Ruboto - Ruby for Android

Today's Talk

Setup

Android project

Ruboto project

Android API

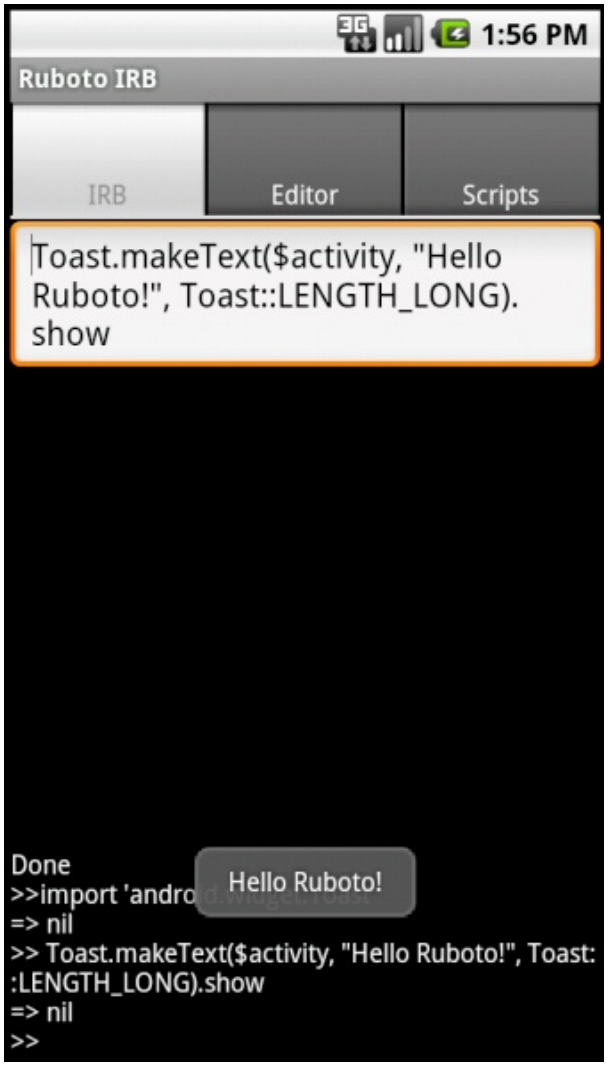
Resources

What is Ruboto?

Two forms

ruboto-irb

interactive environment on phone


1:56 PM
Ruboto IRB
IRB
Editor
Scripts
Toast.makeText($activity, "Hello Ruboto!", Toast::LENGTH_LONG).show
Done
>>import 'andro
Hello Ruboto!
=> nil
>> Toast.makeText($activity, "Hello Ruboto!", Toast::LENGTH_LONG).show
=> nil
>>

ruboto-core

Means of packaging Ruby scripts for Android as an .apk

```
$ ruboto gen app --package com.my.app --path myapp \
--name MyApp --target android-8 --activity MyActivity
```

```
$ find -type f myapp
myapp/AndroidManifest.xml
myapp/assets/scripts/my_activity.rb
myapp/assets/scripts/ruboto.rb
myapp/Rakefile
myapp/src/com/my/app/MyActivity.java
...
```

Uses JRuby

Caveat - slow startup

Binding Java classes is inefficient

~2s startup time "definitely achievable"

--@headius

Java -> Ruby Automapping

method definitions

```
public void onClick(View target)
```

method definitions

```
def on_click(target)
```

method calls

```
this.setContentView(view)
```

method calls

```
self.content_view = view
```

constants

```
LinearLayout.VERTICAL
```

constants

```
LinearLayout::VERTICAL
```

Java

```
import android.widget.Toast;
Toast toast = Toast.makeText(
     getApplicationContext(),
     "Thank you very much!",
     Toast.LENGTH_SHORT
);
toast.show();
```

Ruby

```
java_import 'android.widget.Toast'
toast = Toast.make_text(
    $activity,
    "Domo arigato!",
    Toast::LENGTH_SHORT
)
toast.show
```

