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FPGA Prototyping by Verilog Examples

Xilinx Spartan-3 Version

John Wiley & Sons **FPGA Prototyping Using Verilog Examples** will provide you with a hands-on introduction to Verilog synthesis and FPGA programming through a “learn by doing” approach. By following the clear, easy-to-understand templates for code development and the numerous practical examples, you can quickly develop and simulate a sophisticated digital circuit, realize it on a prototyping device, and verify the operation of its physical implementation. This introductory text that will provide you with a solid foundation, instill confidence with rigorous examples for complex systems and prepare you for future development tasks.

The VHDL Cookbook

A quick introduction to VHDL.

Introduction to Reconfigurable Computing

Architectures, Algorithms, and Applications

Springer Science & Business Media **This work is a comprehensive study of the field. It provides an entry point to the novice willing to move in the research field reconfigurable computing, FPGA and system on programmable chip design. The book can also be used as teaching reference for a graduate course in computer engineering, or as reference to advance electrical and computer engineers. It provides a very strong theoretical and practical background to the field, from the early Estrin’s machine to the very modern architecture such as embedded logic devices.**

Digital Systems Design Using VHDL

Cengage Learning **Written for advanced study in digital systems design, Roth/John’s DIGITAL SYSTEMS DESIGN USING VHDL, 3E integrates the use of the industry-standard hardware description language, VHDL, into the digital design process. The book begins with a valuable review of basic logic design concepts before introducing the fundamentals of VHDL. The book concludes with detailed coverage of advanced VHDL topics. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.**

RTL Hardware Design Using VHDL

Coding for Efficiency, Portability, and Scalability

John Wiley & Sons **The skills and guidance needed to master RTL hardware design This book teaches readers how to systematically design efficient, portable, and scalable Register Transfer Level (RTL) digital circuits using the VHDL hardware description language and synthesis software. Focusing on the module-level design, which is composed of functional units, routing circuit, and storage, the book illustrates the relationship between the VHDL constructs and the underlying hardware components, and shows how to develop codes that faithfully reflect the module-level design and can be synthesized into efficient gate-level implementation. Several unique features distinguish the book: * Coding style that shows a clear relationship between VHDL constructs and hardware components * Conceptual diagrams that illustrate the realization of VHDL codes * Emphasis on the code reuse * Practical examples that demonstrate and reinforce design concepts, procedures, and techniques * Two chapters on realizing sequential algorithms in hardware * Two chapters on scalable and parameterized designs and coding * One chapter covering the synchronization and interface between multiple clock domains Although the focus of the book is RTL synthesis, it also examines the synthesis task from the perspective of the overall development process. Readers learn good design practices and guidelines to ensure that an RTL design can accommodate future simulation, verification, and testing needs, and can be easily incorporated into a larger system or reused. Discussion is independent of technology and can be applied to both ASIC and FPGA devices. With a balanced presentation of fundamentals and practical examples, this is an excellent textbook for upper-level undergraduate or graduate courses in advanced digital logic. Engineers who need to make effective use of today’s synthesis software and FPGA devices should also refer to this book.**

FPGA Prototyping by VHDL Examples

Xilinx Spartan-3 Version

John Wiley & Sons **This book uses a “learn by doing” approach to introduce the concepts and techniques of VHDL and FPGA to designers through a series of hands-on experiments. FPGA Prototyping by VHDL Examples provides a collection of clear, easy-to-follow templates for quick code development; a large number of practical examples to illustrate and reinforce the concepts and design techniques; realistic projects that can be implemented and tested on a Xilinx prototyping board; and a thorough exploration of the Xilinx PicoBlaze soft-core microcontroller.**

Open-Source Electronics Platforms

Open-Source Electronics Platforms

MDPI Open-source electronics are becoming very popular, and are integrated with our daily educational and developmental activities. At present, the use open-source electronics for teaching science, technology, engineering, and mathematics (STEM) has become a global trend. Off-the-shelf embedded electronics such as Arduino- and Raspberry-compatible modules have been widely used for various applications, from do-it-yourself (DIY) to industrial projects. In addition to the growth of open-source software platforms, open-source electronics play an important role in narrowing the gap between prototyping and product development. Indeed, the technological and social impacts of open-source electronics in teaching, research, and innovation have been widely recognized.

