Kivy

Multitouch for desktop and mobile with Python

TL;DR

- What is Kivy?
- Kivy application showcase
- Installation / Virtual Machine
- Make a desktop Kivy application
- Turn it into an Android app

Time Permitting Extras:

- Edit Kivy app on Android
- More awesome Kivy tools
- Why Python on Android and for Android?

Who am I?

By day I am the reclusive entirety of the IT department for Van Dam Iron Works.

By night I stalk the mean streets of Grand Rapids, Michigan as a serial user group organizer.

I am Ben Rousch!

Who are you?

Develop on? Deploy to?

- Windows?
- OSX?
- Linux?
- Android?
- iOS?

What is Kivy (Officially)?

- Open source
- Python library
- that uses OpenGL
- for rapid development of applications
- that make use of innovative user interfaces
- such as multi-touch apps

What is Kivy (To Me)?

- Python
- GUI and application framework
- that works on all of my favorite platforms
- (also some other platforms),
- which can make Android apps
- runnable on the desktop w/o the emulator,
- can be modified right on the device,
- and it's run by a mature and stable team.

Cross-Platform

Kivy runs on:

- Windows: XP, 7, 8?
- OSX
- Linux: Many distros
- Android: 2.3+
- iOS

A Few Kivy Apps

- Yeco - A touch controller for Ableton Live
- Kivy Demo Site
- Kivy Touchtracer - Multitouch demo
- Kivy Showcase - Widget demo
- FlatJewels - Jewel-like game
- Particle Panda - particle effects generator
- NORBERT - ROBE Lighting showcase
- KiPyCalc - Programmable calculator

Installation

http://kivy.org/#download

On USB drives:

- Windows
- OSX
- Virtual Machine with VirtualBox

SayThis Tutorial

Enough jibber-jabber, let's make something!

- Demonstrate SayThis app
- Build SayThis app in VM
- Build SayThis app for Android

Kivy Inspector

- Show widget properties while program runs
- Useful for layout debugging
- **`python main.py -m inspector`**
- **`Ctrl + e`**

Plyer

Platform independence for everything

Coming soon!

- Accelerometer
- Camera
- Notifications
- TextToSpeech
- GPS
- Compass
- Audio in and out
- much, much more

Packaging Requirements

http://kivy.org/docs/guide/packaging.html

Windows: *Pyinstaller on Windows*
OSX: *Pyinstaller on OSX*
Linux: *No automated packaging*
iOS: *OSX and XCode*
Android: *After the recess!*

Kivy Tutorial Pt. 2

Let's make it an Android app!

