

Contemporary Logic Design Katz 2nd Edition

Models that include a notion of time are ubiquitous in disciplines such as the natural sciences, engineering, philosophy, and linguistics, but in computing the abstractions provided by the traditional models are problematic and the discipline has spawned many novel models. This book is a systematic thorough presentation of the results of several decades of research on developing, analyzing, and applying time models to computing and engineering. After an opening motivation introducing the topics, structure and goals, the authors introduce the notions of formalism and model in general terms along with some of their fundamental classification criteria. In doing so they present the fundamentals of propositional and predicate logic, and essential issues that arise when modeling time across all types of system. Part I is a summary of the models that are traditional in engineering and the natural sciences, including fundamental computer science: dynamical systems and control theory; hardware design; and software algorithmic and complexity analysis. Part II covers advanced and specialized formalisms dealing with time modeling in heterogeneous software-intensive systems: formalisms that share finite state machines as common “ancestors”; Petri nets in many variants; notations based on mathematical logic, such as temporal logic; process algebras; and “dual-language approaches” combining two notations with different characteristics to model and verify complex systems, e.g., model-checking frameworks. Finally, the book concludes with summarizing remarks and hints towards future developments and open challenges. The presentation uses a rigorous, yet not overly technical, style, appropriate for readers with heterogeneous backgrounds, and each chapter is supplemented with detailed bibliographic remarks and carefully chosen exercises of varying difficulty and scope. The book is aimed at graduate students and researchers in computer science, while researchers and practitioners in other scientific and engineering disciplines interested in time modeling with a computational flavor will also find the book of value, and the comparative and conceptual approach makes this a valuable introduction for non-experts. The authors assume a basic knowledge of calculus, probability theory, algorithms, and programming, while a more advanced knowledge of automata, formal languages, and mathematical logic is useful.

In today’s digital design environment, engineers must achieve quick turn-around time with ready accesses to circuit synthesis and simulation applications. This type of productivity relies on the principles and practices of computer aided design (CAD). Digital Design: Basic Concepts and Principles addresses the many challenging issues critical to today’s digital design practices such as hazards and logic minimization, finite-state-machine synthesis, cycles and races, and testability theories while providing hands-on experience using one of the industry’s most popular design application, Xilinx Web PACK™. The authors begin by discussing conventional and unconventional number systems, binary coding theories, and arithmetic as well as logic functions and Boolean algebra. Building upon classic theories of digital systems, the book illustrates the importance of logic minimization using the Karnaugh map technique. It continues by discussing implementation options and examining the pros and cons of each method in addition to an assessment of tradeoffs that often accompany design practices. The book also covers testability, emphasizing that a

good digital design must be easy to verify and test with the lowest cost possible. Throughout the text, the authors analyze combinational and sequential logic elements and illustrate the designs of these components in structural, hierarchical, and behavior VHDL descriptions. Covering fundamentals and best practices, Digital Design: Basic Concepts and Principles provides you with critical knowledge of how each digital component ties together to form a system and develops the skills you need to design and simulate these digital components using modern CAD software.

This text is intended for a first course in digital logic design, at the sophomore or junior level, for electrical engineering, computer engineering and computer science programs, as well as for a number of other disciplines such as physics and mathematics. The book can also be used for self-study or for review by practicing engineers and computer scientists not intimately familiar with the subject. After completing this text, the student should be prepared for a second (advanced) course in digital design, switching and automata theory, microprocessors or computer organization. Request Inspection Copy

The authors have designed a tutorial text to provide scientists with a technical understanding of computer-based imaging systems and how these systems interact with digital image processing algorithms. Contents include Boolean logic, image processing, image compression, basic computer architecture, advanced architectures, image processors, operating systems, error detection and correction, local area networks, object-oriented design paradigms, and software engineering. Contains numerous figures and case studies. Annotation copyrighted by Book News, Inc., Portland, OR

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.

This book covers the basic concepts and principles of operating systems, showing how to apply them to the design and implementation of complete operating systems for embedded and real-time systems. It includes all the foundational and background information on ARM architecture, ARM instructions and programming, toolchain for developing programs, virtual machines for software implementation and testing, program execution image, function call conventions, run-time stack usage and link C programs with assembly code. It describes the design and implementation of a complete OS for embedded systems in incremental steps, explaining the design principles and implementation techniques. For Symmetric Multiprocessing (SMP) embedded systems, the author examines the ARM MPCore processors, which include the SCU and GIC for interrupts routing and interprocessor communication and synchronization by Software Generated Interrupts (SGIs). Throughout the book, complete working sample systems demonstrate the design principles and implementation techniques. The content is suitable for advanced-level and graduate students working in software engineering, programming, and systems theory.

