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Agent-Oriented Software Engineering II

This book constitutes the refereed proceedings of the 13th International Conference on Formal Engineering Methods, ICFEM 2011, held in Durham, UK, October 2011. The 40 revised full papers together with 3 invited talks presented were carefully reviewed and selected from 103 submissions. The papers address all current issues in formal methods and their applications in software engineering. They are organized in topical sections on formal models; model checking and probability; specification and development; security; formal verification; cyber physical systems; event-B; verification, analysis and testing; refinement; as well as theorem proving and rewriting.

Enhancing the Fusion Method to Fusion B

Since the 1980s, software agents and multi-agent systems have grown into what is now one of the most active areas of
research and development activity in computing generally. One of the most important reasons for the current intensity of interest in the agent-based computing paradigm certainly is that the concept of an agent as an autonomous system, capable of interacting with other agents in order to satisfy its design objectives, is a natural one for software designers. This recognition has led to the growth of interest in agents as a new paradigm for software engineering. This book reflects the state of the art in the field by presenting 14 revised full papers accepted for the second workshop on this topic, AOSE 2001, together with five invited survey articles. The book offers topical sections on societies and organizations, protocols and interaction frameworks, UML and agent systems, agent-oriented requirements capture and specification, and analysis and design.

Joint Requirements Engineering

This book focuses on defining the achievements of software engineering in the past decades and showcasing visions for the future. It features a collection of articles by some of the most prominent researchers and technologists who have shaped the field: Barry Boehm, Manfred Broy, Patrick Cousot, Erich Gamma, Yuri Gurevich, Tony Hoare, Michael A. Jackson, Rustan Leino, David L. Parnas, Dieter Rombach, Joseph Sifakis, Niklaus Wirth, Pamela Zave, and Andreas Zeller. The contributed articles reflect the authors’ individual views on what constitutes the most important issues facing software development. Both research- and technology-oriented contributions are included. The book provides at the same time a record of a symposium held at ETH Zurich on the occasion of Bertrand Meyer's 60th birthday.

Industrial Deployment of System Engineering Methods

Software development becomes increasingly complex and dynamic. Traditional Requirements Engineering methodologies are advantageously in the formalization of known user requests. If however user requirements and/or technical solutions are unclear, a flexible, fast process becomes mandatory. The Requirements Engineering process has to integrate know-how from customers and developers and to focus on the essentials. Quality Function Deployment (QFD) fulfils these needs. 

Formal Methods and Software Engineering

This book constitutes the thoroughly refereed workshop proceedings of the 9th International Workshop on Structured Object-Oriented Formal Language and Method, SOFL+MSVL 2019, held in Shenzhen, China, in November 2019. The 23 revised full papers included in the volume were carefully reviewed and selected from 43 submissions. They are organized in the following topical sections: testing and debugging, formal verification, problem solving, software analysis and evolution, and software analysis and testing.

Ada in Europe
On the verge of the global information society, enterprises are competing for markets that are becoming global and driven by customer demand, and where growing specialisation is pushing them to focus on core competencies and look for partnerships to provide products and services. Simultaneously the public demands environmentally sustainable industries and urges manufacturers to mind the whole life span of their products and production resources. Information infrastructure systems are anticipated to offer services enabling and catalyzing the strategies of manufacturing companies responding to these challenges: they support the formation of extended enterprises, the mastering of full product and process life cycles, and the digitalization of the development process. Information infrastructure systems would accommodate access to and transformation of information as required by the various authorized stakeholders involved in the life phases of products or production resources. Services should be available to select and present all relevant information for situations involving any kind of players, during any life phase of a product or artifact, at any moment and at any place.

Requirements Engineering for Software and Systems

Gathering customer requirements is a key activity for developing software that meets the customer's needs. A concise and practical overview of everything a requirement's analyst needs to know about establishing customer requirements, this first-of-its-kind book is the perfect desk guide for systems or software development work. The book enables professionals to identify the real customer requirements for their projects and control changes and additions to these requirements. This unique resource helps practitioners understand the importance of requirements, leverage effective requirements practices, and better utilize resources. The book also explains how to strengthen interpersonal relationships and communications which are major contributors to project effectiveness. Moreover, analysts find clear examples and checklists to help them implement best practices.

