Ling 555 — Programming for Linguists

Python — Functions (part II)

Robert Albert Felty

Speech Research Laboratory
Indiana University

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Prereqs

While we are waiting

Please download the courseBackground.txt file from:
http://robfelty.com/teaching/L555Fall2008/resources/sapir.txt

```
curl -o sapir.txt
http://robfelty.com/teaching/L555Fall2008/
resources/sapir.txt
```

For Wednesday:

Read Chapter 7 on More Abstraction (Classes)

Outline

1. Homework questions
2. Projects
3. Functions
   - parameters
   - Return values
   - scope
   - recursion
   - comprehension
4. Linguistic Examples
   - frequency
   - sortDict
   - phon2cv
5. Resources

Homework questions?

Poll

What would be your preferred homework schedule?

1. assigned Monday and due the next Monday
2. assigned Friday and due the next Friday

Final projects

Time to start thinking about final projects

- Final project proposals due November 5th (about two weeks)
- More details under resources > project, including
  - Project guidelines
  - Sample code
  - Sample presentation

3 types of Parameters

positional Positional parameters must be entered in the correct order

```
hello(name, greeting)
```

keyword Keyword parameters can be entered in any order

```
hello(greeting='Servus',
name='rob')
```

collected Parameters can also be collected by a function, allowing the user to input any number of parameters to the function

```
def hello3(*collectedParams):
    return collectedParams
print hello3('foo', 'bar', 0)
```

Parameter types

Definition

Any kind of variable can be passed to a function (string, integer, float, list, dict, tuple, object). Your function must use these as the right type though.

Example

```
def sortStudents(students):
    return sorted(students)

theStudents='John and Mary'
print sortStudents(theStudents)
theStudents=['John', 'Mary']
print sortStudents(theStudents)
```

Return values

Definition

Parameters are inputs to functions. Return values are outputs.

Multiple return values

To return more than one value, put them in a tuple

```
def hello():
    x=1
    y=2
    return (x,y)
foo=hello()
one,two=hello()
```

Function No-Nos

No-no

Don't print out stuff in functions (unless debugging)

```
def hello():
    print "hello, world"
```

Yes-Yes

Do return stuff in functions and print later

```
def hello():
    return "hello, world"
print hello()
# OR
sys.stdout.write(hello() + "\n")
```

Scope (not the mouthwash)

Two types of variables:

local Exist only inside a function

global Exist everywhere inside a program (script)

Avoid global variables

There are appropriate uses for modifying global variables in functions, but generally you should avoid it.

Recursion

Definition

See recursion. (just kidding).
A function which calls itself.

Example

```
def factorial(n):
    if n == 1:
        return n
    else:
        return n * factorial(n-1)
```

Map, filter, and list comprehensions

Definition

These functions (and list comprehensions) can be used to apply a function to each item of a list. You can usually use for loops instead, but they can be very concise and handy, particularly when you want to get a list as a result.

Map, filter, and list comprehensions

Example

```
mylist=[5,10,15,38,95,10,34]
# map
multiples=map(lambda x: x*3, mylist)

# for loop
multiples=[]
for number in mylist:
    multiples.append(number*3)

# list comprehension
multiples = [x*3 for x in mylist]
```

frequency revisited

What to do with a dict?

You could construct a dictionary of a corpus's word frequencies. Each word would be a key, and the corresponding value would be its frequency.

Let's do this with a function now.

Sorting a dictionary by frequency

In homework 6, you were asked to print the 100 most frequent words in the celex, which required you to sort a dictionary. Let's write a function that does this

Convert phonetic transcription to CV

Sometimes it is useful to have a CV transcription of words. That is, all vowels are simply represented as V, and all consonants as C.

Resources for you:

Some of the examples we have covered in class today can be found on the website at:
http://robfelty.com/teaching/L555Fall2008/resources/py
The files from today are:

1. sortDict.py
2. listToFreq.py
3. phon2cv.py