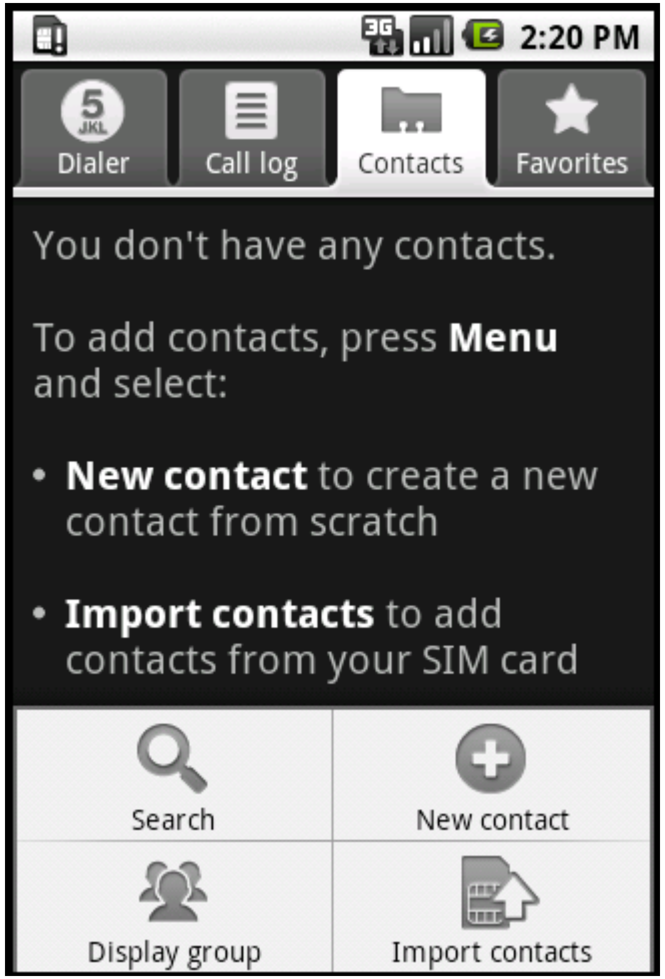
```
import android.support.appcompat.app.ActionBarActivity;
import android.support.appcompat.app.ActionBar;

public class MainActivity extends ActionBarActivity {
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.news_articles);
        ActionBar bar = getSupportActionBar();
        // ...
    }
}
```