Knowledge Engineering and Agent Technology

The four-volume set LNCS 11244, 11245, 11246, and 11247 constitutes the refereed proceedings of the 8th International Symposium on Leveraging Applications of Formal Methods, Verification and Validation, ISoLA 2018, held in Limassol, Cyprus, in October/November 2018. The papers presented were carefully reviewed and selected for inclusion in the proceedings. Each volume focusses on an individual topic with topical section headings within the volume: Part I, Modeling: Towards a unified view of modeling and programming; X-by-construction, STRESS 2018. Part II, Verification: A broader view on verification: from static to runtime and back; evaluating tools for software verification; statistical model checking; RERS 2018; doctoral symposium. Part III, Distributed Systems: rigorous engineering of collective adaptive systems; verification and validation of distributed systems; and cyber-physical systems engineering. Part IV, Industrial Practice: runtime verification from the theory to the industry practice; formal methods in industrial practice - bridging the gap; reliable smart contracts: state-of-the-art, applications, challenges and future directions; and industrial day.
The Requirements Engineering Handbook

This book constitutes the proceedings of the 21st International Conference on Formal Engineering Methods, ICFEM 2019, held in Shenzhen, China, in November 2019. The 28 full and 8 short papers presented in this volume were carefully reviewed and selected from 94 submissions. They deal with the recent progress in the use and development of formal engineering methods for software and system design and record the latest development in formal engineering methods.

Implicit and Explicit Semantics Integration in Proof-Based Developments of Discrete Systems

This book constitutes the proceedings of the 7th International Symposium on Dependable Software Engineering, SETTA 2021, held in Beijing, China, in November 2021. The 16 full papers in this volume were carefully reviewed and selected from 39 submissions, and are presented with 3 abstracts of keynote speeches. They deal with latest research results and ideas on bridging the gap between formal methods and software engineering.

Leveraging Applications of Formal Methods, Verification and Validation: Foundational Techniques

This book constitutes the refereed proceedings of the 16th International Conference on Formal Engineering Methods, ICFEM 2014, held in Luxembourg, Luxembourg, in November 2014. The 28 revised full papers presented were carefully reviewed and selected from 73 submissions. The papers cover a wide range of topics in the area of formal methods and software engineering and are devoted to advancing the state of the art of applying formal methods in practice. They focus in particular on combinations of conceptual and methodological aspects with their formal foundation and tool support.

The Future of Software Engineering

This book presents ARCADIA—a tooled method devoted to systems and architecture engineering, especially for those dealing with strong constraints to be reconciled (cost, performance, safety, security, reuse, consumption, weight). The book describes the detailed reasoning necessary to: understand the real customer need; define and share the product architecture among all engineering stakeholders; early validate its design and justify it; and ease and master integration, validation, verification and qualification (IVVQ). Offers a comprehensive examination of systems engineering, including the use of models to support it Not only yet another book on modeling, but rather a journey in systems engineering, enlightening the use of models to support it. Focuses on solitary modeling tasks while also covering prime collaborations between engineering stakeholders Examines modeling techniques to capture and share architecture and to early verify it against need and non-functional constraints Addresses subjects not usually covered by model-based system engineering (MBSE) methods, such as co-engineering with specialties, system/sub-system co-
engineering, integration verification and validation Features a powerful, dedicated tool (Capella) Covers a range of topics, including an introduction to system engineering issues, an introduction to MBSE, a presentation of the method for beginners and a handy reference manual for advanced users

Information Infrastructure Systems for Manufacturing

This textbook lays the foundations for System-of-Systems Requirements Engineering and Requirements Management practices, principles, technique, and processes. It provides a comprehensive treatment of requirements engineering, an integral part of Multidisciplinary Systems Engineering. The book takes the student/reader though the entire process of documenting, analyzing, tracing, prioritizing, and managing requirements, and then goes on the describe controlling and communicating requirement change throughout the system development lifecycle. The authors discuss the role of requirements management in support of other requirements engineering processes; describe the principal requirements engineering activities and their relationships; introduces techniques for requirements elicitation and analysis and describes requirements validation and the role of requirements reviews; and discusses the role of requirements management in support of other requirements engineering processes. A full suite of classroom material is provided including exercises, assignments, and PowerPoint slides.

