Object Oriented Metrics In Practice Using Software Metrics To Characterize Evaluate And Improve The Design Of Object Oriented Systems

Annotation This book constitutes the thoroughly refereed proceedings of the 6th International Conference, QoSA 2010, held in Prague, Czech Republic in June 2010. The 11 revised long papers were selected from 32 submissions and are organized in topical sections on Model-Driven Analysis, Quality of Service Adaption as well as Case Studies and Experience Reports.

This volume presents the findings of the 6th International Workshop on Software Metrics. Consequently continuing the Workshop’s tradition the focus is on the combination of theoretical and practical contributions.

This volume presents a collection of peer-reviewed, scientific articles from the 14th International Conference on Information Technology - New Generations, held at Tuscany Suites Hotel in Las Vegas. The proceedings addresses critical areas of information technology including web technology, communications, computing architectures, software engineering, security, and data mining.

This two-volume-set (CCIS 188 and CCIS 189) constitutes the refereed proceedings of the International Conference on Digital Information Processing and Communications, ICDIPC 2011, held in Ostrava, Czech Republic, in July 2011. The 91 revised full papers of both volumes presented together with 4 invited talks were carefully reviewed and selected from 235 submissions. The papers are organized in topical sections on network security; Web applications; data mining; neural networks; distributed and parallel processing; biometrics technologies; e-learning; information ethics; image processing; information and data management; software engineering; data compression; networks; computer security; hardware and systems; multimedia; ad hoc network; artificial intelligence; signal processing; cloud computing; forensics; security; software and systems; mobile networking; and some miscellaneous topics in digital information and communications.

The natural mission of Computational Science is to tackle all sorts of human problems and to work out intelligent automata aimed at alleviating the b- den of working out suitable tools for solving complex problems. For this reason ComputationalScience,thoughoriginatingfromtheneedtosolvethemostch- lenging problems in science and engineering (computational science is the key player in the ?ght to gain fundamental advances in astronomy, biology, che- stry, environmental science, physics and several other scienti?c and engineering disciplines) is increasingly turning its attention to all ?elds of human activity. In all activities, in fact, intensive computation, information handling, kn- ledge

synthesis, the use of ad-hoc devices, etc. increasingly need to be exploited and coordinated regardless of the location of both the users and the (various and heterogeneous) computing platforms. As a result the key to understanding the explosive growth of this discipline lies in two adjectives that more and more appropriately refer to Computational Science and its applications: interoperable and ubiquitous. Numerous examples of ubiquitous and interoperable tools and applicationsaregiveninthepresentfourLNCSvolumescontainingthecontri- tions delivered at the 2004 International Conference on Computational Science and its Applications (ICCSA 2004) held in Assisi, Italy, May 14–17, 2004.
This book comprises a set of papers selected from those presented at the fifth « International Conference on Enterprise Information Systems », (ICEIS'2003) held in Angers, France, from 23 to 26 April 2003. The conference was organised by École Supérieure d'Électronique de l'Ouest (ESEO) of Angers, France and the Escola Superior de Tecnologia of Setúbal, Portugal. Since its first edition in 1999, ICEIS focuses on real world applications and aims at bringing together researchers, engineers and practitioners interested in the advances and business applications of information systems. As in previous years, ICEIS'2003 held four simultaneous tracks covering different aspects of enterprise computing: Databases and Information Systems Integration, Artificial Intelligence and Decision Support Systems, Information Systems Analysis and Specification and Software Agents and Internet Computing. Although ICEIS'2003 received 546 paper submissions from over 50 countries, only 80 were accepted as full papers and presented in 30-minutes oral presentations. With an acceptance rate of 15%, these numbers demonstrate the intention of preserving a high quality forum for future editions of this conference. From the articles accepted as long papers for the conference, only 32 were selected for inclusion in this book Additional keynote lectures, tutorials and industrial sessions were also held during ICEIS'2003, and, for the first time this year, the 1st Doctoral Consortium on Enterprise Information Systems gave PhD students an opportunity to present their work to an international audience of experts in the field of information systems.
"The software engineering community has advanced greatly in recent years and we currently have numerous defined items of knowledge, such as standards, methodologies, methods, metrics, techniques, languages, patterns, knowledge related to processes, concepts, etc.The main objective of this book is to give a unified and global vision about Micro-Architectural Design Knowledge, analyzing the main techniques, experiences and methods"--Provided by publisher.
This book constitutes the refereed proceedings of the 10th International IFIP WG 2.13 Conference on Open Source Systems, OSS 2014, held in San José, Costa Rica, in May 2014. The 16 revised full papers and 16 short papers presented together with 5 poster papers were carefully reviewed and selected from 61 submissions. They have been organized in the following topical sections: open source visualization and reporting; open source in business modeling; open source in mobile and web technologies; open source in education and research; development processes of open

