

Introduction To Software Engineering Penn State A Public

Software architectures have gained wide popularity in the last decade. They generally play a fundamental role in coping with the inherent difficulties of the development of large-scale and complex software systems. Component-oriented and aspect-oriented programming enables software engineers to implement complex applications from a set of pre-defined components. Software Architectures and Component Technology collects excellent chapters on software architectures and component technologies from well-known authors, who not only explain the advantages, but also present the shortcomings of the current approaches while introducing novel solutions to overcome the shortcomings. The unique features of this book are: evaluates the current architecture design methods and component composition techniques and explains their shortcomings; presents three practical architecture design methods in detail; gives four industrial architecture design examples; presents conceptual models for distributed message-based architectures; explains techniques for refining architectures into components; presents the recent developments in component and aspect-oriented techniques; explains the status of research on Piccola, Hyper/J®, Pluggable Composite Adapters and Composition Filters. Software Architectures and Component Technology is a suitable text for graduate level students in computer science and engineering, and as a reference for researchers and practitioners in industry.

In two editions spanning more than a decade, The Electrical Engineering Handbook stands as the definitive reference to the multidisciplinary field of electrical engineering. Our knowledge continues to grow, and so does the Handbook. For the third edition, it has expanded into a set of six books carefully focused on a specialized area or field of study. Each book represents a concise yet definitive collection of key concepts, models, and equations in its respective domain, thoughtfully gathered for convenient access. Computers, Software Engineering, and Digital Devices examines digital and logical devices, displays, testing, software, and computers, presenting the fundamental concepts needed to ensure a thorough understanding of each field. It treats the emerging fields of programmable logic, hardware description languages, and parallel computing in detail. Each article includes defining terms, references, and sources of further information. Encompassing the work of the world's foremost experts in their respective specialties, Computers, Software Engineering, and Digital Devices features the latest developments, the broadest scope of coverage, and new material on secure electronic commerce and parallel computing.

The only comprehensive set of guidelines for secure Java programming - from the field's leading organizations, CERT and Oracle

- Authoritative, end-to-end code-level requirements for building secure systems with any recent version of Java, including the new Java 7
- Presents techniques that also improve safety, reliability, dependability, robustness, availability, maintainability, and other attributes of quality.
- Includes extensive risk assessment guidance, plus references for further information.

This is the first authoritative, comprehensive compilation of code-level requirements for building secure systems in Java. Organized by CERT's pioneering software security experts, with support from Oracle's own Java platform developers, it covers every facet of secure software coding with Java 7 SE and Java 6 SE, and offers value even to developers working with other Java versions. The authors

itemize the most common coding errors leading to vulnerabilities in Java programs, and provide specific guidelines for avoiding each of them. They show how to produce programs that are not only secure, but also safer, more reliable, more robust, and easier to maintain. After a high-level introduction to Java application security, eighteen consistently-organized chapters detail specific guidelines for each facet of Java development. Each set of guidelines defines conformance, presents both noncompliant examples and corresponding compliant solutions, shows how to assess risk, and offers references for further information. To limit this book's size, the authors focus on 'normative requirements': strict rules for what programmers must do for their work to be secure, as defined by conformance to specific standards that can be tested through automated analysis software. (Note: A follow-up book will present 'non-normative requirements': recommendations for what Java developers typically 'should' do to further strengthen program security beyond testable 'requirements'.)

Computer Architecture/Software Engineering

This book constitutes the proceedings of the Third International Symposium on Dependable Software Engineering: Theories, Tools, and Applications, SETTA 2018, held in Beijing, China, in September 2018. The 9 full papers presented together with 3 short papers were carefully reviewed and selected from 22 submissions. The purpose of SETTA is to provide an international forum for researchers and practitioners to share cutting-edge advancements and strengthen collaborations in the field of formal methods and its interoperability with software engineering for building reliable, safe, secure, and smart systems.

