

LIMITED ACCESS MODERN C DESIGN GENERIC PROGRAMMING AND DESIGN PATTERNS APPLIED

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Modern C Design Generic Programming And Design Patterns Applied Introduction

Modern C++ Design

This title documents a convergence of programming techniques - generic programming, template metaprogramming, object-oriented programming and design patterns. It describes the C++ techniques used in generic programming and implements a number of industrial strength components.

Hands-On Design Patterns with C++

A comprehensive guide with extensive coverage on concepts such as OOP, functional programming, generic programming, and STL along with the latest features of C++ Key FeaturesDelve into the core patterns and components of C++ in order to master application designLearn tricks, techniques, and best practices to solve common design and architectural challenges Understand the limitation imposed by C++ and how to solve them using design patternsBook Description C++ is a general-purpose programming language designed with the goals of efficiency, performance, and flexibility in mind. Design patterns are commonly accepted solutions to well-recognized design problems. In essence, they are a library of reusable components, only for software architecture, and not for a concrete implementation. The focus of this book is on the design patterns that naturally lend themselves to the needs of a C++ programmer, and on the patterns that uniquely benefit from the features of C++, in particular, the generic programming. Armed with the knowledge of these patterns, you will spend less time searching for a solution to a common problem and be familiar with the solutions developed from experience, as well as their advantages and drawbacks. The other use of design patterns is as a concise and an efficient way to communicate. A pattern is a familiar and instantly recognizable solution to specific problem; through its use, sometimes with a single line of code, we can convey a considerable amount of information. The code conveys: \"This is the problem we are facing, these are additional considerations that are most important in our case; hence, the following well-known solution was chosen.\" By the end of this book, you will have gained a comprehensive understanding of design patterns to create robust, reusable, and maintainable code. What you will learnRecognize the most common design patterns used in C++Understand how to use C++ generic programming to solve common design problemsExplore the most powerful C++ idioms, their strengths, and drawbacksRediscover how to use popular C++ idioms with generic programmingUnderstand the impact of design patterns on the program's performanceWho this book is for This book is for experienced C++ developers and programmers who wish to learn about software design patterns and principles and apply them to create robust, reusable, and easily maintainable apps.

Design Patterns in Modern C++

Apply modern C++17 to the implementations of classic design patterns. As well as covering traditional

design patterns, this book fleshes out new patterns and approaches that will be useful to C++ developers. The author presents concepts as a fun investigation of how problems can be solved in different ways, along the way using varying degrees of technical sophistication and explaining different sorts of trade-offs. Design Patterns in Modern C++ also provides a technology demo for modern C++, showcasing how some of its latest features (e.g., coroutines) make difficult problems a lot easier to solve. The examples in this book are all suitable for putting into production, with only a few simplifications made in order to aid readability. What You Will Learn Apply design patterns to modern C++ programming Use creational patterns of builder, factories, prototype and singleton Implement structural patterns such as adapter, bridge, decorator, facade and more Work with the behavioral patterns such as chain of responsibility, command, iterator, mediator and more Apply functional design patterns such as Monad and more Who This Book Is For Those with at least some prior programming experience, especially in C++.

Design Patterns in Modern C++20

Apply the latest editions of the C++ standard to the implementation of design patterns. As well as covering traditional design patterns, this book fleshes out new design patterns and approaches that will be useful to modern C++ developers. Author Dmitri Nesteruk presents concepts as a fun investigation of how problems can be solved in different ways, along the way using varying degrees of technical sophistication and explaining different sorts of trade-offs. Design Patterns in Modern C++20, Second Edition also provides a technology demo for modern C++, showcasing how some of its latest features (e.g., coroutines, modules and more) make difficult problems a lot easier to solve. The examples in this book are all suitable for putting into production, with only a few simplifications made in order to aid readability. What You Will Learn Use creational patterns such as builder, factories, prototype and singleton Implement structural patterns such as adapter, bridge, decorator, facade and more Work with the behavioral patterns such as chain of responsibility, command, iterator, mediator and more Apply functional design patterns such as the Maybe Monad Who This Book Is For This book is for both beginner and experienced C++ developers.

C++ Template Metaprogramming

C++ Template Metaprogramming sheds light on the most powerful idioms of today's C++, at long last delivering practical metaprogramming tools and techniques into the hands of the everyday programmer. A metaprogram is a program that generates or manipulates program code. Ever since generic programming was introduced to C++, programmers have discovered myriad "template tricks" for manipulating programs as they are compiled, effectively eliminating the barrier between program and metaprogram. While excitement among C++ experts about these capabilities has reached the community at large, their practical application remains out of reach for most programmers. This book explains what metaprogramming is and how it is best used. It provides the foundation you'll need to use the template metaprogramming effectively in your own work. This book is aimed at any programmer who is comfortable with idioms of the Standard Template Library (STL). C++ power-users will gain a new insight into their existing work and a new fluency in the domain of metaprogramming. Intermediate-level programmers who have learned a few advanced template techniques will see where these tricks fit in the big picture and will gain the conceptual foundation to use them with discipline. Programmers who have caught the scent of metaprogramming, but for whom it is still mysterious, will finally gain a clear understanding of how, when, and why it works. All readers will leave with a new tool of unprecedented power at their disposal—the Boost Metaprogramming Library. Note: CD materials are only available with the print edition.

