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Although software engineering can trace its beginnings to a NATO conference in 1968, it cannot be said to have become an empirical science until the 1970s with the advent of the work of Prof. Victor Robert Basili of the University of Maryland. In addition to the need to engineer software was the need to understand software. Much like other sciences, such as physics, chemistry, and biology, software engineering needed a discipline of observation, theory formation, experimentation, and feedback. By applying the scientific method to the software engineering domain, Basili developed concepts like the Goal-Question-Metric method, the Quality-Improvement- Paradigm, and the Experience Factory to help bring a sense of order to the ad hoc developments so prevalent in the software engineering field. On the occasion of Basili's 65th birthday, we present this book containing reprints of 20 papers that defined much of his work. We divided the 20 papers into 6 sections, each describing a

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different facet of his work, and asked several individuals to write an introduction to each section. Instead of describing the scope of this book in this preface, we decided to let one of his papers, the keynote paper he gave at the International Conference on Software Engineering in 1996 in Berlin, Germany to lead off this book. He, better than we, can best describe his views on what is - perimental software engineering.

This is the most authoritative archive of Barry Boehm's contributions to software engineering. Featuring 42 reprinted articles, along with an introduction and chapter summaries to provide context, it serves as a "how-to" reference manual for software engineering best practices. It provides convenient access to Boehm's landmark work on product development and management processes. The book concludes with an insightful look to the future by Dr. Boehm.

JCKBSE aims to provide a forum for researchers and practitioners to discuss the latest developments in the areas of knowledge engineering and software engineering. Particular emphasis is placed upon applying knowledge-based methods to software engineering problems.

Writing and running software is now as much a part of science as telescopes and test tubes, but most researchers are never taught how to do either well. As a result, it takes them longer to accomplish

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simple tasks than it should, and it is harder for them to share their work with others than it needs to be.

This book introduces the concepts, tools, and skills that researchers need to get more done in less time and with less pain. Based on the practical experiences of its authors, who collectively have spent several decades teaching software skills to scientists, it covers everything graduate-level researchers need to automate their workflows, collaborate with colleagues, ensure that their results are trustworthy, and publish what they have built so that others can build on it. The book assumes only a basic knowledge of Python as a starting point, and shows readers how it, the Unix shell, Git, Make, and related tools can give them more time to focus on the research they actually want to do. Research Software Engineering with Python can be used as the main text in a one-semester course or for self-guided study. A running example shows how to organize a small research project step by step; over a hundred exercises give readers a chance to practice these skills themselves, while a glossary defining over two hundred terms will help readers find their way through the terminology. All of the material can be re-used under a Creative Commons license, and all royalties from sales of the book will be donated to The Carpentries, an organization that teaches foundational coding and data science skills to researchers worldwide.

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This book focuses on a specialized branch of the vast domain of software engineering: component-based software engineering (CBSE). Component-Based Software Engineering: Methods and Metrics enhances the basic understanding of components by defining categories, characteristics, repository, interaction, complexity, and composition. It divides the research domain of CBSE into three major sub-domains: (1) reusability issues, (2) interaction and integration issues, and (3) testing and reliability issues. This book covers the state-of-the-art literature survey of at least 20 years in the domain of reusability, interaction and integration complexities, and testing and reliability issues of component-based software engineering. The aim of this book is not only to review and analyze the previous works conducted by eminent researchers, academicians, and organizations in the context of CBSE, but also suggests innovative, efficient, and better solutions. A rigorous and critical survey of traditional and advanced paradigms of software engineering is provided in the book. Features: In-interactions and Out-Interactions both are covered to assess the complexity. In the context of CBSE both white-box and black-box testing methods and their metrics are described. This work covers reliability estimation using reusability which is an innovative method. Case studies and real-life software examples are used to explore the problems and their solutions.

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Students, research scholars, software developers, and software designers or individuals interested in software engineering, especially in component-based software engineering, can refer to this book to understand the concepts from scratch. These measures and metrics can be used to estimate the software before the actual coding commences. Proceedings of the 2019 International Conference on Software Engineering Research and Practice (SERP'19) held July 29th - August 1st, 2019 in Las Vegas, Nevada.