As requirements engineering continues to be recognized as the key to on-time and on-budget delivery of software and systems projects, many engineering programs have made requirements engineering mandatory in their curriculum. In addition, the wealth of new software tools that have recently emerged is empowering practicing engineers to improve their requirements engineering habits. However, these tools are not easy to use without appropriate training. Filling this need, Requirements Engineering for Software and Systems, Second Edition has been vastly updated and expanded to include about 30 percent new material. In addition to new exercises and updated references in every chapter, this edition updates all chapters with the latest applied research and industry practices. It also presents new material derived from the experiences of professors who have used the text in their classrooms. Improvements to this edition include: An expanded introductory chapter with extensive discussions on requirements analysis, agreement, and consolidation An expanded chapter on requirements engineering for Agile methodologies An expanded chapter on formal methods with new examples An expanded section on requirements traceability An updated and expanded section on requirements engineering tools New exercises including ones suitable for research projects Following in the footsteps of its bestselling predecessor, the text illustrates key ideas associated with requirements engineering using extensive case studies and three common example systems: an airline baggage handling system, a point-of-sale system for a large pet store chain, and a system for a smart home. This edition also includes an example of a wet well pumping system for a wastewater treatment station. With a focus on software-intensive systems, but highly applicable to non-software systems, this text provides a probing and comprehensive review of recent developments in requirements engineering in high integrity systems.

This book constitutes revised selected papers from the jointly held conferences FHIES 2014, 4th International Symposium on Foundations of Health Information Engineering and Systems, and SEHC 2014, 6th International Workshop on Software Engineering in Health Care. The meeting took place in Washington, DC, USA, in July 2014. The 16 papers presented in this volume were carefully reviewed and selected from 23 submissions. They deal with security aspects of health information systems; medical devices in cyberphysical systems; the process of providing healthcare and of monitoring patients; and patient safety and the assurance of medical systems.

Modern-day projects require software and systems engineers to work together in realizing architectures of large and complex software-intensive systems. To date, the two have used their own tools and methods to deal with similar issues when it comes to the requirements, design, testing, maintenance, and evolution of these architectures. *Software and Systems Architecture in Action* explores practices that can be helpful in the development of architectures of large-scale systems in which software is a major component. Examining the synergies that exist between the disciplines of software and systems engineering, it presents concepts, techniques, and methods for creating and documenting architectures. The book describes an approach to architecture design that is driven from systemic quality attributes determined from both the business and technical goals of the system, rather than just its functional requirements. This architecture-centric design approach utilizes analytically derived patterns and tactics for quality attributes that inform the architect's design choices and help shape the architecture of a given system. The book includes coverage of techniques used to assess the impact of architecture-centric design on the structural complexity of a system. After reading the book, you will understand how to create architectures of systems and assess their ability to meet the business goals of your organization. Ideal for anyone involved with large and complex software-intensive systems, the book details powerful methods for engaging the software and systems engineers on your team. The book is also suitable for use in undergraduate and graduate-level courses on software and systems architecture as it exposes students to the concepts and techniques used to create and manage architectures of software-intensive systems.

This volume presents the thoroughly revised proceedings of the ICSE '94 Workshop on Joint Research Issues in Software Engineering and Human-Computer Interaction, held in Sorrento, Italy in May 1994. In harmony with the main objectives of the Workshop, this book essentially contributes to establishing a sound common platform for exchange and cooperation among researchers and design professionals from the SE and HCI communities. The book includes survey papers by leading experts as well as focused submitted papers. Among the topics covered are design, processes, user interface technology and SE environments, platform independence, prototyping, interactive behaviour, CSCW, and others.

This book constitutes the refereed proceedings of the 5th International Workshop on Software Engineering for Resilient Systems, SERENE 2013, held in Kiev, Ukraine, in October 2013. The 13 revised full papers were carefully reviewed and selected from 21 submissions. The papers are organized in topical sections on resilient software and design, rigorous reasoning, applications, concepts, and analysis.

This Festschrift volume, published in honor of Kokichi Futatsugi, contains 31 invited contributions from internationally leading researchers in formal methods and software engineering. Prof. Futatsugi is one of the founding fathers of the field of algebraic specification and verification

and is a leading researcher in formal methods and software engineering. He has pioneered and advanced novel algebraic methods and languages supporting them such as OBJ and CafeOBJ and has worked tirelessly over the years to bring such methods and tools in contact with software engineering practice. This volume contains contributions from internationally leading researchers in formal methods and software engineering.