Rather than yet another project-based workbook, *Arduino: A Technical Reference* is a reference and handbook that thoroughly describes the electrical and performance aspects of an Arduino board and its software. This book brings together in one place all the information you need to get something done with Arduino. It will save you from endless web searches and digging through translations of datasheets or notes in project-based texts to find the information that corresponds to your own particular setup and question. Reference features include pinout diagrams, a discussion of the AVR microcontrollers used with Arduino boards, a look under the hood at the firmware and run-time libraries that make the Arduino unique, and extensive coverage of the various shields and add-on sensors that can be used with an Arduino. One chapter is devoted to creating a new shield from scratch. The book wraps up with detailed descriptions of three different projects: a programmable signal generator, a "smart" thermostat, and a programmable launch sequencer for model rockets. Each project highlights one or more topics that can be applied to other applications.

Computing Handbook, Third Edition: Computer Science and Software Engineering mirrors the modern taxonomy of computer science and software engineering as described by the Association for Computing Machinery (ACM) and the IEEE Computer Society (IEEE-CS). Written by established leading experts and influential young researchers, the first volume of this popular handbook examines the elements involved in designing and implementing software, new areas in which computers are being used, and ways to solve computing problems. The book also explores our current understanding of software engineering and its effect on the practice of software development and the education of software professionals. Like the second volume, this first volume describes what occurs in research laboratories, educational institutions, and public and private organizations to advance the effective development and use of computers and computing in today's world. Research-level survey articles provide deep insights into the computing discipline, enabling readers to understand the principles and practices that drive computing education, research, and development in the twenty-first century.

Digital Logic with an Introduction to Verilog and FPGA-Based Design provides basic knowledge of field programmable gate array

(FPGA) design and implementation using Verilog, a hardware description language (HDL) commonly used in the design and verification of digital circuits. Emphasizing fundamental principles, this student-friendly textbook is an ideal resource for introductory digital logic courses. Chapters offer clear explanations of key concepts and step-by-step procedures that illustrate the real-world application of FPGA-based design. Designed for beginning students familiar with DC circuits and the C programming language, the text begins by describing of basic terminologies and essential concepts of digital integrated circuits using transistors. Subsequent chapters cover device level and logic level design in detail, including combinational and sequential circuits used in the design of microcontrollers and microprocessors. Topics include Boolean algebra and functions, analysis and design of sequential circuits using logic gates, FPGA-based implementation using CAD software tools, and combinational logic design using various HDLs with focus on Verilog.

Updated with modern coverage, a streamlined presentation, and excellent companion software, this seventh edition of FUNDAMENTALS OF LOGIC DESIGN achieves yet again an unmatched balance between theory and application. Authors Charles H. Roth, Jr. and Larry L. Kinney carefully present the theory that is necessary for understanding the fundamental concepts of logic design while not overwhelming students with the mathematics of switching theory. Divided into 20 easy-to-grasp study units, the book covers such fundamental concepts as Boolean algebra, logic gates design, flip-flops, and state machines. By combining flip-flops with networks of logic gates, students will learn to design counters, adders, sequence detectors, and simple digital systems. After covering the basics, this text presents modern design techniques using programmable logic devices and the VHDL hardware description language. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Although the notion is a relatively recent one, the notions and principles of Granular Computing (GrC) have appeared in a different guise in many related fields including granularity in Artificial Intelligence, interval computing, cluster analysis, quotient space theory and many others. Recent years have witnessed a renewed and expanding interest in the topic as it begins to play a key role in bioinformatics, e-commerce, machine learning, security, data mining and wireless mobile computing when it comes to the issues of effectiveness, robustness and uncertainty. The Handbook of Granular Computing offers a comprehensive reference source for the granular computing community, edited by and with contributions from leading experts in the field. Includes chapters covering the foundations of granular computing, interval analysis and fuzzy set theory; hybrid methods and models of granular computing; and applications and case studies. Divided into 5 sections: Preliminaries, Fundamentals, Methodology and Algorithms, Development of Hybrid Models and Applications and Case Studies. Presents the flow of ideas in a systematic, well-organized manner, starting with the concepts and motivation and proceeding to detailed design that materializes in specific algorithms, applications and case studies. Provides the reader with a self-contained reference that includes all pre-requisite knowledge, augmented with step-by-step explanations of more advanced concepts. The Handbook of Granular Computing represents a significant and valuable contribution to the literature and will appeal to a broad audience including researchers, students and

practitioners in the fields of Computational Intelligence, pattern recognition, fuzzy sets and neural networks, system modelling, operations research and bioinformatics.