Software Engineering 1

The use of Knowledge Engineering and Agent Technology (KEAT) for application development is now recognized as an alternative to conventional software techniques in many application domains. From the background of the IFIP IT&KNOWS conference held in late 1998, this volume aims to discuss the role and the perspectives of domain models and corresponding reasoning processes in the different application fields under a common perspective to create conceptual bases and methods to develop and to improve the use of this type of approach in the context of information technology.

Cooperative Information Agents IV - The Future of Information Agents in Cyberspace

This text contains information on software design and development as presented at the 10th Anniversary IEEE Joint International Requirements Engineering (RE 2002).

Requirements Engineering

In the ten years since the first MAAMAW was held in 1989, at King's College, Cambridge, the field of Multi-Agent Systems (MAS) has flourished. It has attracted an increasing amount of theoretical and applied research. During this decade, important efforts have been made to establish the scientific and technical foundations of MAS. MAAMAW
publications are testimony to the progress achieved in key areas such as agent modelling and reasoning, multi-agent interaction and communication, and multi-agent organisation and social structure. Research results have covered a wide range of inter-related topics in each area including agent architectures, reasoning models, logics, conflict resolution, negotiation, resource allocation, load balancing, learning; social behaviour and interaction, languages and protocols, interagent and agent-human communication, social models, agent roles, norms and social laws, and static and dynamic organisational structures. The feasibility and the viability of the proposed models and techniques have been demonstrated through MAS applications in heterogeneous domains including electronic commerce, co-operative work, telecommunications, social and biological systems, robotics, office and business automation, public administration, social simulations and banking. As the applicability of the technology became understood, the multi-agent paradigm has been progressively accepted by product managers and system developers, giving rise to a considerable amount of business expectation from industry. These expectations do not rest on the concept or metaphor of agent, but on the development of MAS useful in an industrial setting, with real-time systems presenting the biggest challenge.

IEEE Joint International Conference on Requirements Engineering

The two-volume set LNCS 9952 and LNCS 9953 constitutes the refereed proceedings of the 7th International Symposium on Leveraging Applications of Formal Methods, Verification and Validation, ISoLA 2016, held in Imperial, Corfu, Greece, in October 2016. The papers presented in this volume were carefully reviewed and selected for inclusion in the proceedings. Featuring a track introduction to each section, the papers are organized in topical sections named: statistical model checking; evaluation and reproducibility of program analysis and verification; ModSyn-PP: modular synthesis of programs and processes; semantic heterogeneity in the formal development of complex systems; static and runtime verification: competitors or friends?; rigorous engineering of collective adaptive systems; correctness-by-construction and post-hoc verification: friends or foes?; privacy and security issues in information systems; towards a unified view of modeling and programming; formal methods and safety certification: challenges in the railways domain; RVE: runtime verification and enforcement, the (industrial) application perspective; variability modeling for scalable software evolution; detecting and understanding software doping; learning systems: machine-learning in software products and learning-based analysis of software systems; testing the internet of things; doctoral symposium; industrial track; RERS challenge; and STRESS.