This book contains the refereed proceedings of the 16th International Conference on Agile Software Development, XP 2015, held in Helsinki, Finland, in May 2015. While agile development has already become mainstream in industry, this field is still constantly evolving and continues to spur an enormous interest both in industry and academia. The XP conference series has always played, and continues to play, an important role in connecting the academic and practitioner communities, providing a forum for both formal and informal sharing and development of ideas, experiences, and opinions. The theme of XP 2015 "Delivering Value: Moving from Cyclic to Continuous Value Delivery" reflects the modern trend towards organizations that are simultaneously very efficient and flexible in software development and delivery. The 15 full and 7 short papers accepted for XP 2015 were selected from 44 submissions. All of the submitted papers went through a rigorous peer-review process. Additionally, 11 experience reports were selected from 45 proposals, and in each case the authors were shepherded by an experienced researcher.

This volume constitutes the proceedings of the 8th Conference on Software Engineering Education, SEI CSEE 1995, held in New Orleans, Louisiana, USA in March/April 1995. The volume presents 25 carefully selected full papers by researchers, educators, trainers and managers from the relevant academic, industrial and governmental communities; in addition there are abstracts of keynote speeches, panels, and tutorials. The topics covered include curriculum issues: Goals - what should we be teaching.- Process issues.- Software engineering in special domains.- Requirements and designs.- People, management, and leadership skills.- Technology issues.- Education and training - needs and trends.

This book constitutes the refereed proceedings of the 9th International Conference on Software Reuse, ICSR 2006, held in Torino, Italy, in June 2006. The book presents 27 revised full papers and 13 revised short papers, carefully reviewed and selected from numerous submissions. The Coverage includes COTS selection and integration; product lines, domain analysis, and variability; reengineering maintenance; programming languages and retrieval; aspect-oriented software development; approaches and models; and components. Machine learning deals with the issue of how to build computer programs that improve their performance at some tasks through experience. Machine learning algorithms have proven to be of great practical value in a variety of application domains. Not surprisingly, the field of software engineering turns out to be a fertile ground where many software development and maintenance tasks could be formulated as learning problems and approached in terms of learning algorithms. This book deals with the subject of machine learning applications in software engineering. It provides an overview of machine learning, summarizes the state-of-the-practice in this niche area, gives a classification of the existing work, and offers some application guidelines. Also included in the book is a collection of previously published papers in this research area.

Software Engineering for Image Processing Systems creates a modern engineering framework for the specification, design, coding, testing, and maintenance of image processing software and systems. The text is designed to benefit not only software engineers, but also workers with backgrounds in mathematics, the physical sciences, and other engineering

Aimed at the computer-literate person wishing to find out about the reality of exploiting the promise of artificial intelligence (AI) in practical, maintainable software systems, this text tries to avoid the hype usually associated with the subject. Instead, it presents the realities, the problems, the current state of the art, and future directions.

Software Engineering for Image Processing SystemsCRC Press

Includes articles in topic areas such as autonomic computing, operating system architectures, and open source software technologies and applications.

Software development is a complex problem-solving activity with a high level of uncertainty. There are many technical challenges concerning scheduling, cost estimation, reliability, performance, etc, which are further aggravated by weaknesses such as changing requirements, team dynamics, and high staff turnover. Thus the management of knowledge and experience is a key means of systematic software development and process improvement. "Managing Software Engineering Knowledge" illustrates several theoretical examples of this vision and solutions applied to industrial practice. It is structured in four parts addressing the motives for knowledge management, the concepts and models used in knowledge management for software engineering, their application to software engineering, and practical guidelines for managing software engineering knowledge. This book provides a comprehensive overview of the state of the art and best practice in knowledge management applied to software engineering. While researchers and graduate students will benefit from the interdisciplinary approach leading to basic frameworks and methodologies, professional software developers and project managers will also profit from industrial experience reports and practical guidelines.

This book reports on the concepts and ideas discussed at the well attended ICRA2005 Workshop on "Principles and Practice of Software Development in Robotics", held in Barcelona, Spain, April 18 2005. It collects contributions that describe the state of the art in software development for the Robotics domain. It also reports a number of practical applications to real systems and discuss possible future developments.

The book introduces the idea of Coherency Management, and asserts that this is the primary outcome goal of an enterprise's architecture. With submissions from over 30 authors and co-authors, the book reinforces the idea that EA is being practiced in an ever-increasing variety of circumstances - from the tactical to the strategic, from the technical to the political, and with governance that ranges from sell to tell. The characteristics, usages, value statements, frameworks, rules, tools and countless other attributes of EA seem to be anything but orderly, definable, classifiable, and understandable as might be hoped given heritage of EA and the famous framework and seminal article on the subject by John Zachman over two decades ago. Notably, EA is viewed as an Enterprise Design and Management approach, adopted to build better enterprises, rather than a IT Design and Management approach limited to build better systems.