"Engineering Digital Design" provides the most extensive coverage of any available textbook in digital logic and design. Modern notation combines with a state-of-the-art treatment of the most important subjects in digital design to provide the student with the background needed to enter industry or graduate study at a competitive level. Software programs, including a logic minimizer and a logic simulator, are provided on a CD-ROM and include detailed instructions for use.

Contemporary Logic Design Prentice Hall

A bestseller in its first edition, The Circuits and Filters Handbook has been thoroughly updated to provide the most current, most comprehensive information available in both the classical and emerging fields of circuits and filters, both analog and digital. This edition contains 29 new chapters, with significant additions in the areas of computer-

With an abundance of insightful examples, problems, and computer experiments, Introduction to Logic Design provides a balanced, easy-to-read treatment of the fundamental theory of logic functions and applications to the design of digital devices and systems. Requiring no prior knowledge of electrical circuits or electronics, it supplies the

Offering comprehensive, cutting-edge coverage, THE ATMEL AVR MICROCONTROLLER: MEGA AND XMEGA IN ASSEMBLY AND C delivers a systematic introduction to the popular Atmel 8-bit AVR microcontroller with an emphasis on the MEGA and XMEGA subfamilies. It begins with a concise and complete introduction to the assembly language programming before progressing to a review of C language syntax that helps with programming the AVR microcontroller. Emphasis is placed on a wide variety of peripheral functions useful in embedded system design. Vivid examples demonstrate the applications of each peripheral function, which are programmed using both the assembly and C languages. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

A coherent and integrated account of the leading UML 2 semantics work and the practical applications of UML semantics development With contributions from leading experts in the field, the book begins with an introduction to UML and goes on to offer in-depth and up-to-date coverage of: The role of semantics Considerations and rationale for a UML system model Definition of the UML system model UML descriptive semantics Axiomatic semantics of UML class diagrams The object constraint language Axiomatic semantics of state machines A coalgebraic semantic framework for reasoning about interaction designs Semantics of activity diagrams Verification of UML models State invariants Model transformation specification and verification Additionally, readers are provided with expert guidance on how to resolve semantic problems and a section on applications of UML semantics with model analysis. UML 2 Semantics and Applications is an ideal resource for researchers and tool-builders working in UML, among others. It is also an excellent textbook for postgraduate teaching and research.

In two editions spanning more than a decade, The Electrical Engineering Handbook stands as the definitive reference to the multidisciplinary field of electrical engineering. Our knowledge continues to grow, and so does the Handbook. For the third edition, it has expanded into a set of six books carefully focused on a specialized area or field of study. Each book represents a concise yet definitive collection of key concepts, models, and equations in its respective domain, thoughtfully gathered for convenient access. Computers, Software Engineering, and Digital Devices examines digital and logical devices, displays, testing, software, and computers, presenting the fundamental concepts needed to ensure a thorough understanding of each field. It treats the emerging fields of programmable logic, hardware description languages, and parallel computing in detail. Each article includes defining terms, references, and sources of further information. Encompassing the work of the world's foremost experts in their respective specialties, Computers, Software Engineering, and Digital Devices features the latest developments, the broadest scope of coverage, and new material on secure electronic commerce and parallel computing.

The omnipresence of electronic devices in our everyday lives has been accompanied by the downscaling of chip feature sizes and the ever increasing complexity of digital circuits. This book is devoted to the analysis and design of digital circuits, where the signal can assume only two possible logic levels. It deals with the basic principles and concepts of digital electronics. It addresses all aspects of combinational logic and provides a detailed understanding of logic gates that are the basic components in the implementation of circuits used to perform functions and operations of Boolean algebra. Combinational logic circuits are characterized by outputs that depend only on the actual input values. Efficient techniques to derive logic equations are proposed together with methods of analysis and synthesis of combinational logic circuits. Each chapter is well structured and is supplemented by a selection of solved exercises covering logic design practices.