Users increasingly demand more from their software than ever before—more features, fewer errors, faster runtimes. To deliver the best quality products possible, software engineers are constantly in the process of employing novel tools in developing the latest software applications. Progressions and Innovations in Model-Driven Software Engineering investigates the most recent and relevant research on model-driven engineering. Within its pages, researchers and professionals in the field of software development, as well as academics and students of computer science, will find an up-to-date discussion of scientific literature on the topic, identifying opportunities and advantages, and complexities and challenges, inherent in the future of software engineering.

Although there are countless books on statistics, few are dedicated to the application of statistical

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methods to software engineering. Simple Statistical Methods for Software Engineering: Data and Patterns fills that void. Instead of delving into overly complex statistics, the book details simpler solutions that are just as effective and connect with the intuition of problem solvers. Sharing valuable insights into software engineering problems and solutions, the book not only explains the required statistical methods, but also provides many examples, review questions, and case studies that provide the understanding required to apply those methods to real-world problems. After reading this book, practitioners will possess the confidence and understanding to solve day-to-day problems in quality, measurement, performance, and benchmarking. By following the examples and case studies, students will be better prepared able to achieve seamless transition from academic study to industry practices. Includes boxed stories, case studies, and illustrations that demonstrate the nuances behind proper application Supplies historical anecdotes and traces statistical methods to inventors and gurus Applies basic statistical laws in their simplest forms to resolve engineering problems Provides simple techniques for addressing the issues software engineers face The book starts off by reviewing the essential facts about data. Next, it supplies a detailed review and summary of metrics, including development, maintenance, test, and agile

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metrics. The third section covers the fundamental laws of probability and statistics and the final section presents special data patterns in the form of tailed mathematical distributions. In addition to selecting simpler and more flexible tools, the authors have also simplified several standard techniques to provide you with the set of intellectual tools all software engineers and managers require.

This book constitutes the thoroughly refereed post-proceedings of the International Dagstuhl-Seminar on Empirical Software Engineering, held in Dagstuhl Castle, Germany in June 2006. The 54 revised full papers in this state-of-the-art survey are organized in topical sections on the empirical paradigm, measurement and model building, technology transfer and education, as well as roadmapping.

"This book provides coverage of recent advances in the area of secure software engineering that address the various stages of the development process from requirements to design to testing to implementation"--Provided by publisher.

The authors describe in detail the capture and use of design rationale in software engineering to improve the quality of software. Their book is the first comprehensive and unified treatment of rationale usage in software engineering. It provides a consistent conceptual framework and a unified terminology for comparing, contrasting and combining the myriad approaches to rationale in software engineering. It is both an excellent introductory text and a uniquely valuable reference.

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Like other sciences and engineering disciplines, software engineering requires a cycle of model building, experimentation, and learning. Experiments are valuable tools for all software engineers who are involved in evaluating and choosing between different methods, techniques, languages and tools. The purpose of Experimentation in Software Engineering is to introduce students, teachers, researchers, and practitioners to empirical studies in software engineering, using controlled experiments. The introduction to experimentation is provided through a process perspective, and the focus is on the steps that we have to go through to perform an experiment. The book is divided into three parts. The first part provides a background of theories and methods used in experimentation. Part II then devotes one chapter to each of the five experiment steps: scoping, planning, execution, analysis, and result presentation. Part III completes the presentation with two examples. Assignments and statistical material are provided in appendixes. Overall the book provides indispensable information regarding empirical studies in particular for experiments, but also for case studies, systematic literature reviews, and surveys. It is a revision of the authors' book, which was published in 2000. In addition, substantial new material, e.g. concerning systematic literature reviews and case study research, is introduced. The book is self-contained and it is suitable as a course book in undergraduate or graduate studies where the need for empirical studies in software engineering is stressed. Exercises and assignments are included to

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combine the more theoretical material with practical aspects. Researchers will also benefit from the book, learning more about how to conduct empirical studies, and likewise practitioners may use it as a “cookbook” when evaluating new methods or techniques before implementing them in their organization.

The software profession has a problem, widely recognized but which nobody seems willing to do anything about; a variant of the well known “telephone game,” where some trivial rumor is repeated from one person to the next until it has become distorted beyond recognition and blown up out of all proportion.

Unfortunately, the objects of this telephone game are generally considered cornerstone truths of the discipline, to the point that their acceptance now seems to hinder further progress. This book takes a look at some of those “ground truths” the claimed 10x variation in productivity between developers; the “software crisis”; the cost-of-change curve; the “cone of uncertainty”; and more. It assesses the real weight of the evidence behind these ideas - and confronts the scary prospect of moving the state of the art forward in a discipline that has had the ground kicked from under it.