C++ Coding Standards

Consistent, high-quality coding standards improve software quality, reduce time-to-market, promote teamwork, eliminate time wasted on inconsequential matters, and simplify maintenance. Now, two of the world's most respected C++ experts distill the rich collective experience of the global C++ community into a set of coding standards that every developer and development team can understand and use as a basis for

their own coding standards. The authors cover virtually every facet of C++ programming: design and coding style, functions, operators, class design, inheritance, construction/destruction, copying, assignment, namespaces, modules, templates, genericity, exceptions, STL containers and algorithms, and more. Each standard is described concisely, with practical examples. From type definition to error handling, this book presents C++ best practices, including some that have only recently been identified and standardized--techniques you may not know even if you've used C++ for years. Along the way, you'll find answers to questions like What's worth standardizing--and what isn't? What are the best ways to code for scalability? What are the elements of a rational error handling policy? How (and why) do you avoid unnecessary initialization, cyclic, and definitional dependencies? When (and how) should you use static and dynamic polymorphism together? How do you practice \"safe\" overriding? When should you provide a no-fail swap? Why and how should you prevent exceptions from propagating across module boundaries? Why shouldn't you write namespace declarations or directives in a header file? Why should you use STL vector and string instead of arrays? How do you choose the right STL search or sort algorithm? What rules should you follow to ensure type-safe code? Whether you're working alone or with others, C++ Coding Standards will help you write cleaner code--and write it faster, with fewer hassles and less frustration.

Applying UML and Patterns

A fast-paced, thorough introduction to modern C++ written for experienced programmers. After reading C++ Crash Course, you'll be proficient in the core language concepts, the C++ Standard Library, and the Boost Libraries. C++ is one of the most widely used languages for real-world software. In the hands of a knowledgeable programmer, C++ can produce small, efficient, and readable code that any programmer would be proud of. Designed for intermediate to advanced programmers, C++ Crash Course cuts through the weeds to get you straight to the core of C++17, the most modern revision of the ISO standard. Part 1 covers the core of the C++ language, where you'll learn about everything from types and functions, to the object life cycle and expressions. Part 2 introduces you to the C++ Standard Library and Boost Libraries, where you'll learn about all of the high-quality, fully-featured facilities available to you. You'll cover special utility classes, data structures, and algorithms, and learn how to manipulate file systems and build high-performance programs that communicate over networks. You'll learn all the major features of modern C++, including: Fundamental types, reference types, and user-defined types The object lifecycle including storage duration, memory management, exceptions, call stacks, and the RAII paradigm Compile-time polymorphism with templates and run-time polymorphism with virtual classes Advanced expressions, statements, and functions Smart pointers, data structures, dates and times, numerics, and probability/statistics facilities Containers, iterators, strings, and algorithms Streams and files, concurrency, networking, and application development With well over 500 code samples and nearly 100 exercises, C++ Crash Course is sure to help you build a strong C++ foundation.

C++ Crash Course

API Design for C++ provides a comprehensive discussion of Application Programming Interface (API) development, from initial design through implementation, testing, documentation, release, versioning, maintenance, and deprecation. It is the only book that teaches the strategies of C++ API development, including interface design, versioning, scripting, and plug-in extensibility. Drawing from the author's experience on large scale, collaborative software projects, the text offers practical techniques of API design that produce robust code for the long term. It presents patterns and practices that provide real value to individual developers as well as organizations. API Design for C++ explores often overlooked issues, both technical and non-technical, contributing to successful design decisions that product high quality, robust, and long-lived APIs. It focuses on various API styles and patterns that will allow you to produce elegant and durable libraries. A discussion on testing strategies concentrates on automated API testing techniques rather than attempting to include end-user application testing techniques such as GUI testing, system testing, or manual testing. Each concept is illustrated with extensive C++ code examples, and fully functional examples and working source code for experimentation are available online. This book will be helpful to new

programmers who understand the fundamentals of C++ and who want to advance their design skills, as well as to senior engineers and software architects seeking to gain new expertise to complement their existing talents. Three specific groups of readers are targeted: practicing software engineers and architects, technical managers, and students and educators. The only book that teaches the strategies of C++ API development, including design, versioning, documentation, testing, scripting, and extensibility. Extensive code examples illustrate each concept, with fully functional examples and working source code for experimentation available online. Covers various API styles and patterns with a focus on practical and efficient designs for large-scale long-term projects.

API Design for C++

D is a programming language built to help programmers address the challenges of modern software development. It does so by fostering modules interconnected through precise interfaces, a federation of tightly integrated programming paradigms, language-enforced thread isolation, modular type safety, an efficient memory model, and more. The D Programming Language is an authoritative and comprehensive introduction to D. Reflecting the author's signature style, the writing is casual and conversational, but never at the expense of focus and precision. It covers all aspects of the language (such as expressions, statements, types, functions, contracts, and modules), but it is much more than an enumeration of features. Inside the book you will find In-depth explanations, with idiomatic examples, for all language features How feature groups support major programming paradigms Rationale and best-use advice for each major feature Discussion of cross-cutting issues, such as error handling, contract programming, and concurrency Tables, figures, and "cheat sheets" that serve as a handy quick reference for day-to-day problem solving with D Written for the working programmer, The D Programming Language not only introduces the D language—it presents a compendium of good practices and idioms to help both your coding with D and your coding in general.

