Coding Practice #2

Recursive Functions
11/14/16

LESSON: Recursion

- Recursion is a method of programming or coding a problem, in which a function calls itself one or more times in its body. Usually, it is returning the return value of this function call. If a function definition satisfies the condition of recursion, we call this function a recursive function.
- Recursion in computer science is a method where the solution to a problem is based on solving smaller instances of the same problem.

LESSON: Recursion

Termination condition/base case/end case:

- A recursive function has to fulfil an important condition to be used in a program: it has to terminate. A recursive function terminates, if with every recursive call the solution of the problem is downsized and moves towards a base case.
- A base case is a case, where the problem can be solved without further recursion. A recursion can end up in an infinite loop, if the base case is not met in the calls.

CHALLENGE:

1. Factorials
2. Fibonacci Numbers
3. BONUS Pascal's Triangle

Go to github repo for detailed instructions:

https://github.com/kgracia44/DSI-TA-Reviews/tree/master/DSI_2_DysonSwarm/Week_09/coding_practice_2

TIPS:

- Read the problem statement to make sure you fully understand the problem
- Identify the base case(s)
- Determine the underlying formula/pattern
- (I like to) Start with the recursion step, then consider end conditions (but be careful not to get stuck in an infinite loop!)

TEST CASES

test_1 = 0

test_2 = -1

test_3 = 1

Other test cases are located in the README here:

https://github.com/kgracia44/DSI-TA-Reviews/tree/master/DSI_2_DysonSwarm/Week_09/coding_practice_2

SOLUTION:

(Well, this is just one solution. There are many. Try to make a better solution than mine...and be able to explain why it's better.)

Go to my github repo for solution code:

https://github.com/kgracia44/DSI-TA-Reviews/blob/master/DSI_2_DysonSwarm/Week_09/coding_practice_2/Coding_practice_2_solutionCode.ipynb

TAKE-AWAYS:

- Who is the end-user of the functions?
- Try it by hand first.
- Use timeit module in python to check time of functions
- Article over recursive functions in python and exercises with solutions: http://www.python-course.eu/python3_recursive_functions.php