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Digital Systems Design -

Introduction to Digital Systems Design - Giuliano Donzellini 2018-08-23

This book has been designed for a first course on digital design for engineering and computer science students. It offers an extensive introduction on fundamental theories, from Boolean algebra and binary arithmetic to sequential networks and finite state machines, together with the essential tools to design and simulate systems composed of a controller and a datapath. The numerous worked examples and solved exercises allow a better understanding and more effective learning. All of the examples and exercises can be run on the Deeds software, freely available online on a webpage developed and maintained by the authors. Thanks to the learning-by-doing approach and the plentiful examples, no prior knowledge in electronics or programming is required. Moreover, the book can be adapted to different level of education, with different targets and depth, be used for self-study, and even independently from the simulator. The book draws on the authors' extensive experience in teaching and developing learning materials.

Fundamentals of Digital Logic with VHDL Design - Stephen D. Brown 2005

Fundamentals of Digital Logic With VHDL Design teaches the basic design techniques for logic circuits. It emphasizes the synthesis of circuits and explains how circuits are implemented in real chips. Fundamental concepts are illustrated by using small examples, which are easy to understand. Then, a modular approach is used to show how larger circuits are designed. VHDL is used to demonstrate how the basic building blocks and larger systems are defined in a hardware description language, producing designs that can be implemented with modern CAD tools. The book emphasizes the concepts that should be covered in an introductory course on logic design, focusing on: Logic functions, gates, and rules of Boolean algebra
Circuit synthesis and optimization techniques
Number representation and arithmetic circuits
Combinational-circuit building blocks, such as multiplexers, decoders, encoders, and code converters
Sequential-circuit building blocks, such as flip-flops, registers, and counters
Design of synchronous sequential circuits
Use of the basic building blocks in designing larger systems
It also includes chapters that deal with important, but more advanced topics: Design of asynchronous sequential circuits
Testing of logic circuits
For students who have had no exposure to basic electronics, but are interested in learning a few key concepts, there is a chapter that presents the most basic aspects of electronic implementation of digital circuits. Major changes in the second edition of the book include new examples to clarify the presentation of fundamental concepts over 50 new examples of solved problems provided at the end of chapters
NAND and NOR gates now introduced in Chapter 2
more complete discussion of techniques for minimization of logic functions in Chapter 4 (including the tabular method)
a new chapter explaining the CAD flow for synthesis of logic circuits
Altera's Quartus II CAD software provided on a CD-ROM
three appendices that give tutorials on the use of Quartus II software

Circuit Design with VHDL, third edition - Volnei A. Pedroni 2020-04-14

A completely updated and expanded comprehensive treatment of VHDL and its applications to the design and simulation of real, industry-standard circuits. This comprehensive treatment of VHDL and its applications to the design and simulation of real, industry-standard circuits has been completely updated and expanded for the third edition. New features include all VHDL-2008 constructs, an extensive review of digital circuits, RTL analysis, and an unequalled collection of VHDL examples and exercises. The book

focuses on the use of VHDL rather than solely on the language, with an emphasis on design examples and laboratory exercises. The third edition begins with a detailed review of digital circuits (combinatorial, sequential, state machines, and FPGAs), thus providing a self-contained single reference for the teaching of digital circuit design with VHDL. In its coverage of VHDL-2008, it makes a clear distinction between VHDL for synthesis and VHDL for simulation. The text offers complete VHDL codes in examples as well as simulation results and comments. The significantly expanded examples and exercises include many not previously published, with multiple physical demonstrations meant to inspire and motivate students. The book is suitable for undergraduate and graduate students in VHDL and digital circuit design, and can be used as a professional reference for VHDL practitioners. It can also serve as a text for digital VLSI in-house or academic courses.

Digital System Design with VHDL - Mark Zwoliński 2000

Electronic systems based on digital principles are becoming ubiquitous. A good design approach to these systems is essential and a top-down methodology is favoured. Such an approach is vastly simplified by the use of computer modeling to describe the systems. VHDL is a formal language which allows a designer to model the behaviours and structure of a digital circuit on a computer before implementation. "Digital System Design with VHDL" is intended both for students on Digital Design courses and practitioners who would like to integrate digital design and VHDL synthesis in the workplace. Its unique approach combines the principles of digital design with a guide to the use of VHDL. Synthesis issues are discussed and practical guidelines are provided for improving simulation accuracy and performance. Features: a practical perspective is obtained by the inclusion of real-life examples
an emphasis on software engineering practices encourages clear coding and adequate documentation of the process
demonstrates the effects of particular coding styles on synthesis and simulation efficiency
covers the major VHDL standards
includes an appendix with examples in Verilog

RTL Hardware Design Using VHDL - Pong P. Chu 2006-04-20

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.