Requirements Engineering for Sociotechnical Systems

This volume contains the contributions presented at the International Workshop on Current Trends in Applied Formal Methods organized October 7-9, 1998, in Boppard, Germany. The main objective of the workshop was to draw a map of the key issues facing the practical application of formal methods in industry. This appears to be particularly timely with safety and security issues becoming a real obstacle to industrial software and hardware development. As a consequence, almost all major companies have now set up departments or groups to work with formal methods and many European
countries face a severe labour shortage in this new field. Tony Hoare's prediction of the art of software (and hardware) development becoming a proper engineering science with its own body of tools and techniques is now becoming a reality. So the focus of this application oriented workshop was not so much on special academic topics but rather on the many practical aspects of this emerging new technology: verification and validation, and tool support and integration into the software life-cycle. By evaluating the state of the art with respect to industrial applications a discussion emerged among scientists, practising engineers, and members of regulatory and funding agencies about future needs and developments. This discussion lead to roadmaps with respect to the future of this field, to tool support, and potential application areas and promising market segments. The contributions of the participants from industry as well as from the respective national security bureaus were particularly valuable and highly appreciated.

Requirements Engineering

In this book, Hussmann builds a bridge between the pragmatic methods for the design of information systems and the formal, mathematical background. Firstly, the principal feasibility of an integration of the different methods is demonstrated. Secondly, the formalism is used as a systematic semantic analysis of the concepts in SSADM, a British standard structured software engineering method. Thirdly, a way of obtaining a hybrid formal-pragmatic specification using a combination of SSADM notations and formal (SPECTRUM) specifications is shown. This well-written book encourages scientists and software engineers to apply formal methods to practical software development problems.

Requirements Engineering: Foundation for Software Quality

This book constitutes revised selected papers from the 6th International Workshop on Structures Object-Oriented Formal Language and Method, SOFL+MSVL 2016, held in Tokyo, Japan, in November 2016. The 13 papers presented in this volume were carefully reviewed and selected from 26 submissions. They are organized in topical sections named: modeling and specification; animation and prototyping; verification and validation; and model checking.

Formal Methods and Software Engineering

This book constitutes the refereed proceedings of the 19th International Conference on Formal Engineering Methods, ICFEM 2017, held in Xi'an, China, in November 2017. The 28 revised full papers presented together with one invited talk and two abstracts of invited talks were carefully reviewed and selected from 80 submissions. The conference focuses on all areas related to formal engineering methods, such as verification and validation, software engineering, formal specification and modeling, software security, and software reliability.

Human-System Integration in the System Development Process
Solid requirements engineering has increasingly been recognized as the key to improved, on-time, and on-budget delivery of software and systems projects. This textbook provides a comprehensive treatment of the theoretical and practical aspects of discovering, analyzing, modeling, validating, testing, and writing requirements for systems of all kinds, with an intentional focus on software-intensive systems. It brings into play a variety of formal methods, social models, and modern requirements for writing techniques to be useful to the practicing engineer. This book was written to support both undergraduate and graduate requirements engineering courses. Each chapter includes simple, intermediate, and advanced exercises. Advanced exercises are suitable as a research assignment or independent study and are denoted by an asterisk. Various exemplar systems illustrate points throughout the book, and four systems in particular—a baggage handling system, a point of sale system, a smart home system, and a wet well pumping system—are used repeatedly. These systems involve application domains with which most readers are likely to be familiar, and they cover a wide range of applications from embedded to organic in both industrial and consumer implementations. Vignettes at the end of each chapter provide mini-case studies showing how the learning in the chapter can be employed in real systems. Requirements engineering is a dynamic field and this text keeps pace with these changes. Since the first edition of this text, there have been many changes and improvements. Feedback from instructors, students, and corporate users of the text was used to correct, expand, and improve the material. This third edition includes many new topics, expanded discussions, additional exercises, and more examples. A focus on safety critical systems, where appropriate in examples and exercises, has also been introduced. Discussions have also been added to address the important domain of the Internet of Things. Another significant change involved the transition from the retired IEEE Standard 830, which was referenced throughout previous editions of the text, to its successor, the ISO/IEC/IEEE 29148 standard.

