

Download Free Coupling And Cohesion In Software Engineering With Examples Free Download Pdf

Hands-On Software Engineering with Golang Software Engineering at Google Software Engineering Software Engineering for Science Software Engineering in C Research Software Engineering with Python Software Engineering: A Hands-On Approach Introduction to Software Engineering What Every Engineer Should Know about Software Engineering Rethinking Productivity in Software Engineering Software Engineering with UML Software Engineering from Scratch Hands-On Software Engineering with Python Financial Software Engineering Foundations of Software Engineering Software Engineering at Google A Discipline of Software Engineering Strategic Software Engineering Contemporary Empirical Methods in Software Engineering Perspectives on Data Science for Software Engineering Software Engineering Software Engineer's Reference Book Hands-On Software Engineering with Golang Experimentation in Software Engineering Guide to the Software Engineering Body of Knowledge (Swebok(r)) Software Engineering for Absolute Beginners Hands-On Software Engineering with Python Software Engineering Software Engineering with OBJ Software Engineering Quality Practices Become an Effective Software Engineering Manager Concise Guide to Software Engineering Software Engineering Essentials Search-Based Software Engineering Effective Methods for

Software Engineering A Journey Towards Bio-inspired Techniques
in Software Engineering The Responsible Software Engineer
Software Engineering 1 Green in Software Engineering Iterative
Software Engineering for Multiagent Systems

This textbook provides a progressive approach to the teaching of software engineering. First, readers are introduced to the core concepts of the object-oriented methodology, which is used throughout the book to act as the foundation for software engineering and programming practices, and partly for the software engineering process itself. Then, the processes involved in software engineering are explained in more detail, especially methods and their applications in design, implementation, testing, and measurement, as they relate to software engineering projects. At last, readers are given the chance to practice these concepts by applying commonly used skills and tasks to a hands-on project. The impact of such a format is the potential for quicker and deeper understanding. Readers will master concepts and skills at the most basic levels before continuing to expand on and apply these lessons in later chapters. This book presents the analysis, design, documentation, and quality of software solutions based on the OMG UML v2.5. Notably it covers 14 different modelling constructs including use case diagrams, activity diagrams, business-level class diagrams, corresponding interaction diagrams and state machine diagrams. It presents the use of UML in creating a Model of the Problem Space (MOPS), Model of the Solution Space (MOSS) and Model of the Architectural Space (MOAS). The book touches important areas of contemporary software engineering ranging from how a software engineer needs to invariably work in an Agile development environment through to the techniques to model a Cloud-based solution. 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. Explore software engineering methodologies, techniques, and best practices in Go programming to build easy-to-maintain software that can effortlessly scale on demand

Key Features

- Apply best practices to produce lean, testable, and maintainable Go code to avoid accumulating technical debt
- Explore Go's built-in support for concurrency and message passing to build high-performance applications
- Scale your Go programs across machines and manage their life cycle using Kubernetes

Book Description

Over the last few years, Go has become one of the favorite languages for building scalable and distributed systems. Its opinionated design and built-in concurrency features make it easy for engineers to author code that efficiently utilizes all available CPU cores. This Golang book distills industry best practices for writing lean Go code that is easy to test and maintain, and helps you to explore its practical implementation by creating a multi-tier application called Links 'R' Us from scratch. You'll be guided through all the steps involved in designing, implementing, testing, deploying, and scaling an application. Starting with a monolithic architecture, you'll iteratively transform the project into a service-oriented architecture (SOA) that supports the efficient out-of-core processing of large link graphs. You'll learn about various cutting-edge and advanced software engineering techniques such as building extensible data processing pipelines, designing APIs using gRPC, and running distributed graph processing algorithms at scale. Finally, you'll learn how to compile and package your Go services using Docker and automate their deployment to a Kubernetes cluster. By the end of this book, you'll know how to think like a professional software developer or engineer and write lean and efficient Go code. What you will learn