As electronic devices become increasingly prevalent in everyday life, digital circuits are becoming even more complex and smaller in size. This book presents the basic principles of digital electronics in an accessible manner, allowing the reader to grasp the principles of combinational and sequential logic and the underlying techniques for the analysis and design of digital circuits. Providing a hands-on approach, this work introduces techniques and methods for establishing logic equations and designing and analyzing digital circuits. Each chapter is supplemented with practical examples and well-designed exercises with worked solutions. This second of three volumes focuses on sequential and arithmetic logic circuits. It covers various aspects related to the following topics: latch and flip-flop; binary counters; shift registers; arithmetic and logic circuits; digital integrated circuit technology; semiconductor memory; programmable logic circuits. Along with the two accompanying volumes, this book is an indispensable tool for students at a bachelors or masters level

seeking to improve their understanding of digital electronics, and is detailed enough to serve as a reference for electronic, automation and computer engineers.

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The book is divided into four major parts. Part I covers HDL constructs and synthesis of basic digital circuits. Part II provides an overview of embedded software development with the emphasis on low-level I/O access and drivers. Part III demonstrates the design and development of hardware and software for several complex I/O peripherals, including PS2 keyboard and mouse, a graphic video controller, an audio codec, and an SD (secure digital) card. Part IV provides three case studies of the integration of hardware accelerators, including a custom GCD (greatest common divisor) circuit, a Mandelbrot set fractal circuit, and an audio synthesizer based on DDFS (direct digital frequency synthesis) methodology. The book utilizes FPGA devices, Nios II soft-core processor, and development platform from Altera Co., which is one of the two main FPGA manufactures. Altera has a generous university program that provides free software and discounted prototyping boards for educational institutions (details at <http://www.altera.com/university>). The two main educational prototyping boards are known as DE1 (\$99) and DE2 (\$269). All experiments can be implemented and tested with these boards. A board combined with this book becomes a “turn-key” solution for the SoPC design experiments and projects. Most HDL and C codes in the book are device independent and can be adapted by other prototyping boards as long as a board has similar I/O configuration.

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.

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.

Updated to reflect the latest advances in the field, the Sixth Edition of Fundamentals of Digital Logic and Microcontrollers further enhances its reputation as the most accessible introduction to the basic principles and tools required in the design of digital systems. Features updates and revision to more than half of the material from the previous edition Offers an all-encompassing focus on the areas of computer design, digital logic, and digital systems, unlike other texts in the marketplace Written with clear and concise explanations of fundamental topics such as number system and Boolean algebra, and simplified examples and tutorials utilizing the PIC18F4321 microcontroller Covers an enhanced version of both combinational and sequential logic design, basics of computer organization, and microcontrollers

A hands-on introduction to FPGA prototyping and SoC design This Second Edition of the popular book follows the same "learning-by-doing" approach to teach the fundamentals and practices of VHDL synthesis and FPGA prototyping. It 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 strict design guidelines and coding practices used for large, complex digital systems. The new edition is completely updated. 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 revised 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) envelop 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. Introduces basic concepts of software-hardware co-design with Xilinx MicroBlaze MCS soft-core processor. Provides an overview of bus interconnect and interface circuit. Introduces basic embedded system software development. Suggests additional modules and peripherals for interesting and challenging projects. The FPGA Prototyping by VHDL Examples, Second Edition makes a natural companion text for introductory and advanced digital design courses and embedded system course. It also serves as an ideal self-teaching guide for practicing engineers who wish to learn more about this emerging area of interest.

Switching Theory for Logic Synthesis covers the basic topics of switching theory and logic synthesis in fourteen chapters. Chapters 1 through 5 provide the mathematical foundation. Chapters 6 through 8 include an introduction to sequential circuits, optimization of sequential machines and asynchronous sequential circuits. Chapters 9 through 14 are the main feature of the book. These chapters introduce and explain various topics that make up the subject of logic synthesis: multi-valued input two-valued output function, logic design for PLDs/FPGAs, EXOR-based design, and complexity theories of logic networks. An appendix providing a history of switching theory is included. The reference list consists of over four hundred entries. Switching Theory for Logic Synthesis is based on the author's lectures at Kyushu Institute of Technology as well as seminars for CAD engineers from various Japanese technology companies. Switching Theory for Logic Synthesis will be of interest to CAD professionals and students at the advanced level. It is also useful as a textbook, as each chapter contains examples, illustrations, and exercises.

This is a superb source of quickly accessible information on the whole area of electrical engineering and electronics. It serves as a concise and quick reference, with self-contained chapters comprising all important expressions, formulas, rules and theorems, as well as many examples and applications.