Introduction to Logic Circuits & Logic Design with Verilog

Springer This textbook for courses in Digital Systems Design introduces students to the fundamental hardware used in modern computers. Coverage includes both the classical approach to digital system design (i.e., pen and paper) in addition to the modern hardware description language (HDL) design approach (computer-based). Using this textbook enables readers to design digital systems using the modern HDL approach, but they have a broad foundation of knowledge of the underlying hardware and theory of their designs. This book is designed to match the way the material is actually taught in the classroom. Topics are presented in a manner which builds foundational knowledge before moving onto advanced topics. The author has designed the presentation with learning Goals and assessment at its core. Each section addresses a specific learning outcome that the student should be able to "do" after its completion. The concept checks and exercise problems provide a rich set of assessment tools to measure student performance on each outcome.

Digital Systems Design Using Verilog

Cengage Learning DIGITAL SYSTEMS DESIGN USING VERILOG integrates coverage of logic design principles, Verilog as a hardware design language, and FPGA implementation to help electrical and computer engineering students master the process of designing and testing new hardware configurations. A Verilog equivalent of authors Roth and John's previous successful text using VHDL, this practical book presents Verilog constructs side-by-side with hardware, encouraging students to think in terms of desired hardware while writing synthesizable Verilog. Following a review of the basic concepts of logic design, the authors introduce the basics of Verilog using simple combinational circuit examples, followed by models for simple sequential circuits. Subsequent chapters ask readers to tackle more and more complex designs. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Applied Reconfigurable Computing

13th International Symposium, ARC 2017, Delft, The Netherlands, April 3-7, 2017, Proceedings

Springer This book constitutes the refereed proceedings of the 13th International Symposium on Applied Reconfigurable Computing, ARC 2017, held in Delft, The Netherlands, in April 2017. The 17 full papers and 11 short papers presented in this volume were carefully reviewed and selected from 49 submissions. They are organized in topical sections on adaptive architectures, embedded computing and security, simulation and synthesis, design space exploration, fault tolerance, FPGA-based designs, neural networks, and languages and estimation techniques.

The Zynq Book

Embedded Processing with the Arm Cortex-A9 on the Xilinx Zynq-7000 All Programmable Soc

This book is about the Zynq-7000 All Programmable System on Chip, the family of devices from Xilinx that combines an application-grade ARM Cortex-A9 processor with traditional FPGA logic fabric. Catering for both new and experienced readers, it covers fundamental issues in an accessible way, starting with a clear overview of the device architecture, and an introduction to the design tools and processes for developing a Zynq SoC. Later chapters progress to more advanced topics such as embedded systems development, IP block design and operating systems. Maintaining a 'real-world' perspective, the book also compares Zynq with other device alternatives, and considers end-user applications. The Zynq Book is accompanied by a set of practical tutorials hosted on a companion website. These tutorials will guide the reader through first steps with Zynq, following on to a complete, audio-based embedded systems design.

Digital System Design with VHDL

Pearson Education India

Digital Design (Verilog)

An Embedded Systems Approach Using Verilog

Elsevier Digital Design: An Embedded Systems Approach Using Verilog provides a foundation in digital design for students in computer engineering, electrical engineering and computer science courses. It takes an up-to-date and modern approach of presenting digital logic design as an activity in a larger systems design context. Rather than focus on aspects of digital design that have little relevance in a realistic design context, this book concentrates on modern and evolving knowledge and design skills. Hardware description language (HDL)-based design and verification is emphasized--Verilog examples are used extensively throughout. By treating digital logic as part of embedded systems design, this book provides an understanding of the hardware needed in the analysis and design of systems comprising both hardware and software components. Includes a Web site with links to vendor tools, labs and tutorials. Presents digital logic design as an activity in a larger systems design context Features extensive use of Verilog examples to demonstrate HDL (hardware description language) usage at the abstract behavioural level and register transfer level, as well as for low-level verification and verification environments Includes worked examples throughout to enhance the reader's understanding and retention of the material Companion Web site includes links to tools for FPGA design from Synplcity, Mentor Graphics, and Xilinx, Verilog source code for all the examples in the book, lecture slides, laboratory projects, and solutions to exercises

Project Oberon

The Design of an Operating System and Compiler

Addison-Wesley **Project Oberon** contains a definition of the Oberon Language and describes its relation to Modula-2 and the software tools developed with the system. This definitive, first-hand account of the design, development, and implementation of Oberon completes the Oberon trilogy.

