

Verilog Coding for Logic Synthesis: A Comprehensive Guide for Digital Designers

In the realm of digital design, Verilog has emerged as the industry-standard hardware description language (HDL) for describing and synthesizing complex digital circuits. Verilog's robust capabilities and expressive syntax make it the preferred choice for designing and verifying electronic systems, from simple combinational logic to advanced sequential circuits.



Verilog Coding for Logic Synthesis by Weng Fook Lee

★★★★☆ 4 out of 5

Language : English

File size : 6511 KB

Text-to-Speech : Enabled

Print length : 309 pages

Lending : Enabled

Screen Reader : Supported

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Verilog Coding for Logic Synthesis is a comprehensive guide that provides a thorough understanding of Verilog's syntax, semantics, and best practices for designing logic circuits. Written by an experienced digital design engineer with over 20 years of industry experience, this book empowers designers with the knowledge and skills to harness the power of Verilog for efficient and reliable logic synthesis.

Key Features

- **Step-by-Step Approach:** The book follows a logical progression, from the basics of Verilog syntax to advanced topics like clock gating and pipelining.
- **Real-World Examples:** Each chapter is enriched with practical examples and coding exercises, enabling readers to apply the concepts directly to their own designs.
- **CUDA Parallelism:** Verilog's powerful features for implementing parallel constructs are explored, including the latest advances in CUDA parallelism.
- **FPGA Implementation:** The book provides detailed insights into Verilog coding techniques for targeting FPGAs, ensuring efficient logic synthesis and resource utilization.
- **Simulation and Verification:** Essential aspects of simulation and verification are covered, equipping readers with the skills to validate their designs.

Content Overview

Chapter 1: Verilog Overview

* to Verilog and its role in logic synthesis * Syntax, semantics, and data types * Modules, ports, and parameterization

Chapter 2: Combinational Logic

* Designing basic combinational logic circuits * Implementing Boolean expressions * Arithmetic operations and comparators

Chapter 3: Sequential Logic

* Flip-flops and registers * State machines and finite state machines (FSMs) * Timing analysis and metastability

Chapter 4: Clocking and Resetting

* Clock distribution and skew * Reset circuits and synchronous reset * Asynchronous reset and edge-triggered registers

Chapter 5: Memory Elements

* RAMs, ROMs, and FIFOs * Memory access and control * Multi-port memories

Chapter 6: Pipelining

* Benefits and challenges of pipelining * Pipeline stages and latency * Data forwarding and hazard detection

Chapter 7: Clock Gating

* Power optimization through clock gating * Types of clock gating mechanisms * Clock gating strategies

Chapter 8: Advanced Verilog Techniques

* Concurrent conditional assignments * Case statements and priority encoders * Verilog code coverage

Chapter 9: CUDA Parallelism

* Fundamentals of CUDA programming * Verilog constructs for parallel processing * Implementing parallel algorithms

Chapter 10: FPGA Implementation

* to FPGAs and their architecture * Verilog HDL for FPGA synthesis * Logic optimization and synthesis techniques

Chapter 11: Simulation and Verification

* Testbenches and test fixtures * Assertions and coverage analysis * Debugging and troubleshooting techniques

* Summary of key concepts and best practices * Future trends and advancements in Verilog coding

Target Audience

Verilog Coding for Logic Synthesis is an invaluable resource for:

- Digital design engineers
- FPGA designers
- Hardware engineers
- Computer science students
- Electronics enthusiasts

Whether you are a seasoned professional or just starting out in the field, this book will provide you with the knowledge and skills necessary to master Verilog coding for efficient and reliable logic synthesis.

Author Credentials

The author of Verilog Coding for Logic Synthesis is a highly respected digital design engineer with over two decades of experience in the industry. Having designed and implemented complex electronic systems for a wide range of applications, the author possesses a deep understanding of the intricacies of logic synthesis and Verilog coding.

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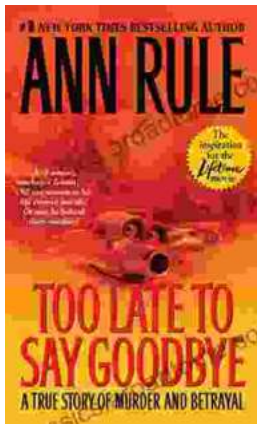
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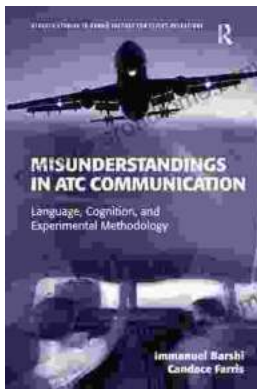


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