Functions in Python

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)
```
### 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**  
```
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=foo()
```

### Tip on Printing

**Avoid the following**  
Don’t print out stuff in functions (unless debugging)  
```
def hello():
    print "hello , world"
```

**Instead, do the following**  
Do return stuff in functions and print later  
```
def hello():
    return "hello , world"
print hello()
```