Formal Methods and Software Engineering

This book constitutes the thoroughly refereed post-proceedings of the 7th International Workshop on Agent-Oriented Software Engineering, AOSE 2006, held in Hakodate, Japan, in May 2006 as part of AAMAS 2006. The 13 revised full papers are organized in topical sections on modeling and design of agent systems, modeling open agent systems, formal reasoning about designs, as well as testing, debugging and evolvability.

Multiple Approaches to Intelligent Systems

We never create anything, We discover and reproduce. The Twelfth International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems has a distinguished theme. It is concerned with bridging the gap between the academic and the industrial worlds of Artificial Intelligence (AI) and Expert Systems. The academic world is mainly concerned with discovering new algorithms, approaches, and methodologies; however, the industrial world is mainly driven by profits, and concerned with producing new products or solving customers’ problems. Ten years ago, the artificial intelligence research gap between academia and industry was very broad. Recently, this gap
has been narrowed by the emergence of new fields and new joint research strategies in academia. Among the new fields which contributed to the academic-industrial convergence are knowledge representation, machine learning, searching, reasoning, distributed AI, neural networks, data mining, intelligent agents, robotics, pattern recognition, vision, applications of expert systems, and others. It is worth noting that the end results of research in these fields are usually products rather than empirical analyses and theoretical proofs. Applications of such technologies have found great success in many domains including fraud detection, internet service, banking, credit risk and assessment, telecommunication, etc. Progress in these areas has encouraged the leading corporations to institute research funding programs for academic institutes. Others have their own research laboratories, some of which produce state of the art research.

Agent-Oriented Software Engineering VII

Solid requirements engineering has increasingly been recognized as the key to improved, on-time, and on-budget delivery of software and systems projects. This textbook provides a comprehensive treatment of the theoretical and practical aspects of discovering, analyzing, modeling, validating, testing, and writing requirements for systems of all kinds, with an intentional focus on software-intensive systems. It brings into play a variety of formal methods, social models, and modern requirements for writing techniques to be useful to the practicing engineer. This book was written to support both undergraduate and graduate requirements engineering courses. Each chapter includes simple, intermediate, and advanced exercises. Advanced exercises are suitable as a research assignment or independent study and are denoted by an asterisk. Various exemplar systems illustrate points throughout the book, and four systems in particular—a baggage handling system, a point of sale system, a smart home system, and a wet well pumping system—are used repeatedly. These systems involve application domains with which most readers are likely to be familiar, and they cover a wide range of applications from embedded to organic in both industrial and consumer implementations. Vignettes at the end of each chapter provide mini-case studies showing how the learning in the chapter can be employed in real systems. Requirements engineering is a dynamic field and this text keeps pace with these changes. Since the first edition of this text, there have been many changes and improvements. Feedback from instructors, students, and corporate users of the text was used to correct, expand, and improve the material. This third edition includes many new topics, expanded discussions, additional exercises, and more examples. A focus on safety critical systems, where appropriate in examples and exercises, has also been introduced. Discussions have also been added to address the important domain of the Internet of Things. Another significant change involved the transition from the retired IEEE Standard 830, which was referenced throughout previous editions of the text, to its successor, the ISO/IEC/IEEE 29148 standard.

Formal Foundations for Software Engineering Methods

This book addresses mechanisms for reducing model heterogeneity induced by the absence of explicit semantics
expression in the formal techniques used to specify design models. More precisely, it highlights the advances in handling both implicit and explicit semantics in formal system developments, and discusses different contributions expressing different views and perceptions on the implicit and explicit semantics. The book is based on the discussions at the Shonan meeting on this topic held in 2016, and includes contributions from the participants summarising their perspectives on the problem and offering solutions. Divided into 5 parts: domain modelling, knowledge-based modelling, proof-based modelling, assurance cases, and refinement-based modelling, and offers inspiration for researchers and practitioners in the fields of formal methods, system and software engineering, domain knowledge modelling, requirement analysis, and explicit and implicit semantics of modelling languages.