The D Programming Language

C++'s Standard Template Library is revolutionary, but learning to use it well has always been a challenge for students. In *Effective STL*, best-selling author Scott Meyers (*Effective C++*, *More Effective C++*) reveals the critical rules of thumb employed by the experts -- the things they almost always do or almost always avoid doing -- to get the most out of the library. This book offers clear, concise, and concrete guidelines to C++ programmers. While other books describe what's in the STL, *Effective STL* shows the student how to use it. Each of the book's 50 guidelines is backed by Meyers' legendary analysis and incisive examples, so the student will learn not only what to do, but also when to do it - and why.

Effective STL

Go from competent C++ developer to skilled designer or architect using this book as your C++ design master class. This title will guide you through the design and implementation of a fun, engaging case study. Starting with a quick exploration of the requirements for building the application, you'll delve into selecting an appropriate architecture, eventually designing and implementing all of the necessary modules to meet the project's requirements. By the conclusion of *Practical C++ Design*, you'll have constructed a fully functioning calculator that builds and executes on multiple platforms. Access to the complete source code will help speed your learning. Utilize the Model-View-Controller pattern to determine the optimal architecture for the calculator; the observer pattern to design an event system; the singleton pattern as you design the calculator's central data repository, a reusable stack; the command pattern to design a command system supporting unlimited undo/redo; and the abstract factory pattern for a cross-platform plugin infrastructure to make the calculator extensible. What You Will Learn Read a specification document and translate it into a practical C++ design Understand trade-offs in selecting between alternative design scenarios Gain practical experience in applying design patterns to realistic development scenarios Learn how to effectively use language elements of modern C++ to create a lasting design Develop a complete C++

program from a blank canvas through to a fully functioning, cross platform application Read, modify, and extend existing, high quality code Learn the fundamentals of API design, including class, module, and plugin interfaces Who This Book Is For The experienced C++ developer ready to take the next step to becoming a skilled C++ designer.

Practical C++ Design

"The puzzles and problems in Exceptional C++ not only entertain, they will help you hone your skills to become the sharpest C++ programmer you can be. - Many of these problems are culled from the famous Guru of the Week feature of the Internet newsgroup comp.lang.c++, moderated, expanded and updated to conform to the official ISO/ANSI C++ Standard."--BOOK JACKET. - "Try your skills against the C++ masters and come away with the insight and experience to create more efficient, effective, robust, and portable C++ code."--Jacket.

Exceptional C++

Apply business requirements to IT infrastructure and deliver a high-quality product by understanding architectures such as microservices, DevOps, and cloud-native using modern C++ standards and features Key FeaturesDesign scalable large-scale applications with the C++ programming languageArchitect software solutions in a cloud-based environment with continuous integration and continuous delivery (CI/CD)Achieve architectural goals by leveraging design patterns, language features, and useful toolsBook Description Software architecture refers to the high-level design of complex applications. It is evolving just like the languages we use, but there are architectural concepts and patterns that you can learn to write high-performance apps in a high-level language without sacrificing readability and maintainability. If you're working with modern C++, this practical guide will help you put your knowledge to work and design distributed, large-scale apps. You'll start by getting up to speed with architectural concepts, including established patterns and rising trends, then move on to understanding what software architecture actually is and start exploring its components. Next, you'll discover the design concepts involved in application architecture and the patterns in software development, before going on to learn how to build, package, integrate, and deploy your components. In the concluding chapters, you'll explore different architectural qualities, such as maintainability, reusability, testability, performance, scalability, and security. Finally, you will get an overview of distributed systems, such as service-oriented architecture, microservices, and cloud-native, and understand how to apply them in application development. By the end of this book, you'll be able to build distributed services using modern C++ and associated tools to deliver solutions as per your clients' requirements. What you will learnUnderstand how to apply the principles of software architectureApply design patterns and best practices to meet your architectural goalsWrite elegant, safe, and performant code using the latest C++ featuresBuild applications that are easy to maintain and deployExplore the different architectural approaches and learn to apply them as per your requirementSimplify development and operations using application containersDiscover various techniques to solve common problems in software design and developmentWho this book is for This software architecture C++ programming book is for experienced C++ developers looking to become software architects or develop enterprise-grade applications.

Software Architecture with C++

"Every C++ professional needs a copy of Effective C++. It is an absolute must-read for anyone thinking of doing serious C++ development. If you've never read Effective C++ and you think you know everything about C++, think again." — Steve Schirripa, Software Engineer, Google "C++ and the C++ community have grown up in the last fifteen years, and the third edition of Effective C++ reflects this. The clear and precise style of the book is evidence of Scott's deep insight and distinctive ability to impart knowledge." — Gerhard Kreuzer, Research and Development Engineer, Siemens AG The first two editions of Effective C++ were embraced by hundreds of thousands of programmers worldwide. The reason is clear: Scott Meyers' practical approach to C++ describes the rules of thumb used by the experts — the things they almost always do or

almost always avoid doing — to produce clear, correct, efficient code. The book is organized around 55 specific guidelines, each of which describes a way to write better C++. Each is backed by concrete examples. For this third edition, more than half the content is new, including added chapters on managing resources and using templates. Topics from the second edition have been extensively revised to reflect modern design considerations, including exceptions, design patterns, and multithreading. Important features of *Effective C++* include: Expert guidance on the design of effective classes, functions, templates, and inheritance hierarchies. Applications of new “TR1” standard library functionality, along with comparisons to existing standard library components. Insights into differences between C++ and other languages (e.g., Java, C#, C) that help developers from those languages assimilate “the C++ way” of doing things.

