



# REFACTORING

## IMPROVING THE DESIGN OF EXISTING CODE

**MARTIN FOWLER**

With contributions by **Kent Beck, John Brant,  
William Opdyke, and Don Roberts**

Foreword by **Erich Gamma**  
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# Refactoring Improving The Design Of Existing Code

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## **Refactoring Improving The Design Of Existing Code:**

**Refactoring** Martin Fowler, Kent Beck, John Brant, William Opdyke, Don Roberts, 2012-03-09 As the application of object technology particularly the Java programming language has become commonplace a new problem has emerged to confront the software development community Significant numbers of poorly designed programs have been created by less experienced developers resulting in applications that are inefficient and hard to maintain and extend Increasingly software system professionals are discovering just how difficult it is to work with these inherited non optimal applications For several years expert level object programmers have employed a growing collection of techniques to improve the structural integrity and performance of such existing software programs Referred to as refactoring these practices have remained in the domain of experts because no attempt has been made to transcribe the lore into a form that all developers could use until now In *Refactoring Improving the Design of Existing Code* renowned object technology mentor Martin Fowler breaks new ground demystifying these master practices and demonstrating how software practitioners can realize the significant benefits of this new process With proper training a skilled system designer can take a bad design and rework it into well designed robust code In this book Martin Fowler shows you where opportunities for refactoring typically can be found and how to go about reworking a bad design into a good one Each refactoring step is simple seemingly too simple to be worth doing Refactoring may involve moving a field from one class to another or pulling some code out of a method to turn it into its own method or even pushing some code up or down a hierarchy While these individual steps may seem elementary the cumulative effect of such small changes can radically improve the design Refactoring is a proven way to prevent software decay In addition to discussing the various techniques of refactoring the author provides a detailed catalog of more than seventy proven refactorings with helpful pointers that teach you when to apply them step by step instructions for applying each refactoring and an example illustrating how the refactoring works The illustrative examples are written in Java but the ideas are applicable to any object oriented programming language

**Refactoring** Martin Fowler, 2018-11-20 Martin Fowler's guide to reworking bad code into well structured code Refactoring improves the design of existing code and enhances software maintainability as well as making existing code easier to understand Original Agile Manifesto signer and software development thought leader Martin Fowler provides a catalog of refactorings that explains why you should refactor how to recognize code that needs refactoring and how to actually do it successfully no matter what language you use Refactoring principles understand the process and general principles of refactoring Code smells recognize bad smells in code that signal opportunities to refactor Application improvement quickly apply useful refactorings to make a program easier to comprehend and change Building tests writing good tests increases a programmer's effectiveness Moving features an important part of refactoring is moving elements between contexts Data structures a collection of refactorings to organize data an important role in programs Conditional Logic use refactorings to make conditional sections easier to understand APIs modules and their

functions are the building blocks of our software and APIs are the joints that we use to plug them together Inheritance it is both very useful and easy to misuse and it s often hard to see the misuse until it s in the rear view mirror refactorings can fix the misuse Examples are written in JavaScript but you shouldn t find it difficult to adapt the refactorings to whatever language you are currently using as they look mostly the same in different languages Whenever you read Refactoring it s time to read it again And if you haven t read it yet please do before writing another line of code David Heinemeier Hansson Creator of Ruby on Rails Founder CTO at Basecamp Any fool can write code that a computer can understand Good programmers write code that humans can understand M Fowler 1999     **Refactoring** Martin Fowler,Kent Beck,1999 Refactoring is gaining momentum amongst the object oriented programming community It can transform the internal dynamics of applications and has the capacity to transform bad code into good code This book offers an introduction to refactoring     REFACTORING IMPROVING THE DESIGN OF EXISTING CODE. MATRIN. FOWLER,1999     *Refactoring* Martin Fowler,2009     **Proceedings of the IEEE International Symposium on Industrial Electronics** ,2001     *Design Patterns in C#* Steven John Metsker,2004 bull A catalogue of proven solutions to recurring problems in C software design bull Part of the Addison Wesley Software Patterns Series with John Vlissides as consulting editor bull Allows the growing legions of Microsoft technology developers to apply traditional software approaches to frequently encountered problems

