Lecture Notes in Computer Science 7320

Commenced Publication in 1973
Founding and Former Series Editors:
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Formal Methods for Model-Driven Engineering

12th International School
on Formal Methods for the Design of Computer,
Communication, and Software Systems, SFM 2012
Bertinoro, Italy, June 18-23, 2012
Advanced Lectures

Springer

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ISSN 0302-9743 e-ISSN 1611-3349
ISBN 978-3-642-30981-6 e-ISBN 978-3-642-30982-3
DOI 10.1007/978-3-642-30982-3
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2012939229

CR Subject Classification (1998): D.2.4, D.2, D.3.1, F.3-4, K.6, C.3

LNCS Sublibrary: SL 2 – Programming and Software Engineering

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

This volume presents a set of papers accompanying the lectures of the 12th International School on Formal Methods for the Design of Computer, Communication and Software Systems (SFM).

This series of schools addresses the use of formal methods in computer science as a prominent approach to the rigorous design of the above-mentioned systems. The main aim of the SFM series is to offer a good spectrum of current research in foundations as well as applications of formal methods, which can be of help for graduate students and young researchers who intend to approach the field.

SFM 2012 was devoted to model-driven engineering and covered several topics including modeling languages, model transformations, functional and performance modeling and analysis, and model evolution management.

This volume comprises 11 articles. Selic's paper reviews how UML has changed over time and what new features it can provide that support not only informal lightweight sketching in early phases of development, but also full implementation capability. The paper by Andova, Van Den Brand, Engelen, and Verhoeff discusses the basic aspects of model-driven engineering in combination with textual domain-specific languages developed using the language invention pattern. Cabot and Gogolla present a comprehensive view of OCL and its applications including the use for expressing model transformations, well-formedness rules, and code-generation templates. The paper by Di Ruscio, Eramo, and Pierantonio introduces a classification of model-transformation approaches and languages and illustrates the characteristics of the most prominent ones. Giese, Lambers, Becker, Hildebrandt, Neumann, Vogel, and Wätzoldt show that graph transformations can be employed to engineer solutions for model-driven development, dynamic adaptation, and models at run time. The paper by De Caso, Braberman, Garbervetsky, and Uchitel deals with enabledness-preserving abstractions, which are concise representations of the behavior space for software engineering artifacts such as source code and specifications. Petriu, Alhaj, and Tawhid consider quantitative performance analysis of UML software models annotated with performance attributes according to the MARTE profile and describe a model-transformation chain that enables the integration of performance analysis in a UML-based software development process. Becker's paper gives an overview on the process of model-driven quality analyses with a special focus on issues that arise in fully automated approaches. The paper by Cortellessa, Di Marco, and Trubiani addresses the problem of capturing performance problems in the software design process by means of software performance antipatterns. Brosch, Kappel, Langer, Seidl, Wieland, and Wimmer offer an introduction to the foundations of model versioning, the underlying technologies for processing models and their evolution, and the state of the art in the field. Finally, the paper by Vallecillo, Gogolla, Burgueño, Wimmer, and Hamann presents model-transformation

specification and testing by discussing and classifying some of the existing approaches and introducing a generalization of model-transformation contracts.

We believe that this book offers a useful view of what has been done and what is going on worldwide in the field of formal methods for model-driven engineering. We wish to thank all the speakers and all the participants for a lively and fruitful school. We also wish to thank the entire staff of the University Residential Center of Bertinoro for the organizational and administrative support.

June 2012

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