C Concurrency In Action

Thank you for downloading **c concurrency in action**. As you may know, people have search hundreds times for their chosen novels like this c concurrency in action, but end up in infectious downloads.
Rather than reading a good book with a cup of tea in the afternoon, instead they juggled with some infectious virus inside their computer.

c concurrency in action is available in our book collection an online access to it is set as public so you can get it instantly.
Our book servers saves in multiple countries, allowing you to get the most less latency time to download any of our books like this one.
Kindly say, the c concurrency in action is universally compatible with any devices to read

C++ Templates - David Vandevoorde 2017-09-15
Templates are among the most powerful features of C++, but they remain misunderstood and underutilized, even as the C++ language and development community have advanced. In C++ Templates, Second Edition, three pioneering C++ experts show why, when, and how to use modern templates to build software that’s cleaner, faster, more efficient, and easier to maintain. Now extensively updated for the C++11, C++14, and C++17 standards, this new edition presents state-of-the-art techniques for a wider spectrum of applications. The authors provide authoritative explanations of all new language features that either improve templates or interact with them, including variadic templates, generic lambdas, class template argument deduction, compile-time if, forwarding references, and user-defined literals. They also deeply delve into fundamental language concepts (like value categories) and fully cover all standard type traits. The book starts with an insightful tutorial on basic concepts and relevant language features. The remainder of the book serves as a comprehensive reference, focusing first on language details and then on coding techniques, advanced applications, and sophisticated idioms. Throughout, examples clearly illustrate abstract concepts and demonstrate best practices for exploiting all that C++ templates can do. Understand exactly how templates behave, and avoid common pitfalls Use templates to write more efficient, flexible, and maintainable software Master today’s most effective idioms and techniques Reuse source code without compromising performance or safety Benefit from utilities for generic programming in the C++ Standard Library Preview the upcoming concepts feature The companion website, tmplbook.com, contains sample code and additional updates.
C++ High Performance - Björn Andrist 2020-12-30
A comprehensive guide to help aspiring and professional C++ developers elevate the performance of their apps by allowing them to run faster and consume fewer resources Key FeaturesUpdated to C++20 with completely revised code and more content on error handling, benchmarking, memory allocators, and concurrent programmingExplore the latest C++20 features including concepts, ranges, and coroutinesUtilize C++ constructs and techniques to carry out effective data structure optimization and memory managementBook Description C++ High Performance, Second Edition guides you through optimizing the performance of your C++ apps. This allows them to run faster and consume fewer resources on the device they're running on without compromising the readability of your codebase. The book begins by introducing the C++ language and some of its modern concepts in brief. Once you are familiar with the fundamentals, you will be ready to measure, identify, and eradicate bottlenecks in your C++ codebase. By following this process, you will gradually improve your style of writing code. The book then explores data structure optimization, memory management, and how it can be used efficiently concerning CPU caches. After laying the foundation, the book trains you to leverage algorithms, ranges, and containers from the standard library to achieve faster execution, write readable code, and use customized iterators. It provides hands-on examples of C++ metaprogramming, coroutines, reflection to reduce boilerplate code, proxy objects to perform optimizations under the hood, concurrent programming, and lock-free data structures. The book concludes with an overview of parallel algorithms. By the end of this book, you will have the ability to use every tool as needed to boost the efficiency of your C++ projects. What you will learnWrite specialized data structures for performance-critical codeUse modern metaprogramming techniques to reduce runtime calculationsAchieve efficient memory management using custom memory allocatorsReduce boilerplate code using reflection techniquesReap the benefits of lock-free concurrent programmingGain insights into subtle optimizations used by standard library algorithmsCompose algorithms using ranges libraryDevelop the ability to apply metaprogramming aspects such as constexpr, constraints, and conceptsImplement lazy generators and asynchronous tasks using C++20 coroutinesWho this book is for If you're a C++ developer looking to improve the efficiency of your code or just keen to upgrade your skills to the next level, this book is for you.
Concurrency in C# Cookbook - Stephen Cleary 2014-05-15
If you're one of the many developers uncertain about concurrent and multithreaded development, this practical cookbook will change your mind. With more than 75 code-rich recipes, author Stephen Cleary demonstrates parallel processing and asynchronous programming techniques, using libraries and language features in .NET 4.5 and C# 5.0. Concurrency is becoming more common in responsive and scalable application development, but it’s been extremely difficult to code. The detailed solutions in this cookbook show you how modern tools raise the level of abstraction, making concurrency much easier than before. Complete with ready-to-use code and discussions about how and why the solution works, you get recipes for using: async and await for asynchronous operations Parallel programming with the Task Parallel Library The TPL Dataflow library for creating dataflow pipelines Capabilities that Reactive Extensions build on top of LINQ Unit testing with concurrent code Interop scenarios for combining concurrent approaches Immutable, threadsafe, and producer/consumer collections Cancellation support in your concurrent code Asynchronous-friendly Object-Oriented Programming Thread synchronization for accessing data
Clojure in Action - Amit Rathore 2015-12-16
Summary A fully revised edition that covers the new features available in Clojure 1.6. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Clojure is a modern Lisp for the JVM. It has the strengths you expect: first-class functions, macros, and Lisp's clean programming style. It supports functional programming, making it ideal for concurrent programming and for creating domain-specific languages. Clojure lets you solve harder problems, make faster changes, and end up with a smaller code base. It's no wonder that there are so many Clojure success stories. About the Book Clojure in Action, Second Edition is an expanded and improved version that's been updated to cover the new features of Clojure 1.6. The book gives you a rapid introduction to the Clojure language, moving from abstract theory to practical examples. You'll start by learning how to use Clojure as a general-purpose language. Next, you'll explore Clojure's efficient concurrency model, based on the database concept of Software Transactional Memory (STM). You'll gain a new level of productivity through Clojure DSLs that can run on the JVM. Along the way, you'll learn countless tips, tricks, and techniques for writing smaller, safer, and faster code. What's Inside Functional programming basics Metaprogramming with Clojure's macros Interoperating with Java Covers Clojure 1.6 About the Reader Assumes readers are familiar with a programming language like C, Java, Ruby, or Python. Table of Contents Introducing Clojure Clojure elements: Data structures and functions Building blocks of Clojure Multimethod polymorphism Exploring Clojure and Java interop State and the concurrent world Evolving Clojure through macros More on functional programming Protocols, records, and types Test-driven development and more More macros and DSL
Mastering C++ Multithreading - Maya Posch 2017-07-28
Master multithreading and concurrent processing with C++ About This Book Delve into the fundamentals of multithreading and concurrency and find out how to implement them Explore atomic operations to optimize code performance Apply concurrency to both distributed computing and GPGPU processing Who This Book Is For This book is for intermediate C++ developers who wish to extend their knowledge of multithreading and concurrent processing. You should have basic experience with multithreading and be comfortable using C++ development toolchains on the command line. What You Will Learn Deep dive into the details of