As technology continues to evolve, the popularity of mobile computing has become inherent within today’s society. With the majority of the population using some form of mobile device, it has become increasingly important to develop more efficient cloud platforms.

Modern Software Engineering Methodologies for Mobile and Cloud Environments investigates emergent trends and research on innovative software platforms in mobile

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and cloud computing. Featuring state-of-the-art software engineering methods, as well as new techniques being utilized in the field, this book is a pivotal reference source for professionals, researchers, practitioners, and students interested in mobile and cloud environments. Large and growing opportunity costs are resulting from the inability to produce sophisticated, reliable software in a timely manner. Software engineering presents stubborn problems, but in this book, a group of experts suggest several constructive directions for research. Together, they support the need for greater interaction between researchers and practitioners and more aggressive efforts to share and reuse software engineering knowledge.

This book addresses action research (AR), one of the main research methodologies used for academia-industry research collaborations. It elaborates on how to find the right research activities and how to distinguish them from non-significant ones. Further, it details how to glean lessons from the research results, no matter whether they are positive or negative. Lastly, it shows how companies can evolve and build talents while expanding their product portfolio. The book's structure is based on that of AR projects; it sequentially covers and discusses each phase of the project. Each chapter shares new insights into AR and provides the reader with a better understanding of how to apply it. In addition, each chapter includes a number of practical use cases or examples. Taken together, the chapters cover the entire software lifecycle: from problem diagnosis to project (or action) planning and execution, to documenting and

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disseminating results, including validity assessments for AR studies. The goal of this book is to help everyone interested in industry-academia collaborations to conduct joint research. It is for students of software engineering who need to learn about how to set up an evaluation, how to run a project, and how to document the results. It is for all academics who aren't afraid to step out of their comfort zone and enter industry. It is for industrial researchers who know that they want to do more than just develop software blindly. And finally, it is for stakeholders who want to learn how to manage industrial research projects and how to set up guidelines for their own role and expectations.

"This book explores different applications in V & V that spawn many areas of software development -including real time applications- where V & V techniques are required, providing in all cases examples of the applications"--Provided by publisher.

As the software industry continues to evolve, professionals are continually searching for practices that can assist with the various problems and challenges in information technology (IT). Agile development has become a popular method of research in recent years due to its focus on adapting to change. There are many factors that play into this process, so success is no guarantee. However, combining agile development with other software engineering practices could lead to a high rate of success in problems that arise during the maintenance and development of computing technologies. Software Engineering for Agile Application Development is a collection of innovative research on the methods and implementation of adaptation practices in software development that improve the quality and

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performance of IT products. The presented materials combine theories from current empirical research results as well as practical experiences from real projects that provide insights into incorporating agile qualities into the architecture of the software so that the product adapts to changes and is easy to maintain. While highlighting topics including continuous integration, configuration management, and business modeling, this book is ideally designed for software engineers, software developers, engineers, project managers, IT specialists, data scientists, computer science professionals, researchers, students, and academics.

"This book provides integrated chapters on software engineering and enterprise systems focusing on parts integrating requirements engineering, software engineering, process and frameworks, productivity technologies, and enterprise systems"--Provided by publisher.

Nowadays, societies crucially depend on high-quality software for a large part of their functionalities and activities. Therefore, software professionals, researchers, managers, and practitioners alike have to competently decide what software technologies and products to choose for which purpose. For various reasons, systematic empirical studies employing strictly scientific methods are hardly practiced in software engineering. Thus there is an unquestioned need for developing improved and better-qualified empirical methods, for their application in practice and for dissemination of the results. This book describes different kinds of empirical studies and methods for performing such studies, e.g., for planning, performing, analyzing, and reporting such studies. Actual studies are presented in detail in various chapters dealing with inspections, testing, object-oriented techniques, and component-based software engineering.

Evidence-Based Software Engineering and Systematic Reviews provides a clear introduction to the use of an

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evidence-based model for software engineering research and practice. It explains the roles of primary studies (experiments, surveys, case studies) as elements of an over-arching evidence model, rather than as disjointed elem

In the decade since the idea of adapting the evidence-based paradigm for software engineering was first proposed, it has become a major tool of empirical software engineering. Evidence-Based Software Engineering and Systematic Reviews provides a clear introduction to the use of an evidence-based model for software engineering research and practice.

