SPECIFICATION AND TRANSFORMATION OF PROGRAMS

A FORMAL APPROACH TO SOFTWARE DEVELOPMENT

Helmut A. Partsch

Specification And Transformation Of Programs

Søren Prehn,W. J. Toetenel

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 sensitivetransformation and verification development of transformation meta programs version management and so on with an initial libraryof 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

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 **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 **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 *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 libraryof 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 **Modern Software Tools for Scientific Computing** E. Arge,A. Bruaset,Hans Petter Langtangen,1997-04 The purpose of this book is to survey some recent advances in the development of software tools for scientific computing This book presents 17 carefully selected and refereed chapters originally presented at the SciTools 96 Workshop in Oslo Norway The chapters emphasize the design of large software codes computational efficiency object oriented programming in scientific computing reliability of numerical software and parallel computing *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 the VDM Europe formed in 1985 as an advisory board sponsored by the Commission of the European Communities The VDM Europe working group consisted of reasearchers software engineers and programmers all interested in prommoting 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 the 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 Volume2 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 PUBLISHER S WEBSITE **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 **TAPSOFT '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 TAPSOFT 89 is the Third International Joint Conference on Theory and Practice of Software Development held in Barcelona Spain March 13 17 1989 The conference consissted 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 TAPSOFT 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 transfonnation 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 develop ment including deductive synthesis inductive synthesis transforma tions 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 **Recent Trends in Data Type Specification** Hans-Jörg Kreowski,2013-06-29 **Advances in Systems, Computing Sciences and Software Engineering** Tarek Sobh,Khaled Elleithy,2007-09-27 Advances in Systems Computing Sciences and Software Engineering This book includes the proceedings of the International Conference on Systems Computing Sciences and Software Engineering SCSS 05 The proceedings are a set of rigorously reviewed world class manuscripts addressing and detailing state of the art research projects in the areas of computer science software engineering computer engineering systems sciences and engineering information technology parallel and distributed computing and web based programming SCSS 05 was part of the International Joint Conferences on Computer Information and Systems Sciences and Engineering CISSE 05 www cisse2005 org the World s first Engineering Computing and Systems Research E Conference CISSE 05 was the first high caliber Research Conference in the world to be completely conducted online in real time via the internet CISSE 05 received 255 research paper submissions and the final program included 140 accepted papers from more than 45 countries The concept and format of CISSE 05 were very exciting and ground breaking The PowerPoint presentations final paper manuscripts and time schedule for live presentations over the web had been available for 3 weeks prior to the start of the conference for all registrants so they could choose the presentations they want to attend and think about questions that they might want to ask The live audio presentations were also recorded and were part of the permanent CISSE archive which also included all power point presentations and papers SCSS 05 provided a virtual forum for presentation and discussion of the state of the art research on Systems Computing Sciences and Software Engineering **Logic Program Synthesis and Transformation** Norbert E. Fuchs,2003-05-20 This volume contains the papers from the Seventh International Workshop on Logic Program Synthesis and Transformation LOPSTR 97 that took place in Leuven Belgium on July 10 12 1997 back to back with the Fourteenth International Conference on Logic Programming ICLP 97 Both ICLP and LOPSTR were organised by the K U Leuven Department of Computer Science LOPSTR 97 was sponsored by Compulog Net and by the Flanders Research

