Larch: Languages and Tools for Formal Specification

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Larch Languages And Tools For Formal Specification

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   Larch: Languages and Tools for Formal Specification John V. Guttag,James J. Horning,2012-12-06 Building software often seems harder than it ought to be It takes longer than expected the software s functionality and performance are not as wonderful as hoped and the software is not particularly malleable or easy to maintain It does not have to be that way This book is about programming and the role that formal specifications can play in making programming easier and programs better The intended audience is practicing programmers and students in undergraduate or basic graduate courses in software engineering or formal methods To make the book accessible to such an audience we have not presumed that the reader has formal training in mathematics or computer science We have however presumed some programming experience The roles of fonnal specifications Designing software is largely a matter of combining inventing and planning the implementation of abstractions The goal of design is to describe a set of modules that interact with one another in simple well defined ways If this is achieved people will be able to work independently on different modules and yet the modules will fit together to accomplish the larger purpose In addition during program maintenance it will be possible to modify a module without affecting many others Abstractions are intangible But they must somehow be captured and communicated That is what specifications are for Specification gives us a way to say what an abstraction is independent of any of its implementations   *Larch: Languages and Tools for Formal Specification* John V. Guttag,James J. Horning,1993-03-05 Building software often seems harder than it ought to be It takes longer than expected the software s functionality and performance are not as wonderful as hoped and the software is not particularly malleable or easy to maintain It does not have to be that way This book is about programming and the role that formal specifications can play in making programming easier and programs better The intended audience is practicing programmers and students in undergraduate or basic graduate courses in software engineering or formal methods To make the book accessible to such an audience we have not presumed that the reader has formal training in mathematics or computer science We have however presumed some programming experience The roles of fonnal specifications Designing software is largely a matter of combining inventing and planning the implementation of abstractions The goal of design is to describe a set of modules that interact with one another in simple well defined ways If this is achieved people will be able to work independently on different modules and yet the modules will fit together to accomplish the larger purpose In addition during program maintenance it will be possible to modify a module without affecting many others Abstractions are intangible But they must somehow be captured and communicated That is what specifications are for Specification gives us a way to say what an abstraction is independent of any of its implementations   *ZUM '95: The Z Formal Specification Notation* Jonathan P. Bowen,1995-08-23 This book presents the proceedings of the 9th International Conference of Z Users ZUM 95 held in Limerick Ireland in September 1995 The book contains 34 carefully selected papers on Z using Z applications of Z proof testing industrial usage object orientation

animation of specification method integration and teaching formal methods Of particular interest is the inclusion of an annotated Z bibliography listing 544 entries While focussing on Z by far the most commonly used formal method both in industry and application the volume is of high relevance for the whole formal methods community **Specification of Software Systems** V.S. Alagar,K. Periyasamy,2013-03-14 This is a textbook on software specification emphasizing formal methods that are relevant to requirements and design stages of software development The aim of the book is to teach the fundamental principles of formal methods in the construction of modular and verifiable formal specifications The book introduces several formal specification techniques and illustrates the expressive power of each technique with a number of examples General Characteristics Traditional textbooks on software engineering discuss the difficulties and chal lenges that lie on the path from requirements analysis to implementation of a software product Most of these books describe some techniques in detail and give hints on implementation of these techniques Only a few among them deal with important software engineering principles and techniques and discuss how a particular technique may be used to implement a given principle There is very little exposure in these books to a rigorous approach to or a systematic study of the construction of verifiable software Those who have acquired an understanding of the fundamental principles of software engineering from traditional textbooks will find the following characteristics of this book quite relevant to the practice of software engineering The book deals with specification The principal characteristic of this book is to discuss formalisms that provide a theoretical foundation for the principles of software engineering and are appropriate to the requirements and design stages of software development *Encyclopedia of Computer Science and Technology* Allen Kent,James G. Williams,2021-05-30 Volume 38 Supplement 23 Algorithms for Designing Multimedia Storage Servers to Models and Architectures Covering more than basic computer commands and procedures this encyclopaedia summarizes how technology has developed the future of computer programs and applications and the significance of computer components Following an introduction and overview there are approximately 750 to 800 entries **First International Workshop on Larch** Ursula Martin,Jeannette M. Wing,2013-11-11 The papers in this volume were presented at the First International Workshop on Larch held at MIT Endicott House near Boston on 13 15 July 1992 Larch is a family of formal specification languages and tools and this workshop was a forum for those who have designed the Larch languages built tool support for them particularly the Larch Prover and used them to specify and reason about software and hardware systems The Larch Project started in 1980 led by John Guttag at MIT and James Horning then at Xerox Palo Alto Research Center and now at Digital Equipment Corporation Systems Research Center DEC SRC Major applications have included VLSI circuit synthesis medical device communications compiler development and concurrent systems based on Lamport s TLA as well as several applications to classical theorem proving and algebraic specification Larch supports a two tiered approach to specifying software and hardware modules One tier of a specification is wrillen in the Larch Shared Language LSL An LSL specification describes mathematical abstractions