The development of products in disciplines such as mechanical, electrical, or software engineering is a challenging task. Costs have to be reduced, the time-to-market has to be shortened, and quality has to be improved. Skilled engineers

and sophisticated tools for supporting technical work are necessary prerequisites, yet they are not sufficient for meeting these ambitious goals. In addition, the work of developers must be coordinated so that they cooperate smoothly. To this end, the steps of the development process have to be planned, an engineer executing a task must be provided with documents and tools, the results of development activities have to be fed back to management which in turn has to adjust the plan accordingly, the documents produced in different working areas have to be kept consistent with each other, etc. This book reports on models and tools for managing development processes. It provides both a survey of the current state of the art and presents our own contributions. The material covered in this book is based on research in different engineering disciplines (mechanical, software, and chemical engineering). It presents a unified view on the management of development processes in these disciplines.

While vols. III/29 A, B (published in 1992 and 1993, respectively) contains the low frequency properties of dielectric crystals, in vol. III/30 the high frequency or optical properties are compiled. While the first subvolume 30 A contains piezooptic and elastooptic constants, linear and quadratic electrooptic constants and their temperature coefficients, and relevant refractive indices, the present subvolume 30 B covers second and third order nonlinear optical susceptibilities. For the reader's convenience an alphabetical formula index and an alphabetical index of chemical, mineralogical and technical names for all substances of volumes 29 A, B and 30 A, B are included.

Software engineering education is an important, often controversial, issue in the education of Information Technology professionals. It is of concern at all levels of education, whether undergraduate, post-graduate or during the working life of professionals in the field. This publication gives perspectives from academic institutions, industry and education bodies from many different countries. Several papers provide actual curricula based on innovative ideas and modern programming paradigms. Various aspects of project work, as an important component of the educational process, are also covered and the uses of software tools in the software industry and education are discussed. The book provides a valuable source of information for all those interested and involved in software engineering education.

While the SCM-10 experiment proved very successful, the SCM community felt that it should go for a formal workshop once again. In fact, this would open up the opportunity to document current research and fertilize the development of this discipline.

As a consequence, the follow-up workshop SCM-11 was held as a co-located event with ICSE at Portland, Oregon in May 2003. The Call for Papers received a lively response with 36 submissions, out of which 15 were accepted for publication (12 long and 3 short papers). These papers appear in the second part of this volume, ordered by topic. In addition to paper presentations, the workshop provided sufficient time for inspiring discussions.

The chairs of both workshops would like to acknowledge the invaluable contribution of all authors and speakers, the program committees, the organizers of the ICSE conferences, and Springer-Verlag.

May2003 BernhardWestfechtel Andr´evanderHoek VI Preface ProgramCommitteeofSCM2003
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BernhardWestfechtel,RWTHAachen,Germany JimWhitehead,UniversityofCalifornia,SantaCruz,USA
AndreasZeller,UniversityofSaarbruc " ken,Germany SCMWorkshops SCM-1,Grassau,Germany(1988)
SCM-2,Princeton,USA(1990) SCM-3,Trondheim,Norway(1991) SCM-4,Baltimore,USA(1993) SCM-5,Seattle,USA(1995)
SCM-6,Berlin,Germany(1996) SCM-7,Boston,USA(1997) SCM-8,Brussels,Belgium(1998) SCM-9,Toulouse,France(1999)
SCM-10,Toronto,Canada(2001) SCM-11,Portland,Oregon(2003) TableofContents BestPapersofSCM2001
De?ningandSupportingConcurrentEngineeringPoliciesinSCM. 1 JackyEstublier,SergioGarc´?a,andGerman´
Vega Con?gurationManagementinComponentBasedProductPopulations. 16 RobvanOmmering
SoftwareArchitectureandSoftwareCon?gurationManagement. 24 BernhardWestfechtelandReidarConradi
SupportingDistributedCollaborationthroughMultidimensionalSoftware Con?gurationManagement.
. 40 MarkC. Chu-CarrollandJamesWright
SoftwareCon?gurationManagementRelatedtotheManagementof DistributedSystemsandService-OrientedArchitectures . . .
. 54 VladimirTosic,DavidMennie,andBernardPagurek VersionModelsI
UniformComparisonofCon?gurationManagementDataModels 70 E. JamesWhitehead,Jr. andDorritGordon
TowardsIntelligentSupportforManagingEvolutionofCon?gurable SoftwareProductFamilies
. 86 TeroKojo,TomiMa"nnist"o,andTimoSoininen
IntegratingSoftwareConstructionandSoftwareDeployment 102 EelcoDolstra VersionModelsII
DataProductCon?gurationManagementand Versioningin Large-Scale ProductionofSatelliteScienti?cData
. 118 BruceR. Barkstrom MergingCollectionDataStructuresinaContentManagementSystem.
134 AxelWienberg CompatibilityofXMLLanguageVersions. 148
DanielDuiandWolfgangEmmerich VIII TableofContents Architecture UsingFederationsforFlexibleSCMSystems
. 163 JackyEstublier,Anh-TuyetLe,andJorgeVillalobos DissectingCon?gurationManagementPolicies. .

