T–79.4301 Parallel and Distributed Systems (4 ECTS)

T–79.4301 Rinnakkaiset ja hajautetut järjestelmät (4 op)

Lecture 12

28th of April 2008

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Course Feedback

- Remember to give course feedback between 28th of April and 20th of May at 23:59.
- The direct links to the course feedback form are on the course homepage at: `http://www.tcs.hut.fi/Studies/T-79.4301/`
- Lecture 12 (this lecture) slides will be only available on the Web and are not part of the exam requirements.

Members of Model Checking Group

- Leader: Academy Research Fellow Keijo Heljanko
- Members:
  - D.Sc. (Tech.) Tommi Junttila, D.Sc. (Tech.) Heikki Tauriainen, M.Sc. (Tech.) Jori Dubrovin, M.Sc. Siert Wieringa,
  - Five students doing their Masters' Theses full time. Four other students working as summer trainees/research assistants.
- Selected as one of three "Outstanding junior research groups of Helsinki University of Technology (TKK)" Aug 2006–Jul 2008

Research Goal

The main goal of the research is to create methods and tools to enable the cost efficient development of correctly functioning software systems. The main methods are:

- Model based software design: The development of methods and tools that enabled software to be model checked early in the design cycle.
- Bounded model checking: An efficient symbolic model checking method employing techniques from computational logic
- Symbolic partial order methods: Creating methods combining the theory of concurrency with symbolic model checking methods

Main Achievements

- Doctoral Theses on Model Checking: Heljanko (2002), Junttila (2003), Latvala (2005), Jussila (2005), Keinänen (2006), Tauriainen (2006). Journal and conference articles.
- A new state-of-the-art approach to bounded model checking, implemented into the NuSMV2 system:
  - Heljanko, K., Junttila, T., and Latvala, T.: Incremental and Complete Bounded Model Checking for Full PLTL. In Proceedings of CAV'2005 (Computer Aided Verification).
  - Heljanko, K., Junttila, T., Keinänen. M., Lange, M., and Latvala, T.: Bounded Model Checking for Weak Alternating Automata. In CAV'2006.

New Book on Unfoldings

- Unfoldings are an approach based on partial-orders to alleviate the state explosion problem:
  - Esparza, J. and Heljanko, K.: Unfoldings – A Partial-Order Approach to Model Checking. EATCS Monographs in Theoretical Computer Science, Springer-Verlag, ISBN 978-3-540-77425-9, 172 p., 2008.

Main Projects

- Testing, Verification and Synthesis of Distributed Systems
- Model-Based Safety Evaluation of Automation Systems (MODSAFE)
- Lightweight formal Methods for distributed component-based Embedded systems (LIME)
- Computer Aided Verification Theory and Tools (CAV)

Teaching of Verification

- T–79.4301 Parallel and Distributed Systems, Autumn
- T–79.5301 Reactive Systems, Spring
- T–79.5302 Symbolic Model Checking, every second year, next time Autumn 2009
- T–79.5304 Formal Conformance Testing, given by specialist teacher from the industry, every second year, next time Autumn 2008
- T–79.5305 Formal Methods, every second year, next time Autumn 2008