SPECIFICATION AND TRANSFORMATION OF PROGRAMS

A FORMAL APPROACH TO SOFTWARE DEVELOPMENT

Helmut A. Partsch

Specification And Transformation Of Programs A Formal Approach To Software Development

Walter R. Cleaveland

Specification And Transformation Of Programs A Formal Approach To Software Development:

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   **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,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   **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   **The Impact of CASE Technology on Software Processes** Daniel Cooke,1994 This review volume consists of articles concerning CASE technology and research as discussed from two perspectives For the most part the available CASE technology is intended to automate certain phases of the software development life cycle The book contains articles which focus on how the current technology alters the nature of software engineering efforts Papers which delve into the knowledge a software engineer needs to possess and how the software engineer s work content has or may change are included Cultural as well as technical considerations are discussed The current CASE technology exists to automate phases of the software development life cycle thus affecting software development in the short term but we cannot ignore the CASE research efforts toward a higher generation language Such a language should affect software development in the long term Papers suggesting how these languages may alter the nature of software engineering in the future are presented   **Algorithimic Languages and Calculi** Richard Bird,Lambert Meerkens,2016-01-09 The general theme of this conference is notations methods and tool support for the calculation of programs from specifications The purpose of this working conference is to present the results of ongoing research descriptions of existing and proposed systems and applications to the production of practical software   *Algebraic Methodology and Software Technology* Martin Wirsing,Maurice Nivat,1996-06-19 Content Description Includes bibliographical references and index   Knowledge-based Software Development for Real-time Distributed Systems Jeffrey J.-P. Tsai,Thomas J. Weigert,1993 The interplay of artificial intelligence and software engineering has been an interesting and an active area in research institution and industry This book covers the state of the art in the use of knowledge based approaches for software specification design implementation

testing and debugging Starting with an introduction to various software engineering paradigms and knowledge based software systems the book continues with the discussion of using hybrid knowledge representation as a basis to specify software requirements to facilitate specification analysis and transformation of real time distributed software systems A formal requirements specification language using non monotonic logic temporal logic frames and production systems for new software engineering paradigms such as rapid prototyping operational specification and transformational implementation is also discussed in detail Examples from switching and other applications are used to illustrate the requirements language Finally the development specification and verification of knowledge based systems are investigated   High-Integrity System Specification and Design Jonathan P. Bowen,Michael G. Hinchey,2012-12-06 Errata detected in Taylor s Logarithms London 4to 1792 sic 14 18 3 6 Kk Co sine of 3398 3298 Nautical Almanac 1832 In the list of ERRATA detected in Taylor s Logarithms for cos 4 18 3 read cos 14 18 2 Nautical Almanac 1833 ERRATUM ofthe ERRATUM ofthe ERRATA of TAYLOR S Logarithms For cos 4 18 3 read cos 14 18 3 Nautical Almanac 1836 In the 1820s an Englishman named Charles Babbage designed and partly built a calculating machine originally intended for use in deriving and printing logarithmic and other tables used in the shipping industry At that time such tables were often inaccurate copied carelessly and had been instrumental in causing a number of maritime disasters Babbage s machine called a Difference Engine because it performed its cal culations using the principle of partial differences was intended to substantially reduce the number of errors made by humans calculating the tables Babbage had also designed but never built a forerunner of the modern printer which would also reduce the number of errors admitted during the transcription of the results Nowadays a system implemented to perform the function of Babbage s engine would be classed as safety critical That is the failure of the system to produce correct results could result in the loss of human life mass destruction of property in the form of ships and cargo as well as financial losses and loss of competitive advantage for the shipping firm   Programming Languages and System Architectures Jürg Gutknecht,1994-02-22 Programming languages and system architectures are at the frontiers of two different worlds The conference on which this book is based was an adventure in a land where the two worlds the formal world of algorithms and the physical world of electronic circuits interact The participants explored this land under the guidance of internationally renowned researchers such as Butler W Lampson Susan Graham Jan L A van de Snepscheut and C A R Hoare all of whom gave invited papers The volume includes these papers together with sixteen session papers Subjects of special interest include programing language design and history programming environments programming methods operating systems compiler construction and innovative system architectures   Calculational System Design M. Broy,Ralf Steinbrüggen,1999 Computer Science has made considerable progress in making complex software and hardware systems more reliable This is a result of practical experience and continuous process improvement on one side and of a better and deeper understanding of the fundamentals of software and system engineering on the other side Recent encouraging trends