But that's just the beginning

- Styles and themes
- Common layouts
- Extra theme attributes to query

Misc Tips

Don't style the options panel

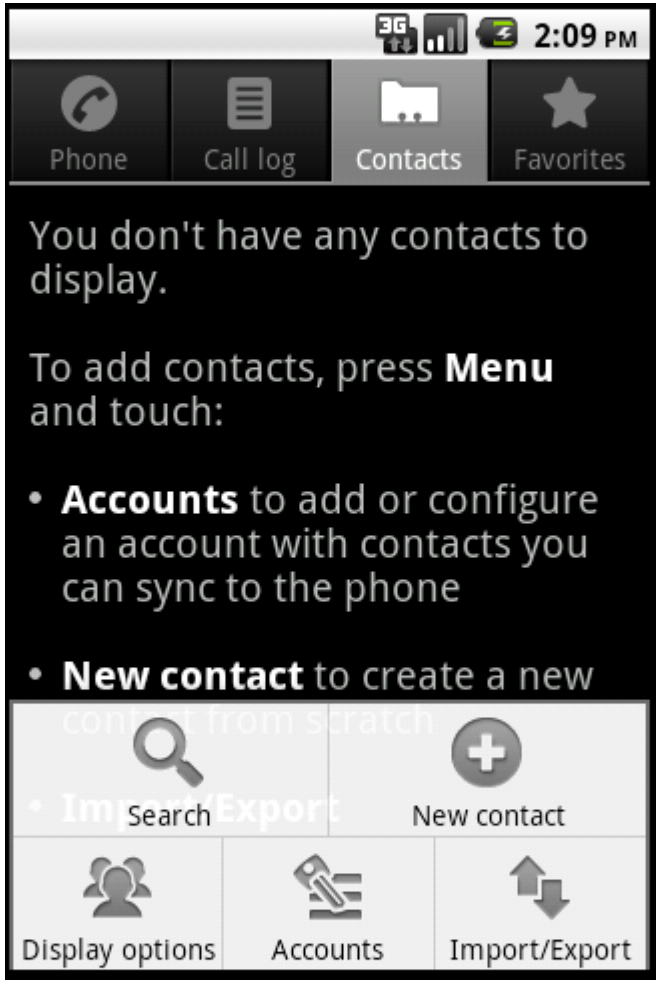


You don't have any contacts.

To add contacts, press **Menu** and select:

- **New contact** to create a new contact from scratch
- **Import contacts** to add contacts from your SIM card

Cupcake

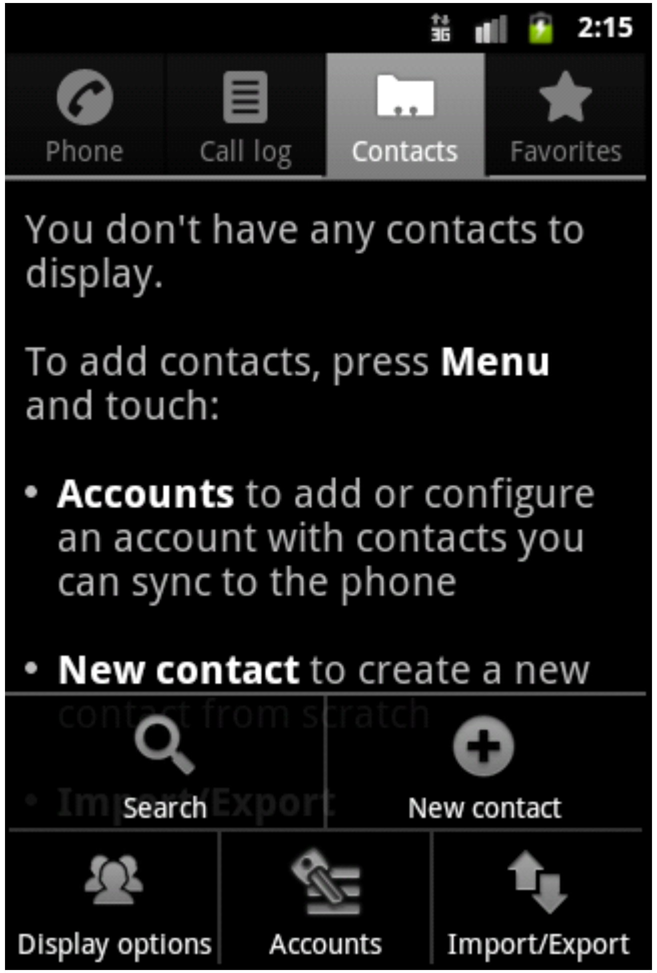


You don't have any contacts to display.

To add contacts, press **Menu** and touch:

- **Accounts** to add or configure an account with contacts you can sync to the phone
- **New contact** to create a new contact from scratch
- **Import/Export**

