

# Algorithms for Model Checking (2IW55)

## Domestic Announcements

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MF 7.073

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## Course organisation:

- ▶ Lectures are (tentatively) organised as follows:
  - 2 September – 12 September (part I, 4 lectures)
  - 23 September – 3 October (part II, 4 lectures)
  - 14 October – 24 October (part III, 3/4 lectures)
- ▶ Assignment deadlines (30% of the final mark; average 5.5/10 needed):
  - Assignment 1: 10 October (available from 12 September)
  - Assignment 2: 8 November (available from 3 October)
- ▶ Exam dates (70% of the final mark; average 5.5/10 needed):
  - Wednesday, 30 October, 2013, 9am - 12 noon
  - Monday, 21 January, 2014, 9am - 12 noon

Up-to-date course information and handouts are made available through:

<http://www.win.tue.nl/~timw/2IW55.php>

Bug-related health issues are communicated also through the above interface

## Part I (basics):

- ▶ syntax and semantics of CTL\* (today)
- ▶ symbolic model checking CTL, counterexamples and fairness
- ▶ the modal  $\mu$ -calculus

## Tentative schedule:

2 Sep	The temporal logics CTL*, CTL and LTL: syntax and semantics
5 Sep	Symbolic Model Checking for CTL
9 Sep	Symbolic Model checking: fairness and counterexamples
12 Sep	Mu-calculus + Assignment

## Part II (advanced):

- ▶ Boolean equation systems for  $\mu$ -calculus model checking
- ▶ Parity Games for model checking

## Tentative schedule:

23 Sep	Boolean Equation Systems	
26 Sep	Parity Games	
30 Sep	Recursive Algorithm for Parity Games	(Maciej Gazda)
3 Oct	Small Progress Measures for Parity Games + Assignment	(Maciej Gazda)

## Part III (advanced++):

- ▶ Model checking with data
- ▶ Data abstraction

## Tentative schedule:

14 Oct		$\mu$ -calculus with data
17 Oct		Parameterised Boolean Equation Systems
21 Oct		Data abstraction
24 Oct		Q&A & Wrap-up

## Additional reading:

- ▶ Handouts (accessible via the website on occasions) and slides
- ▶ Exercises and solutions to the 2010 and a 2009 exam are available from the 2010 and 2009 incarnations of the course's website
- ▶ Book: Model Checking. Edmund M. Clarke, Jr., Orna Grumberg, and Doron A. Peled. MIT Press, ISBN 0-262-03270-8
- ▶ Book: Principles of Model Checking. Christel Baier and Joost-Pieter Katoen. MIT Press, ISBN 978-0-262-02649-9 (mainly for the interested reader)

Note: Books not strictly required, as virtually all slides are self-contained.

## Related Courses (at the TU/e):

A.2	2IF85	Program Verification Techniques (R. Kuiper).
A.2	2IW15	Automated Reasoning (H. Zantema).
B.3	2IW26	System Validation (J.F. Groote).
B.4	2IF96	Seminar Formal System Analysis (H. Zantema).