the how various operating systems currently implement multithreading Choose the best multithreading APIs when designing a new application Explore the use of mutexes, spin-locks, and other synchronization concepts and see how to safely pass data between threads Understand the level of API support provided by various C++ toolchains Resolve common issues in multithreaded code and recognize common pitfalls using tools such as Memcheck, CacheGrind, DRD, Helgrind, and more Discover the nature of atomic operations and understand how they can be useful in optimizing code Implement a multithreaded application in a distributed computing environment Design a C++-based GPGPU application that employs multithreading In Detail Multithreaded applications execute multiple threads in a single processor environment, allowing developers achieve concurrency. This book will teach you the finer points of multithreading and concurrency concepts and how to apply them efficiently in C++. Divided into three modules, we start with a brief introduction to the fundamentals of multithreading and concurrency concepts. We then take an in-depth look at how these concepts work at the hardware-level as well as how both operating systems and frameworks use these low-level functions. In the next module, you will learn about the native multithreading and concurrency support available in C++ since the 2011 revision, synchronization and communication between threads, debugging concurrent C++ applications, and the best programming practices in C++. In the final module, you will learn about atomic operations before moving on to apply concurrency to distributed and GPGPU-based processing. The comprehensive coverage of essential multithreading concepts means you will be able to efficiently apply multithreading concepts while coding in C++. Style and approach This book is filled with examples that will help you become a master at writing robust concurrent and parallel applications in C++.

Rust in Action - Tim McNamara 2021-09-07

"This well-written book will help you make the most of what Rust has to offer." - Ramnivas Laddad, author of AspectJ in Action Rust in Action is a hands-on guide to systems programming with Rust. Written for inquisitive programmers, it presents real-world use cases that go far beyond syntax and structure. Summary Rust in Action introduces the Rust programming language by exploring numerous systems programming concepts and techniques. You'll be learning Rust by delving into how computers work under the hood. You'll find yourself playing with persistent storage, memory, networking and even tinkering with CPU instructions. The book takes you through using Rust to extend other applications and teaches you tricks to write blindingly fast code. You'll also discover parallel and concurrent programming. Filled to the brim with real-life use cases and scenarios, you'll go beyond the Rust syntax and see what Rust has to offer in real-world use cases. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Rust is the perfect language for systems programming. It delivers the low-level power of C along with rock-solid safety features that let you code fearlessly. Ideal for applications requiring concurrency, Rust programs are compact, readable, and blazingly fast. Best of all, Rust’s famously smart compiler helps you avoid even subtle coding errors. About the book Rust in Action is a hands-on guide to systems programming with Rust. Written for inquisitive programmers, it presents real-world use cases that go far beyond syntax and structure. You’ll explore Rust implementations for file manipulation, networking, and kernel-level programming and discover awesome techniques for parallelism and concurrency. Along the way, you’ll master Rust’s unique borrow checker model for memory management without a garbage collector. What's inside Elementary to advanced Rust programming Practical examples from systems programming Command-line, graphical and networked applications About the reader For intermediate programmers. No previous experience with Rust required. About the author Tim McNamara uses Rust to build data processing pipelines and generative art. He is an expert in natural language processing and data engineering. Table of Contents 1 Introducing Rust PART 1 RUST LANGUAGE DISTINCTIVES 2 Language foundations 3 Compound data types 4 Lifetimes, ownership, and borrowing PART 2 DEMYSTIFYING SYSTEMS PROGRAMMING 5 Data in depth 6 Memory 7 Files and storage 8 Networking 9 Time and timekeeping 10 Processes, threads, and containers 11 Kernel 12 Signals, interrupts, and exceptions

Large-Scale C++ Volume I - John Lakos 2019-12-02

Writing reliable and maintainable C++ software is hard. Designing such software at scale adds a new set of challenges. Creating large-scale systems requires a practical understanding of logical design – beyond the theoretical concepts addressed in most popular texts. To be successful on an enterprise scale, developers must also address physical design, a dimension of software engineering that may be unfamiliar even to expert developers. Drawing on over 30 years of hands-on experience building massive, mission-critical enterprise systems, John Lakos shows how to create and grow Software Capital. This groundbreaking volume lays the foundation for projects of all sizes and demonstrates the processes, methods, techniques, and tools needed for successful real-world, large-scale development. Up to date and with a solid engineering focus, Large-Scale C++, Volume I: Process and Architecture, demonstrates fundamental design concepts with concrete examples. Professional developers of all experience levels will gain insights that transform their approach to design and development by understanding how to Raise productivity by leveraging differences between infrastructure and application development Achieve exponential productivity gains through feedback and hierarchical reuse Embrace the component’s role as the fundamental unit of both logical and physical design Analyze how fundamental properties of compiling and linking affect component design Discover effective partitioning of logical content in appropriately sized physical aggregates Internalize the important differences among sufficient, complete, minimal, and primitive software Deliver solutions that simultaneously optimize encapsulation, stability, and performance Exploit the nine established levelization techniques to avoid cyclic physical dependencies Use lateral designs judiciously to avoid the “heaviness” of conventional layered architectures Employ appropriate architectural insulation techniques for eliminating compile-time coupling Master the multidimensional process of designing large systems using component-based methods This is the first of John Lakos’s three authoritative volumes on developing large-scale systems using C++. This book, written for fellow software practitioners, uses familiar C++ constructs to solve real-world problems while identifying (and motivating) modern C++ alternatives. Together with the forthcoming Volume II: Design and Implementation and Volume III: Verification and Testing, Large-Scale C++ offers comprehensive guidance for all aspects of large-scale C++ software development. If you are an architect or project leader, this book will empower you to solve critically important problems right now – and serve as your go-to reference for years to come. Register your book for convenient access to downloads, updates, and/or corrections as they become available. See inside book for details.

