3x+1 Problem

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August 26, 2023

The Collatz conjecture, also known as the $3x+1$ problem, is defined as:

$$c(x) = \begin{Bmatrix} x/2, & \text{if } x = 0 \pmod 2 \\ 3x+1, & \text{if } x = 1 \pmod 2 \end{Bmatrix}, x \in \mathbb{N}^+$$

Or the "shortcut" version:

$$s(x) = \begin{Bmatrix} x/2, & \text{if } x = 0 \pmod 2 \\ (3x+1)/2, & \text{if } x = 1 \pmod 2 \end{Bmatrix}, x \in \mathbb{N}^+$$

This process will eventually reach the number 1, regardless of which positive integer is chosen initially.

1 Proving the Collatz Conjecture for the set 2^n

$\{x \in \mathbb{N}^+ : 2^x\}$
In this case, $c^{(log_2 x)}(x) = 1$.
Ex. $x = 2, c(2) = \frac{2}{2} = 1$
Therefore, the conjecture for the set 2^n is true.