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Mobile Application Prototyping with Python

A 3-Day Crash Course for the University of Nairobi

Day 3: The Fun Stuff

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Day 3 : Phone As Sensor

- OS Read and Writes
  - File IO
  - System Information
- Sound Recording and Playing
  - Call Logs
  - .wav processing?
- Location
  - Logging the Cell Towers
  - BT GPS Interface
- Imaging
  - Image Capture using the Camera
  - Image Handling
- Bluetooth Sensing
  - Identifying Who is Around…
- GPRS!
  - Download
  - Upload
  - TCP/IP

OS Reads and Writes

- Get the Contents of a Directory

```
import e32
import os

# define the directory to read
imagedir=u'c:\\nokia\images'

# read the directory
files=map(unicode,os.listdir(imagedir))
```

- Example script : os_dir_read.py

Reading

- Read an image into a variable:

```
import e32
import os

 # read the directory
f=open('c:\\nokia\\images\\test
img.jpg','rb')
test = f.read()
f.close()
```

Writing Files

```
# define the directory and file name to write the file into
    imagedir=u'c:\\writetest.txt'

epoc32\wins\c
# create the file
    file = open(imagedir,'w')
# write some text into it
    file.write('hello, this works')
# close the file
    file.close()
```

- Example script : os_dir_write.py

Reading and Writing OS Settings

- Write and read settings to/from the OS:
- Write several variables with attached values as settings into a file on the OS, and also read the them.
- SYSINFO:

```
import sysinfo
sysinfo.battery()
sysinfo.imei()
sysinfo.free_diskspace()
sysinfo.total_ram()
sysinfo.signal()
```

SEE PYTHON API!

Sound Recording and Playback

- Program an application that can record and play a sound, controlled from the application menu

import audio

audio.Sound.play() for playing the sound

audio.Sound.record() to record

2. You need to open and close sound files by using:

audio.Sound.open(filename)

audio.Sound.close()

- **Example: ex_soundrecorder_descr.py**

Bluetooth Scans: Who is Around?

```
import socket
```

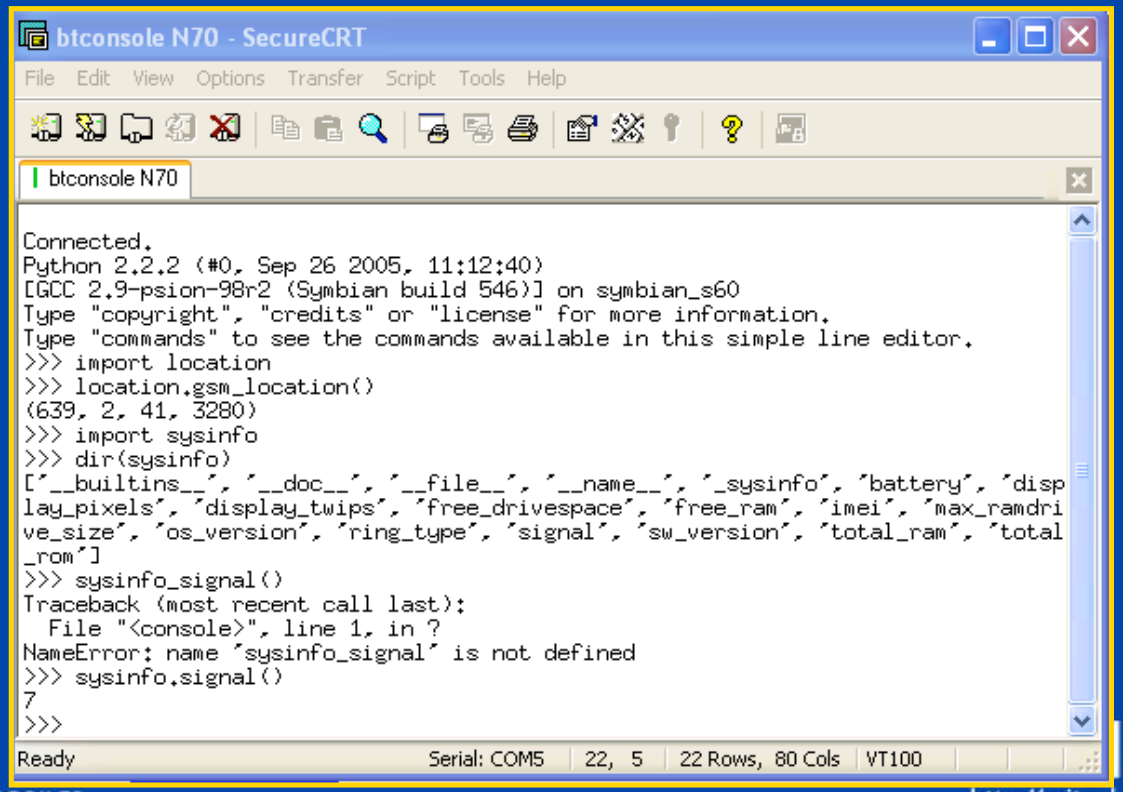
```
mac, services=socket.bt_discover()
```