Effective C++

As scientific and engineering projects grow larger and more complex, it is increasingly likely that those projects will be written in C++. With embedded hardware growing more powerful, much of its software is moving to C++, too. *Mastering C++* gives you strong skills for programming at nearly every level, from “close to the hardware” to the highest-level abstractions. In short, C++ is a language that scientific and technical practitioners need to know. Peter Gottschling’s *Discovering Modern C++* is an intensive introduction that guides you smoothly to sophisticated approaches based on advanced features. Gottschling introduces key concepts using examples from many technical problem domains, drawing on his extensive experience training professionals and teaching C++ to students of physics, math, and engineering. This book is designed to help you get started rapidly and then master increasingly robust features, from lambdas to expression templates. You’ll also learn how to take advantage of the powerful libraries available to C++ programmers: both the Standard Template Library (STL) and scientific libraries for arithmetic, linear algebra, differential equations, and graphs. Throughout, Gottschling demonstrates how to write clear and expressive software using object orientation, generics, metaprogramming, and procedural techniques. By the time you’re finished, you’ll have mastered all the abstractions you need to write C++ programs with exceptional quality and performance.

Discovering Modern C++

Design patterns are the cutting-edge paradigm for programming in object-oriented languages. Here they are discussed, for the first time in a book, in the context of implementing financial models in C++. Assuming only a basic knowledge of C++ and mathematical finance, the reader is taught how to produce well-designed, structured, re-usable code via concrete examples. Each example is treated in depth, with the whys and wherefores of the chosen method of solution critically examined. Part of the book is devoted to designing re-usable components that are then put together to build a Monte Carlo pricer for path-dependent exotic options. Advanced topics treated include the factory pattern, the singleton pattern and the decorator pattern. Complete ANSI/ISO-compatible C++ source code is included on a CD for the reader to study and re-use and so develop the skills needed to implement financial models with object-oriented programs and become a working financial engineer. Please note the CD supplied with this book is platform-dependent and PC users will not be able to use the files without manual intervention in order to remove extraneous characters. Cambridge University Press apologises for this error. Machine readable files for all users can be obtained from www.markjoshi.com/design.

C++ Design Patterns and Derivatives Pricing

C++ Programming with Design Patterns Revealed introduces C++ syntax alongside current object-oriented tools such as design patterns, and the Unified Modeling Language (UML), which are essential for the production of well-designed C++ software. Through this book, readers will attain mastery of many C++ features, as well as the object-oriented design techniques that facilitate and optimize their use. This book uses an example-based approach. First, a technique is presented alongside a piece of code that implements that technique. Next, a component is shown that uses the technique. Finally, an entire running example that

incorporates the technique is presented. The book balances a systematic discussion of object-oriented design alongside the introduction of C++ syntax. It introduces twelve basic design patterns early on and uses them throughout, and describes design patterns via use of basic UML. Numerous reference appendices are included for the idioms, design patterns, and programming guidelines in the book. Portability tips, common programming errors, idioms, and programming style tips are also highlighted in each chapter. This book is designed for readers who have been exposed to Java, as well as to basic object-oriented ideas, and are looking to gain familiarity with C++.

C++ Programming with Design Patterns Revealed

Standard C++ provides a foundation for creating new, improved, and more powerful C++ components. IOStreams and locales are two such major components for text internationalization. As critical as these two APIs are, however, there are few resources devoted to explaining them. "Standard C++ IOStreams and Locales" fills this informational gap. It provides a comprehensive description of, and reference to, the iostreams and locales classes, showing how to put them to use and offering advanced information on customizing and extending their basic operation. Written by two experts involved with the development of the standard, this book reveals the rationale behind the design of the APIs and points out their potential pitfalls. This book serves as both a guide and a reference to C++ components. Part I explains iostreams, what they are, how they are used, their underlying architectural concepts, and the techniques for extending the iostream framework. Part II introduces internationalization and shows you how to adapt your program to local conventions. Readers seeking an initial overview of the problem domain will find an explanation of what internationalization and localization are, how they are related, and how they differ. With examples, the authors show the differences among cultural conventions, how C++ locales can be used to address such differences, and how locale framework can be extended to handle further, nonstandard cultural conventions. "Standard C++ IOStreams and Locales" Explains formatting and error indication features of iostreams in detail Describes underlying concepts of the iostreams framework Demonstrates implementation of i/o operations for user-defined types Shows techniques for implementing extended stream and stream buffer classes Introduces internationalization Explains how to use standard features for internationalization Demonstrates techniques for implementation of user-defined internationalization services IOStreams and locales serve as a foundation library that provides a number of ready-to-use interfaces, as well as frameworks that can be customized and extended. The class reference to C++ IOStreams and locales completes this comprehensive resource, which belongs in the libraries of all intermediate and advanced C++ programmers. 0201183951B04062001

Standard C++ IOStreams and Locales

This tutorial book presents six carefully revised lectures given at the Spring School on Datatype-Generic Programming, SSDGP 2006. This was held in Nottingham, UK, in April 2006. It was colocated with the Symposium on Trends in Functional Programming (TFP 2006), and the Conference of the Types Project (TYPES 2006). All the lectures have been subjected to thorough internal review by the editors and contributors, supported by independent external reviews.