Setup

ruboto-irb

Search "ruboto" on the Android Market.

ruboto-core

install jruby

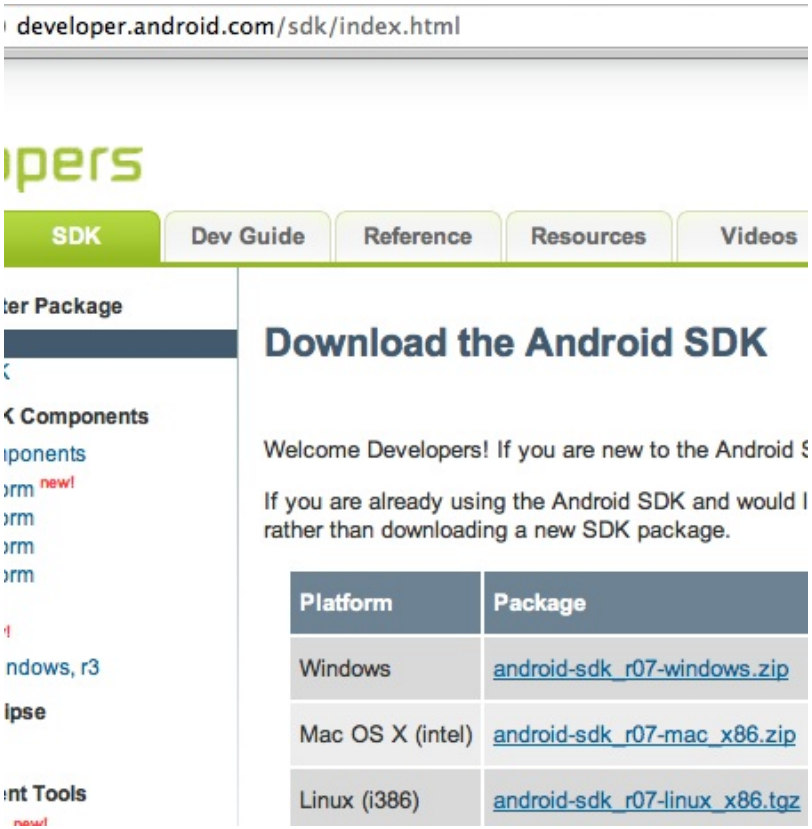
install gem

install android SDK

```
$ sudo gem install rvm
$ rvm-install
$ exit
```

```
$ rvm install jruby
$ rvm use jruby
$ gem install ruboto-core #no sudo!
```

http://developer.android.com/


developer.android.com/sdk/index.html
SDK
Dev Guide
Reference
Resources
Videos
Download the Android SDK
Welcome Developers! If you are new to the Android
If you are already using the Android SDK and would
rather than downloading a new SDK package.
Platform
Package
Windows
android-sdk_r07-windows.zip
Mac OS X (intel)
android-sdk_r07-mac_x86.zip
Linux (i386)
android-sdk_r07-linux_x86.tgz

```
$ unzip ~/Downloads/android-sdk_*.zip -d ~/Applications
 creating: /Users/jay/Applications/android-sdk-mac_86/
 creating: /Users/jay/Applications/android-sdk-mac_86/platform
inflating: /Users/jay/Applications/android-sdk-mac_86/SDK Read
...

$ export PATH=$PATH:${HOME}/Applications/android-sdk/tools/
```

Create a new AVD

```
$ android -s create avd -f -n MyApp -t android-8
Android 2.2 is a basic Android platform.
Do you wish to create a custom hardware profile [no]
Created AVD 'MyApp' based on Android 2.2,
with the following hardware config:
hw.lcd.density=160
```

Launch the emulator

```
$ emulator -avd MyApp
```


10:44 PM
Google
See all your apps.
Touch the Launcher icon.
1 of 6
MENU
ALT
SYM
ALT

Create app

```
$ ruboto gen app --package com.my.app --path myapp \
--name MyApp --target android-8 --activity MyActivity

$ cd myapp

$ mate .
```