- Communicate!
  - rfcomm_client.py
  - rfcomm_server.py
  - Dial: *#2820#
- Scan!
  - bt_background_scan.py

See the python_api for more details…

Logging into your Phone: Bluetooth Console

- BT Console let's you log into your phone!
  - Terminal Client Needed:
    - HyperTerminal, SecureCRT, etc…
    - COM port



Logging into your Phone: Bluetooth Sync

- **Using file sync from PC to phone:**
  - Written in Python for the PC
  - Backend requires win32com and PySerial
  - UI requires wxPython
  - Uses PySerial on the PC side.
  - http://people.csail.mit.edu/kapu/symbian/python.html.
- No need to keep pushing .py scripts into your inbox!
- Has simple shell capabilities (ls, cat, rm…)
- Screen snapshots for real-time demos!

The Camera

- Program an application that lets you take a picture. The picture shall be stored on the c: drive.
- 1. **from graphics import *** and **import camera**
- 2. Use the **SELECT key** to **take the picture.**
- 3. Use the **LeftSoftKey** to to activate the camera mode again.
- Example: ex_camera_descr.py

*Check out the python_api.pdf for more parameters! (exposure, white balance, ….)

Image Handling

- Play with Nokia's Example Scripts:
  - Image Rotation
    - Example script : image_rotation.py
  - Image Viewing
    - Example script : imageviewer.py

Location & Messaging

- Location

```
import location
#Mobile Country Code, Mobile Network Code,
#Location Area Code, and Cell ID
(mcc, mnc, lac, cellid) = location.gsm_location()
```

- SMS Messaging

```
import messaging
sms_send(recipient, message)
```

Exercise

- Create an Application that Sends Your Phone's Location by SMS
  - Use Example: ex_sms_sending_descr.py

Networking with GPRS

- Downloading Media Content
  - import urllib
  - urllib.urlretrieve(url, tempfile)
- Handling the Content: Playback
  - content_handler.open(tempfile)
    - rss, images, video, audio, etc…
- Example:
  - urllib_example.py
  - ex_video_download_descr.py

GPRS Access Point Settings

- Go to Tools->Settings->Connections->Access Points
- Access Point Name for Safaricom
  - web.safaricom.com
- Access Point Name for Celtel
  - ke.celtel.com

```
import urllib
url =
"http://weather.gov/mdl/radar/rcm1pix_b.gif"
tempfile = "c:\\testimg.gif"
urllib.urlretrieve(url, tempfile)
```

GRPS Uploading

- Why?
  - Automatic Data Collection
  - Mobile Blogging
  - Database Interactions
- Modules
  - urllib, httplib, ftplib (install)
- Examples
  - ftp_example.py
  - ex_image_upload_to_database.py

TCP/IP – Pushing Data through Sockets

- Connect directly to your desktop computer…

```
# Phone Script

import socket

HOST = '217.30.180.11'#desktop's IP

PORT = 12008 # Port number

print "define socket"

s = socket.socket(socket.AF_INET,
socket.SOCK_STREAM)

print "trying to connect to socket"

s.connect((HOST, PORT)) print
"connected"

s.send('Hello, world') print "data
send"

data = s.recv(1024)

s.close()

print 'Received', `data`
```

```
# Desktop Script

HOST = '' # meaning the local host

PORT = 12008  # Arbitrary port

print "define the socket"

s = socket.socket(socket.AF_INET,
socket.SOCK_STREAM)

print "bind the socket"

s.bind((HOST, PORT)) s.listen(1)

print "waiting of the client to connect"

conn, addr = s.accept()

print 'Connected by', addr

while 1:data = conn.recv(1024) if not
data: break

conn.send(data) conn.close()
```

No GPRS?

- app_tabs_advanced.py
- imgviewer.py
- ex_extended_graphics_drawing.py

Questions, Comments, Suggestions

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