Understand

different stages of the software development life cycle and the role of a software engineer
Create APIs using gRPC and leverage the middleware offered by the gRPC ecosystem
Discover various approaches to managing package dependencies for your projects
Build an end-to-end project from scratch and explore different strategies for scaling it
Develop a graph processing system and extend it to run in a distributed manner
Deploy Go services on Kubernetes and monitor their health using Prometheus
Who this book is for This Golang programming book is for developers and software engineers looking to use Go to design and build scalable distributed systems effectively. Knowledge of Go programming and basic networking principles is required. Each and every chapter covers the contents up to a reasonable depth necessary for the intended readers in the field. The book consists in all about 1200 exercises based on the topics and sub-topics covered. Keeping in view the emerging trends in newly emerging scenario with new dimension of software engineering, the book specially includes the following chapters, but not limited to these only. This book explains all the notions related to software engineering in a very systematic way, which is of utmost importance to the novice readers in the field of software Engineering. 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 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 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 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. The agent metaphor and the agent-based approach to systems design constitute a promising new paradigm for building complex distributed systems. However, until now, the majority of the agent-based applications available have been built by researchers who specialize in agent-based computing and distributed artificial intelligence. If agent-based computing is to become anything more than a niche technology practiced by the few, then the base of people who can successfully apply the approach needs to be broadened dramatically. A major step in this broadening endeavor is the development of methodologies for agent-oriented software engineering accessible to and attractive for professional software engineers in their daily work. Against this background, this book presents one of the first coherent attempts to develop such a methodology for a broad class of agent-based systems. The author provides a clear introduction to the key issues in the field of agent-oriented software engineering. Practical Guidance on the Efficient Development of High-Quality Software Introduction to Software Engineering, Second Edition equips students with the fundamentals to prepare them for satisfying careers as software engineers regardless of future changes in the field, even if the changes are unpredictable or disruptive in nature. Retaining the same organization as its predecessor, this second edition adds considerable material on open source and agile development models. The text helps students understand software development techniques and processes at a reasonably sophisticated level. Students acquire practical experience through team software projects. Throughout much of the book, a relatively large project is used to teach about the requirements, design, and coding of software. In addition, a continuing case

study of an agile software development project offers a complete picture of how a successful agile project can work. The book covers each major phase of the software development life cycle, from developing software requirements to software maintenance. It also discusses project management and explains how to read software engineering literature. Three appendices describe software patents, command-line arguments, and flowcharts. The author starts with the premise that C is an excellent language for software engineering projects. The book concentrates on programming style, particularly readability, maintainability, and portability. Documents the proposed ANSI Standard, which is expected to be ratified in 1987. This book is designed as a text for both beginner and intermediate-level programmers. Software Engineering with OBJ: Algebraic Specification in Action is a comprehensive introduction to OBJ, the most widely used algebraic specification system. As a formal specification language, OBJ makes specifications and designs more precise and easier to read, as well as making maintenance easier and more accurate. OBJ differs from most other specification languages not just in having a formal semantics, but in being executable, either through symbolic execution with term rewriting, or more generally through theorem proving. One problem with specifications is that they are often wrong. OBJ can help validate specifications by executing test cases, and by proving properties. As well as providing a detailed introduction to the language and the OBJ system that implements it, Software Engineering with OBJ: Algebraic Specification in Action provides case studies by leading practitioners in the field, in areas such as computer graphics standards, hardware design, and parallel computation. The case studies demonstrate that OBJ can be used in a wide variety of ways to achieve a wide variety of practical aims in the system development process. The papers on various OBJ systems also demonstrate that the language is relatively easy to understand, implement, and use, and that it supports formal

reasoning in a straightforward but powerful way. Software Engineering with OBJ: Algebraic Specification in Action will be of interest to students and teachers in the areas of data types, programming languages, semantics, theorem proving, and algebra, as well as to researchers and practitioners in software engineering. Software Engineer's Reference Book provides the fundamental principles and general approaches, contemporary information, and applications for developing the software of computer systems. The book is comprised of three main parts, an epilogue, and a comprehensive index. The first part covers the theory of computer science and relevant mathematics. Topics under this section include logic, set theory, Turing machines, theory of computation, and computational complexity. Part II is a discussion of software development methods, techniques and technology primarily based around a conventional view of the software life cycle. Topics discussed include methods such as CORE, SSADM, and SREM, and formal methods including VDM and Z. Attention is also given to other technical activities in the life cycle including testing and prototyping. The final part describes the techniques and standards which are relevant in producing particular classes of application. The text will be of great use to software engineers, software project managers, and students of computer science. The pervasiveness of software in business makes it crucial that software engineers and developers understand how software development impacts an entire organization. Strategic Software Engineering: An Interdisciplinary Approach presents software engineering as a strategic, business-oriented, interdisciplinary endeavor, rather than simply a technical process, as it has been described in previous publications. The book addresses technical, scientific, and management aspects of software development in a way that is accessible to a wide audience. It provides a detailed, critical review of software development models and processes, followed with a strategic assessment of how process models evolved over

