



# 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

## Martin Fowler

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

**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      Developing Applications with Visual Basic and UML Paul R. Reed,2000 Reed s guide includes detailed coverage of architecting VB enterprise applications and features working examples and step by step instructions for planning and development of an order entry system detailing do s and don t s for analysis design and construction CD ROM contains several templates for applying UML as well as complete Rational Rose models for the sample applications      **The Guru's Guide to Transact-SQL** Ken Henderson,2000-02-23 Since its introduction over a decade ago the Microsoft SQL Server query language Transact SQL has become increasingly popular and more powerful The current version sports such advanced features as OLE Automation support cross platform querying facilities and full text search management This book is the consummate guide to Microsoft Transact SQL From data type nuances to complex statistical computations to the bevy of undocumented features in the language The Guru s Guide to Transact SQL imparts the knowledge you need to become a virtuoso of the language as quickly as possible In this book you will find the information explanations and advice you need to master Transact SQL and develop the best possible Transact SQL code Some 600 code examples not only illustrate important concepts and best practices but also provide working Transact SQL code that can be incorporated into your own real world DBMS applications Your journey begins with an introduction explaining language fundamentals such as database and table creation inserting and updating data queries joins data presentation and managing transactions Moving on to more advanced topics the journey continues with in depth coverage of Transact SQL performance tuning using tools such as Query Analyzer and Performance Monitor Nuances of the various T SQL data types Complex statistical calculations such as medians modes and sliding aggregates Run sequence and series identification and interrogation Advanced Data Definition Language DDL and Data Management Language DML techniques Stored procedure and trigger best practices and coding methods Transaction management Optimal cursor use and caveats to look out for Full text search Hierarchies and arrays Administrative Transact SQL OLE Automation More than 100 undocumented commands and language features including

numerous unpublished DBCC command verbs trace flags stored procedures and functions Comprehensive written in understandable terms and full of practical information and examples The Guru s Guide to Transact SQL is an indispensable reference for anyone working with this database development language The accompanying CD ROM includes the complete set of code examples found in the book as well as a SQL programming environment that will speed the development of your own top notch Transact SQL code

Extreme Programming and Agile Methods - XP/Agile Universe 2002 Don Wells,Lauris Williams,2003-08-02 The second XP Universe and rst Agile Universe brought together many p ple interested in building software in a new way Held in Chicago August 4 7 2002 it attracted software experts educators and developers Unlike most c ferences the venue was very dynamic Many activities were not even well de ned in advance All discussions were encouraged to be spontaneous Even so there were some written words available and you are holding all of them now We have collected as much material as possible together into this small volume It is just the tip of the iceberg of course A reminder to us of what we learned the people we met and the ideas we expressed The conference papers including research and experience papers are rep duced in these proceedings Forty one 41 papers were submitted Each subm ted paper received three reviews by program committee members The program committee consisted of 40 members Papers submitted by program committee members were refereed separately This ensured that reviewers could provide an honest feedback not seen by the paper submitters In many cases the program committee shepherded authors to signi cantly improve their initial submission prior to completing the version contained in these proceedings In the end the program committee chose 25 papers for publication 60% acceptance

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Simple Object-Oriented Design Mauricio Aniche, 2024-06-04 Write object oriented code that's manageable, maintainable, and future proof. Keeping your object oriented designs simple demands a creative approach, and that's exactly what you'll find in Simple Object Oriented Design. This book is full of patterns and principles for reducing complexity, each one proven in author Mauricio Aniche's 20-year career in software development. You'll learn how to tackle code's natural growth in complexity and adopt a good enough approach that means it's easy to refactor when requirements change. You'll discover insightful principles for making code readable and documented, improving consistency and encapsulation, managing dependencies, designing abstractions, handling infrastructure, effective modularization. Learn what constitutes both good and bad object oriented software design, discover how to make better trade-offs in design decisions, and when to embrace complexity over simpler data structures. With this book as your vital reference, you'll be ready to write code that will last the test of time without slowing feature delivery to a crawl. About the technology: Even a simple object oriented application can quickly become complex as it evolves. Each new class, method, or feature means more state and abstractions to manage, which in turn increases complexity, maintenance, and time spent detangling legacy code. It takes effort and skill to keep your codebase simple. This book shows you how. About the book: Simple Object Oriented Design: Create clean, maintainable applications presents practical design principles you can use to keep an object oriented codebase simple as it grows and changes. Written as a collection of practical techniques you can apply in any OO language, it offers tips for concise code, managing dependencies and modules, and designing flexible abstractions. Illuminating figures, real-world examples, and insightful exercises make each principle stick. What's inside: Writing simple, understandable classes; Flexible abstractions to extend your designs; Reducing the impact of coupling. About the reader: Readers should be familiar with an object oriented language like Java, C, or Python. About the author: Mauricio Aniche is a software engineer with 20 years of experience. He's also an Assistant Professor in Software Engineering at Delft University of Technology and the author of Effective Software Testing. Table of Contents: 1. It's all about managing complexity 2. Making code small 3. Keeping objects consistent 4. Managing dependencies 5. Designing good abstractions 6. Handling external dependencies and infrastructure 7. Achieving modularization 8. Being pragmatic