source products; testing and assurance of open source projects; and global impact on open source communities and development. The last section consists of five case studies and demonstrations of open source projects.

Data science is an emerging field and innovations in it need to be explored for the success of society 5.0. This book not only focuses on the practical applications of data science to achieve computational excellence, but also digs deep into the issues and implications of intelligent systems. This book highlights innovations in data science to achieve computational excellence that can optimize performance of smart applications. The book focuses on methodologies, framework, design issues, tools, architectures, and technologies necessary to develop and understand data science and its emerging applications in the present era. This book will be useful for the research community, start-up entrepreneurs, academicians, and data centered industries and professors that are interested in exploring innovations in varied applications and areas of data science.

This book constitutes the refereed proceedings of the 11th International Conference on Model Driven Engineering Languages and Systems, MoDELS 2008, held in Toulouse, France, during September 28-October 3, 2008. The 58 revised full papers presented were carefully reviewed and selected from 271 submissions. The book also contains three keynote speeches and contributions to workshops, symposia, tutorials and panels at the conference. The papers are organized in topical sections on Model Transformation: Foundations; Requirements Modeling; Domain-Specific Modeling; Model Transformation: Techniques, Composition and Analysis of Behavioral Models; Model Comprehension; Model Management; Behavioral Conformance and Refinement; Metamodeling and Modularity; Constraints; Model Analysis; Service-Oriented Architectures; Adaptive and Autonomic Systems; Empirical Studies; Evolution and Reverse Engineering; Modeling Language Semantics; Dependability Analysis and Testing; Aspect-Oriented Modeling; Structural Modeling;and Embedded Systems.

This volume contains 87 papers presented at FICTA 2014: Third International Conference on Frontiers in Intelligent Computing: Theory and Applications. The conference was held during 14-15, November, 2014 at Bhubaneswar, Odisha, India. This volume contains papers mainly focused on Network and Information Security, Grid Computing and Clod Computing, Cyber Security and Digital Forensics, Computer Vision, Signal, Image & Video Processing, Software Engineering in Multidisciplinary Domains and Ad-hoc and Wireless Sensor Networks.

????:Object-oriented design

This book contains the refereed proceedings of the 11th International Conference on Agile Software Development, XP 2010, held in Trondheim, Norway, in June 2010. In order to better evaluate the submitted papers and to highlight the applicational aspects of agile software practices, there were two different program committees, one for research papers

and one for experience reports. Regarding the research papers, 11 out of 39 submissions were accepted as full papers; and as far as the experience reports were concerned, the respective number was 15 out of 50 submissions. In addition to these papers, this volume also includes the short research papers, the abstracts of the posters, the position papers of the PhD symposium, and the abstracts of the panel on “Collaboration in an Agile World”.

This book contains both relevant real-world research, as well as reviews of different areas of interest in the software engineering literature, such as clone identification. The contents of the various sections will provide a better understanding of known problems and detailed treatment of advanced topics. Consequently, the book consolidates the work and findings from leading researchers in the software research community in key areas such as maintainability, architectural recovery, code analysis, software migration, and tool support.