time and how to improve them. The authors then focus on the relation between problem-solving techniques and strategies for effectively confronting real-world business problems. They also analyze the impact of interdisciplinary factors on software development, including the role of people and business economics. The book concludes with a brief look at specialized system development. The diverse backgrounds of the authors, encompassing computer science, information systems, technology, and business management, help create this book's integrated approach, which answers the demand for a comprehensive, interdisciplinary outlook encompassing all facets of how software relates to an organization. This textbook presents a concise introduction to the fundamental principles of software engineering, together with practical guidance on how to apply the theory in a real-world, industrial environment. The wide-ranging coverage encompasses all areas of software design, management, and quality. Topics and features: presents a broad overview of software engineering, including software lifecycles and phases in software development, and project management for software engineering; examines the areas of requirements engineering, software configuration management, software inspections, software testing, software quality assurance, and process quality; covers topics on software metrics and problem solving, software reliability and dependability, and software design and development, including Agile approaches; explains formal methods, a set of mathematical techniques to specify and derive a program from its specification, introducing the Z specification language; discusses software process improvement, describing the CMMI model, and introduces UML, a visual modelling language for software systems; reviews a range of tools to support various activities in software engineering, and offers advice on the selection and management of a software supplier; describes such innovations in the field of software as distributed systems, service-oriented architecture, software as a service,

cloud computing, and embedded systems; includes key learning topics, summaries and review questions in each chapter, together with a useful glossary. This practical and easy-to-follow textbook/reference is ideal for computer science students seeking to learn how to build high quality and reliable software on time and on budget. The text also serves as a self-study primer for software engineers, quality professionals, and software managers. Explore software engineering methodologies, techniques, and best practices in Go programming to build easy-to-maintain software that can effortlessly scale on demand

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end of this book, you'll know how to think like a professional software developer or engineer and write lean and efficient Go code. What you will learn Understand different stages of the software development life cycle and the role of a software engineer Create APIs using gRPC and leverage the middleware offered by the gRPC ecosystem Discover various approaches to managing package dependencies for your projects Build an end-to-end project from scratch and explore different strategies for scaling it Develop a graph processing system and extend it to run in a distributed manner Deploy Go services on Kubernetes and monitor their health using Prometheus Who this book is for This Golang programming book is for developers and software engineers looking to use Go to design and build scalable distributed systems effectively. Knowledge of Go programming and basic networking principles is required. In this textbook the authors introduce the important concepts of the financial software domain, and motivate the use of an agile software engineering approach for the development of financial software. They describe the role of software in defining financial models and in computing results from these models. Practical examples from bond pricing, yield curve estimation, share price analysis and valuation of derivative securities are given to illustrate the process of financial software engineering. Financial Software Engineering also includes a number of case studies based on typical financial engineering problems: *Internal rate of return calculation for bonds * Macaulay duration calculation for bonds * Bootstrapping of interest rates * Estimation of share price volatility * Technical analysis of share prices * Re-engineering Matlab to C# * Yield curve estimation * Derivative security pricing * Risk analysis of CDOs The book is suitable for undergraduate and postgraduate study, and for practitioners who wish to extend their knowledge of software engineering techniques for financial applications Learn software engineering from scratch, from installing and setting up your development

environment, to navigating a terminal and building a model command line operating system, all using the Scala programming language as a medium. The demand for software engineers is growing exponentially, and with this book you can start your journey into this rewarding industry, even with no prior programming experience. Using Scala, a language known to contain “everything and the kitchen sink,” you’ll begin coding on a gentle learning curve by applying the basics of programming such as expressions, control flow, functions, and classes. You’ll then move on to an overview of all the major programming paradigms. You’ll finish by studying software engineering concepts such as testing and scalability, data structures, algorithm design and analysis, and basic design patterns. With *Software Engineering from Scratch* as your navigator, you can get up to speed on the software engineering industry, develop a solid foundation of many of its core concepts, and develop an understanding of where to invest your time next.