C++ Concurrency in Action - Anthony Williams 2012

With the new C++ Standard and Technical Report 2 (TR2), multi-threading is coming to C++ in a big way. TR2 will provide higher-level synchronization facilities that allow for a much greater level of abstraction, and make programming multi-threaded applications simpler and safer. Concurrent programming is required if programmers are to take advantage of the multi-core microprocessors increasingly available from Intel and others. The new standard for C++ has extensions to the language that make concurrent programming more accessible to regular developers. As a guide and reference to the new concurrency features in the upcoming C++ Standard and TR2, this book is invaluable for existing programmers familiar with writing multi-threaded code in C++ using platform-specific APIs, or in other languages, as well as C++ programmers who have never written multithreaded code before.

Modern C++ Design - Debbie Debbie Lafferty 2001

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.

C++ Reactive Programming - Praseed Pai 2018-06-29

Learn how to implement the reactive programming paradigm with C++ and build asynchronous and concurrent applications Key Features Efficiently exploit concurrency and parallelism in your programs Use the Functional Reactive programming model to structure programs Understand reactive GUI programming to make your own applications using Qt Book Description Reactive programming is an effective way to build highly responsive applications with an easy-to-maintain code base. This book covers the essential functional reactive concepts that will help you build highly concurrent, event-driven, and asynchronous applications in a simpler and less error-prone way. C++ Reactive Programming begins with a discussion on how event processing was undertaken by different programming systems earlier. After a brisk introduction to modern C++ (C++17), you’ll be taken through language-level concurrency and the lock-free programming model to set the stage for our foray into the Functional Programming model. Following this, you’ll

be introduced to RxCpp and its programming model. You'll be able to gain deep insights into the RxCpp library, which facilitates reactive programming. You'll learn how to deal with reactive programming using Qt/C++ (for the desktop) and C++ microservices for the Web. By the end of the book, you will be well versed with advanced reactive programming concepts in modern C++ (C++17). What you will learn Understand language-level concurrency in C++ Explore advanced C++ programming for the FRP Uncover the RxCpp library and its programming model Mix the FP and OOP constructs in C++ 17 to write well-structured programs Master reactive microservices in C++ Create custom operators for RxCpp Learn advanced stream processing and error handling Who this book is for If you're a C++ developer interested in using reactive programming to build asynchronous and concurrent applications, you'll find this book extremely useful. This book doesn't assume any previous knowledge of reactive programming.

Programming Concurrency on the JVM - Venkat Subramaniam 2011-08-26

More than ever, learning to program concurrency is critical to creating faster, responsive applications. Speedy and affordable multicore hardware is driving the demand for high-performing applications, and you can leverage the Java platform to bring these applications to life. Concurrency on the Java platform has evolved, from the synchronization model of JDK to software transactional memory (STM) and actor-based concurrency. This book is the first to show you all these concurrency styles so you can compare and choose what works best for your applications. You'll learn the benefits of each of these models, when and how to use them, and what their limitations are. Through hands-on exercises, you'll learn how to avoid shared mutable state and how to write good, elegant, explicit synchronization-free programs so you can create easy and safe concurrent applications. The techniques you learn in this book will take you from dreading concurrency to mastering and enjoying it. Best of all, you can work with Java or a JVM language of your choice - Clojure, JRuby, Groovy, or Scala - to reap the growing power of multicore hardware. If you are a Java programmer, you'd need JDK 1.5 or later and the Akka 1.0 library. In addition, if you program in Scala, Clojure, Groovy or JRuby you'd need the latest version of your preferred language. Groovy programmers will also need GPars.

Java Threads - Scott Oaks 1999

Explains how to use Java's portable platforms to program and use threads effectively and efficiently while avoiding common mistakes

The Rust Programming Language (Covers Rust 2018) - Steve Klabnik 2019-09-03

The official book on the Rust programming language, written by the Rust development team at the Mozilla Foundation, fully updated for Rust 2018. The Rust Programming Language is the official book on Rust: an open source systems programming language that helps you write faster, more reliable software. Rust offers control over low-level details (such as memory usage) in combination with high-level ergonomics, eliminating the hassle traditionally associated with low-level languages. The authors of The Rust Programming Language, members of the Rust Core Team, share their knowledge and experience to show you how to take full advantage of Rust's features--from installation to creating robust and scalable programs. You'll begin with basics like creating functions, choosing data types, and binding variables and then move on to more advanced concepts, such as: • Ownership and borrowing, lifetimes, and traits • Using Rust's memory safety guarantees to build fast, safe programs • Testing, error handling, and effective refactoring • Generics, smart pointers, multithreading, trait objects, and advanced pattern matching • Using Cargo, Rust's built-in package manager, to build, test, and document your code and manage dependencies • How best to use Rust's advanced compiler with compiler-led programming techniques You'll find plenty of code examples throughout the book, as well as three chapters dedicated to building complete projects to test your learning: a number guessing game, a Rust implementation of a command line tool, and a multithreaded server. New to this edition: An extended section on Rust macros, an expanded chapter on modules, and appendixes on Rust development tools and editions.