Developing Quality Complex Database Systems: Practices, Techniques and Technologies provides opportunities for improving today's database systems using innovative development practices, tools and techniques. An emphasis is placed on organizational and management issues.

Welcome to the Proceedings of the 2010 International Conference on Advanced Software Engineering and Its Applications (ASEA 2010) – one of the partnering events of the Second International Mega-Conference on Future Generation Information Technology (FGIT 2010). ASEA brings together researchers from academia and industry as well as practitioners to share ideas, problems and solutions relating to the multifaceted aspects of software engineering, including its links to computational sciences, mathematics and information technology. In total, 1,630 papers were submitted to FGIT 2010 from 30 countries, which includes 175 papers submitted to ASEA 2010. The submitted papers went through a rigorous reviewing process: 395 of the 1,630 papers were accepted for FGIT 2010, while 40 papers were accepted for ASEA 2010. Of the 640 papers were selected for the special FGIT 2010 volume published by Springer in the LNCS series. 32 papers are published in this volume, and 2 papers were withdrawn due to technical reasons. We would like to acknowledge the great effort of the ASEA 2010 International Advisory Board and members of the International Program Committee, as well as all the organizations and individuals who supported the idea of publishing this volume of proceedings, including SERSC and Springer. Also, the success of the conference would not have been possible without the huge support from our sponsors and the work of the Chairs and Organizing Committee.

The Rough Sets and Knowledge Technology (RSKT) conferences serve as a - jor forum that brings researchers and industry practitioners together to discuss and deliberate on fundamental issues of knowledge processing and management and knowledge-intensive practical solutions in the current knowledge age. - perts from around the world meet annually to present state-of-the-art sci- ti?c results, to nurture academic and industrial interaction, and to promote collaborative research in rough sets and knowledge

technology. The main theme of the RSKT conference is to explore the synergy between rough sets and - vanced knowledge technology and applications, including knowledge discovery, datamining,knowledgeprocessingandmanagement,granularcomputing,evo- tionary computing, biocomputing and bioinformatics, cognitive computing and cognitive informatics, natural and arti?cial intelligence, Web intelligence, c- plex systems, and many others. The ?rst RSKT conference was held in 2006 in Chongqing, P.R. China, f- lowed by RSKT 2007 in Toronto, Canada and RSKT 2008 in Chengdu, P.R. China. This volume contains the papers selected for presentation at the 4th - ternationalConferenceonRoughSetsandKnowledgeTechnology(RSKT2009), which was held during July 14-16 on the Gold Coast, Australia.

Information visualisation is the field of study that is concerned with the development of methods for transforming abstract, complex data into visual representations in order to make that data more easily communicable and understandable. This volume reviews recent developments in information visualisation techniques, their application, and methods for their evaluation. It offers a wide range of examples of applied information visualisation from across disciplines such as history, art, the hum...

"This book presents current research on all aspects of domain-specific language for scholars and practitioners in the software engineering fields, providing new results and answers to open problems in DSL research"--

Practical approach to software measurement Contains hands-on industry experiences

Page 26: How can I avoid off-by-one errors? Page 143: Are Trojan Horse attacks for real? Page 158: Where should I look when my application can't handle its workload? Page 256: How can I detect memory leaks? Page 309: How do I target my application to international markets? Page 394: How should I name my code's identifiers? Page 441: How can I find and improve the code coverage of my tests? Diomidis Spinellis' first book, Code Reading, showed programmers how to understand and modify key functional properties of software. Code Quality focuses on non-functional properties, demonstrating how to meet such critical requirements as reliability, security, portability, and maintainability, as well as efficiency in time and space. Spinellis draws on hundreds of examples from open source projects--such as the Apache web and application servers, the BSD Unix systems, and the HSQLDB Java database--to illustrate concepts and techniques that every professional software developer will be able to appreciate and apply immediately. Complete files for the open source code illustrated in this book are available online at: http://www.spinellis.gr/codequality/