Datatype-Generic Programming

This boxed-set of five volumes on C++ programming includes: Modern C++ Design; Accelerated C++; Essential C++; Exceptional C++; and More Exceptional C++.

C++ In-depth

Geared to experienced C++ developers who may not be familiar with the more advanced features of the language, and therefore are not using it to its full capabilities Teaches programmers how to think in C++-that is, how to design effective solutions that maximize the power of the language The authors drill down into this

notoriously complex language, explaining poorly understood elements of the C++ feature set as well as common pitfalls to avoid Contains several in-depth case studies with working code that's been tested on Windows, Linux, and Solaris platforms

Professional C++

A comprehensive guide with extensive coverage of concepts such as OOP, functional programming, generic programming, concurrency, and STL along with the latest features of C++ Purchase of the print or Kindle book includes a free PDF eBook Key Features: Delve into the core patterns and components of C++ to master application design Learn tricks, techniques, and best practices to solve common design and architectural challenges Understand the limitation imposed by C++ and how to solve them using design patterns Book Description: C++ is a general-purpose programming language designed for efficiency, performance, and flexibility. Design patterns are commonly accepted solutions to well-recognized design problems. In essence, they are a library of reusable components, only for software architecture, and not for a concrete implementation. This book helps you focus on the design patterns that naturally adapt to your needs, and on the patterns that uniquely benefit from the features of C++. Armed with the knowledge of these patterns, you'll spend less time searching for solutions to common problems and tackle challenges with the solutions developed from experience. You'll also explore that design patterns are a concise and efficient way to communicate, as patterns are a familiar and recognizable solution to a specific problem and can convey a considerable amount of information with a single line of code. By the end of this book, you'll have a deep understanding of how to use design patterns to write maintainable, robust, and reusable software. What You Will Learn: Recognize the most common design patterns used in C++ Understand how to use C++ generic programming to solve common design problems Explore the most powerful C++ idioms, their strengths, and their drawbacks Rediscover how to use popular C++ idioms with generic programming Discover new patterns and idioms made possible by language features of C++17 and C++20 Understand the impact of design patterns on the program's performance Who this book is for: This book is for experienced C++ developers and programmers who wish to learn about software design patterns and principles and apply them to create robust, reusable, and easily maintainable programs and software systems.

Hands-On Design Patterns with C++ - Second Edition: Solve Common C++ Problems with Modern Design Patterns and Build Robust Applications

Summary Programming with Types teaches you to design safe, resilient, correct software that's easy to maintain and understand by taking advantage of the power of strong type systems. Designed to provide practical, instantly useful techniques for working developers, this clearly written tutorial introduces you to using type systems to support everyday programming tasks. About the technology Common bugs often result from mismatched data types. By precisely naming and controlling which data are allowable in a calculation, a strong type system can eliminate whole classes of errors and ensure data integrity throughout an application. As a developer, skillfully using types in your everyday practice leads to better code and saves time tracking down tricky data-related errors. About the book Programming with Types teaches type-based techniques for writing software that's safe, correct, easy to maintain, and practically self-documenting. Designed for working developers, this clearly written tutorial sticks with the practical benefits of type systems for everyday programming tasks. Following real-world examples coded in TypeScript, you'll build your skills from primitive types up to more-advanced concepts like functors and monads. What's inside Building data structures with primitive types, arrays, and references How types affect functions, inheritance, and composition Object-oriented programming with types Applying generics and higher-kinded types About the reader You'll need experience with a mainstream programming language like TypeScript, Java, JavaScript, C#, or C++. About the author Vlad Riscutia is a principal software engineer at Microsoft. He has headed up several major software projects and mentors up-and-coming software engineers.

Programming with Types

Explore the world of .NET design patterns and bring the benefits that the right patterns can offer to your toolkit today About This Book Dive into the powerful fundamentals of .NET framework for software development The code is explained piece by piece and the application of the pattern is also showcased. This fast-paced guide shows you how to implement the patterns into your existing applications Who This Book Is For This book is for those with familiarity with .NET development who would like to take their skills to the next level and be in the driver's seat when it comes to modern development techniques. Basic object-oriented C# programming experience and an elementary familiarity with the .NET framework library is required. What You Will Learn Put patterns and pattern catalogs into the right perspective Apply patterns for software development under C#/.NET Use GoF and other patterns in real-life development scenarios Be able to enrich your design vocabulary and well articulate your design thoughts Leverage object/functional programming by mixing OOP and FP Understand the reactive programming model using Rx and RxJs Writing compositional code using C# LINQ constructs Be able to implement concurrent/parallel programming techniques using idioms under .NET Avoiding pitfalls when creating compositional, readable, and maintainable code using imperative, functional, and reactive code. In Detail Knowing about design patterns enables developers to improve their code base, promoting code reuse and making their design more robust. This book focuses on the practical aspects of programming in .NET. You will learn about some of the relevant design patterns (and their application) that are most widely used. We start with classic object-oriented programming (OOP) techniques, evaluate parallel programming and concurrency models, enhance implementations by mixing OOP and functional programming, and finally to the reactive programming model where functional programming and OOP are used in synergy to write better code. Throughout this book, we'll show you how to deal with architecture/design techniques, GoF patterns, relevant patterns from other catalogs, functional programming, and reactive programming techniques. After reading this book, you will be able to convincingly leverage these design patterns (factory pattern, builder pattern, prototype pattern, adapter pattern, facade pattern, decorator pattern, observer pattern and so on) for your programs. You will also be able to write fluid functional code in .NET that would leverage concurrency and parallelism! Style and approach This tutorial-based book takes a step-by-step approach. It covers the major patterns and explains them in a detailed manner along with code examples.