..... 177 RonaldvanderLingenandAndr´evanderHoek ConcurrencyandDistribution
ImprovingCon?ictDetectioninOptimisticConcurrencyControlModels. . 191 CiaranO'Reilly,PhilipMorrow,andDavidBustard
DataTopologyandProcessPatternsforDi

"The Fifth SEI Conference on Software Engineering was held in Pittsburgh, Pennsylvania, October 7-8, 1991. This annual conference is a forum for discussion of software engineering education and training among members of the academic, industry, and government communities. It is funded by the Education Program of the Software Engineering Institute, a federallyfunded research and development center of the U.S. Department of Defense. For the first time in 1991 it was held in conjunction with the Association for Computing Machinery and the IEEE Computer Society. Seven sessions addressed: software project courses, software engineering training in government and industry, curriculum issues, software engineering teaching styles, teaching design, topics inreal time and environments, and developing software engineering expertise."--PUBLISHER'S WEBSITE.

This book constitutes the refereed proceedings of the Third International Software Product Line Conference, SPLC 2004, held in Boston, MA, USA in August/September 2004. The 18 revised full technical papers presented together with a keynote abstract and summaries of panels, tutorials, and workshops were carefully reviewed and selected for inclusion in the book. Organized in sections on business, architecture, and quality assurance, the papers address topics ranging from how to start a software product line in a company, to case studies of mature product lines and the technology used, to test strategies of product lines, to strategies and notations for creating product line architectures, and to the importance of binding times in creating product lines.

Ethical practice in engineering is critical for ensuring public trust in the field and in its practitioners, especially as engineers increasingly tackle international and socially complex problems that combine technical and ethical challenges. This report aims to raise awareness of the variety of exceptional programs and strategies for improving engineers' understanding of ethical and social issues and provides a resource for those who seek to improve ethical development of engineers at their own institutions. This publication presents 25 activities and programs that are exemplary in their approach to infusing ethics into the development of engineering students. It is intended to serve as a resource for institutions of higher education seeking to enhance their efforts in this area.

This book reports on cutting-edge theories and methods for analyzing complex systems, such as transportation and communication networks and discusses multi-disciplinary approaches to dependability problems encountered when dealing with complex systems in practice. The book presents the most noteworthy methods and results discussed at the International Conference on Reliability and Statistics in Transportation and Communication (RelStat), which took place

remotely from Riga, Latvia, on October 14-17, 2020. It spans a broad spectrum of topics, from mathematical models and design methodologies, to software engineering, data security and financial issues, as well as practical problems in technical systems, such as transportation and telecommunications, and in engineering education.

