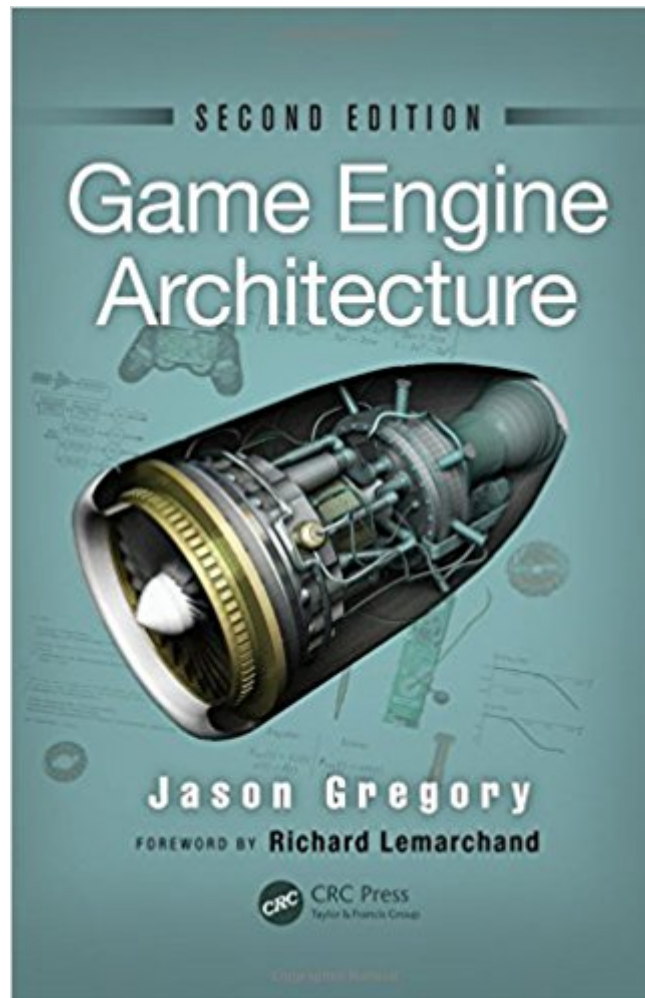




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# Game Engine Architecture, Second Edition



## Synopsis

Hailed as a "must-have textbook" (CHOICE, January 2010), the first edition of Game Engine Architecture provided readers with a complete guide to the theory and practice of game engine software development. Updating the content to match today's landscape of game engine architecture, this second edition continues to thoroughly cover the major components that make up a typical commercial game engine. New to the Second Edition

- Information on new topics, including the latest variant of the C++ programming language, C++11, and the architecture of the eighth generation of gaming consoles, the Xbox One and PlayStation 4
- New chapter on audio technology covering the fundamentals of the physics, mathematics, and technology that go into creating an AAA game audio engine
- Updated sections on multicore programming, pipelined CPU architecture and optimization, localization, pseudovectors and Grassman algebra, dual quaternions, SIMD vector math, memory alignment, and anti-aliasing
- Insight into the making of Naughty Dog's latest hit, The Last of Us

The book presents the theory underlying various subsystems that comprise a commercial game engine as well as the data structures, algorithms, and software interfaces that are typically used to implement them. It primarily focuses on the engine itself, including a host of low-level foundation systems, the rendering engine, the collision system, the physics simulation, character animation, and audio. An in-depth discussion on the "gameplay foundation layer" delves into the game's object model, world editor, event system, and scripting system. The text also touches on some aspects of gameplay programming, including player mechanics, cameras, and AI. An awareness-building tool and a jumping-off point for further learning, Game Engine Architecture, Second Edition gives readers a solid understanding of both the theory and common practices employed within each of the engineering disciplines covered. The book will help readers on their journey through this fascinating and multifaceted field.

## Book Information

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## Customer Reviews

"This is the best of its kind, and you're lucky to have found it. It covers the huge field of game engine architecture in a succinct, clear way, and expertly balances the breadth and depth of its coverage, offering enough detail that even a beginner can easily understand the concepts it presents. The author, Jason Gregory, is not only a world expert in his field; he's a working programmer with production-quality knowledge and many shipped game projects under his belt. Jason is also an experienced educator who has taught in the top-ranked university game program in North America. The many detailed code samples and implementation examples in this book will help you understand just how the pieces come together in a great game. By helping you in this way, Jason's book might just empower you to outstrip even the most audacious dreams of history's best game designers and developers." From the Foreword by Richard Lemarchand Praise for the First Edition: A 2010 CHOICE Outstanding Academic Title "This course resource provides an excellent, comprehensive look at every major system and issue related to modern game development a must-have textbook for computer science, software engineering, or game programming majors, amateur hobbyists, game 'modders,' and game developers." A. Chen, CHOICE, January 2010 "It looks like most of the critical areas and concepts are touched on. It looks like you'll have some reasonably deep understanding of the elements that go into making a game engine. Quite an impressive work, and I know of nothing else in this area that is so detailed." Eric Haines, [www.realtimerendering.com/blog/](http://www.realtimerendering.com/blog/), July 2009 "Jason Gregory draws upon his many years of experience and expertise to create a complete and comprehensive textbook on the theory and practice of game engine software development. Informed and informative, replete with examples for every aspect of the game development process, and fully accessible to aspiring game engine developers as well as a very useful reference for even experienced technicians in the field, Game Engine Architecture is an invaluable, thoroughly user friendly, and highly recommended core addition to personal, professional, and academic Computer Science reference and resource collections in general, as well as gaming engine design instructional reading lists in particular." The Midwest Book Review, September 2009 "The book contains a huge