*EJB Design Patterns* Floyd Marinescu,2002-03-05 A lot of programming involves solving the same kinds of basic problems Well what if a community of experts got together and pooled their knowledge to come up with the best programming practices for solving these problems You would have what are known as design patterns Author Floyd Marinescu a leading expert on EJB worked with the members of the EJB community of TheServerSide com to put their collective knowledge together to build a library of design patterns strategies and best practices for EJB design and development This treasure trove of proven best practices will allow developers to quickly solve difficult programming assignments Unlike other patterns books this book goes beyond high level designs to the actual code for implementing them saving developers countless hours of time and effort when building scalable reliable and maintainable EJB systems     *Designing Enterprise Applications with the J2EE Platform (Custom Version)* Inderjeet Singh,Beth Stearns,Mark Johnson,Enterprise Team,2002-03-25     IntelliJ IDEA in Action Duane K. Fields,Stephen Saunders,Eugene Belyaev,2006-03-26 IntelliJ IDEA in Action will help developers dig a little deeper into IDEA and embrace its streamlining features which allow for more time to be spent on project design rather than code management Without some educational investment however IDEA can be just another editor That then is the purpose of this book To not only get you up and running quickly but to teach you how to use IDEA s powerful software development tools to their fullest advantage Important product features including the debugger source code control and the many code generation tools are carefully explained and accompanied by tips and tricks that will leave even experienced IDEA users with Eureka moments of informed programming Coders just graduating from NOTEPAD and Java IDE veterans alike

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**Designing Software Product Lines with UML** Hassan Gomaa, 2005 Designing Software Product Lines with UML is well written informative and addresses a very important topic It is a valuable contribution to the literature in this area and offers practical guidance for software architects and engineers Alan Brown Distinguished Engineer Rational Software IBM Software Group Gomaa's process and UML extensions allow development teams to focus on feature oriented development and provide a basis for improving the level of reuse across multiple software development efforts This book will be valuable to any software development professional who needs to manage across projects and wants to focus on creating software that is consistent reusable and modular in nature Jeffrey S Hammond Group Marketing Manager Rational Software IBM Software Group This book brings together a good range of concepts for understanding software product lines and provides an organized method for developing product lines using object oriented techniques with the UML Once again Hassan has done an excellent job in balancing the needs of both experienced and novice software engineers Robert G Pettit IV Ph D Adjunct Professor of Software Engineering George Mason University This breakthrough book provides a comprehensive step by step approach on how to develop software product lines which is of great strategic benefit to industry The development of software product lines enables significant reuse of software architectures Practitioners will benefit from the well defined PLUS process and rich case studies Hurley V Blankenship II Program Manager Justice and Public Safety Science Applications International Corporation The Product Line UML based Software engineering PLUS is leading edge With the author's wide experience and deep knowledge PLUS is well harmonized with architectural and design pattern technologies Michael Shin Assistant Professor Texas Tech University Long a standard practice in traditional manufacturing the concept of product lines is quickly earning recognition in the software industry A software product line is a family of systems that shares a common set of core technical assets with preplanned extensions and variations to address the needs of specific customers or market segments When skillfully implemented a product line strategy can yield enormous gains in productivity quality and time to market Studies indicate that if three or more systems with a degree of common functionality are to be developed a product line approach is significantly more cost effective To model and design families of systems the analysis and design concepts for single product systems need to be extended to support product lines Designing Software Product Lines with UML shows

how to employ the latest version of the industry standard Unified Modeling Language UML 2.0 to reuse software requirements and architectures rather than starting the development of each new system from scratch Through real world case studies the book illustrates the fundamental concepts and technologies used in the design and implementation of software product lines This book describes a new UML based software design method for product lines called PLUS Product Line UML based Software engineering PLUS provides a set of concepts and techniques to extend UML based design methods and processes for single systems in a new dimension to address software product lines Using PLUS the objective is to explicitly model the commonality and variability in a software product line Hassan Gomaa explores how each of the UML modeling views use case static state machine and interaction modeling can be extended to address software product families He also discusses how software architectural patterns can be used to develop a reusable component based architecture for a product line and how to express this architecture as a UML platform independent model that can then be mapped to a platform specific model Key topics include Software product line engineering process which extends the Unified Development Software Process to address software product lines Use case modeling including modeling the common and variable functionality of a product line Incorporating feature modeling into UML for modeling common optional and alternative product line features Static modeling including modeling the boundary of the product line and information intensive entity classes Dynamic modeling including using interaction modeling to address use case variability State machines for modeling state dependent variability Modeling class variability using inheritance and parameterization Software architectural patterns for product lines Component based distributed design using the new UML 2.0 capability for modeling components connectors ports and provided and required interfaces Detailed case studies giving a step by step solution to real world product line problems Designing Software Product Lines with UML is an invaluable resource for all designers and developers in this growing field The information technology and case studies presented here show how to harness the promise of software product lines and the practicality of the UML to take software design quality and efficiency to the next level An enhanced online index allows readers to quickly and easily search the entire text for specific topics