FPGA Prototyping by SystemVerilog Examples

Xilinx MicroBlaze MCS SoC Edition

John Wiley & Sons **A hands-on introduction to FPGA prototyping and SoC design** This is the successor edition of the popular *FPGA Prototyping by Verilog Examples* text. It follows the same “learning-by-doing” approach to teach the fundamentals and practices of HDL synthesis and FPGA prototyping. The new edition uses a coherent series of examples to demonstrate the process to develop sophisticated digital circuits and IP (intellectual property) cores, integrate them into an SoC (system on a chip) framework, realize the system on an FPGA prototyping board, and verify the hardware and software operation. The examples start with simple gate-level circuits, progress gradually through the RT (register transfer) level modules, and lead to a functional embedded system with custom I/O peripherals and hardware accelerators. Although it is an introductory text, the examples are developed in a rigorous manner, and the derivations follow the strict design guidelines and coding practices used for large, complex digital systems. The book is completely updated and uses the SystemVerilog language, which “absorbs” the Verilog language. It presents the hardware design in the SoC context and introduces the hardware-software co-design concept. Instead of treating examples as isolated entities, the book integrates them into a single coherent SoC platform that allows readers to explore both hardware and software “programmability” and develop complex and interesting embedded system projects. The new edition: Adds four general-purpose IP cores, which are multi-channel PWM (pulse width modulation) controller, I2C controller, SPI controller, and XADC (Xilinx analog-to-digital converter) controller. Introduces a music synthesizer constructed with a DDFS (direct digital frequency synthesis) module and an ADSR (attack-decay-sustain-release) envelope generator. Expands the original video controller into a complete stream based video subsystem that incorporates a video synchronization circuit, a test-pattern generator, an OSD (on-screen display) controller, a sprite generator, and a frame buffer. Provides a detailed discussion on blocking and nonblocking statements and coding styles. Describes basic concepts of software-hardware co-design with Xilinx MicroBlaze MCS soft-core processor. Provides an overview of bus interconnect and interface circuit. Presents basic embedded system software development. Suggests additional modules and peripherals for interesting and challenging projects. *FPGA Prototyping by SystemVerilog Examples* makes a natural companion text for introductory and advanced digital design courses and embedded system courses. It also serves as an ideal self-teaching guide for practicing engineers who wish to learn more about this emerging area of interest.

Digital Logic and Microprocessor Design with VHDL

Cl-Engineering This book will teach students how to design digital logic circuits, specifically combinational and sequential circuits. Students will learn how to put these two types of circuits together to form dedicated and general-purpose microprocessors. This book is unique in that it combines the use of logic principles and the building of individual components to create data paths and control units, and finally the building of real dedicated custom microprocessors and general-purpose microprocessors. After understanding the material in the book, students will be able to design simple microprocessors and implement them in real hardware.

Detection of Intrusions and Malware, and Vulnerability Assessment

17th International Conference, DIMVA 2020, Lisbon, Portugal, June 24–26, 2020, Proceedings

Springer Nature This book constitutes the proceedings of the 17th International Conference on Detection of Intrusions and Malware, and Vulnerability Assessment, DIMVA 2020, held in Lisbon, Portugal, in June 2020.* The 13 full papers presented in this volume were carefully reviewed and selected from 45 submissions. The contributions were organized in topical sections named: vulnerability discovery and analysis; attacks; web security; and detection and containment. *The conference was held virtually due to the COVID-19 pandemic.

Advanced Computer and Communication Engineering Technology

Proceedings of ICOCOE 2015

Springer This book covers diverse aspects of advanced computer and communication engineering, focusing specifically on industrial and manufacturing theory and applications of electronics, communications, computing and information technology. Experts in research, industry, and academia present the latest developments in technology, describe applications involving cutting-edge communication and computer systems, and explore likely future trends. In addition, a wealth of new algorithms that assist in solving computer and communication engineering problems are presented. The book is based on presentations given at ICOCOE 2015, the 2nd International Conference on Communication and Computer Engineering. It will appeal to a wide range of professionals in the field, including telecommunication engineers, computer engineers and scientists, researchers, academics and students.

