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Formal Methods for Components and Objects

Second International Symposium, FMCO 2003
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Revised Lectures

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Preface

Large and complex software systems provide the necessary infrastucture in all industries today. In order to construct such large systems in a systematic manner, the focus in the 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 large systems requires a further development of specification and verification techniques supporting the concepts of reusability and modifiability.

In order to bring together researchers and practioners in the areas of software engineering and formal methods, we organized the 2nd International Symposium on Formal Methods for Components and Objects (FMCO) in Leiden, The Netherlands, from November 4 to 7, 2003. The program consisted of invited tutorials and technical presentations given by leading experts in the fields of theoretical computer science and software engineering. The symposium was attended by more than 80 people from all over the world.

This volume contains the contributions of the invited speakers to FMCO 2003. We believe that the presented material provides a unique combination of ideas on software engineering and formal methods which we hope will form an inspiration for those aiming at further bridging the gap between the theory and practice of software engineering.

The very idea to organize FMCO arose out of the NWO/DFG bilateral project Mobi-J. In particular we acknowledge the financial support of the NWO funding of Mobi-J. Additional financial support was provided by the Lorentz Center, the IST project Omega (2001-33522), the Dutch Institute for Programming Research and Algorithmics (IPA), the Royal Netherlands Academy of Arts and Sciences (KNAW), the Centrum voor Wiskunde en Informatica (CWI), and the Leiden Institute of Advanced Computer Science (LIACS).

July 2004

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The Mobi-J Project

Mobi-J is a project funded 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:

- Centrum voor Wiskunde en Informatica (F.S. de Boer)
- Leiden Institute of Advanced Computer Science (M.M. Bonsangue)
- Christian-Albrechts-Universität Kiel (W.-P. de Roever)

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

The activities of Mobi-J include the organization of international symposia funded by the NWO and Ph.D. research funded by the DFG. By means of regular meetings the partners discuss intensively Ph.D. research involving Mobi-J related topics. Mobi-J also maintains contacts with other German universities, including the universities of Oldenburg and Munich, and a close collaboration with the European IST project OMEGA.

The Omega Project

The overall aim of the European IST project Omega (2001-33522) is the definition of a development methodology in UML for embedded and real-time systems based on formal verification techniques. The approach is based on a formal semantics of a suitable subset of UML, adapted and extended where needed with a special emphasis on time-related aspects.

The Omega project involves the following partners: VERIMAG (France, Coordinator), Centrum voor Wiskunde en Informatica (The Netherlands), Christian-Albrechts-Universität (Germany), University of Nijmegen (The Netherlands), Weizmann Institute (Israel), OFFIS (Germany), EADS Launch Vehicles (France), France Telecom R&D (France), Israeli Aircraft Industries (Israel), and National Aerospace Laboratory (The Netherlands).

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