Using Rake

```
$ rake -T
rake clean                  # Remove any temporary products.
rake clobber                # Remove any generated file.
rake compile_stdlib         # precompile ruby stdlib
rake install:restart        # Build, install, and restart the
...
```

Build/install/run app

```
$ rake

$ rake install:restart
```


7:53 PM
Alarm Clock
API Demos
Browser
Calculator
Camera
Car Home
Contacts
Custom Locale
Dev Tools
Email
Gallery
Gestures Builder
Messaging
Music
MyActivity
Phone
Settings
Spare Parts
Speech Recorder

Update as needed

```
$ rake update_scripts:restart

$ adb push load_me.mp3 /sdcard
```

Anatomy of an Android app

Activity

Usually one per screen

Has child Views

Responsible for setup, teardown, persistence

View

A UI component

CheckBox, Button, TextView...

Resources: Drawables

Bitmap

PathShape

etc.

Resources: Layouts

Portrait

Landscape

etc.

Resources: Strings

```
<string name="app_name">MyApp</string>
```

Service

A background process - Music player, etc.

Bind to it, call methods (ex: play(), pause(), etc.)

Spawn a new thread for lengthy operations.

BroadcastReceiver

Responds to system messages

(Timezone changed, low battery, picture taken...)

Can launch Activity, display alert, etc.

No UI

Intent

Launch or update an Activity or Service

Send Broadcasts

Anatomy of a Ruboto project

src/org/ruboto/

RubotoActivity.java

RubotoBroadcastReceiver.java

RubotoService.java

src/org/ruboto/

Look, don't touch

Make subclasses in com.yourapp

src/com/yourapp/YourActivity.java

```
onCreate(Bundle priorState)
onRestart()
onStart()
onResume()
onPause()
onStop()
onDestroy()
```

```
package com.myapp;
import android.os.Bundle;

public class MyActivity extends org.ruboto.Ru
  public void onCreate(android.os.Bundle arg0
    try {
      setSplash(
        Class.forName("com.my.ruboto.R$layout
          .getField("splash")
          .getInt(null)
      );
    } catch (Exception e) {}
    setScriptName("my_activity.rb");
    super.onCreate(arg0);
  }
}
```

Can keep generated onCreate()

Can inherit most other methods

Can redefine if you wish

Can use Ruby callbacks if you wish

assets/scripts/my_activity.rb

```
def on_create

activity.content_view = some_widget

def on_pause
```

def on*save*instance_state(bundle)

def on*restore*instance_state(bundle)

assets/scripts/ruboto.rb

Require from your script

Witchcraft!

<Soapbox>

Witchcraft! (using ruboto.rb)

```
ruboto_import_widgets
    :LinearLayout, :TextView
linear_layout(:orientation => VERTICAL) do
    text_view(
      :text => 'foo',
      :text_size => 14
    )
end
```

```
def ruboto_import_widget
  view_class = java_import "android.widget.#{
  RubotoActivity.class_eval "
  def #{(class_name.to_s.gsub(/([A-Z])/) {'_'
    rv = #{class_name}.new self
    @view_parent.addView(rv) if @view_parent
    rv.configure self, params
    if block_given?
      old_view_parent, @view_parent = @view_p
      yield
      @view_parent = old_view_parent
    end
    rv
  end
  "
end
```

Church-sanctioned code (without ruboto.rb)

```
java_import "android.widget.LinearLayout"
java_import "android.widget.EditText"
layout = LinearLayout.new($activity)
layout.orientation = LinearLayout::VERTICAL
edit = EditText.new($activity)
layout.add_view(edit)
edit.text = 'foo'
edit.text_size = 14
self.content_view = layout
```

</Soapbox>

AndroidManifest.xml

```
<application>
    @name, @icon, @label
<activity>
    <intent-filter>
        <action>
        <category>
<service>
<receiver>
```

```
<uses-permission>
    CALL_PHONE
    SEND_SMS
    RECORD_AUDIO
    WRITE_EXTERNAL_STORAGE
    INSTALL_SHORTCUT
    INTERNET
    ACCESS_COARSE_LOCATION
    ACCESS_FINE_LOCATION
    ...
```