.NET Design Patterns

This book is a comprehensive guide to understanding and implementing design patterns and SOLID principles in C++. The book is designed for both novice and experienced programmers who want to improve their understanding of software design and development in C++. Design patterns are reusable solutions to common problems that arise in the design of object-oriented systems. They provide a way to structure and organize code, making it more flexible, maintainable and extensible. This book covers the most commonly used design patterns in C++, such as the Singleton, Factory, Observer, and Decorator patterns. Each pattern is explained in detail, with real-world examples and C++ code snippets that demonstrate how to implement the pattern in an actual C++ application. In addition to design patterns, the book also covers SOLID principles, which are a set of guidelines for writing maintainable and extensible code. The SOLID principles are widely considered to be best practices in object-oriented software development, and this book explains how they can be applied in a C++ context.

Software Design Simplified in Modern C++

If you program in C++ you've been neglected. Test-driven development (TDD) is a modern software development practice that can dramatically reduce the number of defects in systems, produce more maintainable code, and give you the confidence to change your software to meet changing needs. But C++ programmers have been ignored by those promoting TDD--until now. In this book, Jeff Langr gives you hands-on lessons in the challenges and rewards of doing TDD in C++. Modern C++ Programming With Test-Driven Development, the only comprehensive treatment on TDD in C++ provides you with everything you need to know about TDD, and the challenges and benefits of implementing it in your C++ systems. Its many detailed code examples take you step-by-step from TDD basics to advanced concepts. As a veteran C++

programmer, you're already writing high-quality code, and you work hard to maintain code quality. It doesn't have to be that hard. In this book, you'll learn: how to use TDD to improve legacy C++ systems how to identify and deal with troublesome system dependencies how to do dependency injection, which is particularly tricky in C++ how to use testing tools for C++ that aid TDD new C++11 features that facilitate TDD As you grow in TDD mastery, you'll discover how to keep a massive C++ system from becoming a design mess over time, as well as particular C++ trouble spots to avoid. You'll find out how to prevent your tests from being a maintenance burden and how to think in TDD without giving up your hard-won C++ skills. Finally, you'll see how to grow and sustain TDD in your team. Whether you're a complete unit-testing novice or an experienced tester, this book will lead you to mastery of test-driven development in C++. What You Need A C++ compiler running under Windows or Linux, preferably one that supports C++11. Examples presented in the book were built under gcc 4.7.2. Google Mock 1.6 (downloadable for free; it contains Google Test as well) or an alternate C++ unit testing tool. Most examples in the book are written for Google Mock, but it isn't difficult to translate them to your tool of choice. A good programmer's editor or IDE. cmake, preferably. Of course, you can use your own preferred make too. CMakeLists.txt files are provided for each project. Examples provided were built using cmake version 2.8.9. Various freely-available third-party libraries are used as the basis for examples in the book. These include: cURL JsonCpp Boost (filesystem, date_time/gregorian, algorithm, assign) Several examples use the boost headers/libraries. Only one example uses cURL and JsonCpp.

Modern C++ Programming with Test-Driven Development

Effective C++ has been updated to reflect the latest ANSI/ISO standards. The author, a recognised authority on C++, shows readers fifty ways to improve their programs and designs.

Effective C++

The biggest challenge facing many game programmers is completing their game. Most game projects fizzle out, overwhelmed by the complexity of their own code. Game Programming Patterns tackles that exact problem. Based on years of experience in shipped AAA titles, this book collects proven patterns to untangle and optimize your game, organized as independent recipes so you can pick just the patterns you need. You will learn how to write a robust game loop, how to organize your entities using components, and take advantage of the CPUs cache to improve your performance. You'll dive deep into how scripting engines encode behavior, how quadrees and other spatial partitions optimize your engine, and how other classic design patterns can be used in games.

Game Programming Patterns

"This book is aimed at any programmer who is comfortable with idioms of the Standard Template Library (STL). C++ power-users will gain a new insight into their existing work and a new fluency in the domain of metaprogramming. Intermediate-level programmers who have learned a few advanced template techniques will see where these tricks fit in the big picture and will gain the conceptual foundation to use them with discipline. Programmers who have caught the scent of metaprogramming, but for whom it is still mysterious, will finally gain a clear understanding of how, when, and why it works. All readers will leave with a new tool of unprecedented power at their disposal - the Boost Metaprogramming Library."--Jacket.

C++ Template Metaprogramming

* Allen Holub is a highly regarded instructor for the University of California, Berkeley, Extension. He has taught since 1982 on various topics, including Object-Oriented Analysis and Design, Java, C++, C. Holub will use this book in his Berkeley Extension classes. * Holub is a regular presenter at the Software Development conferences and is Contributing Editor for the online magazine JavaWorld, for whom he writes the Java Toolbox. He also wrote the OO Design Process column for IBM DeveloperWorks. * This book is

not time-sensitive. It is an extremely well-thought out approach to learning design patterns, with Java as the example platform, but the concepts presented are not limited to just Java programmers. This is a complement to the Addison-Wesley seminal "Design Patterns" book by the "Gang of Four".