Concurrency in .NET - Riccardo Terrell 2018-06-05

Summary Concurrency in .NET teaches you how to build concurrent and scalable programs in .NET using the functional paradigm. This intermediate-level guide is aimed at developers, architects, and passionate computer programmers who are interested in writing code with improved speed and effectiveness by adopting a declarative and pain-free programming style. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Unlock the incredible performance built into your multi-processor machines. Concurrent applications run faster because they spread work across processor cores, performing several tasks at the same time. Modern tools and techniques on the .NET platform, including parallel LINQ, functional programming, asynchronous programming, and the Task Parallel Library, offer powerful alternatives to traditional thread-based concurrency. About the Book Concurrency in .NET teaches you to write code that delivers the speed you need for performance-sensitive applications. Featuring examples in both C# and F#, this book guides you through concurrent and parallel designs that emphasize functional programming in theory and practice. You'll start with the foundations of concurrency and master essential techniques and design practices to optimize code running on modern multiprocessor systems. What's Inside The most important concurrency abstractions Employing the agent programming model Implementing real-time event-stream processing Executing unbounded asynchronous operations Best concurrent practices and patterns that apply to all platforms About the Reader For readers skilled with C# or F#. About the Book Riccardo Terrell is a seasoned software engineer and Microsoft MVP who is passionate about functional programming. He has over 20 years' experience delivering cost-effective technology solutions in a competitive business environment. Table of Contents PART 1 - Benefits of functional programming applicable to concurrent programs Functional concurrency foundations Functional programming techniques for concurrency Functional data structures and immutability PART 2 - How to approach the different parts of a concurrent program The basics of processing big data: data parallelism, part 1 PLINQ and MapReduce: data parallelism, part 2 Real-time event streams: functional reactive programming Task-based functional parallelism Task asynchronicity for the win Asynchronous functional programming in F# Functional combinators for fluent concurrent programming Applying reactive programming everywhere with agents Parallel workflow and agent programming with TPL Dataflow PART 3 - Modern patterns of concurrent programming applied Recipes and design patterns for successful concurrent programming Building a scalable mobile app with concurrent functional programming

Erlang and OTP in Action - Eric Merritt 2010-11-15

Concurrent programming has become a required discipline for all programmers. Multi-core processors and the increasing demand for maximum performance and scalability in mission-critical applications have renewed interest in functional languages like Erlang that are designed to handle concurrent programming. Erlang, and the OTP platform, make it possible to deliver more robust applications that satisfy rigorous uptime and performance requirements. Erlang and OTP in Action teaches you to apply Erlang's message passing model for concurrent programming--a completely different way of tackling the problem of parallel programming from the more common multi-threaded approach. This book walks you through the practical considerations and steps of building systems in Erlang and integrating them with real-world C/C++, Java, and .NET applications. Unlike other books on the market, Erlang and OTP in Action offers a comprehensive view of how concurrency relates to SOA and web technologies. This hands-on guide is perfect for readers just learning Erlang or for those who want to apply their theoretical knowledge of this powerful language. You'll delve into the Erlang language and OTP runtime by building several progressively more interesting real-world distributed applications. Once you are competent in the fundamentals of Erlang, the book takes you on a deep dive into the process of designing complex software systems in Erlang. Purchase of the print book comes with an offer of a free PDF, ePub, and Kindle eBook from Manning. Also available is all code from the book.

Functional Programming in C++ - Ivan Cukic 2018-11-09

Summary Functional Programming in C++ teaches developers the practical side of functional programming and the tools that C++ provides to develop software in the functional style. This in-depth guide is full of useful diagrams that help you understand FP concepts and begin to think functionally. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Well-written code is easier to test and reuse, simpler to parallelize, and less error prone. Mastering the functional style of programming can help you tackle the demands of modern apps and will lead to simpler expression of complex program logic, graceful error handling, and elegant concurrency. C++ supports FP with templates, lambdas, and other core language features, along with many parts of the STL. About the Book Functional Programming in C++ helps you unleash the functional side of your brain, as you gain a powerful new perspective

on C++ coding. You'll discover dozens of examples, diagrams, and illustrations that break down the functional concepts you can apply in C++, including lazy evaluation, function objects and invokables, algebraic data types, and more. As you read, you'll match FP techniques with practical scenarios where they offer the most benefit. What's inside Writing safer code with no performance penalties Explicitly handling errors through the type system Extending C++ with new control structures Composing tasks with DSLs About the Reader Written for developers with two or more years of experience coding in C++. About the Author Ivan Čukić is a core developer at KDE and has been coding in C++ since 1998. He teaches modern C++ and functional programming at the Faculty of Mathematics at the University of Belgrade. Table of Contents Introduction to functional programming Getting started with functional programming Function objects Creating new functions from the old ones Purity: Avoiding mutable state Lazy evaluation Ranges Functional data structures Algebraic data types and pattern matching Monads Template metaprogramming Functional design for concurrent systems Testing and debugging

Delphi in a Nutshell - Ray Lischner 2000-03-16

"The bulk of the book is a complete ordered reference to the Delphi language set. Each reference item includes: the syntax, using standard code conventions; a description; a list of arguments, if any, accepted by the function or procedure; tips and tricks of usage - practical information on using the language feature in real programs; a brief example; and a cross-reference to related keywords."--Jacket.

The Art of Concurrency - Clay Breshears 2009-05-07

If you're looking to take full advantage of multi-core processors with concurrent programming, this practical book provides the knowledge and hands-on experience you need. The Art of Concurrency is one of the few resources to focus on implementing algorithms in the shared-memory model of multi-core processors, rather than just theoretical models or distributed-memory architectures. The book provides detailed explanations and usable samples to help you transform algorithms from serial to parallel code, along with advice and analysis for avoiding mistakes that programmers typically make when first attempting these computations. Written by an Intel engineer with over two decades of parallel and concurrent programming experience, this book will help you: Understand parallelism and concurrency Explore differences between programming for shared-memory and distributed-memory Learn guidelines for designing multithreaded applications, including testing and tuning Discover how to make best use of different threading libraries, including Windows threads, POSIX threads, OpenMP, and Intel Threading Building Blocks Explore how to implement concurrent algorithms that involve sorting, searching, graphs, and other practical computations The Art of Concurrency shows you how to keep algorithms scalable to take advantage of new processors with even more cores. For developing parallel code algorithms for concurrent programming, this book is a must.

Concurrent Programming in Java - Douglas Lea 2000

Software -- Programming Languages.

Elements of Programming - Alexander Stepanov 2019-06-27

Elements of Programming provides a different understanding of programming than is presented elsewhere. Its major premise is that practical programming, like other areas of science and engineering, must be based on a solid mathematical foundation. The book shows that algorithms implemented in a real programming language, such as C++, can operate in the most general mathematical setting. For example, the fast exponentiation algorithm is defined to work with any associative operation. Using abstract algorithms leads to efficient, reliable, secure, and economical software.