Rakefile

Builds apk, etc.

libs/

```
jruby-core.jar
jruby-stdlib.jar
```

res/

res/drawable/myimage.png

Reference with:

```
java_import "com.my.ruboto.R"

R::drawable::myimage
```

res/layout/layoutname.xml

```
<LinearLayout
    id="@+id/myUniqueLayoutName"
    orientation="vertical"
>
    <EditText .../>
    <ScrollView .../>
    <view class="com.example.MyCustomView"/>
</LinearLayout>
```

Reference with:

```
java_import "com.my.ruboto.R"

find_view_by_id(R::id::myUniqueLayoutName)
```

res/values/strings.xml

```
<string name="my_string_name">
  Any Value
</string>
```

Reference with:

```
java_import "com.my.ruboto.R"

get_string(R::string::my_string_name)
```

Android API

Log

GUI

Hardware

Canvas

WebView

Multimedia

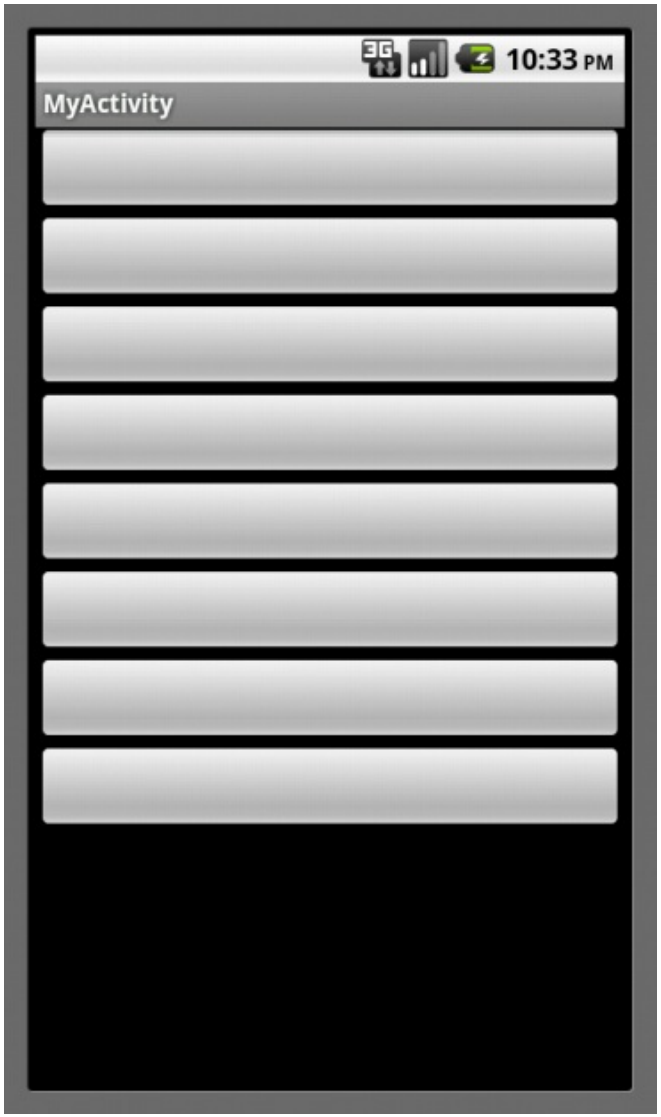
Log

```
Log.d("My Activity", "here's what's up...")
```

```
$ adb logcat
D/dalvikvm(  119): GC_EXPLICIT freed 1050 objects / 61056 byte
I/dalvikvm(  253): Shrank stack (to 0x41869300, curFrame is 0x
D/My Activity(  253): here's what's up...
```

