

11 March 2024

Collatz Trajectories

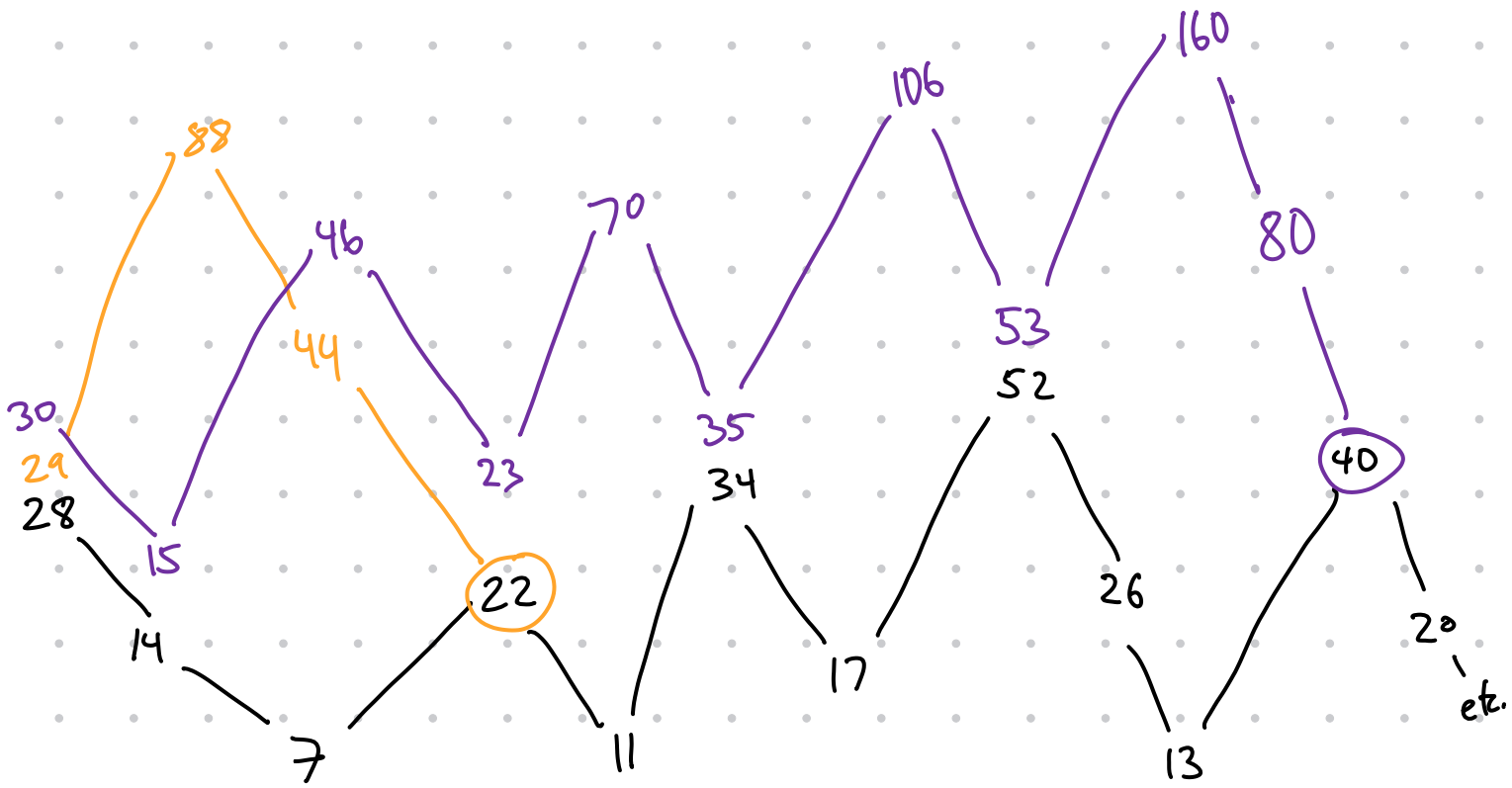
$$\text{col}(n) = \begin{cases} 3n+1 & \text{if } n \text{ is odd} \\ \frac{n}{2} & \text{if } n \text{ is even} \end{cases}$$

STOPPING TIME: $\text{stop}(n)$ is the number of iterations of collatz function required to get to 1 from n .

EXAMPLE: $n=5$

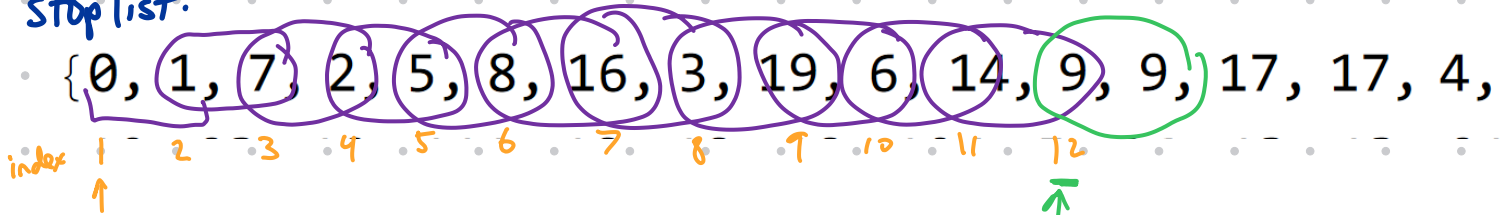


so $\text{stop}(5) = 5$



Goal: find the first pair of consecutive equal values in the list. Return the index of the first such value.

stop list:



↑
return index
of the first
value in the pair

{0, 1, 7, 2, 5, 8, 16, 3, 19, 6, 14, 9, 9, 17, 17, 4, 12, 20, 20, 7, 7, 15, 15, 10, 23, 10, 111, 18, 18, 18, 106, 5, 26, 13, 13, 21, 21, 21, 34, 8, 109, 8, 29, 16, 16, 16, 104, 11, 24, 24, 24, 11, 11, 112, 112, 19, 32, 19, 32, 19, 19, 107, 107, 6, 27, 27, 27, 14, 14, 14, 102, 22, 115, 22, 14, 22, 22, 35, 35, 9, 22, 110, 110, 9, 9, 30, 30, 17, 30, 17, 92, 17, 17, 105, 105, 12, 118, 25, 25, 25}

curr streak = 2
curr streak = 1
curr streak = 2

- pos — current place in the list
- curr streak — how many consecutive values have I seen at this moment