Product metrics are objective measures of the structure of software artefacts. Specifically, product metrics can be used in at least three ways: making system-level predictions, early identification of high-risk software components, and the construction of preventative design & programming guidelines. These uses allow an organization to get an early estimate of software quality and to take early action to reduce the number of faulty software components. The objective of this report is to provide a review of contemporary object-oriented metrics. It first describes how object-oriented metrics can be used in practice by software organizations and presents an overview of some of the most popular object-oriented metrics & those that have been studied most

extensively. The next section describes current cognitive theories used in software engineering that justify the development of object-oriented metrics. This is followed by a further elaboration of the cognitive theory to explain the cognitive mechanisms for metric thresholds. The empirical evidence supporting the above theories is then reviewed. The report concludes with recommendations for the practical usage of object-oriented metrics, a discussion of the match between the empirical results & theory, and directions for future research.

Learn to develop high-quality applications and frameworks in PHP Packed with in-depth information and step-by-step guidance, this book escorts you through the process of creating, maintaining and extending sustainable software of high quality with PHP. World-renowned PHP experts present real-world case studies for developing high-quality applications and frameworks in PHP that can easily be adapted to changing business requirements. . They offer different approaches to solving typical development and quality assurance problems that every developer needs to know and master. Details the process for creating high-quality PHP frameworks and applications that can easily be adapted to changing business requirements Covers the planning, execution, and automation of tests for the different layers and tiers of a Web application Demonstrates how to establish a successful development process Shares real-world case studies from well-known companies and their PHP experts With this book, you'll learn to develop high-quality PHP frameworks and applications that can easily be maintained with reasonable cost and effort.

This volume represents the seventh edition of the ECOOP Workshop Reader, a compendiumofworkshopreportsfromthe17thEuropeanConferenceonObject- Oriented Programming (ECOOP 2003), held in Darmstadt, Germany, during July 21–25, 2003. The workshops were held during the ?rst two days of the conference. They cover a wide range of interesting and innovative topics in object-oriented te- nology and o?ered the participants an opportunity for interaction and lively discussion. Twenty-one workshops were selected from a total of 24 submissions based on their scienti?c merit, the actuality of the topic, and their potential for a lively interaction. Unfortunately, one workshop had to be cancelled. Special thanks are due to the workshop organizers who recorded and s- marized the discussions. We would also like to thank all the participants for their presentations and lively contributions to the discussion: they made this volume possible. Last, but not least, we wish to express our appreciation to the members of the organizing committee who put in countless hours setting up and coordinating the workshops. We hope that this snapshot of current object-oriented technology will prove stimulating to you. October 2003 Frank Buschmann Alejandro Buchmann Mariano Cilia Organization ECOOP 2003 was organized by the Software Technology Group, Department of Computer Science, Darmstadt University of Technology under the auspices of AITO (Association Internationale pour les Technologies Objets) in cooperation with ACM SIGPLAN. The proceedings of the main conference were published as LNCS 2743.

This series, since its first volume in 1960 and now the oldest series still being published, covers new developments in computer technology. Each volume contains 5 to 7 chapters, and 3 volumes are produced annually. Most chapters present an overview of a current subfield within computer science, including many citations and often new developments in the field by the authors of the individual chapters. Topics include

hardware, software, web technology, communications, theoretic underpinnings of computing and novel applications of computers. The book series is a valuable addition to university courses that emphasize the topics under discussion in that particular volume, as well as belonging on the bookshelf of industrial practitioners who need to implement many of the technologies that are described. In-depth surveys and tutorials on new computer technology Well-known authors and researchers in the field Extensive bibliographies with most chapters Many of the volumes are devoted to single themes or subfields of computer science

