

**Autonomous Intelligent Systems,
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Exercises for Artificial Life (MA-INF 4201), SS15

Exercises sheet 1, till: Mon 20. April, 2015

13.4.2015

	Name	1	2	3	4	5	6	7	8	Σ

Remark: The exercises and the assignments are complete voluntary for MA-INF 4201 in Summer 2015.

Still they are helpful to intensify the work with the research topics presented within the lecture. The exercises are designed to be worked on in 2-person groups; if you can not find a 2nd person to form a group single groups are possible. 3-person groups are not really sensefull. Please refrain from doing it.

Hand in the solution on Monday 20.4.2015, in paper before the lecture starts, or by E-Mail to the tutor before the end of the lecture.

Assignment 1 (1 Point)

What is the major difference between *Weak Artificial Life* and *Strong Artificial Life*?

Assignment 2 (2 Point)

Name and describe a definition of *live* or *living* that has not been named during the lecture. Please **cite** the publication where you have found the definition in a **scientific way**.

Assignment 3 (2 Points)

Give the four to six criteria that you find to be most feasible to distinguish *living* from *non living*. Explain your decision.

Assignment 4 (2 Points)

Try to sort the following items with respect to their property of being a living item according to one of the definitions (either from the lecture or from assignments 2 or 3):

Yeast, English language, DNA-sequence, protozoa, river rhine, car, wooden chair, mule, colony of ants, a tornado, the plasmodium causing malaria, a dried pea, lettuce from the mesa, C++ compiler, hinny .

Assignment 5 (2 Points)

Describe the different phases of the behaviour that Langton's Ant shows on a uniform white plane in your own words.

Assignment 6 (2 Point)

Imagine Langton's Ant starting in a white square of an (infinite) chess-board. Depict the first 8 steps.

Assignment 7 (2 Point)

Compare the patterns that Langton's Ant created after N steps for the case **A**: starting on a uniform white plane, with case **B**: starting on a uniform black plane.

Assignment 8 (2 Point)

Explain, why Langton's Ant can be called a two-dimensional Turing machine. Please refer to the formal definition of a Turing machine.