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Formal Methods for Components and Objects

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Revised Selected Papers

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Preface

Large and complex software systems provide infrastructure in all industries today. In order to construct such large systems in a systematic manner, the focus in development methodologies has switched in the last two decades from functional issues to structural issues: both data and functions are encapsulated into software units that are integrated into large systems by means of various techniques supporting reusability and modifiability. This encapsulation principle is essential to both the object-oriented and the more recent component-based software engineering paradigms.

Formal methods have been applied successfully to the verification of medium-sized programs in protocol and hardware design. However, their application to the development of large systems requires more emphasis on specification, modeling and validation techniques supporting the concepts of reusability and modifiability, and their implementation in new extensions of existing programming languages like Java.

The 8th Symposium on Formal Methods for Components and Objects was held in Eindhoven, The Netherlands, November 4–6, 2009. It was realized as a concertation meeting of European projects focusing on formal methods for components and objects. This volume contains 17 revised papers submitted after the symposium by the speakers of each of the following European IST projects involved in the organization of the program:

- IST-FP6 project BIONETS on biologically inspired services evolution for the pervasive age. The contact person for work relating to FMCO is Ludovic Henrio (INRIA Sophia-Antipolis, France).
- The IST-FP7 project COMPAS on compliance-driven models, languages, and architectures for services. The contact person is Schahram Dustdar (Technical University of Vienna, Austria)
- The IST-FP6 project CREDO on modeling and analysis of evolutionary structures for distributed services. The contact person is Frank de Boer (CWI, The Netherlands).
- The IST-FP7 project DEPLOY on industrial deployment of advanced system engineering methods for high productivity and dependability. The contact person is Alexander Romanovsky (Newcastle University, UK).
- The IST-FP7 project HATS on highly adaptable and trustworthy software using formal methods. The contact person is Reiner Hähnle (Chalmers University of Technology, Sweden).
- The IST-FP7 project INESS on integrated European railway signaling system. The contact person for work relating to FMCO is Jim Woodcock (University of York, UK).
- The IST-FP7 project MOGENTES on model-based generation of tests for dependable embedded systems. The contact person for work relating to FMCO is Bernhard Aichernig (TU Graz, Austria).

- The IST-FP6 project PROTEST on property based testing. The contact person is John Derrick (University of Sheffield, UK).
- The IST-FP7 project QUASIMODO on quantitative system properties in model-driven design of embedded systems. The contact person is Kim G. Larsen (Aalborg University, Denmark).

We have also invited members of the working group on Formal Methods and Service-Oriented Architecture (FM-SOA) to participate.

The proceedings of the previous editions of FMCO have been published as volumes 2852, 3188, 3657, 4111, 4709, 5382, and 5751 of Springer's *Lecture Notes in Computer Science*. We believe that these proceedings provide a unique combination of ideas on software engineering and formal methods which reflect the expanding body of knowledge on modern software systems.

Finally, we thank all authors for the high quality of their contributions, and the reviewers for their help in improving the papers for this volume.

June 2010

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Organization

FMCO 2009 was part of the Formal Methods Week at Eindhoven, The Netherlands. Within the Formal Methods Week, the FMCO symposium was co-located with a host of conferences and workshops:

The Symposium on Communicating Process Architectures (CPA)
The International Workshop on Formal Aspects of Component Software (FACS)
The Workshop on Formal Aspects of Security and Trust (FAST)
The International Symposium on Formal Methods (FM)
The International Workshop on Formal Methods for Industrial Critical Systems (FMICS)
The International Workshop on Parallel and Distributed Methods in verifiCation (PDMC)
The 2009 Refine Workshop
The 21st IFIP International Conference on Testing of Communicating Systems (TESTCOM)
The 9th International Workshop on Formal Approaches to Testing of Software (FATES)
The Dutch Testing Day
The Second International FME Conference on Teaching Formal Methods (TFM)

The FMCO symposia are organized in the context of the project Mobi-J, a project founded by a bilateral research program of The Dutch Organization for Scientific Research (NWO) and the Central Public Funding Organization for Academic Research in Germany (DFG). The partners of the Mobi-J projects are: the Centrum voor Wiskunde en Informatica, the Leiden Institute of Advanced Computer Science, and the Christian-Albrechts-Universität Kiel.

This project aims at the development of a programming environment which supports component-based design and the verification of Java programs annotated with assertions. The overall approach is based on an extension of the Java language with a notion of "component" that provides for the encapsulation of its internal processing of data and composition in a network by means of mobile asynchronous channels.

Sponsoring Institutions

The Dutch Organization for Scientific Research (NWO)

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