Conceptual modeling has long been recognized as the primary means to enable so- ware development in information systems and data engineering. Nowadays, conc- tual modeling has become fundamental to any domain in which organizations have to cope with complex, real-world systems. Conceptual modeling fosters communi- tion between information systems developers and end-users, and it has become a key mechanism for understanding and representing computing systems and environments of all kinds, including the new e-applications and the information systems that support them. The International Conference on Conceptual Modeling provides the premiere - rum for presenting and discussing current research and applications in which the - jor emphasis is on conceptual modeling. Topics of interest span the entire spectrum of conceptual modeling including research and practice in areas such as theories of c- cepts and ontologies underlying conceptual modeling, methods and tools for devel- ing and communicating conceptual models, and techniques for transforming conc- tual models into effective implementations. Moreover, new areas of conceptual mod- ing broaden its application to include interdependencies with knowledge-based, lo- cal, linguistic, and philosophical theories and approaches. The conference also makes major strides in fostering collaboration and exchange between academia and industry. In this year’s conference, research papers focused on XML, Web services, business modeling, conceptual modeling applied to human-computer interaction, quality in conceptual modeling, conceptual modeling applied to interoperability, requirements modeling, reasoning, the Semantic Web, and metadata management. The call for papers attracted 158 research papers, whose authors represent 27 different countries.

Presents a novel metrics-based approach for detecting design problems in object-oriented software. Introduces an important suite of detection strategies for the identification of different well-known design flaws as well as some rarely mentioned ones.

The five-volume set LNCS 9155-9159 constitutes the refereed proceedings of the 15th International Conference on Computational Science and Its Applications, ICCSA 2015, held in Banff, AB, Canada, in June 2015. The 232 revised full papers presented in 22 workshops and a general track were carefully reviewed and selected from 780 initial submissions for inclusion in this volume. They cover various areas in computational science ranging from computational science technologies to specific areas of computational science such as computational geometry and security.

This book constitutes the refereed proceedings of the Fifth International Symposium on Search-Based Software Engineering, SSBSE 2013, held in St. Petersburg, Russia. The 14 revised full papers, 6 revised short papers, and 6 papers of the graduate track presented together with 2 keynotes, 2 challenge track papers and 1 tutorial paper were carefully reviewed and selected from 50 initial submissions. Search Based Software Engineering (SBSE) studies the application of meta-heuristic optimization techniques to various software engineering problems, ranging from requirements engineering to software testing and maintenance.

This book constitutes the proceedings of the 7th International Conference on Persuasive Technology, PERSUASIVE 2012, held in Linköping, Sweden, in June 2012. The 21 full papers presented together with 5 short papers were carefully reviewed and selected from numerous submissions. In addition three keynote papers are included in this volume. The papers cover the typical fields of persuasive technology, such

as health, safety and education.

The idea that “measuring quality is the key to developing high-quality software systems” is gaining relevance. Moreover, it is widely recognised that the key to obtaining better software systems is to measure the quality characteristics of early artefacts, produced at the conceptual modelling phase. Therefore, improving the quality of conceptual models is a major step towards the improvement of software system development. Since the 1970s, software engineers had been proposing high quantities of metrics for software products, processes and resources but had not been paying any special attention to conceptual modelling. By the mid-1990s, however, the need for metrics for conceptual modelling had emerged. This book provides an overview of the most relevant existing proposals of metrics for conceptual models, covering conceptual models for both products and processes. Contents:Towards a Framework for Conceptual Modelling Quality (M Piattini et al.)A Proposal of a Measure of Completeness for Conceptual Models (O Dieste et al.)Metrics for Use Cases: A Survey of Current Proposals (B Bernárdez et al.)Defining and Validating Metrics for UML Class Diagrams (M Genero et al.)Measuring OCL Expressions: An Approach Based on Cognitive Techniques (L Reynoso et al.)Metrics for Datawarehouses Conceptual Models (M Serrano et al.)Metrics for UML Statechart Diagrams (J A Cruz-Lemus et al.)Metrics for Software Process Models (F García et al.) Readership: Senior undergraduates and graduate students in software engineering; PhD students, researchers, analysts, designers, software engineers and those responsible for quality and auditing. Key Features:Presents the most relevant existing proposals of metrics for conceptual models, covering conceptual models for both products and processesProvides the most current bibliography on this subjectThe only book to focus on the quality aspects of conceptual modelsKeywords:Conceptual Model;Quality;Metrics;UML;OCL;Empirical Research