This third volume in the comprehensive Digital Electronics series, which explores the basic principles and concepts of digital circuits, focuses on finite state machines. These machines are characterized by a behavior that is determined by a limited and defined number of states, the holding conditions for each state, and the branching conditions from one state to another. They only allow one transition at a time and can be divided into two components: a combinational logic circuit and a sequential logic circuit. The approach is gradual and relatively independent of each other chapters. To facilitate the assimilation and practical implementation of various concepts, the book is complemented by a selection of practical exercises.

The methodology described in this book is the result of many years of research experience in the field of synthesizable VHDL design targeting FPGA based platforms. VHDL was first conceived as a documentation language for ASIC designs. Afterwards, the language was used for the behavioral simulation of ASICs, and also as a design input for synthesis tools. VHDL is a rich language, but just a small subset of it can be used to write synthesizable code, from which a physical circuit can be obtained. Usually VHDL books describe both, synthesis and simulation aspects of the language, but in this book the reader is conducted just through the features acceptable by synthesis tools. The book introduces the subjects in a gradual and concise way, providing just enough information for the reader to develop their synthesizable digital

systems in VHDL. The examples in the book were planned targeting an FPGA platform widely used around the world.

A self-contained treatment of fuzzy systems engineering, offering conceptual fundamentals, design methodologies, development guidelines, and carefully selected illustrative material. Forty years have passed since the birth of fuzzy sets, in which time a wealth of theoretical developments, conceptual pursuits, algorithmic environments, and other applications have emerged. Now, this reader-friendly book presents an up-to-date approach to fuzzy systems engineering, covering concepts, design methodologies, and algorithms coupled with interpretation, analysis, and underlying engineering knowledge. The result is a holistic view of fuzzy sets as a fundamental component of computational intelligence and human-centric systems. Throughout the book, the authors emphasize the direct applicability and limitations of the concepts being discussed, and historical and bibliographical notes are included in each chapter to help readers view the developments of fuzzy sets from a broader perspective. A radical departure from current books on the subject, Fuzzy Systems Engineering presents fuzzy sets as an enabling technology whose impact, contributions, and methodology stretch far beyond any specific discipline, making it applicable to researchers and practitioners in engineering, computer science, business, medicine, bioinformatics, and computational biology. Additionally, three appendices and classroom-ready electronic resources make it an ideal textbook for advanced undergraduate- and graduate-level courses in engineering and science.

Explores the unique hardware programmability of FPGA-based embedded systems, using a learn-by-doing approach to introduce the concepts and techniques for embedded SoPC design with Verilog. An SoPC (system on a programmable chip) integrates a processor, memory modules, I/O peripherals, and custom hardware accelerators into a single FPGA (field-programmable gate array) device. In addition to the customized software, customized hardware can be developed and incorporated into the embedded system as well—allowing us to configure the soft-core processor, create tailored I/O interfaces, and develop specialized hardware accelerators for computation-intensive tasks. Utilizing an Altera FPGA prototyping board and its Nios II soft-core processor, Embedded SoPC Design with Nios II Processor and Verilog Examples takes a "learn by doing" approach to illustrate the hardware and software design and development process by including realistic projects that can be implemented and tested on the board. Emphasizing hardware design and integration throughout, the book is divided into four major parts: Part I covers HDL and synthesis of custom hardware. Part II introduces the Nios II processor and provides an overview of embedded software development. Part III demonstrates the design and development of hardware and software of several complex I/O peripherals, including a PS2 keyboard and mouse, a graphic video controller, an audio codec, and an SD (secure digital) card. Part IV provides several case studies of the integration of hardware accelerators, including a custom GCD (greatest common divisor) circuit, a Mandelbrot set fractal circuit, and an audio synthesizer based on DDFS (direct digital frequency synthesis) methodology. While designing and developing an embedded SoPC can be rewarding, the learning can be a long and winding journey. This book shows the trail ahead and guides readers through the initial steps to exploit the full potential of this emerging methodology.

Understand the structure, behavior, and limitations of logic machines with this thoroughly updated third edition. Many new topics are included, such as CMOS gates, logic synthesis, logic design for emerging nanotechnologies, digital system testing, and asynchronous circuit design, to bring students up-to-speed with modern developments. The intuitive examples and minimal formalism of the previous edition are retained, giving students a text that is logical and easy to follow, yet rigorous. Kohavi and Jha begin with the basics, and then cover combinational logic design and testing, before moving on to more advanced topics in finite-state machine design and testing. Theory is made easier to understand with 200 illustrative examples, and students can test their understanding with over 350 end-of-chapter review questions.

