Programming
Winter 2023

Exercises

Number 04, Submission Deadline: November 15, 2pm, 2023

1. Write a function `get_occurrences(my_list, x)` that returns elements that occur   (3 P)
   at least `x` times in the given list `my_list`. Do **not** use the list's `count()` function in
   your implementation. Provide your output using a data type of your choice reporting
   each identified element and the number of times it appears. Make sure to report each
   such identified multiple element only once. You may assume that all elements of list
   `my_list` are immutable. Test your function on the following lists, using different
   values for threshold `x`.

   `[2,'test', 2, (1, 2), 3, 2, 'test', (1, 2), 1, 2, 4, 3]`

2. Write a **recursive** function that calculates the sum of all Fibonacci numbers up to an   (2 P)
   arbitrary position n. Recall that each Fibonacci number corresponds to the sum of
   its 2 preceding numbers, so that $F_n = F_{n-1} + F_{n-2}$, with $F_0 = 0$, $F_1 = 1$ for $n > 1$.

3. Explain the difference between **local** and **global** variables and the concept of **scope** of   (2 P)
   a variable. Write an example of function using a local variable and another example
   of function using a global variable.

4. Write a function that solves the FizzBuzz problem[1]. Starting from the **user's input**,   (3 P)
   use the `assert` statement to check if the input is an integer or float number. The
   function should output the string "Fizz" if the number is divisible by 3, "Buzz" if the
   number is divisible by 5, "FizzBuzz" if the number is divisible by 3 and 5, and raise
   an error if the input is not of the expected type.

5. Write a function that performs the quotient between two numbers. Use the `try /`   (2 P)
   `except` statements to prevent division by zero.

6. Write a program that **writes on a file**[2] the occurrences of letters in your name,   (3 P)
   surname and University course. You can reuse the function you wrote for the first
   exercise. (Hint: to print a nice-looking output on file you can use string formatting).

Important:
Please submit your solution as (adequately commented) Python file. Use the cell separator
comment "#%%" to partition your Python file analog to the exercises. Make sure your
Python file contains only valid Python code.

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[1]`https://en.wikipedia.org/wiki/Fizz_buzz`
[2]`https://realpython.com/read-write-files-python/`