This book constitutes the thoroughly refereed post-conference proceedings of the Third International Joint Conference on Knowledge Discovery, Knowledge Engineering, and Knowledge Management, IC3K 2011, held in Paris, France, in October 2011. This book includes revised and extended versions of a strict selection of the best papers presented at the conference; 39 revised full papers together with one invited lecture were carefully reviewed and selected from 429 submissions. According to the three covered conferences KDIR 2011, KEOD 2011, and KMIS 2011, the papers are organized in topical sections on knowledge discovery and information retrieval, knowledge engineering and ontology development, and on knowledge management and information sharing.

The six-volume set LNCS 10404-10409 constitutes the refereed proceedings of the 17th International Conference on Computational Science and Its Applications, ICCSA 2017, held in Trieste, Italy, in July 2017. The 313 full papers and 12 short papers included in the 6-volume proceedings set were carefully reviewed and selected from 1052 submissions. Apart from the general tracks, ICCSA 2017 included 43 international workshops in various areas of computational sciences, ranging from computational science technologies to specific areas of computational sciences, such as computer graphics and virtual reality. Furthermore, this year ICCSA 2017 hosted the XIV International Workshop On Quantum Reactive Scattering. The program also featured 3 keynote speeches and 4 tutorials.

Innovative tools and techniques for the development and design of software systems are essential to the problem solving and planning of software solutions. Software Design and Development: Concepts, Methodologies, Tools, and Applications brings together the best practices of theory and implementation in the development of software systems. This reference source is essential for researchers, engineers, practitioners, and scholars seeking the latest knowledge on the techniques, applications, and

methodologies for the design and development of software systems.

C. Amting Directorate General Information Society, European Commission, Brussels Under the 4th Framework of European Research, the European Systems and Soft ware Initiative (ESSI) was part of the ESPRIT Programme. This initiative funded more than 470 projects in the area' of software and system process improvements. The majority of these projects were process improvement experiments carrying out and taking up new development processes, methods and technology within the software development process of a company. In addition, nodes (centres of exper tise), European networks (organisations managing local activities), training and dissemination actions complemented the process improvement experiments. ESSI aimed at improving the software development capabilities of European enterprises. It focused on best practice and helped European companies to develop world class skills and associated technologies to build the increasingly complex and varied systems needed to compete in the marketplace. The dissemination activities were designed to build a forum, at European level, to exchange information and knowledge gained within process improvement ex periments. Their major objective was to spread the message and the results of experiments to a wider audience, through a variety of different channels. The European Experience Exchange ~UR~X) project has been one of these dis semination activities within the European Systems and Software Initiative.~UR~X has collected the results of practitioner reports from numerous workshops in Europe and presents, in this series of books, the results of Best Practice achieve ments in European Companies over the last few years.