Froyo



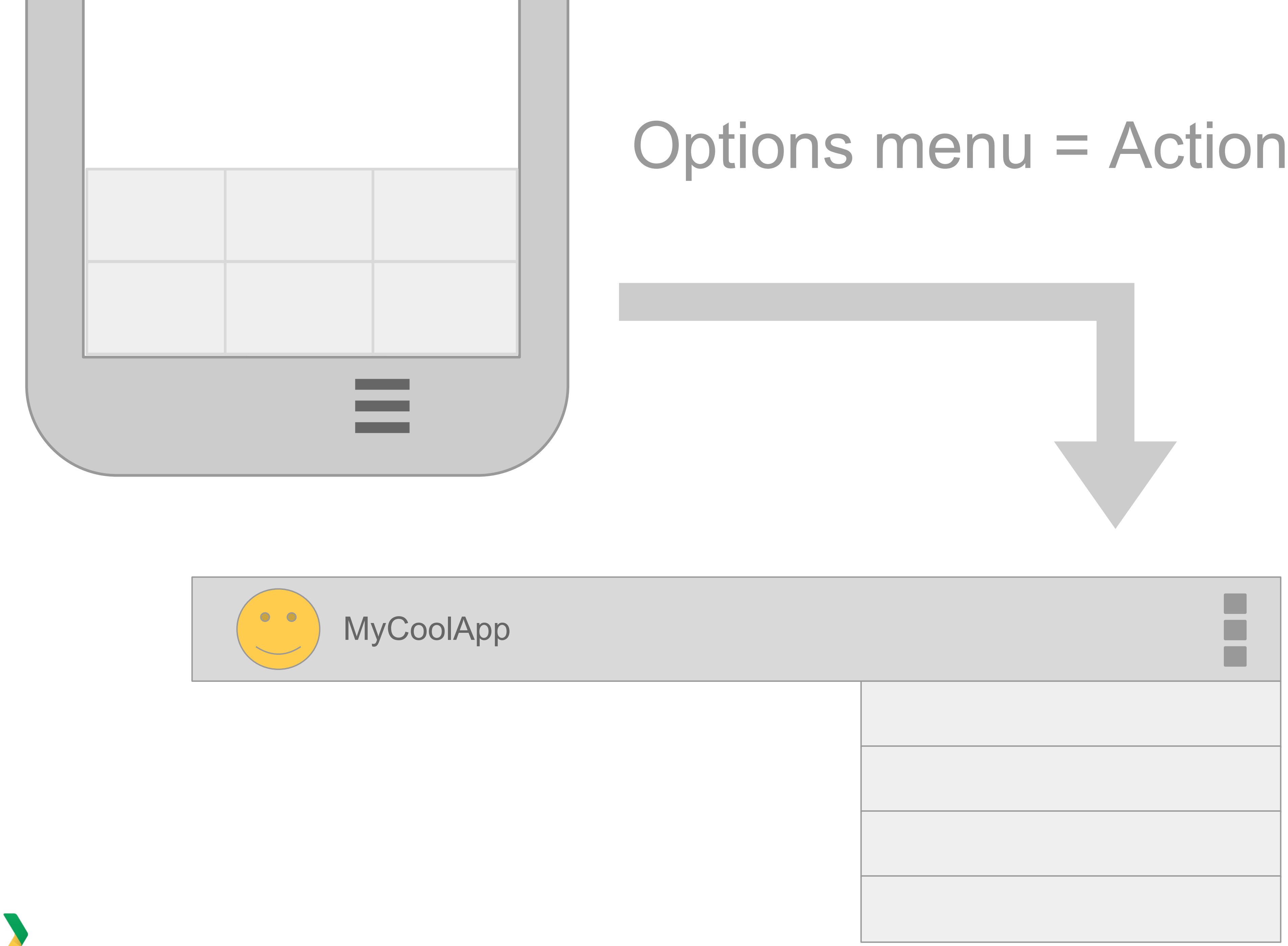
You don't have any contacts to display.

To add contacts, press **Menu** and touch:

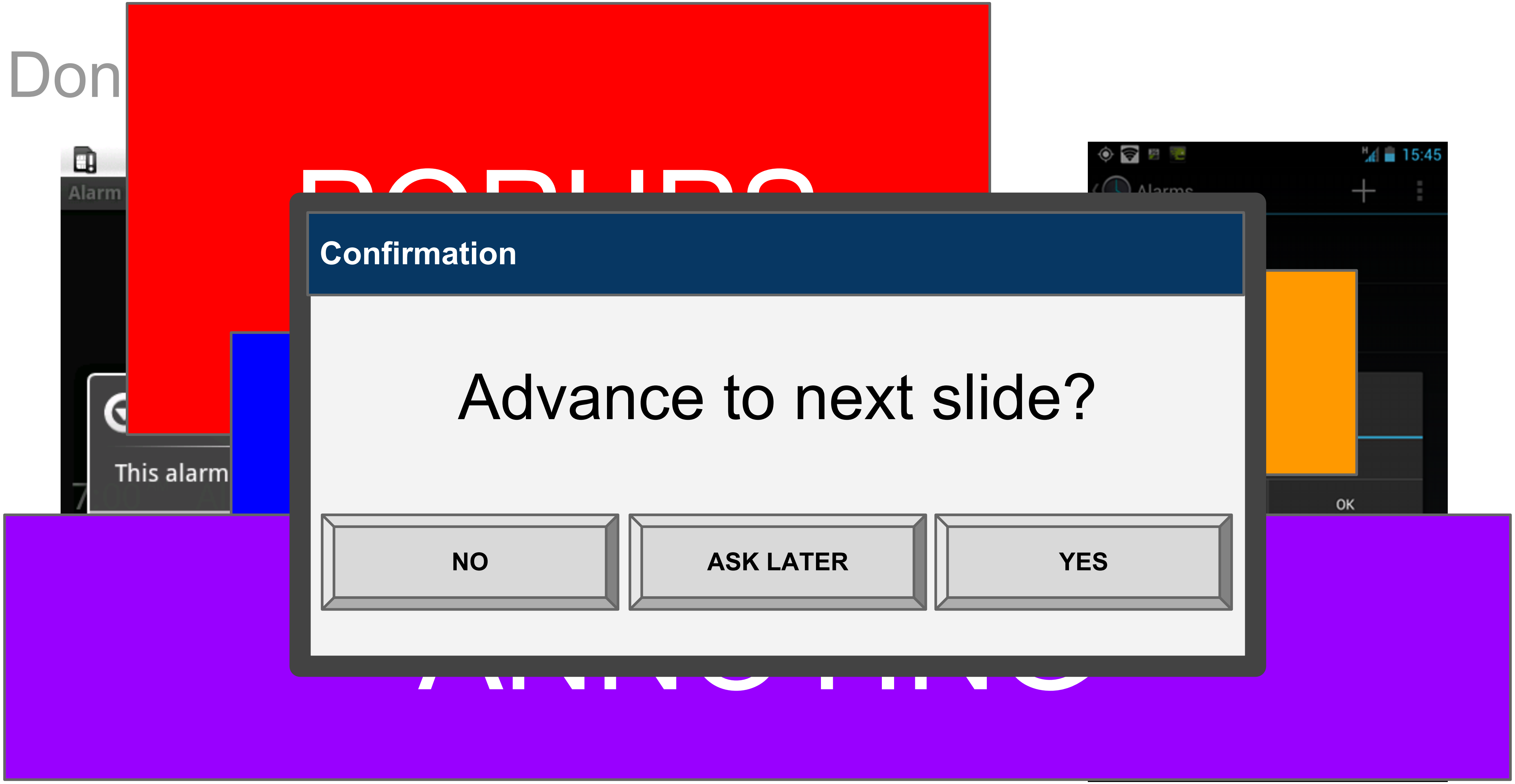
- **Accounts** to add or configure an account with contacts you can sync to the phone
- **New contact** to create a new contact from scratch
- **Import/Export**