What You Will Learn

- Use Scala, even with no prior knowledge
- Demonstrate general Scala programming concepts and patterns
- Begin thinking like a software engineer
- Work on every level of the software development cycle

Who This Book Is For

Anyone who wants to learn about software engineering; no prior programming experience required. This book constitutes the refereed proceedings of the 10th International Symposium on Search-Based Software Engineering, SSBSE 2018, held in Montpellier, France, in September 2018. The 12 full papers and 7 short papers presented together with 3 keynotes, 2 tutorials, and 1 anniversary paper were carefully reviewed and selected from 21 submissions. SSBSE welcomes not only applications from throughout the software engineering lifecycle but also a broad range of search methods ranging from exact Operational Research techniques to nature-inspired algorithms and simulated annealing. Chapter "Deploying Search Based Software Engineering with Sapienz at Facebook" is available open access under a Creative Commons

Attribution 4.0 International License via link.springer.com. Get the most out of this foundational reference and improve the productivity of your software teams. This open access book collects the wisdom of the 2017 "Dagstuhl" seminar on productivity in software engineering, a meeting of community leaders, who came together with the goal of rethinking traditional definitions and measures of productivity. The results of their work, *Rethinking Productivity in Software Engineering*, includes chapters covering definitions and core concepts related to productivity, guidelines for measuring productivity in specific contexts, best practices and pitfalls, and theories and open questions on productivity. You'll benefit from the many short chapters, each offering a focused discussion on one aspect of productivity in software engineering. Readers in many fields and industries will benefit from their collected work. Developers wanting to improve their personal productivity, will learn effective strategies for overcoming common issues that interfere with progress. Organizations thinking about building internal programs for measuring productivity of programmers and teams will learn best practices from industry and researchers in measuring productivity. And researchers can leverage the conceptual frameworks and rich body of literature in the book to effectively pursue new research directions.

What You'll Learn

- Review the definitions and dimensions of software productivity
- See how time management is having the opposite of the intended effect
- Develop valuable dashboards
- Understand the impact of sensors on productivity
- Avoid software development waste
- Work with human-centered methods to measure productivity
- Look at the intersection of neuroscience and productivity
- Manage interruptions and context-switching
- Who Book Is For

Industry developers and those responsible for seminar-style courses that include a segment on software developer productivity. Chapters are written for a generalist audience, without excessive use of technical terminology. This

comprehensive approach to the creation of software systems charts a road through system modelling techniques, allowing software engineers to create software meeting two very basic requirements: • that the software system represent a narrow emulation of the organization system that served as its model; • and that the software system display life attributes identical to those of the organization system that it automatizes. The result is a quantum leap increase in software application quality. Such benefit is achieved by the introduction of a fundamental paradigm: the office-floor metaphor which incorporates such well-balanced basic ideas as the functional normalization of tasks and information (in sharp contrast to the classic data normalization) and the principle of tenant-ownership. Explore various verticals in software engineering through high-end systems using Python Key Features Master the tools and techniques used in software engineering Evaluates available database options and selects one for the final Central Office system-components Experience the iterations software go through and craft enterprise-grade systems Book Description Software Engineering is about more than just writing code—it includes a host of soft skills that apply to almost any development effort, no matter what the language, development methodology, or scope of the project. Being a senior developer all but requires awareness of how those skills, along with their expected technical counterparts, mesh together through a project's life cycle. This book walks you through that discovery by going over the entire life cycle of a multi-tier system and its related software projects. You'll see what happens before any development takes place, and what impact the decisions and designs made at each step have on the development process. The development of the entire project, over the course of several iterations based on real-world Agile iterations, will be executed, sometimes starting from nothing, in one of the fastest growing languages in the world—Python. Application of practices in Python will be laid out, along with a number of Python-specific

capabilities that are often overlooked. Finally, the book will implement a high-performance computing solution, from first principles through complete foundation. What you will learn

Understand what happens over the course of a system's life cycle (SDLC)