**Dependable Software Engineering. Theories, Tools, and Applications**

**Requirements Engineering for Software and Systems**

This book constitutes the refereed proceedings of the 20th International Working Conference on Requirements Engineering: Foundation for Software Quality, REFSQ 2014, held in Essen, Germany, in April 2013. The 23 papers presented together with 1 keynote were carefully reviewed and selected from 62 submissions. The REFSQ'15 conference is organized as a three-day symposium. The REFSQ'15 has chosen a special conference theme “I heard it first at RefsQ”. Two conference days were devoted to presentation and discussion of scientific papers. The two days connect to the conference theme with a keynote, an invited talk and poster presentations. There were two parallel tracks on the third day: the Industry Track and the new Research Methodology Track. REFSQ 2015 seeks reports of novel ideas and techniques that enhance the quality of RE’s products and processes, as well as reflections on current research and industrial RE practices.

**Formal Methods and Software Engineering**

"This book provides a detailed account concerning information society and the challenges and application posed by its elicitation, specification, validation and management: from embedded software in cars to internet-based applications, COTS packages, health-care, and others"--Provided by publisher.

**Multi-Agent System Engineering**

A formal method is not the main engine of a development process, its contribution is to improve system dependability by motivating formalisation where useful. This book summarizes the results of the DEPLOY research project on engineering methods for dependable systems through the industrial deployment of formal methods in software development. The applications considered were in automotive, aerospace, railway, and enterprise information systems, and microprocessor
design. The project introduced a formal method, Event-B, into several industrial organisations and built on the lessons learned to provide an ecosystem of better tools, documentation and support to help others to select and introduce rigorous systems engineering methods. The contributing authors report on these projects and the lessons learned. For the academic and research partners and the tool vendors, the project identified improvements required in the methods and supporting tools, while the industrial partners learned about the value of formal methods in general. A particular feature of the book is the frank assessment of the managerial and organisational challenges, the weaknesses in some current methods and supporting tools, and the ways in which they can be successfully overcome. The book will be of value to academic researchers, systems and software engineers developing critical systems, industrial managers, policymakers, and regulators.

Requirements Engineering: Laying a Firm Foundation

In April 1991 BusinessWeek ran a cover story entitled, â€œI Can't Work This ?@!!@ Thing,â€ about the difficulties many people have with consumer products, such as cell phones and VCRs. More than 15 years later, the situation is much the sameâ€”but at a very different level of scale. The disconnect between people and technology has had society-wide consequences in the large-scale system accidents from major human error, such as those at Three Mile Island and in Chernobyl. To prevent both the individually annoying and nationally significant consequences, human capabilities and needs must be considered early and throughout system design and development. One challenge for such consideration has been providing the background and data needed for the seamless integration of humans into the design process from various perspectives: human factors engineering, manpower, personnel, training, safety and health, and, in the military, habitability and survivability. This collection of development activities has come to be called human-system integration (HSI). Human-System Integration in the System Development Process reviews in detail more than 20 categories of HSI methods to provide invaluable guidance and information for system designers and developers.

Leveraging Applications of Formal Methods, Verification and Validation. Industrial Practice

Requirements Engineering Processes and Techniques Why this book was written The value of introducing requirements engineering to trainee software engineers is to equip them for the real world of software and systems development. What is involved in Requirements Engineering? As a discipline, newly emerging from software engineering, there are a range of views on where requirements engineering starts and finishes and what it should encompass. This book offers the most comprehensive coverage of the requirements engineering process to date - from initial requirements elicitation through to requirements validation. How and Which methods and techniques should you use? As there is no one catch-all technique applicable to all types of system, requirements engineers need to know about a range of different techniques. Tried and tested techniques such as data-flow and object-oriented models are covered as well as some promising new ones. They are all based on real systems descriptions to demonstrate the applicability of the approach. Who should read it? Principally written for senior undergraduate and graduate students studying computer science, software engineering
or systems engineering, this text will also be helpful for those in industry new to requirements engineering. Accompanying Website: http://www.comp.lancs.ac.uk/computing/resources/re Visit our Website: http://www.wiley.com/college/wws