Extreme C - Kamran Amini 2019-10-31

Push the limits of what C - and you - can do, with this high-intensity guide to the most advanced capabilities of C Key FeaturesMake the most of C’s low-level control, flexibility, and high performanceA comprehensive guide to C’s most powerful and challenging featuresA thought-provoking guide packed with hands-on exercises and examplesBook Description There’s a lot more to C than knowing the language syntax. The industry looks for developers with a rigorous, scientific understanding of the principles and practices. Extreme C will teach you to use C’s advanced low-level power to write effective, efficient systems. This intensive, practical guide will help you become an expert C programmer. Building on your existing C knowledge, you will master preprocessor directives, macros, conditional compilation, pointers, and much more. You will gain new insight into algorithm design, functions, and structures. You will discover how C helps you squeeze maximum performance out of critical, resource-constrained applications. C still plays a critical role in 21st-century programming, remaining the core language for precision engineering, aviations, space research, and more. This book shows how C works with Unix, how to implement OO principles in C, and fully covers multi-processing. In Extreme C, Amini encourages you to think, question, apply, and experiment for yourself. The book is essential for anybody who wants to take their C to the next level. What you will learnBuild advanced C knowledge on strong foundations, rooted in first principlesUnderstand memory structures and compilation pipeline and how they work, and how to make most out of themApply object-oriented design principles to your procedural C codeWrite low-level code that’s close to the hardware and squeezes maximum performance out of a computer systemMaster concurrency, multithreading, multi-processing, and integration with other languagesUnit Testing and debugging, build systems, and inter-process communication for C programmingWho this book is for Extreme C is for C programmers who want to dig deep into the language and its capabilities. It will help you make the most of the low-level control C gives you.

Scala in Action - Nilanjan Raychaudhuri 2013-04-08

Summary Scala in Action is a comprehensive tutorial that introduces Scala through clear explanations and numerous hands-on examples. Because Scala is a rich and deep language, it can be daunting to absorb all the new concepts at once. This book takes a "how-to" approach, explaining language concepts as you explore familiar programming challenges that you face in your day-to-day work. About the Technology Scala runs on the JVM and combines object-orientation with functional programming. It's designed to produce succinct, type-safe code, which is crucial for enterprise applications. Scala implements Actor-based concurrency through the amazing Akka framework, so you can avoid Java's messy threading while interacting seamlessly with Java. About this Book Scala in Action is a comprehensive tutorial that introduces the language through clear explanations and numerous hands-on examples. It takes a "how to" approach, explaining language concepts as you explore familiar programming tasks. You'll tackle concurrent programming in Akka, learn to work with Scala and Spring, and learn how to build DSLs and other productivity tools. You'll learn both the language and how to use it. Experience with Java is helpful but not required. Ruby and Python programmers will also find this book accessible. What's Inside A Scala tutorial How to use Java and Scala open source libraries How to use SBT Test-driven development Debugging Updated for Scala 2.10 Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Author Nilanjan Raychaudhuri is a skilled developer, speaker, and an avid polyglot programmer who works with Scala on production systems. Table of Contents PART 1 SCALA: THE BASICS Why Scala? Getting started OOP in Scala Having fun with functional data structures Functional programming PART 2 WORKING WITH SCALA Building web applications in functional style Connecting to a database Building scalable and extensible components Concurrency programming in Scala Building confidence with testing PART 3 ADVANCED STEPS Interoperability between Scala and Java Scalable and distributed applications using Akka

The Art of Multiprocessor Programming, Revised Reprint - Maurice Herlihy 2012-06-25

Revised and updated with improvements conceived in parallel programming courses, The Art of Multiprocessor Programming is an authoritative guide to multicore programming. It introduces a higher level set of software development skills than that needed for efficient single-core programming. This book provides comprehensive coverage of the new principles, algorithms, and tools necessary for effective multiprocessor programming. Students and professionals alike will benefit from thorough coverage of key multiprocessor programming issues. This revised edition incorporates much-demanded updates throughout the book, based on feedback and corrections reported from classrooms since 2008 Learn the fundamentals of programming multiple threads accessing shared memory Explore mainstream concurrent data structures and the key elements of their design, as well as synchronization techniques from simple locks to transactional memory systems Visit the companion site and download source code, example Java programs, and materials to support and enhance the learning experience

Hands-On Concurrency with Rust - Brian L. Troutwine 2018-05-31

Get to grips with modern software demands by learning the effective uses of Rust's powerful memory safety. Key Features Learn and improve

the sequential performance characteristics of your software Understand the use of operating system processes in a high-scale concurrent system Learn of the various coordination methods available in the Standard library Book Description Most programming languages can really complicate things, especially with regard to unsafe memory access. The burden on you, the programmer, lies across two domains: understanding the modern machine and your language's pain-points. This book will teach you to how to manage program performance on modern machines and build fast, memory-safe, and concurrent software in Rust. It starts with the fundamentals of Rust and discusses machine architecture concepts. You will be taken through ways to measure and improve the performance of Rust code systematically and how to write collections with confidence. You will learn about the Sync and Send traits applied to threads, and coordinate thread execution with locks, atomic primitives, data-parallelism, and more. The book will show you how to efficiently embed Rust in C++ code and explore the functionalities of various crates for multithreaded applications. It explores implementations in depth. You will know how a mutex works and build several yourself. You will master radically different approaches that exist in the ecosystem for structuring and managing high-scale systems. By the end of the book, you will feel comfortable with designing safe, consistent, parallel, and high-performance applications in Rust. What you will learn Probe your programs for performance and accuracy issues Create your own threading and multi-processing environment in Rust Use coarse locks from Rust’s Standard library Solve common synchronization problems or avoid synchronization using atomic programming Build lock-free/wait-free structures in Rust and understand their implementations in the crates ecosystem Leverage Rust’s memory model and type system to build safety properties into your parallel programs Understand the new features of the Rust programming language to ease the writing of parallel programs Who this book is for This book is aimed at software engineers with a basic understanding of Rust who want to exploit the parallel and concurrent nature of modern computing environments, safely.