Holub on Patterns

This easy-to-read textbook/reference presents an essential guide to object-oriented C++ programming for scientific computing. With a practical focus on learning by example, the theory is supported by numerous exercises. Features: provides a specific focus on the application of C++ to scientific computing, including parallel computing using MPI; stresses the importance of a clear programming style to minimize the introduction of errors into code; presents a practical introduction to procedural programming in C++, covering variables, flow of control, input and output, pointers, functions, and reference variables; exhibits the efficacy of classes, highlighting the main features of object-orientation; examines more advanced C++ features, such as templates and exceptions; supplies useful tips and examples throughout the text, together with chapter-ending exercises, and code available to download from Springer.

Guide to Scientific Computing in C++

Templates are among the most powerful features of C++, but they are too often neglected, misunderstood, and misused. C++ Templates: The Complete Guide provides software architects and engineers with a clear understanding of why, when, and how to use templates to build and maintain cleaner, faster, and smarter software more efficiently. C++ Templates begins with an insightful tutorial on basic concepts and language features. The remainder of the book serves as a comprehensive reference, focusing first on language details, then on a wide range of coding techniques, and finally on advanced applications for templates. Examples used throughout the book illustrate abstract concepts and demonstrate best practices. Readers learn The exact behaviors of templates How to avoid the pitfalls associated with templates Idioms and techniques, from the basic to the previously undocumented How to reuse source code without threatening performance or safety How to increase the efficiency of C++ programs How to produce more flexible and maintainable software This practical guide shows programmers how to exploit the full power of the template features in C++. The companion Web site at <http://www.josuttis.com/tmplbook/> contains sample code and additional updates.

Accelerated C++: Practical Programming By Example

In this substantive yet accessible book, pioneering software designer Alexander Stepanov and his colleague Daniel Rose illuminate the principles of generic programming and the mathematical concept of abstraction on which it is based, helping you write code that is both simpler and more powerful. If you're a reasonably proficient programmer who can think logically, you have all the background you'll need. Stepanov and Rose introduce the relevant abstract algebra and number theory with exceptional clarity. They carefully explain the problems mathematicians first needed to solve, and then show how these mathematical solutions translate to generic programming and the creation of more effective and elegant code. To demonstrate the crucial role these mathematical principles play in many modern applications, the authors show how to use these results and generalized algorithms to implement a real-world public-key cryptosystem. As you read this book, you'll master the thought processes necessary for effective programming and learn how to generalize narrowly conceived algorithms to widen their usefulness without losing efficiency. You'll also gain deep insight into the value of mathematics to programming—insight that will prove invaluable no matter what programming languages and paradigms you use. You will learn about How to generalize a four thousand-year-old algorithm, demonstrating indispensable lessons about clarity and efficiency Ancient paradoxes, beautiful theorems, and the productive tension between continuous and discrete A simple algorithm for finding greatest common divisor (GCD) and modern abstractions that build on it Powerful mathematical approaches to abstraction How abstract algebra provides the idea at the heart of generic programming Axioms, proofs, theories, and models: using mathematical techniques to organize knowledge about your algorithms and data structures Surprising subtleties of simple programming tasks and what you can learn from them How

practical implementations can exploit theoretical knowledge

C++ Templates

Master C++ “The Qt Way” with Modern Design Patterns and Efficient Reuse This fully updated, classroom-tested book teaches C++ “The Qt Way,” emphasizing design patterns and efficient reuse. Readers will master both the C++ language and Qt libraries, as they learn to develop maintainable software with well-defined code layers and simple, reusable classes and functions. Every chapter of this edition has been improved with new content, better organization, or both. Readers will find extensively revised coverage of QObjects, Reflection, Widgets, Main Windows, Models and Views, Databases, Multi-Threaded Programming, and Reflection. This edition introduces the powerful new Qt Creator IDE; presents new multimedia APIs; and offers extended coverage of Qt Designer and C++ Integration. It has been restructured to help readers start writing software immediately and write robust, effective software sooner. The authors introduce several new design patterns, add many quiz questions and labs, and present more efficient solutions relying on new Qt features and best practices. They also provide an up-to-date C++ reference section and a complete application case study. Master C++ keywords, literals, identifiers, declarations, types, and type conversions. Understand classes and objects, organize them, and describe their interrelationships. Learn consistent programming style and naming rules. Use lists, functions, and other essential techniques. Define inheritance relationships to share code and promote reuse. Learn how code libraries are designed, built, and reused. Work with QObject, the base class underlying much of Qt. Build graphical user interfaces with Qt widgets. Use templates to write generic functions and classes. Master advanced reflective programming techniques. Use the Model-View framework to cleanly separate data and GUI classes. Validate input using regular expressions and other techniques. Parse XML data with SAX, DOM, and QDomStreamReader. Master today’s most valuable creational and structural design patterns. Create, use, monitor, and debug processes and threads. Access databases with Qt’s SQL classes. Manage memory reliably and efficiently. Understand how to effectively manage QThreads and use QtConcurrent algorithms. [Click here to obtain supplementary materials for this book.](#)