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First published in 1995, The Engineering Handbook quickly became the definitive engineering reference. Although it remains a bestseller, the many advances realized in traditional engineering fields along with the emergence and rapid growth of fields such as biomedical engineering, computer engineering, and nanotechnology mean that the time has come to bring this standard-setting reference up to date. New in the Second Edition 19 completely new chapters addressing important topics in bioinstrumentation, control systems, nanotechnology, image and signal processing, electronics, environmental systems, structural systems 131 chapters fully revised and updated Expanded lists of engineering associations and societies The Engineering Handbook, Second Edition is designed to enlighten experts in areas outside their own specialties, to refresh the knowledge of mature practitioners, and to educate engineering novices. Whether you work in industry, government, or academia, this is simply the best, most useful engineering reference you can have in your personal, office, or institutional library.

When you think about how far and fast computer science has progressed in recent years, it's not hard to conclude that a seven-year old handbook may fall a little short of the kind of reference today's computer scientists, software engineers, and IT professionals need. With a broadened scope, more emphasis on applied computing, and more than 70 chap

This practical introduction explains exactly how digital circuits are designed, from the basic circuit to the advanced system. It covers combinational logic circuits, which collect logic signals, to sequential logic circuits, which embody time and memory to progress through sequences of states. The primer also highlights digital arithmetic and the integrated circuits that implement the logic functions. Based on the author's extensive experience in teaching digital electronics to undergraduates, the book translates theory directly into practice and presents the essential information in a compact, digestible style. Worked problems and examples are accompanied by abbreviated solutions, with demonstrations to ensure that the design material and the circuits' operation are fully understood. This is essential reading for any electronic or electrical engineering student new to digital electronics and requiring a succinct yet comprehensive introduction.

Master the principles of logic design with the exceptional balance of theory and application found in Roth/Kinney/John's FUNDAMENTALS OF LOGIC DESIGN, ENHANCED, 7th Edition. This edition introduces you to today's latest advances. The authors have carefully developed a clear presentation that introduces the fundamental concepts of logic design without overwhelming you with the mathematics of switching theory. Twenty engaging, easy-to-follow study units present basic concepts, such as Boolean algebra, logic gate design, flip-flops and state machines. You learn to design counters, adders, sequence detectors and simple digital systems. After mastering the basics, you progress to modern design techniques using programmable logic devices as well as VHDL hardware description language. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Fundamentals of Digital Logic and Microcomputer Design, has long been hailed for its clear and simple presentation of the principles and basic tools required to design typical digital systems such as microcomputers. In this Fifth Edition, the author focuses on computer design at three levels: the device level, the logic level, and the system level. Basic topics are covered, such as number systems and Boolean algebra, combinational and sequential logic design, as well as more advanced subjects such as assembly language programming and microprocessor-based system design. Numerous examples are provided throughout the text. Coverage includes: Digital circuits at the gate and flip-flop levels Analysis and design of combinational and sequential circuits Microcomputer organization, architecture, and programming concepts Design of computer instruction sets, CPU, memory, and I/O System design features associated with popular microprocessors from Intel and Motorola Future plans in microprocessor development An instructor's manual, available upon request Additionally, the accompanying CD-ROM,

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contains step-by-step procedures for installing and using Altera Quartus II software, MASM 6.11 (8086), and 68asmsim (68000), provides valuable simulation results via screen shots. Fundamentals of Digital Logic and Microcomputer Design is an essential reference that will provide you with the fundamental tools you need to design typical digital systems.

In the decade since the first edition of this book was published, the technologies of digital design have continued to evolve. The evolution has run along two related tracks: the underlying physical technology and the software tools that facilitate the application of new devices. The trends identified in the first edition have continued and promise to continue to do so. Programmable logic is virtually the norm for digital designers and the art of digital design now requires the software skills to deal with hardware description languages. Hardware designers now spend the majority of their time dealing with software. Specifically, the tools needed to efficiently map digital designs onto the emerging programmable devices that are growing more sophisticated. They capture their design specifications in software with language appropriate for describing the parallelism of hardware; they use software tools to simulate their designs and then to synthesize it into the implementation technology of choice. Design time is radically reduced, as market pressures require products to be introduced quickly at the right price and performance. Although the complexity of designs is necessitating ever more powerful abstractions, the fundamentals remain unchanged. The contemporary digital designer must have a much broader understanding of the discipline of computation, including both hardware and software. This broader perspective is present in this second edition.

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