Modern Multithreading - Richard H. Carver 2005-11-28

Master the essentials of concurrent programming,including testingand debugging This textbook examines languages and libraries for multithreadedprogramming. Readers learn how to create threads in Java and C++,and develop essential concurrent programming and problem-solvingskills. Moreover, the textbook sets itself apart from othercomparable works by helping readers to become proficient in keytesting and debugging techniques. Among the topics covered, readersare introduced to the relevant aspects of Java, the POSIX Pthreadslibrary, and the Windows Win32 Applications ProgrammingInterface. The authors have developed and fine-tuned this book through theconcurrent programming courses they have taught for the past twentyyears. The material, which emphasizes practical tools andtechniques to solve concurrent programming problems, includesoriginal results from the authors' research. Chaptersinclude: * Introduction to concurrent programming * The critical section problem * Semaphores and locks * Monitors * Message-passing * Message-passing in distributed programs * Testing and debugging concurrent programs As an aid to both students and instructors, class libraries havebeen implemented to provide working examples of all the materialthat is covered. These libraries and the testing techniques theysupport can be used to assess student-written programs. Each chapter includes exercises that build skills in programwriting and help ensure that readers have mastered the chapter'skey concepts. The source code for all the listings in the text andfor the synchronization libraries is also provided, as well asstartup files and test cases for the exercises. This textbook is designed for upper-level undergraduates andgraduate students in computer science. With its abundance ofpractical material and inclusion of working code, coupled with anemphasis on testing and debugging, it is also a highly usefulreference for practicing programmers.

WebAssembly in Action - Gerard Gallant 2019-11-06

"Atwood's Law" is driven by the idea that all applications will ultimately wind up on the web and therefore must be written in JavaScript. WebAssembly may be your way out! With WebAssembly, you can write in nearly any modern language and run your code in the browser through a memory-safe, sandboxed execution environment that can be embedded in a web browser and other platforms. Getting set up and moving with WebAssembly requires you to modify your web dev process; WebAssembly in Action will get you started quickly and guide you through real-world examples and detailed diagrams that help you create, run, and debug WebAssembly modules. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications.

Effective Modern C++ - Scott Meyers 2014-11-11

Coming to grips with C++11 and C++14 is more than a matter of familiarizing yourself with the features they introduce (e.g., auto type declarations, move semantics, lambda expressions, and concurrency support). The challenge is learning to use those features effectively—so that your software is correct, efficient, maintainable, and portable. That’s where this practical book comes in. It describes how to write truly great software using C++11 and C++14—i.e. using modern C++. Topics include: The pros and cons of braced initialization, noexcept specifications, perfect forwarding, and smart pointer make functions The relationships among std::move, std::forward, rvalue references, and universal references Techniques for writing clear, correct, effective lambda expressions How std::atomic differs from volatile, how each should be used, and how they relate to C++'s concurrency API How best practices in "old" C++ programming (i.e., C++98) require revision for software development in modern C++ Effective Modern C++ follows the proven guideline-based, example-driven format of Scott Meyers' earlier books, but covers entirely new material. "After I learned the C++ basics, I then learned how to use C++ in production code from Meyer's series of Effective C++ books. Effective Modern C++ is the most important how-to book for advice on key guidelines, styles, and idioms to use modern C++ effectively and well. Don't own it yet? Buy this one. Now". -- Herb Sutter, Chair of ISO C++ Standards Committee and C++ Software Architect at Microsoft

Java Concurrency in Practice - Tim Peierls 2006-05-09

Threads are a fundamental part of the Java platform. As multicore processors become the norm, using concurrency effectively becomes essential for building high-performance applications. Java SE 5 and 6 are a huge step forward for the development of concurrent applications, with improvements to the Java Virtual Machine to support high-performance, highly scalable concurrent classes and a rich set of new concurrency building blocks. In Java Concurrency in Practice , the creators of these new facilities explain not only how they work and how to use them, but also the motivation and design patterns behind them. However, developing, testing, and debugging multithreaded programs can still be very difficult; it is all too easy to create concurrent programs that appear to work, but fail when it matters most: in production, under heavy load. Java Concurrency in Practice arms readers with both the theoretical underpinnings and concrete techniques for building reliable, scalable, maintainable concurrent applications. Rather than simply offering an inventory of concurrency APIs and mechanisms, it provides design rules, patterns, and mental models that make it easier to build concurrent programs that are both correct and performant. This book covers: Basic concepts of concurrency and thread safety Techniques for building and composing thread-safe classes Using the concurrency building blocks in java.util.concurrent Performance optimization dos and don'ts Testing concurrent programs Advanced topics such as atomic variables, nonblocking algorithms, and the Java Memory Model

Pro TBB - Michael Voss 2019-07-09

This open access book is a modern guide for all C++ programmers to learn Threading Building Blocks (TBB). Written by TBB and parallel programming experts, this book reflects their collective decades of experience in developing and teaching parallel programming with TBB, offering their insights in an approachable manner. Throughout the book the authors present numerous examples and best practices to help you become an effective TBB programmer and leverage the power of parallel systems. Pro TBB starts with the basics, explaining parallel algorithms and C++'s built-in standard template library for parallelism. You'll learn the key concepts of managing memory, working with data structures and how to handle typical issues with synchronization. Later chapters apply these ideas to complex systems to explain performance tradeoffs, mapping common parallel patterns, controlling threads and overhead, and extending TBB to program heterogeneous systems or system-on-chips. What You'll Learn Use Threading Building Blocks to produce code that is portable, simple, scalable, and more understandableReview best practices for parallelizing computationally intensive tasks in your applications Integrate TBB with other threading packages Create scalable, high performance data-parallel programs Work with generic programming to write efficient algorithms Who This Book Is For C++ programmers learning to run applications on multicore systems, as well as C or C++ programmers without much experience with templates. No previous experience with parallel programming or multicore processors

