Exercise 10: Functions and *return* values

By: Rahul Sharma 1 May, 2018

In the last lecture we talked about a friend who we gave a "copy" of our document. He/She made some changes in the document and "returned" the changes to us. Well, consider that friend as a function which is supposed to change your document and return the result. Yes, functions can return anything as long as we know what to get from them. Let's understand it with the help of an example.

<u>Exercise: Functions and return values</u>

1. Create a file called ex10.py and write the following code in it

```
def add(a, b):
        print "ADDING %d + %d" % (a, b)
        return a + b
def subtract(a, b):
        print "SUBTRACTING %d - %d" % (a, b)
        return a - b
def multiply(a, b):
        print "MULTIPLYING %d * %d" % (a, b)
        return a * b
def divide(a, b):
        print "DIVIDING %d / %d" % (a, b)
        return a / b
print "Let's do some math with just functions!"
age = add(30, 5)
height = subtract(78, 4)
weight = multiply(90, 2)
iq = divide(100, 2)
print "Age: %d, Height: %d, Weight: %d, IQ: %d" % (age, height, weight, iq)
# A puzzle for the extra credit, type it in anyway.
print "Here is a puzzle."
what = add(age, subtract(height, multiply(weight, divide(iq, 2))))
print "That becomes: ", what, "Can you do it by hand?"
```

2. Let us understand what is happening in the add function when we call it.

    1. Our function is called with two arguments: a and b.
    2. We print out what our function is doing, in this case ADDING.
    3.Then we tell Python to do something kind of backward: we return the addition of a+b. You might say this as, “I add a and b, then return them.”
    4.Python adds the two numbers. Then when the function ends, any line that runs it will be able to assign this a + b result to a variable.

The = is called an *assignment operator.* It is so because it is used to assign some value. For example, *x = 10*, we are assigning the value 10 to x variable. Similarly, in the case of ***return values*** from a function, we assign the returned value to a variable using the = operator.

3. If you aren't really sure what return does, try writing a few of your own functions and have them return some values. You can return anything that you can put to the right of an =. Try writing a function for simple interest calculation which returns the value to a variable. Name the script as **ex10_SI.py**

4. At the end of the script is a puzzle. I'm taking the return value of one function and using it as the argument of another function. I'm doing this in a chain so that I'm kind of creating a formula using the functions. It looks really weird, but if you run the script, you can see the results. What you should do is try to figure out the normal formula that would recreate this same set of operations.

5. Once you have the formula worked out for the puzzle, get in there and see what happens when you modify the parts of the functions. Try to change it on purpose to make another value.

6. Finally, do the inverse. Write out a simple formula and use the functions in the same way to calculate it.

Do points 4, 5, and 6 in a file called **ex10_playingWithFunctions.py**

NOTE: This exercise is quite challenging and may whack your brains out. Take your time and solve it. This exercise has been given 3 days to get completed. Understand each and every line of the code. Complete your exercises to the best of your abilities.