

TEXTS AND MONOGRAPHS IN COMPUTER SCIENCE

SPECIFICATION AND TRANSFORMATION OF PROGRAMS

**A FORMAL APPROACH TO
SOFTWARE DEVELOPMENT**

Helmut A. Partsch



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Specification And Transformation Of Programs

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Specification And Transformation Of Programs:

Program Development by Specification and Transformation Berthold Hoffmann, Bernd Krieg-Brückner, 1993-08-30

This volume gives a coherent presentation of the outcome of the project PROSPECTRA PROgram development by SPECification and TRANSformation that aims to provide a rigorous methodology for developing correct software and a comprehensive support system. The results are substantial: a theoretically well founded methodology covering the whole development cycle; a very high level specification and transformation language family allowing meta program development and formalization of the development process itself; and a prototype development system supporting structure editing, incremental static semantic checking, interactive context sensitive transformation and verification, development of transformation meta programs, version management and so on, with an initial library of specifications and a sizeable collection of implemented transformations. The intended audience for this documentation is the academic community working in this and related areas and those members of the industrial community interested in the use of formal methods.

Specification and Transformation of Programs Helmut A. Partsch, 1990-07-05. Specification and transformation of programs is short for a methodology of software development where from a formal specification of a problem to be solved, programs correctly solving that problem are constructed by stepwise application of formal semantics preserving transformation rules. The approach considers programming as a formal activity. Consequently it requires some mathematical maturity and above all the will to try something new. A somewhat experienced programmer or a third or fourth year student in computer science should be able to master most of this material at least this is the level I have aimed at. This book is primarily intended as a general introductory textbook on transformational methodology. As with any methodology, reading and understanding is necessary but not sufficient. Therefore most of the chapters contain a set of exercises for practising as homework. Solutions to these exercises exist and can in principle be obtained at nominal cost from the author upon request on appropriate letterhead. In addition the book also can be seen as a comprehensive account of the particular transformational methodology developed within the Munich CIP project.

Specification and Transformation of Programs Helmut A. Partsch, 2012-12-06. Specification and transformation of programs is short for a methodology of software development where from a formal specification of a problem to be solved, programs correctly solving that problem are constructed by stepwise application of formal semantics preserving transformation rules. The approach considers programming as a formal activity. Consequently it requires some mathematical maturity and above all the will to try something new. A somewhat experienced programmer or a third or fourth year student in computer science should be able to master most of this material at least this is the level I have aimed at. This book is primarily intended as a general introductory textbook on transformational methodology. As with any methodology, reading and understanding is necessary but not sufficient. Therefore most of the chapters contain a set of exercises for practising as homework. Solutions to these exercises exist and can in principle be obtained at nominal cost from the author.

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Program Specification and Transformation Lambert Meertens, IFIP Technical Committee 2--Programming, IFIP Working Group 2.1 on Algol, 1987 The economic construction of correct and efficient programs is the central issue in the field of program specification and transformation Research in this field is crucial with the advent of cheap computing power in a society increasingly dependent on the availability of error free programs In recognizing this need this book presents examination of a variety of aspects from practical experience in applying transformational methodology to actual production of software via examples of transformational derivations of algorithms By thus illustrating the state of the art and providing results of recent research the book should not only aid scientists but also show professionals just how their work will be influenced by these developments

Program Development by Specification and Transformation Berthold Hoffmann, 1993 This volume gives a coherent presentation of the outcome of the project PROSPECTRA PROgram development by SPECification and TRAnsformation that aims to provide a rigorous methodology for developing correct software and a comprehensive support system The results are substantial a theoretically well founded methodology covering the whole development cycle a very high level specification and transformation language family allowing meta program development and formalization of the development process itself and a prototype development system supporting structure editing incremental static semantic checking interactive context sensitivetransformation and verification development of transformation meta programs version management and so on with an initial library of specifications and a sizeable collection of implemented transformations The intended audience for this documentation is the academic community working in this and related areas and those members of the industrial community interested in the use of formal methods

Program Transformation and Programming Environments F.L. Bauer, Peter Pepper, H. Remus, 2012-12-06 Proceedings of the NATO Advanced Research Workshop on Program Transformation and Programming Environments

VDM '91. Formal Software Development Methods. 4th International Symposium of VDM Europe, Noordwijkerhout, The Netherlands, October 21-25, 1991. Proceedings Søren Prehn, W. J. Toetenel, 1991 The proceedings of the fourth Vienna Development Method Symposium VDM 91 are published here in two volumes Previous VDM symposia were held in 1987 LNCS 252 1988 LNCS 328 and 1990 LNCS 428 The VDM symposia have been organized by VDM Europe formed in 1985 as an advisory board sponsored by the Commission of the European Communities The VDM Europe working group consisted of researchers software engineers and programmers all interested in promoting the industrial usage of formal methods for software development The fourth VDM symposium presented not only VDM but also a large number of other methods for formal software development Volume 1 contains conference contributions It has four parts contributions of invited speakers papers project reports and tools demonstration abstracts The emphasis is on methods and calculi for development verification and verification tools support

experiences from doing developments and the associated theoretical problems Volume 2 contains four introductory tutorials on LARCH Refinement Calculus VDM and RAISE and four advanced tutorials on ABEL PROSPECTRA The B Method and The Stack They present a comprehensive account of the state of the art *Algebraic System Specification and Development* Michel Bidoit, 1991-06-26 Methods for the algebraic specification of abstract data types were proposed in the early 1970s 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 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 This volume is an annotated bibliography which provides 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 neighboring fields Some indications of how the different approaches are related are included together with some ideas concerning possible future directions

TAPSOF '89. Proceedings of the International Joint Conference on Theory and Practice of Software Development Barcelona, Spain, March 13-17, 1989 Josep Diaz, Fernando Orejas, 1989-02-27 TAPSOF 89 is the Third International Joint Conference on Theory and Practice of Software Development held in Barcelona Spain March 13 17 1989 The conference consisted of three parts Advanced Seminar on Foundations of Innovative Software Development Colloquium on Trees in Algebra and Programming CAAP 89 Colloquium on Current Issues in Programming Languages CCIPL The TAPSOF 89 Conference Proceedings are published in two volumes The first volume includes the papers from CAAP plus the more theoretical ones of the invited papers The second volume comprises the papers from CCIPL and the invited papers more relevant to current issues in programming languages

Logic Program Synthesis and Transformation Yves Deville, 2012-12-06 This volume contains extended versions of papers presented at the Third International Workshop on Logic Program Synthesis and Transformation LOPSTR 93 held in Louvain la Neuve in July 1993 Much of the success of the workshop is due to Yves Deville who served as Organizer and Chair Many people believe that machine support for the development and evolution of software will play a critical role in future software engineering environments Machine support requires the formalization of the artifacts and processes that arise during the software lifecycle Logic languages are unique in providing a uniform declarative notation for precisely describing application domains software requirements and for prescribing behavior via logic programs Program synthesis and transformation techniques formalize the process of developing correct and efficient programs from requirement specifications The natural intersection

of these two fields of research has been the focus of the LOPSTR workshops. The papers in this volume address many aspects of software development including deductive synthesis, inductive synthesis, transformations for optimizing programs and exploiting parallelism, program analysis techniques particularly via abstract interpretation, meta programming languages and tool support and various extensions to Prolog like languages admitting non Horn clauses, functions and constraints. Despite the progress represented in this volume, the transition from laboratory to practice is fraught with difficulties.

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