Digital Systems Design Using VHDL - Charles H. Roth, Jr. 2016-12-05

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.

Digital Systems Design Using Verilog - Charles Roth 2015-01-01

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.

Digital Design and Computer Architecture - Sarah Harris 2015-04-09

Digital Design and Computer Architecture: ARM Edition covers the fundamentals of digital logic design and reinforces logic concepts through the design of an ARM microprocessor. Combining an engaging and humorous writing style with an updated and hands-on approach to digital design, this book takes the reader from the fundamentals of digital logic to the actual design of an ARM processor. By the end of this book, readers will be able to build their own microprocessor and will have a top-to-bottom understanding of how it works. Beginning with digital logic gates and progressing to the design of combinational and sequential circuits, this book uses these fundamental building blocks as the basis for designing an ARM processor. SystemVerilog and VHDL are integrated throughout the text in examples illustrating the methods and techniques for CAD-based circuit design. The companion website includes a chapter on I/O systems with practical examples that show how to use the Raspberry Pi computer to communicate with peripheral devices such as LCDs, Bluetooth radios, and motors. This book will be a valuable resource for students taking a course that combines digital logic and computer architecture or students taking a two-quarter sequence in digital logic and computer organization/architecture. Covers the fundamentals of digital logic design and reinforces logic concepts through the design of an ARM microprocessor. Features side-by-side examples of the two most prominent Hardware Description Languages (HDLs)—SystemVerilog and VHDL—which illustrate and compare the ways each can be used in the design of digital systems. Includes examples throughout the text that enhance the reader's understanding and retention of key concepts and techniques. The Companion website includes a chapter on I/O systems with practical examples that show how to use the Raspberry Pi computer to communicate with peripheral devices such as LCDs, Bluetooth radios, and motors. The Companion website also includes appendices covering practical digital design issues and C programming as well as links to CAD tools, lecture slides, laboratory projects, and solutions to exercises.

Analysis and Design of Digital Systems with VHDL - Allen Mark Dewey 1997

ANALYSIS AND DESIGN OF DIGITAL SYSTEMS WITH VHDL integrates industry-standard hardware description language (VHDL) technology into the undergraduate digital logic course. Author Allen Dewey observes that the widespread use of VHDL in specifying digital system designs is driving change and innovation in industry, and defining a new skill set that engineering students must master to design, model, communicate, and implement digital systems. VHDL provides a formal mechanism for describing digital systems in a format easily processed by computers, succinctly capturing the basic concepts of digital

systems engineering and harnessing the power of design automation technology. This book first presents combinational and sequential systems and their design, along with logic families and integrated circuits. It then interlocks these subjects with discussions of structural and data flow modeling, synchronous behavior, and algorithmic modeling of digital systems in VHDL. This dual-track organization of conceptual and VHDL-related material makes the book easily adaptable to one- or two-semester courses and a variety of teaching approaches.

Digital Design, Preview Ed. - Frank Vahid 2009-11-17

Digital Design provides a modern approach to learning the increasingly important topic of digital systems design. The text's focus on register-transfer-level design and present-day applications not only leads to a better appreciation of computers and of today's ubiquitous digital devices, but also provides for a better understanding of careers involving digital design and embedded system design. 1. Introduction 2.

Combinational Logic Design 3. Sequential Logic Design-Controllers 4. Datapath Components 5. Register-Transfer Level (RTL) Design 6. Optimizations and Tradeoffs 7. Physical Implementation 8. Programmable Processors 9. Hardware Description Languages

Rapid Prototyping of Digital Systems - James O. Hamblen 2007-05-08

Rapid Prototyping of Digital Systems, Second Edition provides an exciting and challenging laboratory component for an undergraduate digital logic design class. The more advanced topics and exercises are also appropriate for consideration at schools that have an upper level course in digital logic or programmable logic. Design engineers working in industry will also want to consider this book for a rapid introduction to FPLD technology and logic synthesis using commercial CAD tools, especially if they have not had previous experience with the new and rapidly evolving technology. Two tutorials on the Altera CAD tool environment, an overview of programmable logic, and a design library with several easy-to-use input and output functions were developed for this book to help the reader get started quickly. Early design examples use schematic capture and library components. VHDL is used for more complex designs after a short introduction to VHDL-based synthesis. A coupon is included with the text for purchase of the new UP 1X board. The additional logic and memory in the UP 1X's FLEX 10K70 is useful on larger design projects such as computers and video games. The second edition includes an update chapter on programmable logic, new robot sensors and projects, optional Verilog examples, and a meta assembler which can be used to develop assemble language programs for the computer designs in Chapters 8 and 13.