amount of data on specifics to consider when developing a game engine."

Ã¢ââ Gamasutra.com, November 2009 "Game Engine Architecture by Jason Gregory has been named a finalist for the Game Developer's 2009 Front Line Award." Ã¢ââ PR Newswire, December 2009

As some previous reviews written, this is a solid book on game engine architecture. What I like about this book is it has a detailed introduction to game animation system which other books couldn't give. However, compared to Game Coding Complete series, this book didn't give the source code of a complete game engine, which I think is essential to learn game programming. You seem to know a lot of things about game programming after reading this book, but there is no way you can put it together without previous game engine experience. I don't suggest this book to people who want to start from scratch to build a game engine, but who want to improve their existing game engine. I hope this book can go more detailed on the gameplay part.

This book sets the bar high, not only for books regarding game engine architecture, but for advanced general computing topics as well. Jason's writing style is crisp, concise, and detailed, and I was able to work my way through this book pretty quickly despite the 1,000+ pages of advanced material (try pacing yourself at 25 or so pages per day, and you'll be done before you know it.) . The fact that Jason works for Naughty Dog, a game studio that makes some of the most compelling, next-generation video games around, lends credence to Jason's skills.

Every detail of modern game engine architecture is included and it is a must for anyone looking to create their own modern game engine. It is heavy reading, but if you are truly interested in the field, it is totally worth it. I also found this book pairs great withÃ¢ââ Game Programming Patterns. Game Programming patterns is a nice tl;dr of this book and has more direct implementation instructions.

I am not a game developer, however I want to become one, but this book is clearly not only about that. Jason has put an enormous effort into explaining things that few will tell you about. This book is a gem, because from my point of view (mainly as a .NET developer), it contains the bases that any respectable programmer must know. It explains you about memory, it gives you the programming/engineering experience accumulated over the years that is far more precious than the money you pay for the book. It explains you concepts that must be explained before anyone letting you write your first piece of code. Don't fool yourself thinking that this is only about game

architecture. This book is about any architecture, about best practices, about the idea how to truly know how to program. My favorite statement from this book is the one that says something like this: Before you develop something, you must know the underlying hardware. Thank you Jason for sharing all this experience! P.S. I've started to read a lot of books, but this one is one of the bests in keeping you reading and making you want more.

The book describes industry-standard approaches to organizing a game's modules in a way that supports functional isolation, and also separates the game-independent core (or engine) from game-specific content and code. It also describes alternatives where they exist, such as the decision between a single centralized resource module vs. distributing resource-specific loaders across their associated modules. I would characterize this book as a survey just because its scope is so large, but even with that, it has plenty of conceptual, algorithmic and mathematical meat. I've used the book (and particularly Figure 1.15) as a way to establish a high-level architecture for my game, and then I drill into specific chapters targeting specific modules as needed. One gap is that by the author's own admission, the book doesn't really treat AI at all (just a single page), so if you're looking for that, you'll need to look elsewhere.

It's a solid book and will keep a place on my shelf, but I don't think it rates a solid 5 stars. It does cover everything, but is often so general in said coverage that you can't use it as a reference. It's also likely that, unless this is one of the first game programming books you have purchased, a lot of the info has already been covered. If you read the title and think this is a book that will lead you thru building a game engine, it's not really like that. If you don't know what you need to know, then this book is the best all-in-one for planning/understanding.

This is an amazing book that every game developer should own. This book will teach you how the different subsystems in a game engine work together in a general overview kind of way. Basically, it demystifies the process of how a game is made from start to finish. After reading it, you have all the knowledge you need to find all the information you need in the future about specific subsystems. I'd recommend getting this once your at the programming level of good memory management techniques and design patterns in c++.

This is a good book, but I feel it kind of gives more of a high level overview and leaves the implementation details as an exercise to the reader. Its not a tutorial, more of a guide to help you

look in the right direction. It comes from a lead of Naughty Dog, a highly respected studio, which earned its nickname "Naughty Dog University" While it doesn't show me step by step as a neophyte C++ developer, I am still happy with my purchase.

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