Gingerbread

Options menu = Action Overflow



Don



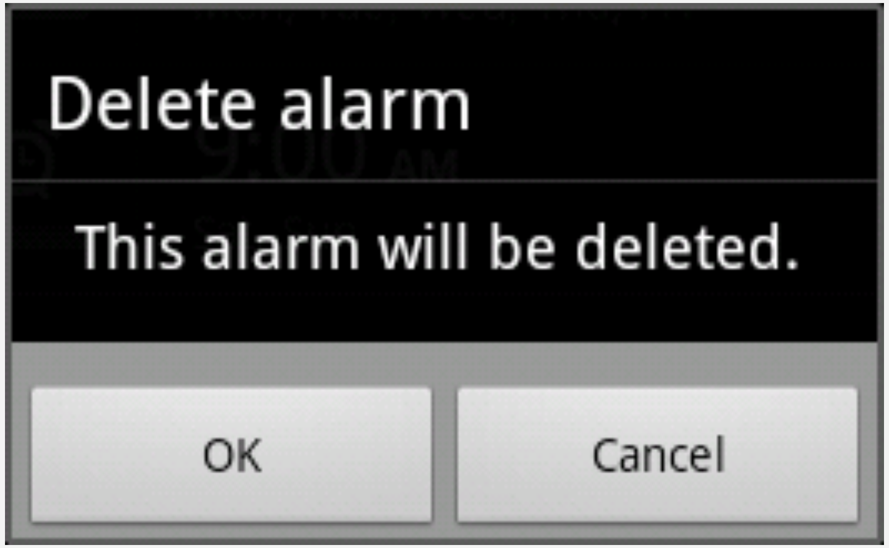
Confirmation

Advance to next slide?

NO | ASK LATER | YES

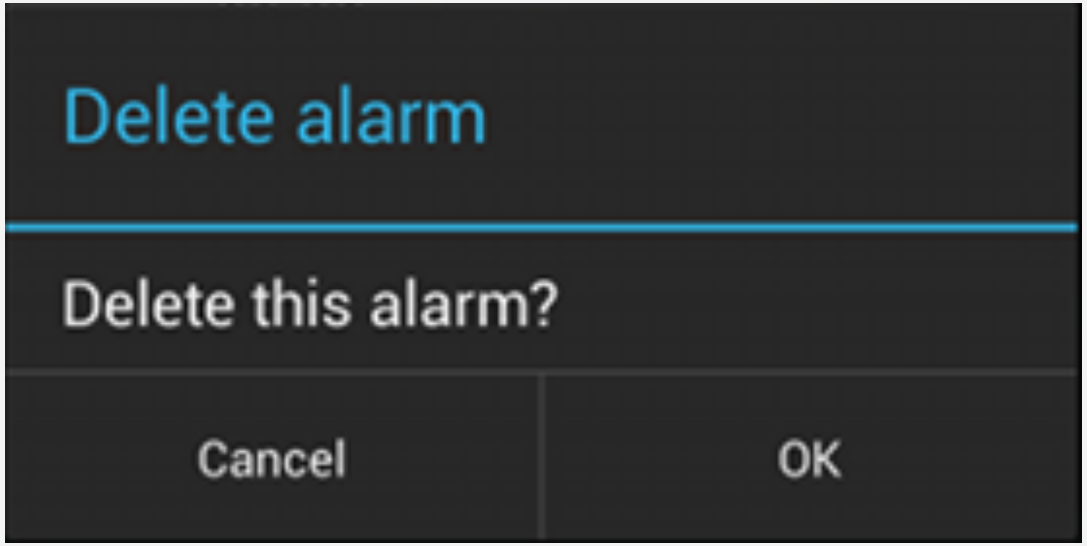
Cupcake Gingerbread ICS

Button order matters!



Delete alarm

This alarm will be deleted.



Delete alarm

Delete this alarm?

pre-ICS

+ 0 -

post-ICS

- 0 +

Set min and target SDK versions

- android:minSdkVersion
- android:targetSdkVersion

#io12 #AndroidMulti

Questions?

+Adam Powell

+Bruno Oliveira **bit.ly/brunooliveira** **@btco**

Don't forget to **+1 the session** (if you liked it, of course!)

#io12 #AndroidMulti

Thank You!

+Adam Powell

+Bruno Oliveira bit.ly/brunooliveira @btco

Don't forget to **+1 the session** (if you liked it, of course!)

Google
Developers