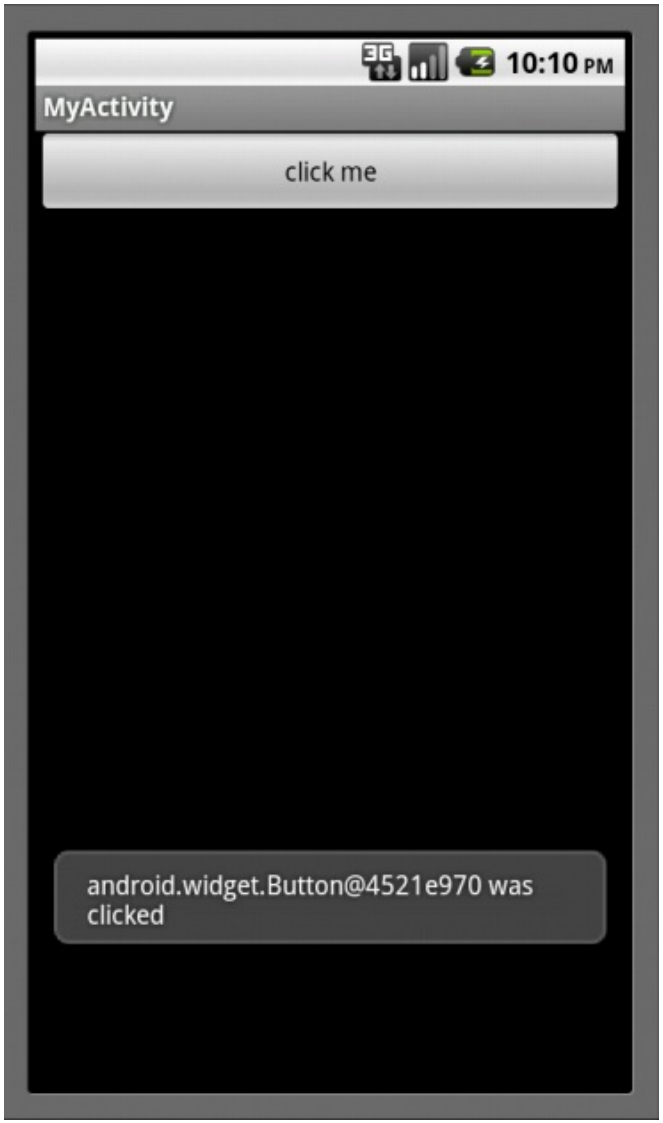
GUI: Layouts

```
layout = LinearLayout.new(self)
layout.orientation = LinearLayout::VERTICAL
8.times {layout.add_view(Button.new(self))}
self.content_view = layout
```


10:33 PM
MyActivity

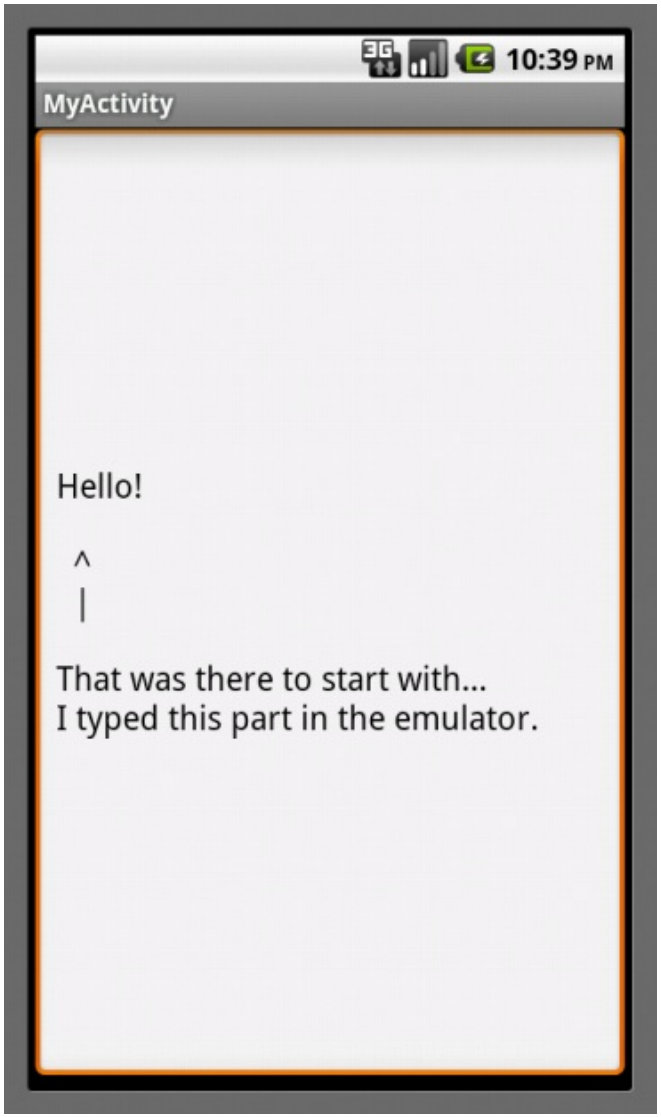
GUI: Buttons

```
def on_create(bundle)
  layout = LinearLayout.new(self)
  button = Button.new(self)
  button.text = "click me"
  layout.add_view(button)
  self.content_view = layout
  button.set_on_click_listener do |view|
    Toast.make_text(
      self, "#{view} was clicked", 5000
    ).show
  end
end
```