Digital Systems Design with FPGAs and CPLDs - Ian Grout 2011-04-08

Digital Systems Design with FPGAs and CPLDs explains how to design and develop digital electronic systems using programmable logic devices (PLDs). Totally practical in nature, the book features numerous (quantify when known) case study designs using a variety of Field Programmable Gate Array (FPGA) and Complex Programmable Logic Devices (CPLD), for a range of applications from control and instrumentation to semiconductor automatic test equipment. Key features include: * Case studies that provide a walk through of the design process, highlighting the trade-offs involved. * Discussion of real world issues such as choice of device, pin-out, power supply, power supply decoupling, signal integrity- for embedding FPGAs within a PCB based design. With this book engineers will be able to: * Use PLD technology to develop digital and mixed signal electronic systems * Develop PLD based designs using both schematic capture and VHDL synthesis techniques * Interface a PLD to digital and mixed-signal systems * Undertake complete design exercises from design concept through to the build and test of PLD based electronic hardware This book will be ideal for electronic and computer engineering students taking a practical or Lab based course on digital systems development using PLDs and for engineers in industry looking for concrete advice on developing a digital system using a FPGA or CPLD as its core. Case studies that provide a walk through of the design process, highlighting the trade-offs involved. Discussion of real world issues such as choice of device, pin-out, power supply, power supply decoupling, signal integrity- for embedding FPGAs within a PCB based design.

Digital Design Using VHDL - William J. Dally 2016

Provides students with a system-level perspective and the tools they need to understand, analyze and design complete digital systems using VHDL. It goes beyond the design of simple combinational and sequential modules to show how such modules are used to build complete systems, reflecting digital design

in the real world.

Digital Systems Design Using VHDL - Charles H. Roth, Jr. 2008

This textbook is intended for a senior-level course in digital systems design. The book covers both basic principles of digital systems design and the use of a hardware description language, VHDL, in the design process.

Introduction to Logic Circuits & Logic Design with VHDL - Brock J. LaMeres 2019-03-27

This textbook introduces readers to the fundamental hardware used in modern computers. The only prerequisite is algebra, so it can be taken by college freshman or sophomore students or even used in Advanced Placement courses in high school. This book presents 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). This textbook enables readers to design digital systems using the modern HDL approach while ensuring they have a solid 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 content with learning goals and assessment at its core. Each section addresses a specific learning outcome that the learner should be able to "do" after its completion. The concept checks and exercise problems provide a rich set of assessment tools to measure learner performance on each outcome. This book can be used for either a sequence of two courses consisting of an introduction to logic circuits (Chapters 1-7) followed by logic design (Chapters 8-13) or a single, accelerated course that uses the early chapters as reference material.

Digital System Design with VHDL - Zwolinski 2004-09

The Designer's Guide to VHDL - Peter J. Ashenden 2002

"The second edition of The Designer's Guide to VHDL sets a new standard in VHDL texts. I am certain that you will find it a very valuable addition to your library." --From the foreword by Paul Menchini, Menchini & Associates Since the publication of the first edition of The Designer's Guide to VHDL in 1996, digital electronic systems have increased exponentially in their complexity, product lifetimes have dramatically shrunk, and reliability requirements have shot through the roof. As a result more and more designers have turned to VHDL to help them dramatically improve productivity as well as the quality of their designs. VHDL, the IEEE standard hardware description language for describing digital electronic systems, allows engineers to describe the structure and specify the function of a digital system as well as simulate and test it before manufacturing. In addition, designers use VHDL to synthesize a more detailed structure of the design, freeing them to concentrate on more strategic design decisions and reduce time to market. Adopted by designers around the world, the VHDL family of standards have recently been revised to address a range of issues, including portability across synthesis tools. This best-selling comprehensive tutorial for the language and authoritative reference on its use in hardware design at all levels--from system to gates--has been revised to reflect the new IEEE standard, VHDL-2001. Peter Ashenden, a member of the IEEE VHDL standards committee, presents the entire description language and builds a modeling methodology based on successful software engineering techniques. Reviewers on Amazon.com have consistently rated the first edition with five stars. This second edition updates the first, retaining the authors unique ability to teach this complex subject to a broad audience of students and practicing professionals. Features: Details how the new standard allows for increased portability across tools. Covers related standards, including the Numeric Synthesis Package and the Synthesis Operability Package, demonstrating how they can be used for digital systems design. Presents four extensive case studies to demonstrate and combine features of the language taught across multiple chapters. Requires only a minimal background in programming, making it an excellent tutorial for anyone in computer architecture, digital systems engineering, or CAD.

