Extra Credit #2

Due: Thursday, February 8, 2018 at 11:59 p.m.  
Points: 30

Please turn in your answers for the homework assignment on Canvas under Extra Credit #1 there.

1. (30 points) Define the function:

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

   The Collatz conjecture says that, if you iterate this sequence for any initial value of \( n \), then eventually the sequence will reach the number 1.

   For a given number \( n \), let \( k \) be the least number of iterations needed to reach the number 1 (excluding the initial value). Then \( k \) is called the total stopping time of \( n \).

   For example, if \( n = 29 \), then the sequence is:

   \[ 29 \ 88 \ 44 \ 22 \ 11 \ 34 \ 17 \ 52 \ 26 \ 13 \ 40 \ 20 \ 10 \ 5 \ 16 \ 8 \ 4 \ 2 \ 1 \]

   and so the total stopping time of 29 is 18.

   Write a program that takes as input a positive integer and prints both the sequence and the total stopping time for that integer. The output should look like:

   \[ 29 \ 88 \ 44 \ 22 \ 11 \ 34 \ 17 \ 52 \ 26 \ 13 \ 40 \ 20 \ 10 \ 5 \ 16 \ 8 \ 4 \ 2 \ 1 \]

   The total stopping time for 29 is 18