From Mathematics to Generic Programming

The new C++11 standard allows programmers to express ideas more clearly, simply, and directly, and to write faster, more efficient code. Bjarne Stroustrup, the designer and original implementer of C++, has reorganized, extended, and completely rewritten his definitive reference and tutorial for programmers who want to use C++ most effectively. The C++ Programming Language, Fourth Edition, delivers meticulous, richly explained, and integrated coverage of the entire language—its facilities, abstraction mechanisms, standard libraries, and key design techniques. Throughout, Stroustrup presents concise, “pure C++11” examples, which have been carefully crafted to clarify both usage and program design. To promote deeper understanding, the author provides extensive cross-references, both within the book and to the ISO standard. New C++11 coverage includes Support for concurrency Regular expressions, resource management pointers, random numbers, and improved containers General and uniform initialization, simplified for-statements, move semantics, and Unicode support Lambdas, general constant expressions, control over class defaults, variadic templates, template aliases, and user-defined literals Compatibility issues Topics addressed in this comprehensive book include Basic facilities: type, object, scope, storage, computation fundamentals, and more Modularity, as supported by namespaces, source files, and exception handling C++ abstraction, including classes, class hierarchies, and templates in support of a synthesis of traditional programming, object-oriented programming, and generic programming Standard Library: containers, algorithms, iterators, utilities, strings, stream I/O, locales, numerics, and more The C++ basic memory model, in depth This fourth edition makes C++11 thoroughly accessible to programmers moving from C++98 or other languages, while introducing insights and techniques that even cutting-edge C++11 programmers will find indispensable. This book features an enhanced, layflat binding, which allows the book to stay open more easily when placed on a flat surface. This special binding method—noticeable by a small space inside the spine—also increases durability.

Introduction to Design Patterns in C++ with Qt

Cay Horstmann offers readers an effective means for mastering computing concepts and developing strong design skills. This book introduces object-oriented fundamentals critical to designing software and shows how to implement design techniques. The author's clear, hands-on presentation and outstanding writing style help readers to better understand the material. · A Crash Course in Java · The Object-Oriented Design Process · Guidelines for Class Design · Interface Types and Polymorphism · Patterns and GUI Programming · Inheritance and Abstract Classes · The Java Object Model · Frameworks · Multithreading · More Design Patterns

The C++ Programming Language

Apply Functional Programming techniques to C++ to build highly modular, testable, and reusable code About This Book Modularize your applications and make them highly reusable and testable Get familiar with complex concepts such as metaprogramming, concurrency, and immutability A highly practical guide to building functional code in C++ filled with lots of examples and real-world use cases Who This Book Is For This book is for C++ developers comfortable with OOP who are interested in learning how to apply the functional paradigm to create robust and testable apps. What You Will Learn Get to know the difference between imperative and functional approaches See the use of first-class functions and pure functions in a functional style Discover various techniques to apply immutable state to avoid side effects Design a recursive algorithm effectively Create faster programs using lazy evaluation Structure code using design patterns to make the design process easier Use concurrency techniques to develop responsive software Learn how to use the C++ Standard Template Library and metaprogramming in a functional way to improve code optimization In Detail Functional programming allows developers to divide programs into smaller, reusable components that ease the creation, testing, and maintenance of software as a whole. Combined with the power of C++, you can develop robust and scalable applications that fulfill modern day software requirements. This book will help you discover all the C++ 17 features that can be applied to build software in a functional way. The book is divided into three modules—the first introduces the fundamentals of functional programming and how it is supported by modern C++. The second module explains how to efficiently implement C++ features such as pure functions and immutable states to build robust applications. The last module describes how to achieve concurrency and apply design patterns to enhance your application's performance. Here, you will also learn to optimize code using metaprogramming in a functional way. By the end of the book, you will be familiar with the functional approach of programming and will be able to use these techniques on a daily basis. Style and approach This book uses a module-based approach, where each module will cover important aspects of functional programming in C++ and will help you develop efficient and robust applications through gaining a practical understanding.

Object-Oriented Design And Patterns

What Every Professional C++ Programmer Needs to Know—Pared to Its Essentials So It Can Be Efficiently and Accurately Absorbed C++ is a large, complex language, and learning it is never entirely easy. But some concepts and techniques must be thoroughly mastered if programmers are ever to do professional-quality work. This book cuts through the technical details to reveal what is commonly understood to be absolutely essential. In one slim volume, Steve Dewhurst distills what he and other experienced managers, trainers, and authors have found to be the most critical knowledge required for successful C++ programming. It doesn't matter where or when you first learned C++. Before you take another step, use this book as your guide to make sure you've got it right! This book is for you if You're no "dummy," and you need to get quickly up to speed in intermediate to advanced C++ You've had some experience in C++ programming, but reading intermediate and advanced C++ books is slow-going You've had an introductory C++ course, but you've found that you still can't follow your colleagues when they're describing their C++ designs and code You're an experienced C or Java programmer, but you don't yet have the experience to develop nuanced C++ code and designs You're a C++ expert, and you're looking for an alternative to answering the same questions from

your less-experienced colleagues over and over again C++ Common Knowledge covers essential but commonly misunderstood topics in C++ programming and design while filtering out needless complexity in the discussion of each topic. What remains is a clear distillation of the essentials required for production C++ programming, presented in the author's trademark incisive, engaging style.

Learning C++ Functional Programming

C++ Common Knowledge

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