New Handbook of Methods in Nonverbal Behavior Research

OUP Oxford For many years the *Handbook of Methods in Nonverbal Behavior Research* (Scherer & Ekman, 1982) has been an invaluable text for researchers looking for methods to study nonverbal behavior and the expression of affect. A successor to this essential text, **The New Handbook of Methods in Nonverbal Behavior Research** includes chapters on coding and methodological issues for a variety of areas in nonverbal behavior: facial actions, vocal behavior, and body movement. Issues relevant to judgment studies, methodology, reliability, analyses, etc. have also been updated. The topics are broad and include specific information about methodology and coding strategies in education, psychotherapy, deception, nonverbal sensitivity, and marital and group behavior. There is also a chapter detailing specific information on the technical aspects of recording the voice and face, and specifically in relation to deception studies. This volume will be valuable for both new researchers and those already working in the fields of nonverbal behavior, affect expression, and related topics. It will play a central role in further refining research methods and coding strategies, allowing a comparison of results from various laboratories where research on nonverbal behavior is being conducted. This will advance research in the field and help to coordinate results so that a more comprehensive understanding of affect expression can be developed.

Membrane Computing Models: Implementations

Springer Nature The theoretical basis of membrane computing was established in the early 2000s with fundamental research into the computational power, complexity aspects and relationships with other (un)conventional computing paradigms. Although this core theoretical research has continued to grow rapidly and vigorously, another area of investigation has since been added, focusing on the applications of this model in many areas, most prominently in systems and synthetic biology, engineering optimization, power system fault diagnosis and mobile robot controller design. The further development of these applications and their broad adoption by other researchers, as well as the expansion of the membrane computing modelling paradigm to other applications, call for a set of robust, efficient, reliable and easy-to-use tools supporting the most significant membrane computing models. This work provides comprehensive descriptions of such tools, making it a valuable resource for anyone interested in membrane computing models.

Real-Time Embedded Systems

MDPI This book is a printed edition of the Special Issue "Real-Time Embedded Systems" that was published in *Electronics*

Applications in Electronics Pervading Industry, Environment and Society

APPLEPIES 2020

Springer This book provides a thorough overview of cutting-edge research on electronics applications relevant to industry, the environment, and society at large. It covers a broad spectrum of application domains, from automotive to space and from health to security, while devoting special attention to the use of embedded devices and sensors for imaging, communication and control. The book is based on the 2020 ApplePies Conference, held online in November 2020, which brought together researchers and stakeholders to consider the most significant current trends in the field of applied electronics and to debate visions for the future. Areas addressed by the conference included information communication technology; biotechnology and biomedical imaging; space; secure, clean and efficient energy; the environment; and smart, green and integrated transport. As electronics technology continues to develop apace, constantly meeting previously unthinkable targets, further attention needs to be directed toward the electronics applications and the development of systems that facilitate human activities. This book, written by industrial and academic professionals, represents a valuable contribution in this endeavor.

Advances in Artificial Intelligence, Software and Systems Engineering

Proceedings of the AHFE 2020 Virtual Conferences on Software and Systems Engineering, and Artificial Intelligence and Social Computing, July 16-20, 2020, USA

Springer Nature This book addresses emerging issues concerning the integration of artificial intelligence systems in our daily lives. It focuses on the cognitive, visual, social and analytical aspects of computing and intelligent technologies, and highlights ways to improve the acceptance, effectiveness, and efficiency of said technologies. Topics such as responsibility, integration and training are discussed throughout. The book also reports on the latest advances in systems engineering, with a focus on societal challenges and next-generation systems and applications for meeting them. Based on the AHFE 2020 Virtual Conference on Software and Systems Engineering, and the AHFE 2020 Virtual Conference on Artificial Intelligence and Social Computing, held on July 16-20, 2020, it provides readers with extensive information on current research and future challenges in these fields, together with practical insights into the development of innovative services for various purposes.

Membrane Computing

An Introduction

Springer Science & Business Media Membrane computing is an unconventional model of computation associated with a new computing paradigm. The field of membrane computing was initiated in 1998 by the author of this book; it is a branch of natural computing inspired by the structure and functioning of the living cell and devises distributed parallel computing models in the form of membrane systems. This book is the first monograph surveying the new field in a systematic and coherent way. It presents the central notions and results: the main classes of P systems, the main results about their computational power and efficiency, a complete bibliography, and a series of open problems and research topics.