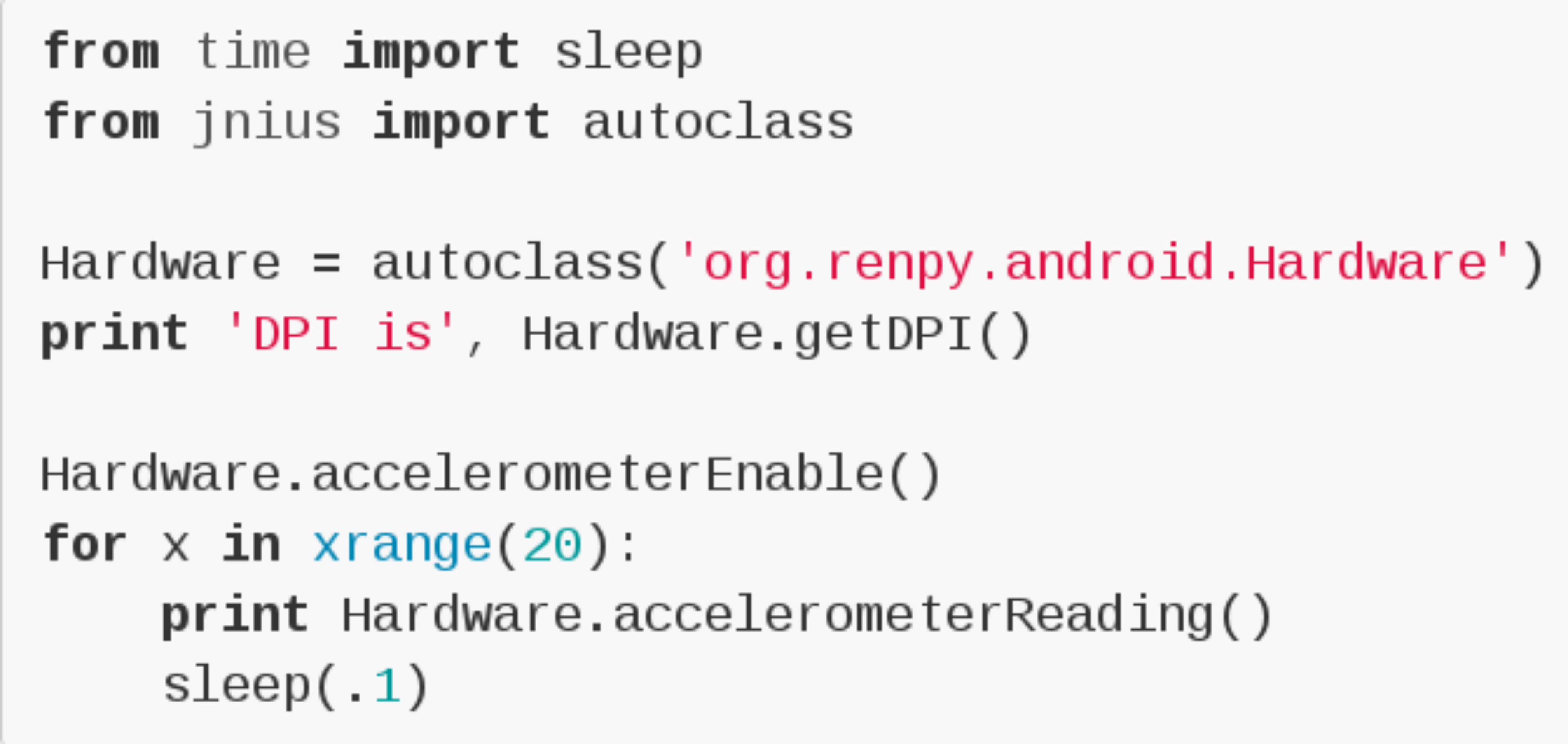
Let's Make it an Android App

1. Install Python for Android
2. Create Python for Android distribution
3. Add Android resources (icon, splash screen)
4. Compile/build the APK
5. Talk about pyjnius

Pyjnius

- JNI wrapper
- to allow access to Java classes
- from Python

Pyjnius Example



```
from time import sleep
from jnius import autoclass

Hardware = autoclass('org.renpy.android.Hardware')
print 'DPI is', Hardware.getDPI()

Hardware.accelerometerEnable()
for x in xrange(20):
    print Hardware.accelerometerReading()
    sleep(.1)
```

Pyjnius in SayThis : Media Volume

```
from jnius import autoclass

PythonActivity =
    autoclass('org.renpy.android.
PythonActivity')

AudioManager =
    autoclass('android.media.AudioManager')

PythonActivity.mActivity.setVolumeControlStream(
    AudioManager.STREAM_MUSIC)
```

Pyjnius in SayThis : TTS

```
from time import sleep
from jnius import autoclass
Locale = autoclass('java.util.Locale')
PythonActivity =
    autoclass('org.renpy.android.PythonActivity')
TextToSpeech =
    autoclass('android.speech.tts.TextToSpeech')
tts = TextToSpeech(PythonActivity.mActivity, None)
tts.setLanguage(Locale.US)
tts.speak(self.message.encode('utf-8'),
          TextToSpeech.QUEUE_FLUSH, None)
```

python-for-android

- Installing
- Creating a distribution
- Recipes
- Building an APK (debug)

python-for-android
Installing

- git clone https://github.com/kivy/python-for-android
- Install Android SDK/NDK requirements
- Install Android NDK
- Install Android SDK
- Modify ~/.bashrc
  - export ANDROIDNDK=/path/to/android-ndk-r8e
  - export ANDROIDNDKVER=r8e
  - export ANDROIDAPI=8
  - export ANDROIDSDK=/path/to/android-sdk-linux
  - PATH=$PATH:$ANDROIDNDK:$ANDROIDSDK/tools:$ANDROIDSDK/platform-tools

python-for-android
Creating a distribution

- cd python-for-android
- ./distribute.sh -m "kivy"

python-for-android Recipes

https://github.com/kivy/python-for-android/tree/master/recipes

Python modules that require C extensions

- lxml
- numpy
- openssl
- pil
- pylibpd
- sqlite3
- twisted
- many, many more!