10:10 PM
MyActivity
click me
android.widget.Button@4521e970 was clicked

GUI: Text Fields

```
edit = EditText.new(self)
edit.text = "Hello!"
self.content_view = edit
```


10:39 PM
MyActivity
Hello!
^
|
That was there to start with...
I typed this part in the emulator.

GUI: AnalogClock

```
self.content_view = AnalogClock.new(self)
```


10:41 PM
MyActivity

Hardware: TouchEvent

Set up to receive events

```
class MyView
  def initialize(parent)
    super
    request_callback CB_TOUCH_EVENT
  end
end
```

Hardware: TouchEvent

Handler method

```
def on_touch_event(event)
  0.upto 10 do |id|
    index = event.find_pointer_index(id)
    break if index == -1
    x = event.getX(index)
    y = event.getY(index)
    Log.d(
      "ONTOUCH",
      "Pointer #{id}: #{x}, #{y}"
    )
  end
  true
end
```

Hardware: Sensors

```
Sensor::TYPE_ACCELEROMETER
Sensor::TYPE_MAGNETIC_FIELD
Sensor::TYPE_ORIENTATION
#etc...
```

```
$ ruboto gen interface android.hardware.SensorEventListener \
  --name MySensorEventListener
```

```
import android.hardware.SensorEventListener;

public class MySensorEventListener
   implements SensorEventListener
{
   public void onSensorChanged(
      SensorEvent event
   ) {
      if (callbackMethods[CB_SENSOR_CHANGED]) {
         //JRuby calls to invoke
         //on_sensor_changed()...
      }
   }
}
```

```
class MySensorEventListener
  def on_sensor_changed(event)
    values = event.values
    Log.d "", "x: #{values[0]}, " +
      "y: #{values[1]}, " +
      "z: #{values[2]}"
  end
end
```

```
def on_create(bundle)
  @sensor_manager = get_system_service(
    Context::SENSOR_SERVICE
  )
  @sensor =
    @sensor_manager.get_default_sensor(
      Sensor::TYPE_ACCELEROMETER
    )
  @listener = MySensorEventListener.new
end
```

```
def on_resume
  @sensor_manager.register_listener(
    @listener, @sensor,
    SensorManager::SENSOR_DELAY_UI
  )
end
def on_pause
  @sensor_manager.unregister_listener(
    @listener, @sensor
  )
end
```

```
$ adb logcat
D/         (23667): x: 1.1570, y: 1.2356, z: 9.5712
D/         (23667): x: 0.9906, y: 1.2356, z: 9.6399
D/         (23667): x: 0.8234, y: 1.2846, z: 9.6399
```