Robotic Exploration and Landmark Determination

Hardware-Efficient Algorithms and FPGA Implementations

Springer This book presents hardware-efficient algorithms and FPGA implementations for two robotic tasks, namely exploration and landmark determination. The work identifies scenarios for mobile robotics where parallel processing and selective shutdown offered by FPGAs are invaluable. The book proceeds to systematically develop memory-driven VLSI architectures for both the tasks. The architectures are ported to a low-cost FPGA with a fairly small number of system gates.

SystemVerilog For Design

A Guide to Using SystemVerilog for Hardware Design and Modeling

Springer Science & Business Media SystemVerilog is a rich set of extensions to the IEEE 1364-2001 Verilog Hardware Description Language (Verilog HDL). These extensions address two major aspects of HDL based design. First, modeling very large designs with concise, accurate, and intuitive code. Second, writing high-level test programs to efficiently and effectively verify these large designs. This book, SystemVerilog for Design, addresses the first aspect of the SystemVerilog extensions to Verilog. Important modeling features are presented, such as two-state data types, enumerated types, user-defined types, structures, unions, and interfaces. Emphasis is placed on the proper usage of these enhancements for simulation and synthesis. A companion to this book, SystemVerilog for Verification,

covers the second aspect of SystemVerilog.

Cutting Edge Research in New Technologies

IntechOpen The book "Cutting Edge Research in New Technologies" presents the contributions of some researchers in modern fields of technology, serving as a valuable tool for scientists, researchers, graduate students and professionals. The focus is on several aspects of designing and manufacturing, examining complex technical products and some aspects of the development and use of industrial and service automation. The book covered some topics as it follows: manufacturing, machining, textile industry, CAD/CAM/CAE systems, electronic circuits, control and automation, electric drives, artificial intelligence, fuzzy logic, vision systems, neural networks, intelligent systems, wireless sensor networks, environmental technology, logistic services, transportation, intelligent security, multimedia, modeling, simulation, video techniques, water plant technology, globalization and technology. This collection of articles offers information which responds to the general goal of technology - how to develop manufacturing systems, methods, algorithms, how to use devices, equipments, machines or tools in order to increase the quality of the products, the human comfort or security.

Applied Reconfigurable Computing

15th International Symposium, ARC 2019, Darmstadt, Germany, April 9–11, 2019, Proceedings

Springer This book constitutes the proceedings of the 15th International Symposium on Applied Reconfigurable Computing, ARC 2019, held in Darmstadt, Germany, in April 2019. The 20 full papers and 7 short papers presented in this volume were carefully reviewed and selected from 52 submissions. In addition, the volume contains 1 invited paper. The papers were organized in topical sections named: Applications; partial reconfiguration and security; image/video processing; high-level synthesis; CGRAs and vector processing; architectures; design frameworks and methodology; convolutional neural networks.

Introduction to Asynchronous Circuit Design

This book is an introduction to the design of asynchronous circuits. It is an updated and significantly extended version of an eight-chapter tutorial that first appeared as Part I in the book "Principles of asynchronous circuit design -- A systems perspective" edited by Sparsø and Furber (2001); a book that has become a standard reference on the topic. The extensions include improved coverage of data-flow components, a new chapter on two-phase bundled-data circuits, a new chapter on metastability, arbitration, and synchronization, and a new chapter on performance analysis using timed Petri nets. With these extensions, the text now provides a more complete coverage of the topic, and it is now made available as a stand-alone book. The book is a beginner's text and the amount of formal notation is deliberately kept at a minimum, using instead plain English and graphical illustrations to explain the underlying intuition and reasoning behind the concepts and methods covered. The book targets senior undergraduate and graduate students in Electrical and Computer Engineering and industrial designers with a background in conventional (clocked) digital design who wish to gain an understanding of asynchronous circuit design.

