



Assignment 00

Algorithms for Sequence Analysis

Sven Rahmann, Jens Zentgraf & Johanna Schmitz

07.04.2025

Tutorials and Assignments

- Assignments will be given out each Monday (this one: Tuesday).
- Approximately 12-13 assignments with 4 tasks each, 4 points per task
- You generally have one week to complete and submit an assignment.
- Assignments include **theory** and **programming** tasks.
- To qualify for the final exam, you need:
 - at least one point of assignment 00,
 - at least 50% of all points from theory tasks,
 - at least 50% of all points from programming tasks, **and**
 - present at least 2 solutions in the tutorial.

How to Hand in your Solutions

CMS

- You submit your solutions via the cms.
- Separate submissions for theory and programming tasks.

Programming tasks

- If necessary, a code framework and tests (in Python) are provided by us.

Plagiarism

Never plagiarize or copy solutions!

- Do **not** use code/explanations from the internet!
- Do **not** copy code/explanations from other students!
- Do **not** copy old solutions from the previous semesters!
- If you plagiarize you are **not allowed** to take the exam!
- If you plagiarize you can be **reported** to the examination board!

Assignment 00 (3 points)

Implement the following algorithm for a given positive integer x .

Given a positive integer x , obtain a new value for x by the following rules:

- 1 If x is even, we divide x by 2.
- 2 If x is odd, we multiply x by 3, and add 1.

$$x \leftarrow \begin{cases} x/2 & \text{if } x \text{ is even,} \\ 3 \cdot x + 1 & \text{if } x \text{ is odd.} \end{cases}$$

This is iterated until x reaches 1. If $x = 1$, it enters a cycle $1 \rightarrow 4 \rightarrow 2 \rightarrow 1$.

Extra credit

Find the smallest positive integer x , for which this never happens.