Empirical research has now become an essential component of software engineering yet software practitioners and researchers often lack an understanding of how the empirical procedures and practices are applied in the field. Empirical Research in Software Engineering: Concepts, Analysis, and Applications shows how to implement empirical research processes, procedures, and practices in software engineering. Written by a leading researcher in empirical software engineering, the book describes the necessary steps to perform replicated and empirical research. It explains how to plan and design experiments, conduct systematic reviews and case studies, and analyze the results produced by the empirical studies. The book balances empirical research concepts with exercises, examples, and real-life case studies, making it suitable for a course on empirical software engineering. The author discusses the process of developing predictive models, such as defect prediction and change prediction, on data collected from source code repositories. She also covers the application of machine learning techniques in empirical software engineering, includes guidelines for publishing and reporting results, and presents popular software tools for carrying out empirical studies.

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Component-Based Software Engineering (CBSE) is the way to produce software fast. This book presents the concepts in CBSE. While detailing both the advantages and the limitations of CBSE, it covers every aspect of component engineering, from software engineering practices to the design of software component infrastructure, technologies, and system.

This book presents contemporary empirical methods in software engineering related to the plurality of research methodologies, human factors, data collection and processing, aggregation and synthesis of evidence, and impact of software engineering research. The individual chapters discuss methods that impact the current evolution of empirical software engineering and form the backbone of future research. Following an introductory chapter that outlines the background of and developments in empirical software engineering over the last 50 years and provides an overview of the subsequent contributions, the remainder of the book is divided into four parts: Study Strategies (including e.g. guidelines for surveys or design science); Data Collection, Production, and Analysis (highlighting approaches from e.g. data science, biometric measurement, and simulation-based studies); Knowledge Acquisition and Aggregation (highlighting literature research, threats to validity, and evidence aggregation); and Knowledge Transfer (discussing open science and knowledge transfer with industry). Empirical methods like experimentation have

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become a powerful means of advancing the field of software engineering by providing scientific evidence on software development, operation, and maintenance, but also by supporting practitioners in their decision-making and learning processes. Thus the book is equally suitable for academics aiming to expand the field and for industrial researchers and practitioners looking for novel ways to check the validity of their assumptions and experiences. Chapter 17 is available open access under a Creative Commons Attribution 4.0 International License via [link.springer.com](http://link.springer.com).

A groundbreaking book in this field, *Software Engineering Foundations: A Software Science Perspective* integrates the latest research, methodologies, and their applications into a unified theoretical framework. Based on the author's 30 years of experience, it examines a wide range of underlying theories from philosophy, cognitive informatics, denota

*Research and Evidence in Software Engineering: From Empirical Studies to Open Source Artifacts* introduces advanced software engineering to software engineers, scientists, postdoctoral researchers, academicians, software consultants, management executives, doctoral students, and advanced level postgraduate computer science students. This book contains research articles addressing numerous software engineering research

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challenges associated with various software development-related activities, including programming, testing, measurements, human factors (social software engineering), specification, quality, program analysis, software project management, and more. It provides relevant theoretical frameworks, empirical research findings, and evaluated solutions addressing the research challenges associated with the above-mentioned software engineering activities. To foster collaboration among the software engineering research community, this book also reports datasets acquired systematically through scientific methods and related to various software engineering aspects that are valuable to the research community. These datasets will allow other researchers to use them in their research, thus improving the quality of overall research. The knowledge disseminated by the research studies contained in the book will hopefully motivate other researchers to further innovation in the way software development happens in real practice.

In this book, the authors highlight recent findings that hold the potential to improve software products or development processes; in addition, they help readers understand new concepts and technologies, and to see what it takes to migrate from old to new platforms. Some of the authors have spent most of their careers in industry, working at the frontiers of

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practice-based innovation, and are at the same time prominent researchers who have made significant academic contributions. Others work together with industry to test, in industrial settings, the methods they've developed in the lab. The choice of subject and authors represent the key elements of this book. Its respective chapters cover a wide range of topics, from cloud computing to agile development, applications of data science methods, re-engineering of aging applications into modern ones, and business and requirements engineering. Taken together, they offer a valuable asset for practitioners and researchers alike.

"This book provides analysis, characterization and refinement of software engineering data in terms of machine learning methods. It depicts applications of several machine learning approaches in software systems development and deployment, and the use of machine learning methods to establish predictive models for software quality while offering readers suggestions by proposing future work in this emerging research field"--Provided by publisher.