This volume combines the proceedings of the 1987 SEI Conference on Software Engineering Education, held in Monroeville, Pennsylvania on April 30 and May 1, 1987, with the set of papers that formed the basis for that conference. The conference was sponsored by the Software Engineering Institute (SEI) of Carnegie-Mellon University. SEI is a federally-funded research and development center established by the United States Department of Defense to improve the state of software technology. The Education Division of SEI is charged with improving the state of software engineering education. This is the third volume on software engineering education to be published by Springer-Verlag. The first (*Software Engineering Education: Needs and Objectives*, edited by Tony Wasserman and Peter Freeman) was published in 1976. That volume documented a workshop in which educators and industrialists explored needs and objectives in software engineering education. The second volume (*Software Engineering Education: The Educational Needs of the Software Community*, edited by Norm Gibbs and Richard Fairley) was published in 1986. The 1986 volume contained the proceedings of a limited attendance workshop held at SEI and sponsored by SEI and Wang Institute. In contrast to the 1986 Workshop, which was limited in attendance to 35 participants, the 1987 Conference attracted approximately 180 participants.

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 intricate fields of information systems and information technology consist of innumerable interrelated facets from hardware to software and creators to end users. All systems inevitably encounter errors or problems, and as new solutions are found and created in today's complex world of technology, it is essential to look at systems as complete entities when searching for solutions and answers. Systems Approach Applications for Developments in Information Technology addresses the essential need to look at systems as a complete unit through using systems approach in the field of IT. This complete reference is designed for all information technology professionals to better understand their current jobs and future goals through the pivotal idea of systems approach as applied in software engineering, systems engineering, and complex systems.

Operations Research: 1934-1941," 35, 1, 143-152; "British The goal of the Encyclopedia of Operations Research and Operational Research in World War II," 35, 3, 453-470; Management Science is to provide to decision makers and "U. S. Operations Research in World War II," 35, 6, 910-925; problem solvers in business, industry, government and and the 1984 article by Harold Lardner that appeared in academia a comprehensive overview of the wide range of Operations Research: "The Origin of Operational Research," ideas, methodologies, and synergistic forces that combine to 32, 2, 465-475. form the preeminent decision-aiding fields of operations re search and management science (OR/MS). To this end, we The Encyclopedia contains no entries that define the fields enlisted a distinguished international group of academics of operations research and management science. OR and MS and practitioners to contribute articles on subjects for are often equated to one another. If one defines them by the which they are renowned. methodologies they employ, the equation would probably The editors, working with the Encyclopedia's Editorial stand inspection. If one defines them by their historical Advisory Board, surveyed and divided OR/MS into specific developments and the classes of problems they encompass, topics that collectively encompass the foundations, applica the equation becomes fuzzy. The formalism OR grew out of tions, and emerging elements of this ever-changing field. We the operational problems of the British and U. s. military also wanted to establish the close associations that OR/MS efforts in World War II.

Over the past decade, there has been an increase in attention and focus on the discipline of software engineering. Software engineering tools and techniques have been developed to gain more predictable quality improvement results. Process standards such as Capability Maturity Model Integration (CMMI), ISO 9000, Software Process Improvement and Capability dEtermination (SPICE), Agile Methodologies, and others have been proposed to assist organizations to achieve more predictable results by incorporating these proven standards and procedures into their software process. Software Process Improvement and Management: Approaches and Tools for Practical Development offers the latest research and case studies on software engineering and development. The production of new process standards assist

organizations and software engineers in adding a measure of predictability to the software process. Companies can gain a decisive competitive advantage by applying these new and theoretical methodologies in real-world scenarios.

Researchers, scholars, practitioners, students, and anyone interested in the field of software development and design should access this book as a major compendium of the latest research in the field.

Observers in the present usually have an advantage when it comes to interpreting events of the past. In the case of software reuse, however, it is unclear why an idea that has gained such universal acceptance was the source of swirling controversy when it began to be taken seriously by the software engineering community in the mid-1980's. From a purely conceptual point of view, the reuse of software designs and components promises nearly risk-free benefits to the developer. Virtually every model of software cost and development effort predicts first-order dependencies on either products size or the number of steps carried out in development. Reduce the amount of new product to be developed and the cost of producing the product decreases. Remove development steps, and total effort is reduced. By reusing previously developed engineering products the amount of new product and the number of development steps can be reduced. In this way, reuse clearly has a major influence on reducing total development cost and effort. This, of course, raises the issue of from whence the reused products arise. There has to be a prior investment in creating "libraries of reuse products before reuse can be successful . . ." How can organizations with a "bottom line" orientation be enticed into contributing to a reuse venture? Fortunately, the economics of reuse resembles many other financial investment situations .

"This book explores the implementation of organizational and end user computing initiatives and provides foundational research to further the understanding of this discipline and its related fields"--Provided by publisher.

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