Digital System Design with FPGA: Implementation Using Verilog and VHDL

McGraw Hill Professional Master FPGA digital system design and implementation with Verilog and VHDL This practical guide explores the development and deployment of FPGA-based digital systems using the two most popular hardware description languages, Verilog and VHDL. Written by a pair of digital circuit design experts, the book offers a solid grounding in FPGA principles, practices, and applications and provides an overview of more complex topics. Important concepts are demonstrated through real-world examples, ready-to-run code, and inexpensive start-to-finish projects for both the Basys and Arty boards. Digital System Design with FPGA: Implementation Using Verilog and VHDL covers: • Field programmable gate array fundamentals • Basys and Arty FPGA boards • The Vivado design suite • Verilog and VHDL • Data types and operators • Combinational circuits and circuit blocks • Data storage elements and sequential circuits • Soft-core microcontroller and digital interfacing • Advanced FPGA applications • The future of FPGA

Advances in Intelligent Analysis of Medical Data and Decision Support Systems

Springer This volume is a result of the fruitful and vivid discussions during the MedDecSup'2012 International Workshop bringing together a relevant body of knowledge, and new developments in the increasingly important field of medical informatics. This carefully edited book presents new ideas aimed at the development of intelligent processing of various kinds of medical information and the perfection of the contemporary computer systems for medical decision support. The book presents advances of the medical information systems for intelligent archiving, processing, analysis and search-by-content which will improve the quality of the medical services for every patient and of the global healthcare system. The book combines in a synergistic way theoretical developments with the practicability of the approaches developed and presents the last developments and achievements in medical informatics to a broad range of readers: engineers, mathematicians, physicians, and PhD students.

Asynchronous Circuit Design

John Wiley & Sons With asynchronous circuit design becoming a powerful tool in the development of new digital systems, circuit designers are expected to have asynchronous design skills and be able to leverage them to reduce power consumption and increase system speed. This book walks readers through all of the different methodologies of asynchronous circuit design, emphasizing practical techniques and real-world applications instead of theoretical simulation. The only guide of its kind, it also features an ftp site complete with support materials. Market: Electrical Engineers, Computer Scientists, Device Designers, and Developers in industry. An Instructor Support FTP site is available from the Wiley editorial department.

Modern Computer Architecture and Organization

Learn x86, ARM, and RISC-V architectures and the design of smartphones, PCs, and cloud servers

Packt Publishing Ltd A no-nonsense, practical guide to current and future processor and computer architectures, enabling you to design computer systems and develop better software applications across a variety of domains Key Features Understand digital circuitry with the help of transistors, logic gates, and sequential logic Examine the architecture and instruction sets of x86, x64, ARM, and RISC-V processors Explore the architecture of modern devices such as the iPhone X and high-performance gaming PCs Book Description Are you a software developer, systems designer, or computer architecture student looking for a methodical introduction to digital device architectures but overwhelmed by their complexity? This book will help you to learn how modern computer systems work, from the lowest level of transistor switching to the macro view of collaborating multiprocessor servers. You'll gain unique insights into the internal behavior of processors that execute the code developed in high-level languages and enable you to design more efficient and scalable software systems. The book will teach you the fundamentals of computer systems including transistors, logic gates, sequential logic, and instruction operations. You will learn details of modern processor architectures and instruction sets including x86, x64, ARM, and RISC-V. You will see how to implement a RISC-V processor in a low-cost FPGA board and how to write a quantum computing program and run it on an actual quantum computer. By the end of this book, you will have a thorough understanding of modern processor and computer architectures and the future directions these architectures are likely to take. What you will learn Get to grips with transistor technology and digital circuit principles Discover the functional elements of computer processors Understand pipelining and superscalar execution Work with floating-point data formats Understand the purpose and operation of the supervisor model Implement a complete RISC-V processor in a low-cost FPGA Explore the techniques used in virtual machine implementation Write a quantum

computing program and run it on a quantum computerWho this book is for This book is for software developers, computer engineering students, system designers, reverse engineers, and anyone looking to understand the architecture and design principles underlying modern computer systems from tiny embedded devices to warehouse-size cloud server farms. A general understanding of computer processors is helpful but not required.

Processor and System-on-Chip Simulation

Springer Science & Business Media Simulation of computer architectures has made rapid progress recently. The primary application areas are hardware/software performance estimation and optimization as well as functional and timing verification. Recent, innovative technologies such as retargetable simulator generation, dynamic binary translation, or sampling simulation have enabled widespread use of processor and system-on-chip (SoC) simulation tools in the semiconductor and embedded system industries. Simultaneously, processor and SoC simulation is still a very active research area, e.g. what amounts to higher simulation speed, flexibility, and accuracy/speed trade-offs. This book presents and discusses the principle technologies and state-of-the-art in high-level hardware architecture simulation, both at the processor and the system-on-chip level.