Establish what to expect from the pre-development life cycle steps

Find out how the development-specific phases of the SDLC affect development

Uncover what a real-world development process might be like, in an Agile way

Find out how to do more than just write the code

Identify the existence of project-independent best practices and how to use them

Find out how to design and implement a high-performance computing process

Who this book is for

Hands-On Software Engineering with Python is for you if you are a developer having basic understanding of programming and its paradigms and want to skill up as a senior programmer. It is assumed that you have basic Python knowledge. 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 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. Software startups make global headlines every day. As technology companies succeed and grow, so do their engineering departments. In your career, you'll may suddenly get the opportunity to lead teams: to become a manager. But this is often uncharted territory. How can you decide whether this career move is right for you? And if you do, what do you need to learn to succeed? Where do you start? How do you know that you're doing it right? What does "it" even mean? And isn't management a dirty word? This book will share the secrets you need to know to manage engineers successfully. Going from engineer to manager doesn't have to be intimidating. Engineers can be managers, and fantastic ones at that. Cast aside the rhetoric and focus on practical, hands-on techniques and tools. You'll become an effective and supportive team leader that your staff will look up to. Start with your transition to being a manager and see how that compares to being an engineer. Learn how to better organize information, feel productive, and delegate, but not micromanage. Discover how to manage your own boss, hire and fire, do performance and salary reviews, and build a great team. You'll also learn the psychology: how to ship while keeping staff happy, coach and mentor, deal with deadline

pressure, handle sensitive information, and navigate workplace politics. Consider your whole department. How can you work with other teams to ensure best practice? How do you help form guilds and committees and communicate effectively? How can you create career tracks for individual contributors and managers? How can you support flexible and remote working? How can you improve diversity in the industry through your own actions? This book will show you how. Great managers can make the world a better place. Join us. 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 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

Software Engineering: Architecture-driven Software Development is the first comprehensive guide to the underlying skills embodied in the IEEE's Software Engineering Body of Knowledge (SWEBOK) standard. Standards expert Richard Schmidt explains the traditional software engineering practices recognized for developing projects for government or

corporate systems. Software engineering education often lacks standardization, with many institutions focusing on implementation rather than design as it impacts product architecture. Many graduates join the workforce with incomplete skills, leading to software projects that either fail outright or run woefully over budget and behind schedule. Additionally, software engineers need to understand system engineering and architecture—the hardware and peripherals their programs will run on. This issue will only grow in importance as more programs leverage parallel computing, requiring an understanding of the parallel capabilities of processors and hardware. This book gives both software developers and system engineers key insights into how their skillsets support and complement each other. With a focus on these key knowledge areas, Software Engineering offers a set of best practices that can be applied to any industry or domain involved in developing software products. A thorough, integrated compilation on the engineering of software products, addressing the majority of the standard knowledge areas and topics Offers best practices focused on those key skills common to many industries and domains that develop software Learn how software engineering relates to systems engineering for better communication with other engineering professionals within a project environment The best way to learn software engineering is by understanding its core and peripheral areas. Foundations of Software Engineering provides in-depth coverage of the areas of software engineering that are essential for becoming proficient in the field. The book devotes a complete chapter to each of the core areas. Several peripheral areas are also explained by assigning a separate chapter to each of them. Rather than using UML or other formal notations, the content in this book is explained in easy-to-understand language. Basic programming knowledge using an object-oriented language is helpful to understand the material in this book. The knowledge gained from this book can be readily used in other relevant courses or in real-world software

development environments. This textbook educates students in software engineering principles. It covers almost all facets of software engineering, including requirement engineering, system specifications, system modeling, system architecture, system implementation, and system testing. Emphasizing practical issues, such as feasibility studies, this book explains how to add and develop software requirements to evolve software systems. This book was written after receiving feedback from several professors and software engineers. What resulted is a textbook on software engineering that not only covers the theory of software engineering but also presents real-world insights to aid students in proper implementation. Students learn key concepts through carefully explained and illustrated theories, as well as concrete examples and a complete case study using Java. Source code is also available on the book's website. The examples and case studies increase in complexity as the book progresses to help students build a practical understanding of the required theories and applications. Do you Use a computer to perform analysis or simulations in your daily work? Write short scripts or record macros to perform repetitive tasks? Need to integrate off-the-shelf software into your systems or require multiple applications to work together? Find yourself spending too much time working the kink This book covers a range of basic and advanced topics in software engineering. The field has undergone several phases of change and improvement since its invention, and there is significant ongoing research in software development, addressing aspects such as analysis, design, testing and maintenance. Rather than focusing on a single aspect of software engineering, this book provides a systematic overview of recent techniques, including requirement gathering in the form of story points in agile software, and bio-inspired techniques for estimating the effort, cost, and time required for software development. As such it is a valuable resource for new researchers interested in advances in software engineering — particularly in the area of