python-for-android
Building an APK

- cd python-for-android/dist/default
- python ./build.py
  - --package <apk full name>
  - --name <app name>
  - --version <version number>
  - --orientation <sensor | portrait | landscape>
  - --icon <path to icon image>
  - --presplash <path to presplash image>
  - --dir <you kivy project dir (main.py)>
  - debug

More Kivy Fun

Extra Kivy things to talk about

Editing Kivy Apps on Android

Kivy Launcher

Replace <sdcard>/<project>/main.pyo
with main.py

More Kivy Stuff Under Construction

- Kivy Catalog - Interactive Kivy playground
- Remote Python Shell on Android (pyjnius)

- Buildozer - create packages for all platforms
- Kivy Designer - WYSIWYG designer and IDE

- Plyer - platform abstraction layer
- Kivy Garden - Contributed widgets

Kivy Community

- Active IRC channel with core devs (#kivy)
- Programming Contest (done)
  - RaspberryPi Bounty
  - Python3 PSF Grant
  - Google Summer of Code (w/ PSF)

For More About Kivy

Kivy Website

Kivy Wiki

Kivy on Github

Kivy Users Google Group

Kivy Development Google Group

#kivy on Freenode (IRC)

Ben's Resources

- brousch's GitHub
- PyOhio Kivy Tutorial Github Repo

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My Motivation

Why Python and Android?

My Motivation

- Tablets are becoming more common.
- Some people only own a tablet.
- Some schools are handing out tablets.
- This is bad for learning to program.

(Rushkoff: Program or Be Programmed)

How can we fix that?

- Let's program for <device> on <device>
- iOS is a lost cause. Too locked down.
- Let's program for Android on Android
  - AIDE - Android Java IDE
  - TerminalIDE
- But I don't like Java.
- I want to use Python!

How to:
Program for Android with Python

- Scripting Layer for Android (SL4A)
- android-python27

How to:
Program in Python on Android

- Scripting Layer for Android (SL4A)
- BotBrew for Android
- Linux on Android

How to:
Program in Python for Android on Android

- ~~Scripting Layer for Android (SL4A)~~?
  - Clumsy project creation and usage
  - Device compatibility issues
  - Limited access to underlying Android
- ~~Linux on Android~~?
  - No Android SDK for ARM
  - High resource demands
- ~~android-python27 + AIDE~~?
  - Annoying Eclipse project to create
  - One person team
  - Device compatibility issues
  - Limited access to underlying Android
- Kivy!

What's Left?

- Create Kivy app on Android
- Kivy-specific on-device IDE
- Version control: git
- Make it easier to build for all platforms
- Platform abstraction layer

More Pyjnius

Native notification app

Android Notification with Pyjnius

```
from jnius import autoclass
AndroidString = autoclass('java.lang.String')
PythonActivity = autoclass('org.renpy.android.PythonActivity')
NotificationBuilder =
    autoclass('android.app.Notification$Builder')
Drawable =
    autoclass('net.clusterbleep.notificationdemo.R$drawable')
icon = Drawable.icon
noti = NotificationBuilder(PythonActivity.mActivity)
noti.setContentTitle(AndroidString(self.title.encode('utf-8')))
noti.setContentText(AndroidString(self.message.encode('utf-8')))
noti.setSmallIcon(icon)
noti.setAutoCancel(True)
nm = PythonActivity.mActivity.getSystemService(
         PythonActivity.NOTIFICATION_SERVICE)
nm.notify(0,noti.build())
```