4330 Assignment 5 [1]

Write your code for the following problems in a single file named:

hw5-*lastname*.py

Please: name your file in exactly this way; lowercase 'hw', a dash (not an underscore), and **NO SPACES** in the filename!

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(1) (20 points)

Consider the function $f : \mathbb{N} \longrightarrow \mathbb{N}$ given by

$$f(n) = \begin{cases} n/2, & \text{if } n \text{ is even ,} \\ (3n+1)/2, & \text{if } n \text{ is odd.} \end{cases}$$

Write Python code to accomplish the following:

(i) Write a Python function named `f3n1` which takes a positive integer n, and computes and returns the integer value $f(n)$ as defined above (use the integer division operator `//` instead of the ordinary division operator `/`). For example, `f3n1(10)` should return 5 and `f3n1(11)` should return 17.

(ii) Write a Python function named `seq_3n1` which takes a positive integer n and returns a list containing the sequence $n, f(n), f(f(n)), f(f(f(n))), \ldots$ up to and including the first occurrence of a 1. For example, the command
`print seq_3n1(12)`
should give the output
`[12, 6, 3, 5, 8, 4, 2, 1]`

(iii) Below those two functions, insert the following:

```
n = int(input("Enter a positive integer n:"))
seq = seq_3n1(n)
print("The resulting sequence is: {0}".format(seq))
print("It has length {0}".format(len(seq)))
```