Hardware: Vibrator

```
get_system_service(VIBRATOR_SERVICE)
vibrate(duration1, duration2, -1)
```

Canvas

```
class CanvasView

  def initialize(parent)
    super
    request_callback CB_DRAW
    invalidate
  end
```

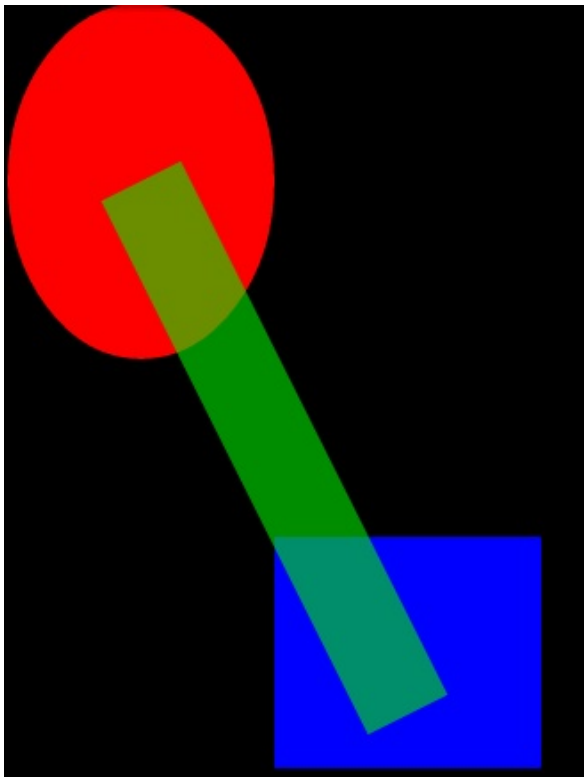
```
def on_draw(canvas)
  red_oval(canvas)
  blue_box(canvas)
  fat_green_semitransparent_line(canvas)
end
```

```
def red_oval(canvas)
  paint = Paint.new
  paint.color = Color.argb(255, 255, 0, 0)
  in_box = RectF.new(0, 0, 150, 200)
  canvas.draw_oval(in_box, paint)
end
```

```
def blue_box(canvas)
  paint = Paint.new
  paint.color = Color.argb(255, 0, 0, 255)
  in_box = RectF.new(150, 300, 300, 500)
  canvas.draw_rect(in_box, paint)
end
```

```
  def fat_green_semitransparent_line(canvas)
    paint = Paint.new
    paint.color = Color.argb(150, 0, 255, 0)
    paint.stroke_width = 50
    canvas.draw_line(
      75, 100,
      225, 400,
      paint
    )
  end

end
```



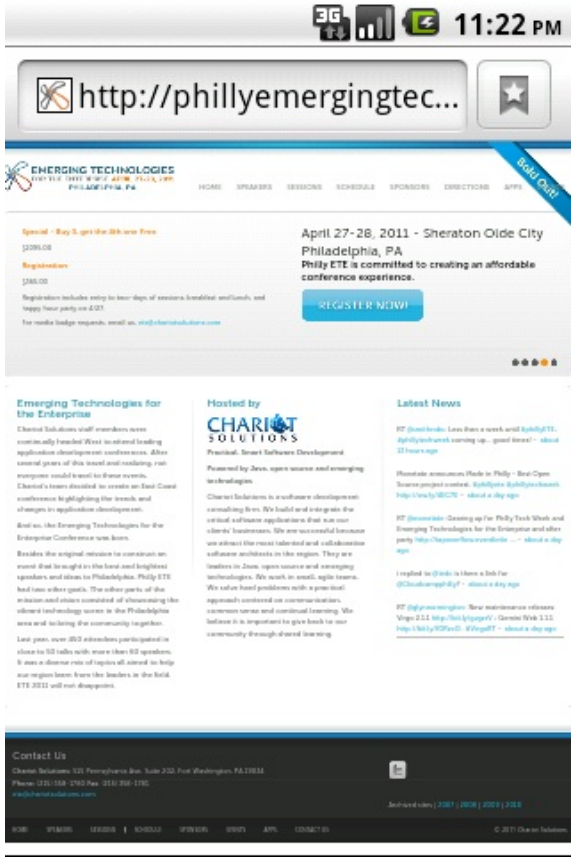
WebView

```
web = WebView.new(self)
web.load_url 'http://phillyemergingtech.com'
self.content_view = web
```

