Lecture Notes in Computer Science 501

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Algebraic System Specification and Development

A Survey and Annotated Bibliography

Springer-Verlag
Berlin Heidelberg New York
London Paris Tokyo
Hong Kong Barcelona
Budapest

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CR Subject Classification (1991): D.2.1.-2., D.2.4, D.2.6, D.2.10-m, D.3.1-3, F.3.1-2, I.1

ISBN 3-540-54060-1 Springer-Verlag Berlin Heidelberg New York
ISBN 0-387-54060-1 Springer-Verlag New York Berlin Heidelberg

Printing and binding: Druckhaus Beltz, Hemsbach/Bergstr.
2145/3140-543210 - Printed on acid-free paper

Preface

Methods for the algebraic specification of abstract data types were proposed in the early seventies in the USA and Canada and became a major research issue in Europe shortly afterwards. Since then the algebraic approach has come to play a central role in research on formal program specification and development, as its range of applications was extended to the specification of complete software systems, to the formal description of the program development process, and to the uniform definition of syntax and semantics of programming languages. Today this approach extends beyond just software to the development of integrated hardware and software systems. These flourishing activities in the area of algebraic specifications have led to an abundance of approaches, theories and concepts, which have universal algebra, category theory and logic as a common mathematical basis.

The present volume is an annotated bibliography which attempts to provide an up-to-date overview of past and present work on algebraic specification. No attempt is made to provide a coherent introduction to the topic for beginners; the intention is rather to provide a guide to the current literature for researchers in algebraic specification and neighbouring fields. Some indications of how the different approaches are related are included, together with some ideas concerning possible future directions.

This volume arose out of the work of the COMPASS Basic Research Working Group, funded by the European Community under the Basic Research Action programme, ref. no. 3264 (see [Kri 90a], [KP 90]) and coordinated by Bernd Krieg-Brückner of the Universität Bremen. The name COMPASS stands for "a COMPrehensive Algebraic approach to System Specification and development". An early version of this document was included in the original COMPASS project proposal as a review of the state of the art [Kri 89a]. The current version is the result of suggestions for improvements from the participants in the COMPASS project, assembled and edited into a more or less coherent form by five editors. Since the COMPASS working group includes most of the leading European experts in algebraic specification, the result should be a relatively comprehensive overview of the main work in the field. But because of the somewhat haphazard way in which this volume arose, there are inevitable gaps and inaccuracies. We apologize for these in advance, and in particular to anybody whose work has inadvertently been omitted. In spite of its deficiencies, we hope that it nevertheless represents a useful snapshot of the current state of the art.

Acknowledgements

We thank those members of the COMPASS working group who contributed to the original grant proposal and/or who later submitted suggestions for improvements. The members of COMPASS are listed overleaf. Thanks also to Oliver Schoett for suggestions for improvement, and to Monika Lekuse for help with the editing. Special thanks to Bernd Krieg-Brückner for coordinating COMPASS.

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