such as sets relations and algebras its semantics is defined in terms of first order theories The second tier is written in a Larch interface language one designed for a specific programming language An interface specification describes the effects of individual modules e g state changes resource allocation and exceptions its semantics is defined in terms of first order predicates over two states where state is defined in terms of the programming language s notion of state Thus LSL is programming language independent a Larch interface language is programming language dependent **Cryptographic Security Architecture** Peter Gutmann,2007-05-08 A cryptographic security architecture is the collection of hardware and software that protects and controls the use of encryption keys and similar cryptovariables It is the foundation for enforcing computer security policies and controls and preempting system misuse This book provides a comprehensive design for a portable flexible high security cryptographic architecture with particular emphasis on incorporating rigorous security models and practices Cryptographic Security Architecture unveils an alternative means of building a trustworthy system based on concepts from established software engineering principles and cognitive psychology Its novel security kernel design implements a reference monitor that controls access to security relevant objects and attributes based on a configurable security policy Topics and features Builds a concise architectural design that can be easily extended in the future Develops an application specific security kernel that enforces a fully customizable rule based security policy Presents a new verification technique that allows verification from the high level specification down to the running code Describes effective security assurance in random number generation and the pitfalls associated therewith Examines the generation and protection of cryptovariables as well as application of the architectural design to cryptographic hardware The work provides an in depth presentation of a flexible platform independent cryptographic security architecture suited to software hardware and hybrid implementations Security design practitioners professionals researchers and advanced students will find the work an essential resource **ZUM ... the Z Formal Specification Notation** ,1995 Technology of Object-oriented Languages, TOOLS 24 Jian Chen,1998 This volume covers topics including performance evaluation of objects with roles design of flexible class library management systems assembling software with the reusable components in a library and object oriented technology transfer to multiprocessor system level synthesis First International Workshop on Larch Ursula Martin,Jeannette Marie Wing,1993 The papers in this volume were presented at the First International Workshop on Larch held at MIT Endicott House near Boston on 13 15 July 1992 Larch is a family of formal specification languages and tools and this workshop was a forum for those who have designed the Larch languages built tool support for them particularly the Larch Prover and used them to specify and reason about software and hardware systems The Larch Project started in 1980 led by John Guttag at MIT and James Horning then at Xerox Palo Alto Research Center and now at Digital Equipment Corporation Systems Research Center DEC SRC Major applications have included VLSI circuit synthesis medical device communications compiler development and concurrent systems based on Lamport s TLA as well as several

applications to classical theorem proving and algebraic specification Larch supports a two tiered approach to specifying software and hardware modules One tier of a specification is wrillen in the Larch Shared Language LSL An LSL specification describes mathematical abstractions such as sets relations and algebras its semantics is defined in terms of first order theories The second tier is written in a Larch interface language one designed for a specific programming language An interface specification describes the effects of individual modules e g state changes resource allocation and exceptions its semantics is defined in terms of first order predicates over two states where state is defined in terms of the programming language s notion of state Thus LSL is programming language independent a Larch interface language is programming language dependent   Formal Description Techniques ,1996   **ACM Transactions on Software Engineering and Methodology** ,2003   ACM SIGPLAN Notices ,2006   **Software Architecture** Mary Shaw,David Garlan,1996 Introduction Architectural styles Case studies Shared information systems Architectural design guidance Formal models and specifications Linguistics issues Tools for architectural design Education of software architects   **Proceedings** ,1997 Metrics and quality assurance knowledge and logic based systems object orientated techniques validation and verification distributed and mobile systems software design methodology software process user interaction and testing software are some of the areas examined in this book   *Algebraic Methodology and Software Technology* ,2002   *Tools and Algorithms for the Construction and Analysis of Systems* ,1998   ECOOP ... ,2004   **Software Engineering** Ian Sommerville,2000 Discusses a comprehensive spectrum of software engineering techniques and shows how they can be applied in practical software projects Programme examples in C and Ada have been removed from this sixth edition   1998 Asia Pacific Software Engineering Conference ,1998 Partial Contents Architecture Framework Formal Methods Metrics Software Design Methodology Validation UML Software Development Environment Object Oriented Techniques Distributed User Interface

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