

Universität Bremen

Finite Automata on Infinite Words and Trees

Winter semester 2009-2010

Course information

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Lectures: Tuesday 14:00-16:00 in MZH Senatssaal (1400)
Thursday 10:00 - 12:00 in GW2 B1400

Website: <http://www.informatik.uni-bremen.de/tdki/lehre/ws09/automata/>

Course content: This course provides an introduction to finite automata on infinite words, finite trees, and infinite trees. Topics covered include: definition of Büchi automata on infinite words, closure properties for Büchi automata, deterministic Büchi automata, definition of Müller, Rabin, and Streett automata, relations between different types of automata on infinite words, determinization of Büchi automata, decision problems for Büchi automata, definition of bottom-up finite tree automata, equivalence of deterministic and non-deterministic bottom-up tree automata, pumping lemma for recognizable tree languages, closure properties for finite tree automata, top-down tree automata, decision problems for automata on finite trees, definition of Büchi, Müller, Rabin, and parity tree automata, relations between different types of automata on infinite trees, closure properties for automata on infinite trees, definition of parity games, determinacy of parity games, complementation problem for automata on infinite trees.

Course prerequisites: Students are expected to be familiar with automata on finite words and comfortable with writing formal mathematical proofs.

Evaluation: There will be two ways for obtaining course credit: an oral exam at the end of the semester, or homework problems. The details will be discussed with students in the first lecture.

Homework: Some of the lectures will be used for discussing solutions to the homework assignments. There will be approximately one homework every two weeks. Homework is to be done in groups of two or three people.

Course materials: Lecture notes, homework problems, and suggested references will be made available on the course website.