Don't forget!

in AndroidManifest.xml:

```
<uses-permission
  android:name="android.permission.INTERNET"
/>
```


11:22 PM
http://phillyemergingtec...
EMERGING TECHNOLOGIES
HOME SPEAKERS SESSIONS SCHEDULE SPONSORS DIRECTIONS APPS
Sold Out!
April 27-28, 2011 - Sheraton Olde City
Philadelphia, PA
Philly ETE is committed to creating an affordable conference experience.
REGISTER NOW!
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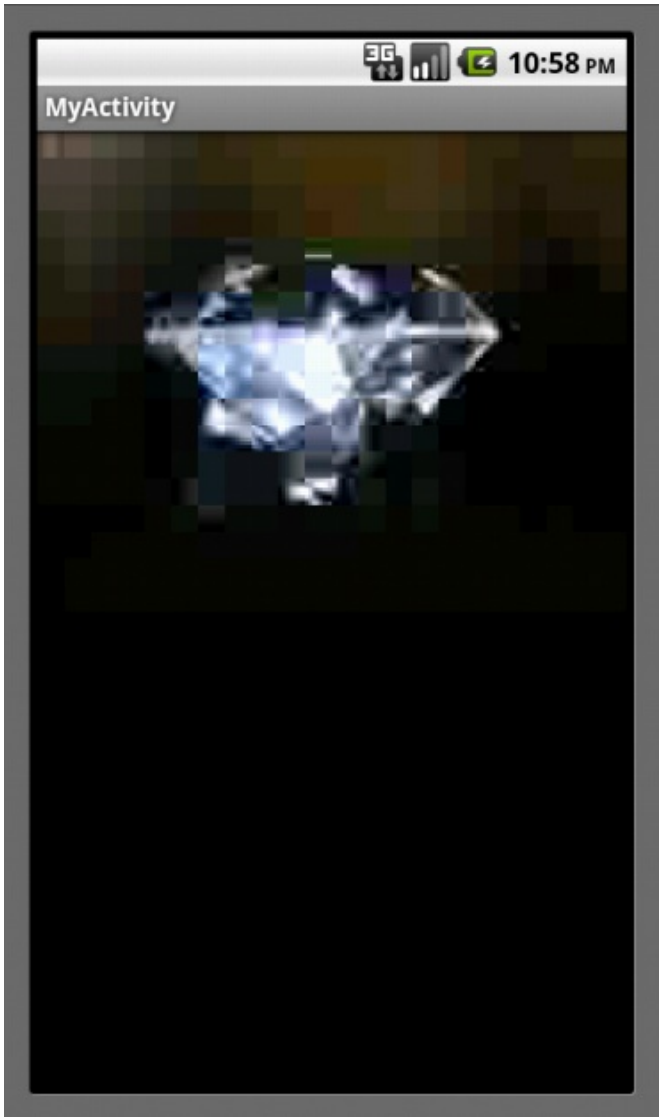
Multimedia: Audio

```
def on_create(bundle)
  request_callback CB_PAUSE
  file = File.new("sdcard/test.mp3")
  uri = Uri.from_file(file)
  player = MediaPlayer.create(self, uri)
  player.start
end
def on_pause
  player.stop
end
```

Multimedia: Video

```
view = VideoView.new(self)
view.video_path = "sdcard/test.mp4"
self.content_view = view
view.start
```


10:58 PM
MyActivity

References

http://ruboto.org

http://developer.android.com

Find source for this presentation at:
http://jay.mcgavren.com/presentations

Steal These Slides!

Questions?

@jaymcgavren