Lecture Notes in Computer Science 1816
Edited by G. Goos, J. Hartmanis and J. van Leeuwen

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Teodor Rus (Ed.)

Algebraic Methodology and Software Technology

8th International Conference, AMAST 2000
Iowa City, Iowa, USA, May 20-27, 2000
Proceedings

Springer

Volume Editor

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Cataloging-in-Publication Data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Algebraic methodology and software technology : 8th international conference ; proceedings / AMAST 2000, Iowa City, Iowa, USA, May 20 - 27, 2000. Teodor Rus (ed.). - Berlin ; Heidelberg ; New York ; Barcelona ; Hong Kong ; London ; Milan ; Paris ; Singapore ; Tokyo : Springer, 2000
(Lecture notes in computer science ; Vol. 1816)
ISBN 3-540-67530-2

CR Subject Classification (1998): F.3-4, D.2, C.3, D.1.6, I.2.3, I.1.3

ISSN 0302-9743
ISBN 3-540-67530-2 Springer-Verlag Berlin Heidelberg New York

Springer-Verlag is a company in the BertelsmannSpringer publishing group.
© Springer-Verlag Berlin Heidelberg 2000
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Boller Mediendesign
Printed on acid-free paper SPIN: 10720319 06/3142 5 4 3 2 1 0

Preface

The AMAST movement was initiated in 1989 with the First International Conference on Algebraic Methodology and Software Technology (AMAST), held on May 21–23 in Iowa City, Iowa, and aimed at setting the development of software technology on a mathematical basis. The virtue of the software technology envisioned by AMAST is the capability to produce software that has the following properties: (a) it is correct and its correctness can be proved mathematically, (b) it is safe, such that it can be used in the implementation of critical systems, (c) it is portable, i.e., it is independent of computing platforms and language generations, and (d) it is evolutionary, i.e., it is self-adaptable and evolves with the problem domain. Ten years later a myriad of workshops, conferences, and research programs that share the goals of the AMAST movement have occurred. This can be taken as proof that the AMAST vision is right. However, often the myriad of workshops, conferences, and research programs lack the clear objectives and the coordination of their goals towards the software technology envisioned by AMAST. This can be taken as a proof that AMAST is still necessary.

The approach of software development promoted by AMAST is based on the integration of the two fundamental mechanisms for problem solving, *specification* and *computation*, into a general problem-solving model by a machine-independent methodology where: (1) specification allows one to develop the mathematical model of the problem at hand and to represent this model in a mathematical language; (2) computation allows one to apply specific *calculi* on problem representation and its input data to deduce the solution. A major aspect of the AMAST interpretation of the algebraic methodology is that software environments designed to help develop software systems should be populated by tools, components, and patterns. Tools are efficient implementations of universal algorithms; components are stand-alone software automatically generated by tools from finite specifications; patterns are domain-oriented composition schemes mapping components into software systems. This ensures the development of a software factory capable of producing software systems having the qualities required by the AMAST movement.

Ten years after its initiation AMAST is no longer a simple grass-roots movement. Instead, AMAST has become a professional movement whose goals are embraced by a large international following. As long as AMAST remains a movement of world-wide computer science researchers determined by philosophical and intellectual conviction rather than by academic or business opportunism, AMAST can provide the balance and the common sense needed by the myriad of formal-methods trends, that are often short sighted by short-term goals of for-profit-organizations. This makes AMAST further necessary as the unique worldwide movement with the goal of *creating the mathematical methodology for the development of software technology.* The transformation of algebraic methodology into the software technology is a dynamic process that involves both static and evolutionary knowledge. Since the more one discovers the more remains to be discovered this process never ends. Hence, AMAST will always be needed to balance the process of building the software factory.

In response to the call for papers, 53 papers were submitted to AMAST 2000 and 29 have been selected by the program committee. The relatively small number of papers submitted tells us that the recent advances in software system design and application requires new forms of research dissemination. It seems that the classical form of paper presentation cannot catch the excitement raised by the current stage of the software technology. Therefore AMAST 2000 takes a step ahead on research dissemination by mixing paper presentations with open panel discussions. The discussion of the software worker education is guided by David Lorge Parnas, who introduces us to "A software engineering program of lasting value" and Jeannette M. Wing, who presents "Thoughts on integrating formal methods into a computer science curriculum". The technical meetings are organized around the following invited talks: Egidio Astesiano, "Plugging data constructs into paradigm-specific languages: towards an application to UML"; Yuri Gurevich, "ASM formalware in the software engineering cycle"; Michael Healy, "Applying category theory to derive engineering software from encoded knowledge"; Oege de Moor, "Pointwise relational programming"; David Lorge Parnas, "Making mathematical methods more practical for the software developer"; and Martin Wirsings, "Algebraic state machines". The excitement is however provided by the three open-panel discussions organized by Joseph Goguen, "New computing logics"; Douglas Smith, "Automatic program generation"; and Roger Shultz, "From software model to commercial product". We thank all these invited speakers for sharing their expertise with us.

Here I thank those whose generosity made possible the organization of this AMAST conference. Ralph Wachter, Office of Naval Research, helped us to initiate AMAST, to lead it towards its maturity, and finally to celebrate its 10th anniversary. Thanks are due to the University of Iowa, Dean Linda Maxson, Associate Provost Lee Anna Clark, and Vice President for Research David Skorton, for their financial support, and particularly Steve Bruell, Chair of Computer Science Department, for his continual support. I also thank Arthur Fleck and the AMAST steering committee for the guidance and all the program committee members for their effort during paper reviewing and selection. Finally, I thank all those who submitted papers to this edition of AMAST. I believe that the result of a peer-evaluation process is rather subjective and therefore I congratulate both those whose papers were accepted as well those whose papers were not accepted. Last (of course, not least) my thanks go to the organizing committee, particularly to Robert Kooima, and to Springer-Verlag, particularly to Alfred Hofmann, Anna Kramer, and Antje Endemann, whose excellent cooperation and advice made these proceedings feasible.

May 2000 Teodor Rus

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Contents

Education Day

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Session 1

Session 2

Session 3

Session 4

Session 5

Session 6