Based on their own experiences of in-depth case studies of software projects in international corporations, in this book the authors present detailed practical guidelines on the preparation, conduct, design and reporting of case studies of software engineering. This is the first software engineering specific book on the case study

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research method.

This book identifies challenges and opportunities in the development and implementation of software that contain significant statistical content. While emphasizing the relevance of using rigorous statistical and probabilistic techniques in software engineering contexts, it presents opportunities for further research in the statistical sciences and their applications to software engineering. It is intended to motivate and attract new researchers from statistics and the mathematical sciences to attack relevant and pressing problems in the software engineering setting. It describes the "big picture," as this approach provides the context in which statistical methods must be developed. The book's survey nature is directed at the mathematical sciences audience, but software engineers should also find the statistical emphasis refreshing and stimulating. It is hoped that the book will have the effect of seeding the field of statistical software engineering by its indication of opportunities where statistical thinking can help to increase understanding, productivity, and quality of software and software production.

Over the past ten years since the idea of adapting the evidence-based paradigm was first proposed for software engineering, it has become a major tool of empirical software engineering, influencing primary studies, as well as motivating secondary studies.

This book promulgates an understanding of

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empirical software engineering practices and knowledge, including how to use such knowledge effectively. It provides guidance upon how to conduct secondary studies in software engineering—replacing the existing 2004 and 2007 technical reports. Software Engineering for Science provides an in-depth collection of peer-reviewed chapters that describe experiences with applying software engineering practices to the development of scientific software. It provides a better understanding of how software engineering is and should be practiced, and which software engineering practices are effective for scientific software. The book starts with a detailed overview of the Scientific Software Lifecycle, and a general overview of the scientific software development process. It highlights key issues commonly arising during scientific software development, as well as solutions to these problems. The second part of the book provides examples of the use of testing in scientific software development, including key issues and challenges. The chapters then describe solutions and case studies aimed at applying testing to scientific software development efforts. The final part of the book provides examples of applying software engineering techniques to scientific software, including not only computational modeling, but also software for data management and analysis. The authors describe their experiences and lessons learned from developing complex

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scientific software in different domains. About the Editors Jeffrey Carver is an Associate Professor in the Department of Computer Science at the University of Alabama. He is one of the primary organizers of the workshop series on Software Engineering for Science (<http://www.SE4Science.org/workshops>). Neil P. Chue Hong is Director of the Software Sustainability Institute at the University of Edinburgh. His research interests include barriers and incentives in research software ecosystems and the role of software as a research object. George K. Thiruvathukal is Professor of Computer Science at Loyola University Chicago and Visiting Faculty at Argonne National Laboratory. His current research is focused on software metrics in open source mathematical and scientific software.

Today, software engineers need to know not only how to program effectively but also how to develop proper engineering practices to make their codebase sustainable and healthy. This book emphasizes this difference between programming and software engineering. How can software engineers manage a living codebase that evolves and responds to changing requirements and demands over the length of its life? Based on their experience at Google, software engineers Titus Winters and Hyrum Wright, along with technical writer Tom Manshreck, present a candid and insightful look at how some of the

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world's leading practitioners construct and maintain software. This book covers Google's unique engineering culture, processes, and tools and how these aspects contribute to the effectiveness of an engineering organization. You'll explore three fundamental principles that software organizations should keep in mind when designing, architecting, writing, and maintaining code: How time affects the sustainability of software and how to make your code resilient over time How scale affects the viability of software practices within an engineering organization What trade-offs a typical engineer needs to make when evaluating design and development decisions

Faster, better and cheaper are challenges that IT-companies face every day. The customer's expectations shall be met in a world where constant change in environment, organization and technology are the rule rather than the exception. A solution for meeting these challenges is to share knowledge and experience - use the company's own experience, and the experience of other companies. Process Improvement in Practice - A Handbook for IT Companies tackles the problems involved in launching these solutions. Process Improvement in Practice - A Handbook for IT Companies is designed for small IT companies who wish to start with systematic improvement. The methods and techniques in this handbook are tried in practice, and

