Coco Conjecture

Professional Programming and Coding Challenge

The dragon CEO demands operational excellence: for each positive integer fired at you in real-time, apply the prescribed transformation rules and report exactly how many transformations are needed to reach the base form 1.

Problem Statement

Given a positive integer n where $1 \leq n \leq 10^{18}$, repeatedly apply the following transformation until the value becomes exactly 1:

- If n is even, replace n with $n/2$.
- If n is odd, replace n with $3n + 1$.

Define steps(n) as the number of transformations performed to reach 1. The starting value does not count as a step. Formally, steps(1) = 0.

Examples.

$$n = 1 \Rightarrow \text{steps}(1) = 0$$
$$n = 2 \Rightarrow 2 \to 1 \text{ (1 step)} \Rightarrow \text{steps}(2) = 1$$
$$n = 3 \Rightarrow 3 \to 10 \to 5 \to 16 \to 8 \to 4 \to 2 \to 1 \text{ (7 steps)} \Rightarrow \text{steps}(3) = 7$$

User Input

For each server prompt integer n, compute the number of transformations required to reach 1 using the rules above, and respond with steps(n) as a base-10 integer followed by a single newline.

Operational Notes

- Inputs are ASCII digits followed by newline.
- Outputs must be ASCII digits with exactly one trailing newline.
- steps(1) = 0 (zero-based count).

Sample

Sample Interaction

```
Server: 3
Client: 7
Server: 8
Client: 3
...
Server: citadel{i_miss_kiryu_coco}
```

Explanation

- For $n = 3$: sequence is $3 \to 10 \to 5 \to 16 \to 8 \to 4 \to 2 \to 1$. There are 7 transformations, so the client returns `7`.
- For $n = 8$: sequence is $8 \to 4 \to 2 \to 1$. There are 3 transformations, so the client returns `3`.

Rules

- No denial-of-service, traffic flooding, or tampering with infrastructure.
- Only send the required numeric answer per prompt; extra chatter may result in an immediate disconnect.
- Inputs are uniformly random in $[1, 10^{18}]$; hardcoding or precomputation of answers is ineffective.
- Keep network usage reasonable and adhere to timeouts.
- Open ticket if any technical issues faced.