NTIN071 A&G tutorial: Credit requirements

This document describes the requirements for the tutorial class taught by Jakub Bulín. If you are enrolled in another tutorial class, refer to your instructor for the requirements.

Point system. In order to get the credit, you need to gain at least 80 points. There will be a written test for which you can earn up to 120 points. In addition, you can earn up to 20 points during classes, for homework assignments and active participation.

Written test. At the end of the semester (during one of the last two classes, unless stated otherwise), there will be a written test worth 120 points. See below for a list of requirements, a sample test is provided as well. The test may be retaken, up to a maximum of two times. (The dates of the retake tests will be specified later.)

Rules for the written test are as follows:

- You may bring a drinking bottle. Nothing else is allowed at your desk. Pen and paper will be provided. (You may leave your personal belongings inside the classroom but not at your desk.)
- Any electronic devices, phones, smartwatches, wearables, headphones, etc. as well as regular watches are strictly prohibited.
- No talking or whispering to yourself or another student during the test.
- Bathroom breaks are not allowed during the test.
- You are not allowed to write anything on your test paper after the time is up.

Any violation of the rules will result in a zero score for the test, and all incidents will be reported.

Homework and active participation. Homework assignments will be given at the end of each class, and the submission deadline is always the beginning of the following class.

Write your solution on a separate A4 sheet of paper, write your name at the top. Be prepared to present your solution as well. You can receive points only if you are in class. Only a subset of the submitted solutions will be graded.

Homework solutions must be 100% your own work; communicating about them with anyone, searching for hints, using generative AI, etc., is prohibited. It is your responsibility to ensure that no other person has access to your solution.

Active participation consists of presenting solutions to assigned problems, or material from the lectures. Presentations will be partly assigned at random, and partly voluntary. Up to three absences from class per semester may be excused by email, no later than 10 minutes before the start. In that case, neither the homework nor class participation will be graded.

List of requirements for the test

If you have any questions about the requirements, please ask during class.

- Finite automaton for a given regular language (DFA, NFA, ϵ-NFA), extended transition function.
- Proof of non-regularity (Pumping lemma for regular languages, Myhill-Nerode theorem, closure properties).
- State equivalence algorithm, construction of reduced DFA.
- Conversion of ϵ-NFA or NFA to DFA (subset construction).
- Conversion from regular expression to finite automaton and vice versa (including state elimination algorithm).
- Right-linear grammar for a given regular language, derivation.
- Conversion of right-linear grammar to finite automaton and vice versa.
- Context-free grammar for a given context-free language, derivation.
- Proof of non-context-freeness (Pumping lemma for context-free languages, closure properties).
- Construction of a pushdown automaton (acceptance by final state, empty stack, conversion between them), sequence of configurations.
- Conversion of context-free grammar to pushdown automaton.
- Turing machine for a given language, sequence of configurations.
- Classification of a language: prove regularity, prove non-regularity and context-freeness, or prove non-context-freeness.