Python

Lab 04: Functions

This lab introduces methods.

Exercise 1: Written Assessment

Part A - What will the following output?

```
def do(thing):
    return str(thing) + str(1)
do(5)?
```

Part B - What will the following output?

```
def do(one, two=5):
  return one+two
do(5)?
```

Part C - What will the following output?

```
def do(a,b):
   a=5
   b=5
   return a*b

inp = 8
do(inp,5)
print inp
```

Part D - What will the following output?

```
def try_to_change_list_contents(the_list):
   the_list.append('four')

outer_list = ['one', 'two', 'three']

try_to_change_list_contents(outer_list)
print outer_list
```

Part E - What will the following output?

```
def do(a, f):
   return a*f(a)
def inp(a):
   return a*2

print do(6,inp)
```

Exercise 2: Recursive Factorial Test
Create a function that prompts a user for a integer, takes the integer as an input and returns that number factorial. See below for an example.

```
>>>
Recursive factorial tests:
Enter a integer: 12
479001600
>>>
```

Exercise 3: Battery Life
Say you have 100 units of battery life. You don't know how fast the battery runs out but you know how long the battery has been discharging (in minutes). Make a function batteryLife that takes a drainer function and the time and returns the remaining battery life. Here's an example drainer function that you can use:

```
def drainerFunction(time):
    return time*1.5
"""
modify with your code
"""
```

Example:
batteryLife(10, drainerFunction)

Outputs:
85

Challenge Exercise: Palindrome Test
Create a method to test whether a word or phrase input by the user is a palindrome.

```
>>>
Palindrome Test
Enter a word or a phrase: race car
Input is a Palindrome:  True
>>>
```

Challenge Exercise: Encryption
One-way encryption is important when storing sensitive information. For example, passwords can be encrypted but never decrypted; this means that if someone gets ahold of the encrypted passwords, there's a good chance that that person would not be able to figure out the password. However, one way for people to figure out the password is writing a rainbow table. This finds the encrypted string of millions of different passwords, and if a password that has been obtained is in the rainbow table, then the password is quickly found. An easy solution to this is adding a salt, which is a known string that is added to the soon-to-be encrypted string.

Write a method that takes a message to be encrypted, and a salt string, and returns the encrypted string. Information on encryption can be found here:
http://docs.python.org/library/hashlib.html#module-hashlib
Use sha224

Challenge Exercise: Multiple Choice Test
You, Fred, and Jill just took a multiple choice test (answers A,B,C,D for each question) and you get a 0. Determine the maximum combined score of Fred and Jill, given strings of equal lengths for each person (you first) and that none of your answers are right.

Example:
AAABCDA
ADDBACA
ADCADDC

returns 7