The21stEuropeanConferenceonObject-OrientedProgramming,ECOOP2007, was held in Berlin, Germany, on July 30 to August 3, 2007. ECOOP is the most importantand inspiring forumin Europeandbeyond for researchers,practiti- ers, and students working in that smorgasbord of topics and approaches known as object orientation. This topic area was explored and challenged by excellent invited speakers—two of which were the winners of this year's Dahl-Nygaard award—in the carefully refereed and selected technical papers, on posters, via demonstrations, and in tutorials. Each of the many workshops complemented this with a very interactive and dynamic treatment of more speci?c topics. - nally, panels allowed for loud and lively disagreement. Yet, it is one of ECOOP's specialqualities that this plethora ofactivities add upto a coherentandexciting whole, rather than deteriorating into chaos. The Program Committee received 161 submissions this year. Only 135 of them were carried through the full review process, because of a number of - tractions and a number of submissions of abstracts that were never followed by a full paper. However, the remaining papers were of very high quality and we accepted25 of them for publication. Helping very goodpapers to be published is more useful than having an impressively low acceptance rate. The papers were selected according to four groups of criteria, whose priority depended on the paper: relevance; originality and signi?cance; precisionand correctness;and p- sentation and clarity. Each paper had three, four, or ?ve reviews, depending on how controversial it was.

Object-Oriented Metrics in PracticeUsing Software Metrics to Characterize, Evaluate, and Improve the Design of Object-Oriented SystemsSpringer Science & Business Media

Conceptual modeling represents a recent approach to creating knowledge. It has emerged in response to the computer revolution,

which started in the middle of the 20th century. Computers, in the meantime, have become a major knowledge media. Conceptual modeling provides an answer to the difficulties experienced throughout the development of computer applications and aims at creating effective, reasonably priced, and sharable knowledge about using computers in business. Moreover, it has become evident that conceptual modeling has the potential to exceed the boundaries of business and computer usage. This state-of-the-art survey originates from the International Seminar on the Evolution of Conceptual Modeling, held in Dagstuhl Castle, Germany, in April 2008. The major objective of this seminar was to look into conceptual modeling from a historical perspective with a view towards the future of conceptual modeling and to achieve a better understanding of conceptual modeling issues in several different domains of discourse, going beyond individual (modeling) projects. The book contains 14 chapters. These were carefully selected during two rounds of reviewing and improvement from 26 presentations at the seminar and are preceded by a detailed preface providing general insights into the field of conceptual modeling that are not necessarily discussed in any of the chapters but nevertheless aid in conceptualizing the inner structure and coherence of the field. The chapters are grouped into the following three thematic sections: the evolution of conceptual modeling techniques; the extension of conceptual modeling to a service-oriented, peer-to-peer, or Web context; and new directions for conceptual modeling.

This book constitutes the proceedings of the 8th International Workshop on Programming Multi-Agent Systems held in Toronto, Canada, in May 2010 in conjunction with AAMAS 2010, the 9th International Joint Conference on Autonomous Agents and Multiagent Systems. The 7 revised full papers presented together with 1 invited paper were carefully reviewed and selected for inclusion in the book. The papers cover a broad range of mostly practical topics like decision component of agent systems; practical examples of programming languages; interaction with the environment, and are thus organized in topical sections on reasoning, programming languages, and environments.

During the last few years, software evolution research has explored new domains such as the study of socio-technical aspects and collaboration between different individuals contributing to a software system, the use of search-based techniques and meta-heuristics, the mining of unstructured software repositories, the evolution of software requirements, and the dynamic adaptation of software systems at runtime. Also more and more attention is being paid to the evolution of collections of inter-related and inter-dependent software projects, be it in the form of web systems, software product families, software ecosystems or systems of systems. With this book, the editors present insightful contributions on these and other domains currently being intensively explored, written by renowned researchers in the respective fields of software evolution. Each chapter presents the state of the art in a particular topic, as well as the current research, available tool support and remaining challenges. The book is complemented by a glossary of important terms used in the community, a reference list of nearly 1,000 papers and books and tips on additional resources that may be useful to the reader (reference books, journals, standards and major scientific events in the domain of software evolution and datasets). This book is intended for all those interested in software engineering, and more particularly, software maintenance and evolution. Researchers and software practitioners alike will find in the contributed chapters an overview

of the most recent findings, covering a broad spectrum of software evolution topics. In addition, it can also serve as the basis of graduate or postgraduate courses on e.g., software evolution, requirements engineering, model-driven software development or social informatics.