bio-inspired techniques. The art, craft, discipline, logic, practice, and science of developing large-scale software products needs a believable, professional base. The textbooks in this three-volume set combine informal, engineeringly sound practice with the rigour of formal, mathematics-based approaches. Volume 1 covers the basic principles and techniques of formal methods abstraction and modelling. First this book provides a sound, but simple basis of insight into discrete mathematics: numbers, sets, Cartesian, types, functions, the Lambda Calculus, algebras, and mathematical logic. Then it trains its readers in basic property- and model-oriented specification principles and techniques. The model-oriented concepts that are common to such specification languages as B, VDM-SL, and Z are explained here using the RAISE specification language (RSL). This book then covers the basic principles of applicative (functional), imperative, and concurrent (parallel) specification programming. Finally, the volume contains a comprehensive glossary of software engineering, and extensive indexes and references. These volumes are suitable for self-study by practicing software engineers and for use in university undergraduate and graduate courses on software engineering. Lecturers will be supported with a comprehensive guide to designing modules based on the textbooks, with solutions to many of the exercises presented, and with a complete set of lecture slides. 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 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. This is the first book that presents a comprehensive overview of sustainability aspects in software engineering. Its format follows the structure of the SWEBOK and covers the key areas involved in the incorporation of green aspects in software engineering, encompassing topics from requirement elicitation to quality assurance and maintenance, while also considering professional practices and economic aspects. The book consists of thirteen chapters, which are structured in five parts. First the "Introduction" gives an overview of the primary general concepts related to Green IT, discussing what Green in Software Engineering is and how it differs from Green by Software Engineering. Next "Environments, Processes and Construction" presents green software development environments, green software engineering processes and green software construction in general. The third part, "Economic and Other Qualities," details models for measuring how well software supports green software

engineering techniques and for performing trade-off analyses between alternative green practices from an economic perspective. "Software Development Process" then details techniques for incorporating green aspects at various stages of software development, including requirements engineering, design, testing, and maintenance. In closing, "Practical Issues" addresses the repercussions of green software engineering on decision-making, stakeholder participation and innovation management. The audience for this book includes software engineering researchers in academia and industry seeking to understand the challenges and impact of green aspects in software engineering, as well as practitioners interested in learning about the state of the art in Green in Software Engineering.

SOFTWARE ENGINEERING ESSENTIALS Volume I: The Engineering Fundamentals FOURTH EDITION A multi- text software engineering course or courses (based on the 2013 IEEE SWEBOK) for undergraduate and graduate university students A self-teaching IEEE CSDP/CADA certificate exam training course based on the Computer Society's CSDP exam specifications These software engineering books serves two separate but connected audiences and roles: 1. Software engineers who wish to study for and pass either or both of the IEEE Computer Society's software engineering certification exams. The Certified Software Development Professional (CSDP) and is awarded to software engineers who have 5 to 7 years of software development experience and pass the CSDP exam. This certification was instituted in 2001 and establishes that the certificate holder is a competent software engineer in most areas of software engineering such as: Software project manager Software developer Software configuration manager Software quality-assurance expert Software test lead And so forth The other certificate is for recent software engineering graduates or self-taught software engineers and is designated Certified Software Development Associate (CDSA). The CSDA also requires passing

an exam, but does not require any professional experience.