is required.
C++ Concurrency in Action - Anthony Williams 2019
C++ Concurrency in Action, Second Edition is the definitive guide to writing elegant multithreaded applications in C++. Updated for C++ 17, it carefully addresses every aspect of concurrent development, from starting new threads to designing fully functional multithreaded algorithms and data structures. Concurrency master Anthony Williams presents examples and practical tasks in every chapter, including insights that will delight even the most experienced developer. -- Provided by publisher.
Clojure Programming - Chas Emerick 2012-03-30
Clojure is a practical, general-purpose language that offers expressivity rivaling other dynamic languages like Ruby and Python, while seamlessly taking advantage of Java libraries, services, and all of the resources of the JVM ecosystem. This book helps you learn the fundamentals of Clojure with examples relating it to the languages you know already, in the domains and topics you work with every day. See how this JVM language can help eliminate unnecessary complexity from your programming practice and open up new options for solving the most challenging problems. Clojure Programming demonstrates the language's flexibility by showing how it can be used for common tasks like web programming and working with databases, up through more demanding applications that require safe, effective concurrency and parallelism, data analysis, and more. This in-depth look helps tie together the full Clojure development experience, from how to organize your project and an introduction to Clojure build tooling, to a tutorial on how to make the most of Clojure's REPL during development, and how to deploy your finished application in a cloud environment. Learn how to use Clojure while leveraging your investment in the Java platform Understand the advantages of Clojure as an efficient Lisp for the JVM See how Clojure is used today in several practical domains Discover how Clojure eliminates the need for many verbose and complicated design patterns Deploy large or small web applications to the cloud with Clojure
Programming Erlang - Joe Armstrong 2013-09-23
A multi-user game, web site, cloud application, or networked database can have thousands of users all interacting at the same time. You need a powerful, industrial-strength tool to handle the really hard problems inherent in parallel, concurrent environments. You need Erlang. In this second edition of the bestselling Programming Erlang, you'll learn how to write parallel programs that scale effortlessly on multicore systems. Using Erlang, you'll be surprised at how easy it becomes to deal with parallel problems, and how much faster and more efficiently your programs run. That's because Erlang uses sets of parallel processes-not a single sequential process, as found in most programming languages. Joe Armstrong, creator of Erlang, introduces this powerful language in small steps, giving you a complete overview of Erlang and how to use it in common scenarios. You'll start with sequential programming, move to parallel programming and handling errors in parallel programs, and learn to work confidently with distributed programming and the standard Erlang/Open Telecom Platform (OTP) frameworks. You need no previous knowledge of functional or parallel programming. The chapters are packed with hands-on, real-world tutorial examples and insider tips and advice, and finish with exercises for both beginning and advanced users. The second edition has been extensively rewritten. New to this edition are seven chapters covering the latest Erlang features: maps, the type system and the Dialyzer, WebSockets, programming idioms, and a new stand-alone execution environment. You'll write programs that dynamically detect and correct errors, and that can be upgraded without stopping the system. There's also coverage of rebar (the de facto Erlang build system), and information on how to share and use Erlang projects on github, illustrated with examples from cowboy and bitcask. Erlang will change your view of the world, and of how you program. What You Need The Erlang/OTP system. Download it from erlang.org.
A Book on C - Al Kelley 1990
The authors provide clear examples and thorough explanations of every feature in the C language. They teach C vis-a-vis the UNIX operating system. A reference and tutorial to the C programming language. Annotation copyrighted by Book News, Inc., Portland, OR
The Boost C++ Libraries - Boris Schäling 2011
The second edition of The Boost C++ Libraries introduces 72 Boost libraries that provide a wide range of useful capabilities. They help you manage memory and process strings more easily. They provide containers and other data structures that go well beyond what the standard library offers. They make it easy to build platform-independent network applications. Simply put, these 72 libraries greatly expand your C++ toolbox. The second edition contains more than 430 examples. All examples are as short as possible, but they are complete, so you can compile and run them as is. They show you what the Boost libraries offer and give you a head start on using the libraries in your own applications. The goal of this book is to increase your efficiency as a C++ developer and to simplify software development with C++. The Boost libraries introduced in this book will help you write less code with fewer bugs and finish projects faster. You code will be more concise and self-explanatory and more easily adapted when requirements change. The second edition is based on the Boost libraries 1.55.0 and 1.56.0 with the latter version having been released in August 2014. The examples are based on C++11 and have been tested with Visual Studio 2013, GCC 4.8 and Clang 3.3 on various platforms. For Boost libraries which were incorporated into the C++11 standard library, differences between Boost and the standard library are highlighted. The Boost libraries are one of the most important and influential open source C++ libraries. Their source code is available under a permissive free software license. Several Boost libraries have been incorporated into the C++11 standard library. The Boost libraries are developed and supported by the Boost community - a worldwide developer community with a strong interest in pushing C++ boundaries further.
Concurrency in Go - Katherine Cox-Buday 2017-07-19
Concurrency can be notoriously difficult to get right, but fortunately, the Go open source programming language makes working with concurrency tractable and even easy. If you're a developer familiar with Go, this practical book demonstrates best practices and patterns to help you incorporate concurrency into your systems. Author Katherine Cox-Buday takes you step-by-step through the process. You'll understand how Go chooses to model concurrency, what issues arise from this model, and how you can compose primitives within this model to solve problems. Learn the skills and tooling you need to confidently write and implement concurrent systems of any size. Understand how Go addresses fundamental problems that make concurrency difficult to do correctly Learn the key differences between concurrency and parallelism Dig into the syntax of Go's memory synchronization primitives Form patterns with these primitives to write maintainable concurrent code Compose patterns into a series of practices that enable you to write large, distributed systems that scale Learn the sophistication behind goroutines and how Go's runtime stitches everything together
Groovy in Action - Cédric Champeau 2015-06-03
Summary Groovy in Action, Second Edition is a thoroughly revised, comprehensive guide to Groovy programming. It introduces Java developers to the dynamic features that Groovy provides, and shows how to apply Groovy to a range of tasks including building new apps, integration with existing code, and DSL development. Covers Groovy 2.4. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology In the last ten years, Groovy has become an integral part of a Java developer's toolbox. Its comfortable, common-sense design, seamless integration with Java, and rich ecosystem that includes the Grails web framework, the Gradle build system, and Spock testing platform have created a large Groovy community About the Book Groovy in Action, Second Edition is the undisputed definitive reference on the Groovy language. Written by core members of the Groovy language team, this book presents Groovy like no other can—from the inside out. With relevant examples, careful explanations of Groovy's key concepts and features, and insightful coverage of how to use Groovy in-production tasks, including building new applications, integration with existing code, and DSL development, this is the only book you'll need. Updated for Groovy 2.4. Some experience with Java or another programming language is helpful. No Groovy experience is assumed. What's Inside Comprehensive coverage of Groovy 2.4 including language features, libraries, and AST transformations Dynamic, static, and extensible typing Concurrency: actors, data parallelism, and dataflow Applying Groovy: Java integration, XML, SQL, testing, and domain-specific language support Hundreds of reusable examples About the Authors Authors Dierk König, Paul King, Guillaume Laforge, Hamlet D'Arcy, Cédric Champeau, Erik Pragt, and Jon Skeet are intimately involved in the creation and ongoing development of the Groovy language and its ecosystem. Table of Contents PART 1 THE GROOVY LANGUAGE Your way to Groovy Overture: Groovy basics Simple Groovy datatypes Collective Groovy datatypes Working with closures Groovy control structures Object orientation, Groovy style Dynamic programming with Groovy Compile-time metaprogramming and AST transformations Groovy as a static language PART 2 AROUND THE GROOVY LIBRARY Working with

