Functions in Python

L555

Dept. of Linguistics, Indiana University
Fall 2010
What is a function?

Definition

A function is something you can call (possibly with some parameters, the things you put in the parentheses), which performs an action and returns a value.

Example

```python
def hello(name, greeting):
    return greeting + ", " + name

print(hello('Markus', 'privet!'))
```

Define first, then call!

In python, a function must be defined before you can call it. That is, define it on line 10, call it on line 15.
Why Use Functions?

Functions are extremely useful because:

- They make code reusable
- They make a program more structured & more readable, especially when it gets longer
- They make it is easier to work with several programmers
Parameters (Arguments)

Definition

Parameters (also known as arguments) are inputs to functions.

Example

When you use the `min()` function, you pass the function a list as a parameter.
Local Scope

Definition

Variables and parameters in functions have local scope.

```python
def change_name(name):
    name = 'Iggy Pop'

name = 'Meatloaf'
change_name(name)
print name
```

```python
def again():
    mypi = 3.11

print mypi
```
Local Scope (2)

Definition

Mutable data structures change in functions.

```python
def change(lis):
    lis.append('the end')

mylist = ['my', 'home', 'is', 'my', 'castle']
change(mylist)
print mylist
```
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=’Matthias’) 
```

**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

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

theStudents = 'John and Mary'
print sortStudents(theStudents)
theStudents = ['John', 'Mary']
print sortStudents(theStudents)
```
Comment your code!

You must know/remember which types work for a function, so it makes sense to add comments that specify the types of the parameters and of the return value.

Example

```python
# function sortStudents sorts the input and returns it
# input: students – list or string
# output: list or string
def sortStudents(students):
    return sorted(students)
```
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

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

Avoid the following
Don’t print out stuff in functions (unless debugging)

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

Instead, do the following
Do return stuff in functions and print later

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