*Object-oriented Information Systems*, 2002     *Journal of Object-oriented Programming*, 2001     **Clean Agile** Robert C. Martin, 2019-09-12 Agile Values and Principles for a New Generation In the journey to all things Agile Uncle Bob has been there done that and has the both the t shirt and the scars to show for it This delightful book is part history part personal stories and all wisdom If you want to understand what Agile is and how it came to be this is the book for you Grady Booch Bob's frustration colors every sentence of Clean Agile but it's a justified frustration What is in the world of Agile development is nothing compared to what could be This book is Bob's perspective on what to focus on to get to that what could be And he's been there so it's worth listening Kent Beck It's good to read Uncle Bob's take on Agile Whether just beginning or a seasoned Agilista you would do well to read this book I agree with almost all of it It's just some of the parts make me realize

my own shortcomings dammit It made me double check our code coverage 85 09% Jon Kern Nearly twenty years after the Agile Manifesto was first presented the legendary Robert C Martin Uncle Bob reintroduces Agile values and principles for a new generation programmers and nonprogrammers alike Martin author of Clean Code and other highly influential software development guides was there at Agile s founding Now in Clean Agile Back to Basics he strips away misunderstandings and distractions that over the years have made it harder to use Agile than was originally intended Martin describes what Agile is in no uncertain terms a small discipline that helps small teams manage small projects with huge implications because every big project is comprised of many small projects Drawing on his fifty years experience with projects of every conceivable type he shows how Agile can help you bring true professionalism to software development Get back to the basics what Agile is was and should always be Understand the origins and proper practice of SCRUM Master essential business facing Agile practices from small releases and acceptance tests to whole team communication Explore Agile team members relationships with each other and with their product Rediscover indispensable Agile technical practices TDD refactoring simple design and pair programming Understand the central roles values and craftsmanship play in your Agile team s success If you want Agile s true benefits there are no shortcuts You need to do Agile right Clean Agile Back to Basics will show you how whether you re a developer tester manager project manager or customer Register your book for convenient access to downloads updates and or corrections as they become available See inside book for details

*Applications of Graph Transformations with Industrial Relevance* ,2003

Extreme Programming Adventures in C# Ron Jeffries,2004 See eXtreme Programming XP in action at the hands of an XP master and learn Microsoft NET and C programming in the process In this fast paced hands on exposition Ron Jeffries one of the leading voices and practitioners in the XP community demonstrates that you can write well designed resilient code incrementally and safely while minimizing your investment in speculative up front design As Jeffries builds his sample application you get firsthand insights into what successful XP development looks like complete with real world challenges such as the eleventh hour change order For further practice and study you can download all the author s code including the missteps so you can see XP and agile concepts in action and assess how they fit into your own work Pair program with an XP master discovering how to Streamline and simplify the software development process Work more effectively as part of an XP development team Reduce missteps by designing testing and refining code in increments Receive clearer specifications and feedback from customers Write cleaner more expressive code and weed out more bugs Conserve resources by planning and reassessing progress as you go Maintain a sustainable work pace and avoid burnout Step up delivery dates shipping the most crucial features first Improve customer satisfaction

**Object-oriented Software Engineering** Bernd Bruegge,Allen H. Dutoit,2010 This textbook develops a long term single project and explores both the theoretical foundations of software engineering as well as the principles and practices of various tools processes and products It emphasizes practical experience whereby participants can apply the techniques learned in class to a realistic

problem     **Object Modeling and User Interface Design** Mark Van Harmelen,2001 Object Modeling and User Interface Design merges theories with practical techniques to create methods for the design to today s systems By reading this book you will gain an understanding of the benefits of integrating object oriented analysis approaches with human computer interaction design and learn how to systematically design interactive systems for their human users BOOK JACKET

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