The Robert C. Martin Clean Code Collection (Collection) Robert C. Martin, 2011-11-10 The Robert C. Martin Clean Code Collection consists of two bestselling eBooks: Clean Code: A Handbook of Agile Software Craftsmanship and The Clean Coder: A Code of Conduct for Professional Programmers. In Clean Code, legendary software expert Robert C. Martin has

teamed up with his colleagues from Object Mentor to distill their best agile practice of cleaning code on the fly into a book that will instill within you the values of a software craftsman and make you a better programmer but only if you work at it You will be challenged to think about what's right about that code and what's wrong with it More important you will be challenged to reassess your professional values and your commitment to your craft In *The Clean Coder* Martin introduces the disciplines techniques tools and practices of true software craftsmanship This book is packed with practical advice about everything from estimating and coding to refactoring and testing It covers much more than technique It is about attitude Martin shows how to approach software development with honor self respect and pride work well and work clean communicate and estimate faithfully face difficult decisions with clarity and honesty and understand that deep knowledge comes with a responsibility to act Readers of this collection will come away understanding How to tell the difference between good and bad code How to write good code and how to transform bad code into good code How to create good names good functions good objects and good classes How to format code for maximum readability How to implement complete error handling without obscuring code logic How to unit test and practice test driven development What it means to behave as a true software craftsman How to deal with conflict tight schedules and unreasonable managers How to get into the flow of coding and get past writer's block How to handle unrelenting pressure and avoid burnout How to combine enduring attitudes with new development paradigms How to manage your time and avoid blind alleys marshes bogs and swamps How to foster environments where programmers and teams can thrive When to say No and how to say it When to say Yes and what yes really means

*Journal of Object-oriented Programming*, 2001      *UML Bible* Tom Pender, 2003-09-26 UML is an industry standard specification for modelling visualizing and documenting software projects This title covers all aspects of the UML including the use of the UML diagramming notation the object constraint language OCL and profiles      **Product Focused Software Process Improvement**, 2001      **Systematic Definition, Implementation and Evaluation of Service-oriented Software Architectures** Reena T. Mathew, 2004      **Advanced C# Programming** Paul Kimmel, 2002-09-04 This advanced resource is ideal for experienced programmers seeking practical solutions to real problems Discover valuable coding techniques and best practices while learning to master Microsoft's newest cross platform programming language This definitive guide will show you how to expertly apply and integrate C into your business applications Create user controls special effects text dynamic user interfaces custom attributes plus you'll also find reliable security and authentication methods      **ACM SIGPLAN Notices**, 2006-07      [Mastering Enterprise JavaBeans](#) Ed Roman, Scott Ambler, Tyler Jewell, 2001-12-28 Enterprise JavaBeans EJB has proven to be wildly successful and is fast becoming the dominant technology for building server side applications including most Web applications In this much anticipated new edition bestselling author Ed Roman teams up with noted software development experts Scott Ambler and Tyler Jewell to once again deliver the definitive guide to all things EJB Geared toward Web site developers enterprise

application developers and developers of software components for resale this book has been updated to cover the latest features of version 2.0 including container services transactions design strategies complex persistence clustering project management and choosing an EJB server as well as to add new more advanced programming tips and techniques

*Knowledge-based Software Engineering* Tatjana Welzer, Shuichiro Yamamoto, Ivan Rozman, 2002 Annotation The book captures 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 The Conference from which the papers are coming originated in order to provide a forum in which the latest developments in the field of knowledge based software engineering could be discussed Although initially targeting scientists from Japan the CIS countries and countries in Central and Eastern Europe the authors come from many countries throughout the world JCKBSE 2002 continues with this tradition and is anticipating even wider international participation Furthermore the scope of the conference as indicated by its topics has been updated to reflect the recent development in all the three covered areas i.e. knowledge engineering software engineering and knowledge based software engineering

Innocent Code Sverre H. Huseby, 2004 This concise and practical book shows where code vulnerabilities lie and how best to fix them without delving into the specifics of the architecture programming or scripting language or application of individual systems It also provides illustrative examples with real code

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the manufacturer s default injection timing is 6 5 deg before tdc the only major changes from the 1kd ftv to the 2kd ftv were the bore and the stroke in 2005 denso corporation introduced the 3rd generation of common rail system

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the construction operation and control of main crs components supply pump injectors rail are identical to the components described in the previously issued common rail system for toyota hilux kijyang innova innova 1kd 2kd doc id 00400077 primary changes and additions are listed below

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to reduce mass and noise the 2kd ftv engine used a plastic cylinder head cover the intake camshaft is driven by a timing belt and the intake camshaft drives the exhaust camshaft by a gear the 2kd ftv engine has four valves per cylinder two intakes and two exhaust 16 in total

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maintenance operations inspect and correct or replace as necessary replace change or lubricate lubricate notes type a 1kd ftv and 2kd ftv engines for south africa and thailand type b 2kd ftv engine for jordan and saudi arabia after 80 000 km 48 000 miles or 48 months inspect every 20 000 m 12 000 miles or 12 months

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during starting to facilitate startability the engine ecu optimally controls the injection control volume and injection timing during starting see page eg 158 idle speed the engine ecu determines the idle speed in accordance with the engine control condition and controls the fuel injection volume in order to maintain the

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