Requirements Engineering: Foundation for Software Quality

Written for those who want to develop their knowledge of requirements engineering process, whether practitioners or students. Using the latest research and driven by practical experience from industry, Requirements Engineering gives useful hints to practitioners on how to write and structure requirements. It explains the importance of Systems Engineering and the creation of effective solutions to problems. It describes the underlying representations used in system modeling and introduces the UML2, and considers the relationship between requirements and modeling. Covering a generic multi-layer requirements process, the book discusses the key elements of effective requirements management. The latest version of DOORS (Version 7) - a software tool which serves as an enabler of a requirements management process - is also introduced to the reader here. Additional material and links are available at: http://www.requirementsengineering.info

Model-based System and Architecture Engineering with the Arcadia Method

These are the proceedings of the Fourth International Workshop on Cooperative Information Agents, held in Boston Massachusetts, USA, July 7-9, 2000. Cooperative information agent research and development focused originally on accessing multiple, heterogeneous, and distributed information sources. Gaining access to these systems, through Internet search engines, application program interfaces, wrappers, and web-based screens has been an important focus of - operative intelligent agents. Research has also focused on the integration of this information into a coherent model that combined data and knowledge from the multiple sources. Finally, this information is disseminated to a wide audience, giving rise to issues such as data quality, information pedigree, source reliability, information security, personal privacy, and information value. Research in - operative information agents has expanded to include agent negotiation, agent communities, agent mobility, as well as agent collaboration for information discovery in constrained environments. The interdisciplinary CIA workshop series encompasses a wide variety of topics dealing with cooperative information agents. All workshop proceedings have been published by Springer as Lecture Notes in Artificial Intelligence, Volumes 1202 (1997), 1435 (1998), and 1652 (1999), respectively. This year, the theme of the CIA workshop was “The Future of Information Agents in Cyberspace”, a very fitting topic as the use of agents for information gathering, negotiation, correlation, fusion, and dissemination becomes ever more prevalent. We noted a marked trend in CIA 2000 towards addressing issues related to communities of agents that: (1) negotiate for information resources, (2) build robust ontologies to enhance search capabilities, (3) communicate for planning and problem solving, (4) learn and evolve based on their experiences, and (5) assume increasing degrees of autonomy in the control of complex systems.
Formal Methods and Software Engineering

This volume constitutes the proceedings of the First International Eurospace/Ada-Europe Symposium, held in Copenhagen in September 1994; this symposium series is the merger of the two conference series Ada in Aerospace and Ada-Europe. The 42 papers accepted for presentation address general Ada-related software engineering aspects as well as Ada language issues; the majority of the papers are stimulated by research and development done in the aerospace and aircraft industry. Among the topics covered are compiler issues, safety, criticality and formal methods, object-orientation, management and training, life cycle, reuse, Ada-libraries, run-time, and real-time aspects.

From Software Engineering to Formal Methods and Tools, and Back

This volume was published in honor of Stefania Gnesi’s 65th birthday. The Festschrift volume contains 32 papers written by close collaborators and friends of Stefania and was presented to her on October 8, 2019 one-day colloquium held in Porto, Portugal, The Festschrift consists of eight sections, seven of which reflect the main research areas to which Stefania has contributed. Following a survey of Stefania's legacy in research and a homage by her thesis supervisor, these seven sections are ordered according to Stefania's life cycle in research, from software engineering to formal methods and tools, and back: Software Engineering; Formal Methods and Tools; Requirements Engineering; Natural Language Processing; Software Product Lines; Formal Verification; and Applications.

