IHF: CODE - PYTHON WORKSHEET 4

Functions

A function is a block of code which only runs when it is called.You can pass data, known as parameters, into a function.A function can return data as a result.

In Python a function is defined using the def keyword.

```
def <function_name>():
    <your code here>
```

To call a function, use the function name followed by parenthesis.

```
def <function_name>():
print("Hello from my function")
my_function()
```

Functions - Parameters

Information can be passed to functions as parameter. Parameters are specified after the function name, inside the brackets.

```
def hello(name):
    print("Hello, " + name + "!")

hello("Alice")
hello("Bob")
hello("Charlie")
```

You can add as many parameters as you want, just separate them with a comma. You can send any data types of parameter to a function (string, number, list, dictionary etc.), and it will be treated as the same data type inside the function.

```
def <function_name>(<params>, ...):
    <your code here>
```

Functions - Recursions

Recursion is a common mathematical and programming concept. It means that a function calls itself. This has the benefit of meaning that you can loop through data to reach a result.

```
def calc_factorial(x):
    if x == 1:
        return 1
    else:
        return (x * calc_factorial(x - 1))
# calc_factorial(4)            # 1st call with 4
# 4 * calc_factorial(3)        # 2nd call with 3
# 4 * 3 * calc_factorial(2)    # 3rd call with 2
# 4 * 3 * 2 * calc_factorial(1)  # 4th call with 1
# 4 * 3 * 2 * 1                # return from 4th call as number=1
# 4 * 3 * 2                    # return from 3rd call
# 4 * 6                        # return from 2nd call
# 24                           # return from 1st call
```

Functions - Return

To let a function return a value, use the return statement.

```
def <function_name>(<params>):
    <your code here>
    return <value>
```

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CODING EXAMPLES

SECTION A

1. def hello_world():
        print("Hello World!")

2. def hello_world():
        print("Hello World!")
    hello_world()

3. def hello(name):
        print("Hello, " + name + "!")
    hello("Alice")
    hello("Bob")
    hello("Charlie")

4. def hello(name, age):
        print("Hello my name is " + name)
        print("I'm " + str(age) + " years old")

        age_in_10_years = age + 10
            print("In 10 years time I will be " +
         str(age_in_10_years))
    hello("Alice", 22)
    hello("Bob", 34)
    hello("Charlie", 17)

5. def area(x, y, z):
        print("The area is " + str(x * y * z))
    area(12, 3, 4)
    area(6, 14, 10)

6. def area(x, y, z):
        return x * y * z
    cube1 = area(12, 3, 4)
    cube2 = area(6, 14, 10)

7. def calc_factorial(x):
        if x == 1:
            return 1
        else:
            return (x * calc_factorial(x - 1))
    num = 4
    print("The factorial of " + num + " is " +
    str(calc_factorial(num)))

SECTION B

1. f = open("<file>.txt", "r")

2. f = open("<file>.txt", "r")
        print(f.read())

3. f = open("<file>.txt", "r")
    for x in f:
        print(x)

4. f = open("example.txt", "w")
    f.write("Hello World")
    f.close()

5. f = open("example.txt", "w")
    f.write("Hello World")
    f.close()
    f = open("example.txt", "a")
    f.write("It's nice to be here")
    f.close()

6. f = open("names.txt", "a")
    name = True
    while name:
        name = input("Enter a name: ")
        f.write(name + "\n")
    f.close()

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QUESTIONS

SECTION A

1. Write a function that prints your name
2. Write a function that accepts a name as a parameter and prints "Hello, "
3. "Loop through the list ["Alice", "Bob", "Charlie"] and call the function you just wrote
4. Write a function that prints the area of two passed in parameters
5. Write a function called 'print_list' that accepts a list as a parameter and then prints out each item of the list
6. Put the following into a function:
   i. If they are younger than 11, print "You're too young to go to this school"
   ii. If they are between 11 and 16, print "You can can come to this school"
   iii. If they are over 16, print 'You're too old for school"
   iv. If they are 0, print "You're not born yet!"

SECTION B

1. Write a function called is_odd that will return True or False if the integer passed as a parameter is odd (hint: x % 2 will return true for all odd numbers)
2. Write a function that accepts a word and returns it backwards, e.g. 'hello' -> 'olleh'
3. Write a recursive function that accepts a number and prints that number of stars, followed by ever decreasing stars on each line, E.g:

*****
****
***
**
*

4. Create a padlock function. You need to be able to pass in a passcode and if its correct it should return "Unlock", else "Locked"
5. Write a function that returns the sum of multiples of 3 and 5 between 0 and limit (parameter). For example, if limit is 20, it should return the sum of 3, 5, 6, 9, 10, 12, 15, 18, 20 6. Write a function called is_prime() that accepts a number and return True or False if the number of prime or not