1 Interview Task

Let c_m be a sequence defined by:

$$c_m(n+1) := \begin{cases} c_m(n)/2 & \text{for } c_m(n) \text{ is even} \\ c_m(n) * 3 + 1 & \text{for } c_m(n) \text{ is uneven} \end{cases} \text{ with } c_m(1) := m \text{ and } m, n \in N$$

Independent of the starting value all known sequences end in repeating $1, 4, 2$.

a) Implement a program to calculate the number of steps to reach 1 the first time for any given $m \in N$.

b) Adapt the implementation to calculate the number of steps for each $m \in [1, 10000]$.

c) Try to improve the implementation to calculate the steps as fast as possbile.

d) Print the number of steps for each $m \in [1, 10000]$ as diagram.

Remark: Please use Python 3.8.1, document all dependencies used in a requirements.txt file and provide for each subtask a separate Python file.