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have proven to be easy to use and scalable for local needs. Managers and developers will discover useful tips to initiate improvement work efficiently. This practical handbook is based on the authors' improvement work in a range of companies since the mid-nineties. *Process Improvement in Practice - A Handbook for IT Companies* is designed for a professional audience, composed of researchers and practitioners in industry. This book is also suitable for graduate-level students in software process improvement and software engineering. SEMAT (Software Engineering Methods and Theory) is an international initiative designed to identify a common ground, or universal standard, for software engineering. It is supported by some of the most distinguished contributors to the field. Creating a simple language to describe methods and practices, the SEMAT team expresses this common ground as a kernel—or framework—of elements essential to all software development. *The Essence of Software Engineering* introduces this kernel and shows how to apply it when developing software and improving a team's way of working. It is a book for software professionals, not methodologists. Its usefulness to development team members, who need to evaluate and choose the best practices for their work, goes well beyond the description or application of any single method. "Software is both a craft and a science, both a work of passion and a work of

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principle. Writing good software requires both wild flights of imagination and creativity, as well as the hard reality of engineering tradeoffs. This book is an attempt at describing that balance.” —Robert Martin (unclebob) “The work of Ivar Jacobson and his colleagues, started as part of the SEMAT initiative, has taken a systematic approach to identifying a ‘kernel’ of software engineering principles and practices that have stood the test of time and recognition.” —Bertrand Meyer “The software development industry needs and demands a core kernel and language for defining software development practices—practices that can be mixed and matched, brought on board from other organizations; practices that can be measured; practices that can be integrated; and practices that can be compared and contrasted for speed, quality, and price. This thoughtful book gives a good grounding in ways to think about the problem, and a language to address the need, and every software engineer should read it.” —Richard Soley This book provides guidelines for practicing design science in the fields of information systems and software engineering research. A design process usually iterates over two activities: first designing an artifact that improves something for stakeholders and subsequently empirically investigating the performance of that artifact in its context. This “validation in context” is a key feature of the book -

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since an artifact is designed for a context, it should also be validated in this context. The book is divided into five parts. Part I discusses the fundamental nature of design science and its artifacts, as well as related design research questions and goals. Part II deals with the design cycle, i.e. the creation, design and validation of artifacts based on requirements and stakeholder goals. To elaborate this further, Part III presents the role of conceptual frameworks and theories in design science. Part IV continues with the empirical cycle to investigate artifacts in context, and presents the different elements of research problem analysis, research setup and data analysis. Finally, Part V deals with the practical application of the empirical cycle by presenting in detail various research methods, including observational case studies, case-based and sample-based experiments and technical action research. These main sections are complemented by two generic checklists, one for the design cycle and one for the empirical cycle. The book is written for students as well as academic and industrial researchers in software engineering or information systems. It provides guidelines on how to effectively structure research goals, how to analyze research problems concerning design goals and knowledge questions, how to validate artifact designs and how to empirically investigate artifacts in context – and finally how to present the results of the design cycle as a whole.

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Perspectives on Data Science for Software Engineering presents the best practices of seasoned data miners in software engineering. The idea for this book was created during the 2014 conference at Dagstuhl, an invitation-only gathering of leading computer scientists who meet to identify and discuss cutting-edge informatics topics. At the 2014 conference, the concept of how to transfer the knowledge of experts from seasoned software engineers and data scientists to newcomers in the field highlighted many discussions. While there are many books covering data mining and software engineering basics, they present only the fundamentals and lack the perspective that comes from real-world experience. This book offers unique insights into the wisdom of the community's leaders gathered to share hard-won lessons from the trenches. Ideas are presented in digestible chapters designed to be applicable across many domains. Topics included cover data collection, data sharing, data mining, and how to utilize these techniques in successful software projects. Newcomers to software engineering data science will learn the tips and tricks of the trade, while more experienced data scientists will benefit from war stories that show what traps to avoid. Presents the wisdom of community experts, derived from a summit on software analytics Provides contributed chapters that share discrete ideas and technique from the trenches Covers top

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areas of concern, including mining security and social data, data visualization, and cloud-based data

Presented in clear chapters designed to be applicable across many domains

Philosophical paradigms, theoretical frameworks, and methodologies make up the answering and problem solving systems that define current research approaches. While there are multiple research method books, the subject lacks an update and integrated source of reference for graduate courses.

Research Methodologies, Innovations and Philosophies in Software Systems Engineering and Information Systems aims to advance scientific knowledge on research approaches used in systems engineering, software engineering, and information systems and to update and integrate disperse and valuable knowledge on research approaches. This aims to be a collection of knowledge for PhD students, research-oriented faculty, and instructors of graduate courses.

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