Digital Design (Verilog) - Peter J. Ashenden 2007-10-24

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 Synplicity, Mentor Graphics, and Xilinx, Verilog source code for all the examples in the book, lecture slides, laboratory projects, and solutions to exercises

VHDL - Zainalabedin Navabi 1998

The definitive guide to VHDL--now updated with the new VHDL93 standard! Here's the new second edition of the authoritative reference engineers need to guide them through the use of VHDL hardware description language in the analysis, simulation, and modeling of complicated microelectronic circuits. The number and depth of its relevant and practical examples and problems is what sets this edition apart from other VHDL texts. It includes extensive new material to bring the guide fully up to date with the new VHDL93 standard, including new chapters on design flow, interfacing, modeling, and timing, as well as appendixes on logic synthesis and description styles.

Verilog Digital System Design - Zainalabedin Navabi 1999

A much-needed, step-by-step tutorial to designing with Verilog--one of the most popular hardware description languages Each chapter features in-depth examples of Verilog coding, culminating at the end of the book in a fully designed central processing unit (CPU) CD-ROM featuring coded Verilog design examples A first-rate resource for digital designers, computer designer engineers, electrical engineers, and students

Digital Logic and Microprocessor Design with VHDL - Enoch O. Hwang 2006

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.

The Designer's Guide to VHDL - Peter J. Ashenden 2010-10-07

VHDL, the IEEE standard hardware description language for describing digital electronic systems, has recently been revised. The Designer's Guide to VHDL has become a standard in the industry for learning the features of VHDL and using it to verify hardware designs. This third edition is the first comprehensive book on the market to address the new features of VHDL-2008. First comprehensive book on VHDL to incorporate all new features of VHDL-2008, the latest release of the VHDL standard Helps readers get up to speed quickly with new features of the new standard Presents a structured guide to the modeling facilities offered by VHDL Shows how VHDL functions to help design digital systems Includes extensive case studies and source code used to develop testbenches and case study examples Helps readers gain maximum facility with VHDL for design of digital systems

Digital Systems Design With Vhdl And Synthesis: An Integrated Approach - Chang 2007-01-10

This book presents an integrated approach to digital design principles, processes, and implementations to help the reader design increasingly complex systems within shorter design cycles. It also introduces digital design concepts, VHDL coding, VHDL simulation, synthesis commands, and strategies together. · VHDL and Digital Circuit Primitives · VHDL Simulation and Synthesis Environment and Design Process · Basic Combinational Circuits · Basic Binary Arithmetic Circuits · Basic Sequential Circuits · Registers · Clock and Reset Circuits · Dual-Port RAM, FIFO, and DRAM Modeling · A Design Case Study: Finite Impulse Response Filter ASIC Design · A Design Case Study: A Microprogram Controller Design · Error Detection and

Correction· Fixed-Point Multiplication· Fixed-Point Division· Floating-Point Arithmetic

Digital Design with CPLD Applications and VHDL - Robert K. Dueck 2001

A guide that uses programmable logic as the vehicle for instructing readers in the principles of digital design. Following discussion of digital fundamentals, the book introduces readers to Complex Programmable Logic Devices. Graphic design files, VHDL files and simulation files are on the CD-ROM, so readers can run simulations or program CPLDs with error-free design files and use these files as templates for their own modifications.