builders Working with the GDK Database programming with Groovy Working with XML and JSON Interacting with Web Services Integrating Groovy PART 3 APPLIED GROOVY Unit testing with Groovy Concurrent Groovy with GPars Domain-specific languages The Groovy ecosystem

Go in Action - Erik St. Martin 2015-11-04

Summary Go in Action introduces the Go language, guiding you from inquisitive developer to Go guru. The book begins by introducing the unique features and concepts of Go. Then, you'll get hands-on experience writing real-world applications including websites and network servers, as well as techniques to manipulate and convert data at speeds that will make your friends jealous. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Application development can be tricky enough even when you aren't dealing with complex systems programming problems like web-scale concurrency and real-time performance. While it's possible to solve these common issues with additional tools and frameworks, Go handles them right out of the box, making for a more natural and productive coding experience. Developed at Google, Go powers nimble startups as well as big enterprises—companies that rely on high-performing services in their infrastructure. About the Book Go in Action is for any intermediate-level developer who has experience with other programming languages and wants a jump-start in learning Go or a more thorough understanding of the language and its internals. This book provides an intensive, comprehensive, and idiomatic view of Go. It focuses on the specification and implementation of the language, including topics like language syntax, Go's type system, concurrency, channels, and testing. What's Inside Language specification and implementation Go's type system Internals of Go's data structures Testing and benchmarking About the Reader This book assumes you're a working developer proficient with another language like Java, Ruby, Python, C#, or C++. About the Authors William Kennedy is a seasoned software developer and author of the blog GoingGo.Net. Brian Ketelsen and Erik St. Martin are the organizers of GopherCon and coauthors of the Go-based Skynet framework. Table of Contents Introducing Go Go quick-start Packaging and tooling Arrays, slices, and maps Go's type system Concurrency Concurrency patterns Standard library Testing and benchmarking

Concurrent Programming on Windows - Joe Duffy 2008-10-28

“When you begin using multi-threading throughout an application, the importance of clean architecture and design is critical. . . . This places an emphasis on understanding not only the platform’s capabilities but also emerging best practices. Joe does a great job interspersing best practices alongside theory throughout his book.” – From the Foreword by Craig Mundie, Chief Research and Strategy Officer, Microsoft Corporation Author Joe Duffy has risen to the challenge of explaining how to write software that takes full advantage of concurrency and hardware parallelism. In Concurrent Programming on Windows, he explains how to design, implement, and maintain large-scale concurrent programs, primarily using C# and C++ for Windows. Duffy aims to give application, system, and library developers the tools and techniques needed to write efficient, safe code for multicore processors. This is important not only for the kinds of problems where concurrency is inherent and easily exploitable—such as server applications, compute-intensive image manipulation, financial analysis, simulations, and AI algorithms—but also for problems that can be speeded up using parallelism but require more effort—such as math libraries, sort routines, report generation, XML manipulation, and stream processing algorithms. Concurrent Programming on Windows has four major sections: The first introduces concurrency at a high level, followed by a section that focuses on the fundamental platform features, inner workings, and API details. Next, there is a section that describes common patterns, best practices, algorithms, and data structures that emerge while writing concurrent software. The final section covers many of the common system-wide architectural and process concerns of concurrent programming. This is the only book you’ll need in order to learn the best practices and common patterns for programming with concurrency on Windows and .NET.

Elixir in Action - Sasa Juric 2019-01-03

Summary Revised and updated for Elixir 1.7, Elixir in Action, Second Edition teaches you how to apply Elixir to practical problems associated with scalability, fault tolerance, and high availability. Along the way, you'll develop an appreciation for, and considerable skill in, a functional and concurrent style of programming. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology When you're building mission-critical software, fault tolerance matters. The Elixir programming language delivers fast, reliable applications, whether you're building a large-scale distributed system, a set of backend services, or a simple web app. And Elixir's elegant syntax and functional programming mindset make your software easy to write, read, and maintain. About the Book Elixir in Action, Second Edition teaches you how to build production-quality distributed applications using the Elixir programming language. Author Saša Jurić introduces this powerful language using examples that highlight the benefits of Elixir's functional and concurrent programming. You'll discover how the OTP framework can radically reduce tedious low-level coding tasks. You'll also explore practical approaches to concurrency as you learn to distribute a production system over multiple machines. What's inside Updated for Elixir 1.7 Functional and concurrent programming Introduction to distributed system design Creating deployable releases About the Reader You'll need intermediate skills with client/server applications and a language like Java, C#, or Ruby. No previous experience with Elixir required. About the Author Saša Jurić is a developer with extensive experience using Elixir and Erlang in complex server-side systems. Table of Contents First steps Building blocks Control flow Data abstractions Concurrency primitives Generic server processes Building a concurrent system Fault-tolerance basics Isolating error effects Beyond GenServer Working with components Building a distributed system Running the system

C++ Crash Course - Josh Lospinoso 2019-09-24

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.