Network on Declarative Methods in Computer Science LOPSTR 97 had 39 participants from 13 countries There were two invited talks by Wolfgang Bibel Darmstadt on A multi level approach to program synthesis and by Henning Christiansen Roskilde on Implicit program synthesis by a reversible metainterpreter Extended versions of both talks appear in this volume There were 19 technical papers accepted for presentation at LOPSTR 97 out of 33 submissions Of these 15 appear in extended versions in this volume Their topics range over the fields of program synthesis program transformation program analysis tabling metaprogramming and inductive logic programming *Logic-Based Program Synthesis and Transformation* Germán Puebla,2007-05-22 This book constitutes the thoroughly refereed postproceedings of the 16th International Symposium on Logic Based Program Synthesis and Transformation LOPSTR 2006 held in Venice Italy July 2006 in conjunction with ICALP 2006 PPDP 2006 and CSFW 2006 The 14 revised full papers cover tools for program development partial evaluation and program transformation security and synthesis debugging and testing as well as termination and analysis **Formal Engineering for Industrial Software Development** Shaoying Liu,2013-03-09 In any serious engineering discipline it would be unthinkable to construct a large system without having a precise notion of what is to be built and without verifying how the system is expected to function Software engineering is no different in this respect Formal methods involve the use of mathematical notation and calculus in software development such methods are difficult to apply to large scale systems with practical constraints e g limited developer skills time and budget restrictions changing requirements Here Liu claims that formal engineering methods may bridge this gap He advocates the incorporation of mathematical notation into the software engineering process thus substantially improving the rigor comprehensibility and effectiveness of the methods commonly used in industry This book provides an introduction to the SOFL Structured Object Oriented Formal Language method that was designed and industry tested by the author Written in a style suitable for lecture courses or for use by professionals there are numerous exercises and a significant real world case study so the readers are provided with all the knowledge and examples needed to successfully apply the method in their own projects **Perspectives of Systems Informatics** Andrei Voronkov,Irina Virbitskaite,2007-08-04 This book constitutes the thoroughly refereed post conference proceedings of the 6th International Andrei Ershov Memorial Conference PSI 2006 held in Akademgorodok Novosibirsk Russia in June 2006 The 30 revised full papers and 10 revised short papers presented together with 5 invited papers address all current aspects of theoretical computer science programming methodology and new information technologies **Structured Object-Oriented Formal Language and Method** Shaoying Liu,Zhenhua Duan,2016-03-17 This book constitutes the thoroughly refereed post workshop proceedings of the 5th International Workshop on Structured Object Oriented Formal Language and Method SOFL MSVL 2015 held in Paris France in November 2015 The 15 papers presented in this volume were carefully reviewed and selected from 22 submissions The focus of this workshops was on following subjects Modeling specification verification model checking testing debugging transformation

and algorithm   **Methods of Programming** M. Broy,1991 The systematic development of software systems is a central task of computing science A software system is the result of putting together knowledge about the application the requirements and the structures of computing science Under the heading CIP Computer aided Intuition guided Programming a group of researchers led by Prof F L Bauer and Prof K Samelson started work in 1975 in the direction of formal program specification transformational programming and tool supportfor program development The collection of papers in this volume presents examples of a formal approach to programming language concepts and program development based on algebraic specifications and program transformations Examples are also presented of evolutions and modificationsof the original ideas of the CIP project The topics range from descriptionsof the program development process to derivations of algorithms from specifications The volume is dedicated to Prof F L Bauer PUBLISHER S WEBSITE   *Automatic Program Development* Olivier Danvy,Fritz Henglein,Harry Mairson,Alberto Pettorossi,2008-01-12 This work a tribute to renowned researcher Robert Paige is a collection of revised papers published in his honor in the Higher Order and Symbolic Computation Journal in 2003 and 2005 Among them there are two key papers a retrospective view of his research lines and a proposal for future studies in the area of the automatic program derivation The book also includes some papers by members of the IFIP Working Group 2 1 of which Bob was an active member

Embracing the Tune of Appearance: An Mental Symphony within **Specification And Transformation Of Programs**

In a global eaten by monitors and the ceaseless chatter of fast interaction, the melodic beauty and emotional symphony produced by the published word usually fade into the background, eclipsed by the constant noise and disruptions that permeate our lives. However, nestled within the pages of **Specification And Transformation Of Programs** an enchanting literary treasure filled with raw feelings, lies an immersive symphony waiting to be embraced. Crafted by a masterful composer of language, this interesting masterpiece conducts viewers on a psychological trip, skillfully unraveling the hidden melodies and profound affect resonating within each cautiously crafted phrase. Within the depths with this touching assessment, we can examine the book is central harmonies, analyze their enthralling writing model, and surrender ourselves to the profound resonance that echoes in the depths of readers souls.

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