2. University students who are taking (or reading) a BS or MS degree in software engineering, or practicing software engineers who want to update their knowledge. This book was originally written as a guide to help software engineers take and pass the IEEE CSDP exam. However several reviewers commented that this book would also make a good university text book for a undergraduate or graduate course in software engineering. So the original books were modified to be applicable to both tasks. The SWEBOK (Software Engineering Body of Knowledge) is a major milestone in the development and publicity of software engineering technology. However it needs to be noted that SWEBOK was NOT developed as a software engineering tutorial or textbook. The SWEBOK is intended to catalog software engineering concepts, not teach them. The new, three-volume, fourth edition, Software Engineering Essentials, by Drs. Richard Hall Thayer and Merlin Dorfman attempts to fill this void. This new software engineering text expands on and replaces the earlier two-volume, third-edition, Software Engineering books which was also written by Thayer and Dorfman and published by the IEEE Computer Society Press [2006]. These new Volumes I and II offer a complete and detailed overview of software engineering as defined in IEEE SWEBOK 2013. These books provide a thorough analysis of software development in requirements analysis, design, coding, testing, and maintenance, plus the supporting processes of configuration management, quality assurance, verification and validation, and reviews and audits. To keep up with evolution of the software industry (as expressed through evolution of the SWEBOK Guide, CSDP/CSDA, and the curriculum guidelines) a third volume in the Software Engineering series is needed. This third volume contains:
Software Engineering Measurements
Software Engineering Economics
Computer Foundations
Mathematics Foundations
Engineering Foundations
This three-volume, Software

Engineering Essentials series, provides an overview snapshot of the software state of the practice in a form that is a lot easier to digest than the SWEBOK Guide. The three-volume set is also a valuable reference (useful well beyond undergraduate and graduate software engineering university programs) that provides a concise survey of the depth and breadth of software engineering. These new KAs exist so that software engineers can demonstrate a mastery of scientific technology and engineering. This is in answer to the criticism of software engineering that it does not contain enough engineering to qualify it as an engineering discipline." Learn how to attract and keep successful software professionals Software Engineering Quality Practices describes how software engineers and the managers that supervise them can develop quality software in an effective, efficient, and professional manner. This volume conveys practical advice quickly and clearly while avoiding the dogma that surrounds the software profession. It concentrates on what the real requirements of a system are, what constitutes an appropriate solution, and how you can ensure that the realized solution fulfills the desired qualities of relevant stakeholders. The book also discusses how successful organizations attract and keep people who are capable of building high-quality systems. The author succinctly describes the nature and fundamental principles of design and incorporates them into an architectural framework, enabling you to apply the framework to the development of quality software for most applications. The text also analyzes engineering requirements, identifies poor requirements, and demonstrates how bad requirements can be transformed via several important quality practices. Software is important because it is used by a great many people in companies and institutions. This book presents engineering methods for designing and building software. Based on the author's experience in software engineering as a programmer in the defense and aerospace industries, this book explains how to

ensure a software that is programmed operates according to its requirements. It also shows how to develop, operate, and maintain software engineering capabilities by instilling an engineering discipline to support programming, design, builds, and delivery to customers. This book helps software engineers to: Understand the basic concepts, standards, and requirements of software engineering. Select the appropriate programming and design techniques. Effectively use software engineering tools and applications. Create specifications to comply with the software standards and requirements. Utilize various methods and techniques to identify defects. Manage changes to standards and requirements. Besides providing a technical view, this book discusses the moral and ethical responsibility of software engineers to ensure that the software they design and program does not cause serious problems. Software engineers tend to be concerned with the technical elegance of their software products and tools, whereas customers tend to be concerned only with whether a software product meets their needs and is easy and ready to use. This book looks at these two sides of software development and the challenges they present for software engineering. A critical understanding of software engineering empowers developers to choose the right methods for achieving effective results. Effective Methods for Software Engineering guides software programmers and developers to develop this critical understanding that is so crucial in today's software-dependent society. The approach to and understanding of software engineering at Google is unlike any other company. With this book, you'll get a candid and insightful look at how software is constructed and maintained by some of the world's leading practitioners. Titus Winters, Tom Manshreck, and Hyrum K. Wright, software engineers and a technical writer at Google, reframe how software engineering is practiced and taught: from an emphasis on programming to an emphasis on software engineering, which roughly translates to programming over time.

