

Introduction to Python Programming

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Exercise Six: User Defined Functions

Python allows programmers to create functions that can be executed just like regular mathematical functions. This gives the programmer great flexibility and makes it much simpler to think about how to break a program apart into segments to be executed.

1. The User Defined Function

In python, user defined functions have to be defined before they are used, so they normally appear at the top of a program. The definition of the function contains the name of the function and the list of arguments that the function takes. These arguments are then used in the body of the function when the statements are executed. Here is a function with one argument:

```
def myFunc( alpha):  
    if (alpha < 0):  
        return math.exp(alpha)  
    else:  
        return math.exp(-alpha)
```

Then later in your code to use the function you could do something like...

```
print myFunc(1)
```

with the result being

```
0.367879441171
```

2. Argument Lists

User defined functions can have any number of arguments. For example you could do something like this:

```
def hypotnuse(a,b):  
    return math.sqrt(a**2+b**2)
```

and call the function in your program as

hypotnuse(1,2)

Which should return the square root of five. What is *critical* is that the order of the arguments in the call statement must match the appropriate variable in the function definition. If you had a function of the form

```
def specialFunc(a,b,c):
    if ( a > b):
        b=c*2
        return math.sqrt(a**2+b**4)-math.exp(c)
    else:
        b=a*2
        return math.sqrt(a**4+b**2)-math.exp(c)
```

If you call this with specialFunc(1,2,3) and specialFunc(2,1,3) you will get VERY different results.

3. Note the Indentation

It is also important to note that ALL of the statements inside of a function have to be indented and that even inside that indentation you will have to follow the additional indentation rules for conditional statements and loop