Scheduling in Real-Time Systems

Wiley * Real-time systems are used in a wide range of applications, including command and control systems, flight control, telecommunication systems, and online purchase payment * Provides an accessible yet comprehensive treatment * of real-time computing and communications systems * Outlines the basics of real-time scheduling and scheduling policies designed for real-time applications * Each chapter contains examples and case studies along with test exercises and solutions

Advanced Computing and Intelligent Engineering

Proceedings of ICACIE 2018, Volume 2

Springer Nature This book gathers high-quality research papers presented at the 3rd International Conference on Advanced Computing and Intelligent Engineering (ICACIE 2018). It includes sections describing technical advances and the latest research in the fields of computing and intelligent engineering. Intended for graduate students and researchers working in the disciplines of computer science and engineering, the proceedings will also appeal to researchers in the field of electronics, as they cover hardware technologies and future communication technologies.

Learning Internet of Things

Packt Pub Limited If you're a developer or electronics engineer who is curious about Internet of Things, then this is the book for you. With only a rudimentary understanding of electronics, Raspberry Pi, or similar credit-card sized computers, and some programming experience using managed code such as C# or Java, you will be taught to develop state-of-the-art solutions for Internet of Things in an instant.

High-Performance Computing Using FPGAs

Springer Science & Business Media High-Performance Computing using FPGA covers the area of high performance reconfigurable computing (HPRC). This book provides an overview of architectures, tools and applications for High-Performance Reconfigurable Computing (HPRC). FPGAs offer very high I/O bandwidth and fine-grained, custom and flexible parallelism and with the ever-increasing computational needs coupled with the frequency/power wall, the increasing maturity and capabilities of FPGAs, and the advent of multicore processors which has caused the acceptance of parallel computational models. The Part on architectures will introduce different FPGA-based HPC platforms: attached co-processor HPRC architectures such as the CHREC's Novo-G and EPCC's Maxwell systems; tightly coupled HPRC architectures, e.g. the Convey hybrid-core computer; reconfigurably networked HPRC architectures, e.g. the QPACE system, and standalone HPRC architectures such as EPFL's CONFETTI system. The Part on Tools will focus on high-level programming approaches for HPRC, with chapters on C-to-Gate tools (such as Impulse-C, AutoESL, Handel-C, MORA-C++); Graphical tools (MATLAB-Simulink, NI LabVIEW); Domain-specific languages, languages for heterogeneous computing (for example OpenCL, Microsoft's Kiwi and Alchemy projects). The part on Applications will present case from several application domains where HPRC has been used successfully, such as Bioinformatics and Computational Biology; Financial Computing; Stencil computations; Information retrieval; Lattice QCD; Astrophysics simulations; Weather and climate modeling.

Thin Film Transistors

Materials and Processes

Logic Design and Verification Using SystemVerilog (Revised)

Createspace Independent Publishing Platform SystemVerilog is a Hardware Description Language that enables designers to work at the higher levels of logic design abstractions that match the increased complexity of current day integrated circuit and field-programmable gate array (FPGA) designs. The majority of the book assumes a basic background in logic design and software programming concepts. It is directed at: * students currently in an introductory logic design course that also teaches SystemVerilog, * designers who want to update their skills from Verilog or VHDL, and * students in VLSI design and advanced logic design courses that include verification as well as design topics. The book starts with a tutorial introduction on hardware description languages and simulation. It proceeds to the register-transfer design topics of combinational and finite state machine (FSM) design - these mirror the topics of introductory logic design courses. The book covers the design of FSM-datapath designs and their interfaces, including SystemVerilog interfaces. Then it covers the more advanced topics of writing testbenches including using assertions and functional coverage. A comprehensive index provides easy access to the book's topics. The goal of the book is to introduce the broad spectrum of features in the language in a way that complements introductory and advanced logic design and verification courses, and then provides a basis for further learning. Solutions to problems at the end of chapters, and text copies of the SystemVerilog examples are available from the author as described in the Preface.