You'll learn: Fundamental differences between software engineering and programming How an organization effectively manages a living codebase and efficiently responds to inevitable change Why culture (and recognizing it) is important, and how processes, practices, and tools come into play. This volume provides workers in the industry with an overview of different approaches to professionalism. It focuses specifically on software engineering as a profession, covering issues such as the role of professional bodies, project management, user awareness, and standards recognition. It also takes account of general topics such as ethical and legal responsibilities, training and education. It includes contributions from leading researchers from a variety of backgrounds, including IBM UK, Imperial Cancer Research Fund, and the Department of Education and Employment. This is one of the first volumes to cover professionalism in software engineering at an advanced level. It is aimed primarily at practitioners and researchers in industry, particularly those working on professional development programs. It will also provide further reading for graduate and postgraduate students on software engineering courses. In the Guide to the Software Engineering Body of Knowledge (SWEBOK(R) Guide), the IEEE Computer Society establishes a baseline for the body of knowledge for the field of software engineering, and the work supports the Society's responsibility to promote the advancement of both theory and practice in this field. It should be noted that the Guide does not purport to define the body of knowledge but rather to serve as a compendium and guide to the knowledge that has been developing and evolving over the past four decades. Now in Version 3.0, the Guide's 15 knowledge areas summarize generally accepted topics and list references for detailed information. The editors for Version 3.0 of the SWEBOK(R) Guide are Pierre Bourque (Ecole de technologie superieure (ETS), Universite du Quebec) and Richard E. (Dick) Fairley (Software and Systems Engineering Associates (S2EA)). Start programming from scratch,

no experience required. This beginners' guide to software engineering starts with a discussion of the different editors used to create software and covers setting up a Docker environment. Next, you will learn about repositories and version control along with its uses. Now that you are ready to program, you'll go through the basics of Python, the ideal language to learn as a novice software engineer. Many modern applications need to talk to a database of some kind, so you will explore how to create and connect to a database and how to design one for your app. Additionally you will discover how to use Python's Flask microframework and how to efficiently test your code. Finally, the book explains best practices in coding, design, deployment, and security. Software Engineering for Absolute Beginners answers the question of what topics you should know when you start out to learn software engineering. This book covers a lot of topics, and aims to clarify the hidden, but very important, portions of the software development toolkit. After reading this book, you, a complete beginner, will be able to identify best practices and efficient approaches to software development. You will be able to go into a work environment and recognize the technology and approaches used, and set up a professional environment to create your own software applications. What You Will Learn Explore the concepts that you will encounter in the majority of companies doing software development Create readable code that is neat as well as well-designed Build code that is source controlled, containerized, and deployable Secure your codebase Optimize your workspace Who This Book Is For A reader with a keen interest in creating software. It is also helpful for students. Explore various verticals in software engineering through high-end systems using Python Key Features Master the tools and techniques used in software engineering Evaluates available database options and selects one for the final Central Office system-components Experience the iterations software go through and craft enterprise-grade systems Book Description

Software Engineering is about more than just writing code--it includes a host of soft skills that apply to almost any development effort, no matter what the language, development methodology, or scope of the project. Being a senior developer all but requires awareness of how those skills, along with their expected technical counterparts, mesh together through a project's life cycle. This book walks you through that discovery by going over the entire life cycle of a multi-tier system and its related software projects. You'll see what happens before any development takes place, and what impact the decisions and designs made at each step have on the development process. The development of the entire project, over the course of several iterations based on real-world Agile iterations, will be executed, sometimes starting from nothing, in one of the fastest growing languages in the world--Python. Application of practices in Python will be laid out, along with a number of Python-specific capabilities that are often overlooked. Finally, the book will implement a high-performance computing solution, from first principles through complete foundation. What you will learn

- Understand what happens over the course of a system's life (SDLC)
- Establish what to expect from the pre-development life cycle steps
- Find out how the development-specific phases of the SDLC affect development
- Uncover what a real-world development process might be like, in an Agile way
- Find out how to do more than just write the code
- Identify the existence of project-independent best practices and how to use them
- Find out how to design and implement a high-performance computing process

Who this book is for

Hands-On Software Engineering with Python is for you if you are a developer having basic understanding of programming and its paradigms and want to skill up as a senior programmer. It is assumed that you have basic Python knowledge. 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 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.

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