are a strong integration of formal techniques with practical industrial development methods and more advanced support tools such as modelling verification and model checking support systems This active area of research has a relatively short term horizon with respect to transferring technology to industrial applications This volume is focusing on techniques and the scientific basis for calculation based development of software and hardware systems as a foundation for advanced methods and tools for software and system engineering This includes topics of specification description methodology refinement verification and implementation The volume presents new trends and insights reflecting the current state of the art in the scientific foundation of these techniques since such a foundation is an indispensable prerequisite for advanced development methods   Programming Languages and Systems S. Doaitse Swierstra,1999-03-10 This is the second time that of ESOP has formed part of the ETAPS cluster of conferences workshops working group meetings and other associated activities One of the results of colocatingso many conferences is a reduction in the number of possibilities to submit a paper to a European conference and the increased competition between conferences that occurs when boundaries between indiv ual conferences have not yet become well established This may have been the reason for the fact that only 44 submission were received this year On the other hand we feel that the average quality of submissions has gone up and thus the program committee was able to select 18 good papers only one less than the year before The program committee did not meet physically and all discussion was done usinga Web driven data base system Despite some mixed feelings there is an overall tendency to appreciate the extra time available for giving papers a s ond look and really going into comments made by other program committee members I want to thank my fellow program committee members for the work they have put into the refereeingprocess and the valuable feedback they have given to authors I want to thank the referees for their work and many detailed comments and nally I want to thank everyone who has submitted a paper without authors no conference

Relational Methods for Computer Science Applications Ewa Orlowska,Andrzej Szalas,2001-02-26   Software and Compilers for Embedded Systems Andreas Krall,2003-09-16 This book constitutes the refereed proceedings of the 7th International Workshop on Software and Compilers for Embedded Systems SCOPES 2003 held in Vienna Austria in September 2003 The 26 revised full papers presented were carefully reviewed and selected from 43 submissions The papers are organized in topical sections on code size reduction code selection loop optimizations automatic retargeting system design register allocation offset assignment analysis and profiling and memory and cache optimzations   **Conference Record of POPL '96** ,1996   **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

CONCUR '92 Walter R. Cleaveland,1992-08-12 This book contains a selection of research papers describing recent advancesin the theory of concurrent systems and their applications The papers were all presented at the CONCUR 92 conference which has emerged as the premiere conference on formal aspects of concurrency The authors include such prominent researchers as R Milner A Pnueli N Lynch and V R Pratt The results represent advances in the mathematical understanding of the behavior of concurrent systems topics covered include process algebras models of true concurrency compositional verification techniques temporal logic verification case studies models of probabilistic and real time systems models of systems with dynamic structure and algorithms and decidability results for system analysis A key feature of CONCUR is its breadth in one volume it presents a snapshot of the state of the art in concurrency theory Assuch it is indispensible to researchers and would be researchers in theformal analysis of concurrent systems **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 **System Development and Ada** A. Nico Habermann,Ugo Montanari,1987-09-23 The collection of papers published in this book was initially presented at the Workshop on Software Factories and Ada held on Capri May 26 30 1986 The subject of the book is software development environments Software development is treated from three viewpoints methodologies language issues and mechanisms Of particular interest are the discussions of automation of the development process and the formalization of software development specifications Several new methodologies are described many of which are available on the commercial market New is in particular the formalization of the design and development process Interesting ideas are presented on planning the design process and on supporting project management by formal tools The reader will find a variety of interesting methodologies and mechanisms that are operational The book is suitable for readers interested in knowing in which direction programming environment research is moving *Prototyping-Oriented Software*

Development Walter R. Bischofberger,Gustav Pomberger,2012-12-06 This book is intended for anyone who plans designs and implements software systems for anyone who is involved with quality assurance and hence for anyone who is interested in the practicability of modern concepts methods and tools in the software development process The book aims at software engineers and at students with specialized interests in the area of software engineering The reader is expected to be familiar with the fundamental concepts of software engineering In writing the book the authors tap years of experience in industrial projects and research work in the development of methods and tools that support the software development process Perhaps now more than ever the buzzword software crisis serves to alert us that software systems are often error prone that significant diffi culties arise in mastering complexity in the production of software systems and that the acceptance and adequacy of software products is significantly lower than is the case with other technical products The following goals have been suggested for the improvement of the software development process exact fulfillment of user requirements increased reliability and robustness greater modularity of both the development process and the product simple and adequate operation i e better ergonomics easy maintainability and extensibility cost effective portability increased reusability of software components reduced costs for production operation and maintenance VI Preface Research and development work in the area of software engineering has in creased dramatically in recent years

Unveiling the Energy of Verbal Art: An Emotional Sojourn through **Specification And Transformation Of Programs A Formal Approach To Software Development**

In a world inundated with screens and the cacophony of immediate interaction, the profound energy and mental resonance of verbal artistry often disappear in to obscurity, eclipsed by the continuous assault of sound and distractions. Yet, set within the musical pages of **Specification And Transformation Of Programs A Formal Approach To Software Development**, a captivating function of fictional splendor that pulses with organic feelings, lies an memorable trip waiting to be embarked upon. Penned by way of a virtuoso wordsmith, that mesmerizing opus manuals viewers on a psychological odyssey, softly revealing the latent potential and profound influence stuck within the complex internet of language. Within the heart-wrenching expanse of this evocative evaluation, we will embark upon an introspective exploration of the book is main themes, dissect its captivating publishing type, and immerse ourselves in the indelible effect it leaves upon the depths of readers souls.

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Specification And Transformation Of Programs A Formal Approach To Software Development Introduction

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