Structured Object-Oriented Formal Language and Method

Software engineering requires specialized knowledge of a broad spectrum of topics, including the construction of software and the platforms, applications, and environments in which the software operates as well as an understanding of the people who build and use the software. Offering an authoritative perspective, the two volumes of the Encyclopedia of Software Engineering cover the entire multidisciplinary scope of this important field. More than 200 expert contributors and reviewers from industry and academia across 21 countries provide easy-to-read entries that cover software requirements, design, construction, testing, maintenance, configuration management, quality control, and software engineering management tools and methods. Editor Phillip A. Laplante uses the most universally recognized definition of the areas of relevance to software engineering, the Software Engineering Body of Knowledge (SWEBOK®), as a template for organizing the material. Also available in an electronic format, this encyclopedia supplies software engineering students, IT professionals, researchers, managers, and scholars with unrivaled coverage of the topics that encompass this ever-changing field. Also Available Online This Taylor & Francis encyclopedia is also available through online subscription, offering a variety of extra benefits for researchers, students, and librarians, including: Citation tracking and alerts Active reference linking Saved searches and marked lists HTML and PDF format options Contact Taylor and Francis for more information or to inquire about subscription options and print/online combination packages. US: (Tel) 1.888.318.2367; (E-mail) e-reference@taylorandfrancis.com International: (Tel) +44 (0) 20 7017 6062; (E-mail)
Encyclopedia of Software Engineering Three-Volume Set (Print)

This volume compiles the papers accepted for presentation at the 16th Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ 2010), held in Essen during June 30 and July 1-2, 2010. Since 1994, when the first REFSQ took place, requirements engineering (RE) has never ceased to be a dominant factor influencing the quality of software, systems and services. Initially started as a workshop, the REFSQ working conference series has now established itself as one of the leading international forums to discuss RE in its (many) relations to quality. It seeks reports of novel ideas and techniques that enhance the quality of RE products and processes, as well as reflections on current research and industrial RE practices. One of the most appreciated characteristics of REFSQ is that of being a highly interactive and structured event. REFSQ 2010 was no exception to this tradition. In all, we received a healthy 57 submissions. After all submissions had been fully assessed by three independent reviewers and went through electronic disc- sions, the Program Committee met and finally selected 15 top-quality full papers (13 research papers and 2 experience reports) and 7 short papers, resulting in an acceptance rate of 38 %. The work presented at REFSQ 2009 continues to have a strong anchoring in practice with empirical investigations spanning over a wide range of application domains.

Structured Object-Oriented Formal Language and Method

The art, craft, discipline, logic, practice, and science of developing large-scale software products needs a believable, professional base. The textbooks in this three-volume set combine informal, engineeringly sound practice with the rigour of formal, mathematics-based approaches. Volume 1 covers the basic principles and techniques of formal methods abstraction and modelling. First this book provides a sound, but simple basis of insight into discrete mathematics: numbers, sets, Cartesians, types, functions, the Lambda Calculus, algebras, and mathematical logic. Then it trains its readers in basic property- and model-oriented specification principles and techniques. The model-oriented concepts that are common to such specification languages as B, VDM-SL, and Z are explained here using the RAISE specification language (RSL). This book then covers the basic principles of applicative (functional), imperative, and concurrent (parallel) specification programming. Finally, the volume contains a comprehensive glossary of software engineering, and extensive indexes and references. These volumes are suitable for self-study by practicing software engineers and for use in university undergraduate and graduate courses on software engineering. Lecturers will be supported with a comprehensive guide to designing modules based on the textbooks, with solutions to many of the exercises presented, and with a complete set of lecture slides.

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Formal methods for development of computer systems have been extensively studied over the years. A range of semantic theories, specification languages, design techniques, and verification methods and tools have been developed and applied to the construction of programs used in critical applications. The challenge now is to scale up formal methods and integrate them into engineering development processes for the correct and efficient construction and maintenance of computer systems in general. This requires us to improve the state of the art on approaches and techniques for integration of formal methods into industrial engineering practice, including new and emerging practice. The now long-established series of International Conferences on Formal Engineering Methods brings together those interested in the application of formal engineering methods to computer systems. Researchers and practitioners, from industry, academia, and government, are encouraged to attend and to help advance the state of the art. This volume contains the papers presented at ICFEM 2009, the 11th International Conference on Formal Engineering Methods, held during December 9-11, in Rio de Janeiro, Brazil.