Fundamentals of Digital and Computer Design with VHDL - Richard S. Sandige 2012

Introduction to Logic Circuits & Logic Design with Verilog - Brock J. LaMeres 2017-04-17

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 Electronics and Design with VHDL - Volnei A. Pedroni 2008-01-25

Digital Electronics and Design with VHDL offers a friendly presentation of the fundamental principles and practices of modern digital design. Unlike any other book in this field, transistor-level implementations are also included, which allow the readers to gain a solid understanding of a circuit's real potential and limitations, and to develop a realistic perspective on the practical design of actual integrated circuits. Coverage includes the largest selection available of digital circuits in all categories (combinational, sequential, logical, or arithmetic); and detailed digital design techniques, with a thorough discussion on state-machine modeling for the analysis and design of complex sequential systems. Key technologies used in modern circuits are also described, including Bipolar, MOS, ROM/RAM, and CPLD/FPGA chips, as well as codes and techniques used in data storage and transmission. Designs are illustrated by means of complete, realistic applications using VHDL, where the complete code, comments, and simulation results are included. This text is ideal for courses in Digital Design, Digital Logic, Digital Electronics, VLSI, and VHDL; and industry practitioners in digital electronics. Comprehensive coverage of fundamental digital concepts and principles, as well as complete, realistic, industry-standard designs Many circuits shown with internal details at the transistor-level, as in real integrated circuits Actual technologies used in state-of-the-art digital circuits presented in conjunction with fundamental concepts and principles Six chapters dedicated to VHDL-based techniques, with all VHDL-based designs synthesized onto CPLD/FPGA chips

Introduction to Logic Circuits & Logic Design with Verilog - Brock J. LaMeres 2019-04-10

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The Student's Guide to VHDL - Peter J. Ashenden 2008-05-19

The Student's Guide to VHDL is a condensed edition of The Designer's Guide to VHDL, the most widely used textbook on VHDL for digital system modeling. The Student's Guide is targeted as a supplemental

reference book for computer organization and digital design courses. Since publication of the first edition of The Student's Guide, the IEEE VHDL and related standards have been revised. The Designer's Guide has been revised to reflect the changes, so it is appropriate that The Student's Guide also be revised. In The Student's Guide to VHDL, 2nd Edition, we have included a design case study illustrating an FPGA-based design flow. The aim is to show how VHDL modeling fits into a design flow, starting from high-level design and proceeding through detailed design and verification, synthesis, FPGA place and route, and final timing verification. Inclusion of the case study helps to better serve the educational market. Currently, most college courses do not formally address the details of design flow. Students may be given informal guidance on how to proceed with lab projects. In many cases, it is left to students to work it out for themselves. The case study in The Student's Guide provides a reference design flow that can be adapted to a variety of lab projects.

Digital Logic Design Using Verilog - Vaibbhav Taraate 2016-05-17

This book is designed to serve as a hands-on professional reference with additional utility as a textbook for upper undergraduate and some graduate courses in digital logic design. This book is organized in such a way that that it can describe a number of RTL design scenarios, from simple to complex. The book constructs the logic design story from the fundamentals of logic design to advanced RTL design concepts. Keeping in view the importance of miniaturization today, the book gives practical information on the issues with ASIC RTL design and how to overcome these concerns. It clearly explains how to write an efficient RTL code and how to improve design performance. The book also describes advanced RTL design concepts such as low-power design, multiple clock-domain design, and SOC-based design. The practical orientation of the book makes it ideal for training programs for practicing design engineers and for short-term vocational programs. The contents of the book will also make it a useful read for students and hobbyists.

Digital System Design with FPGA: Implementation Using Verilog and VHDL - Cem Unsalan 2017-07-14

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

Digital Design - M. Morris Mano 2013

For courses on digital design in an Electrical Engineering, Computer Engineering, or Computer Science department. Digital Design, fifth edition is a modern update of the classic authoritative text on digital design. This book teaches the basic concepts of digital design in a clear, accessible manner. The book presents the basic tools for the design of digital circuits and provides procedures suitable for a variety of digital applications.

Digital System Design Using VHDL - Rishabh Anand 2013

The book covers the complete syllabus of subject as suggested by most of the universities in India. Generic VHDL code is taught and used through out the book so that different companies. VHDL tools can be used if desired. Moving from the unknown in a logical manner. Subject matter in each chapter develops systematically from inceptions. Large number of carefully selected worked examples in sufficient details. No other reference is required. Ideally suited for self-study.

Digital Logic and Microprocessor Design with Interfacing - ENOCH. HWANG 2017-01

Fundamentals of Digital Logic and Microcomputer Design - M. Rafiquzzaman 2005-07-08

Fundamentals of Digital Logic and Microcomputer Design, haslong been hailed for its clear and simple presentation of theprinciples and basic tools required to design typical digitalsystems such as microcomputers. In this Fifth Edition, the authorfocuses 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, contains step-by-step procedures for installing and using Altera Quartus II software, MASM 6.11 (8086), and 68asm (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.

Digital Design with RTL Design, VHDL, and Verilog - Frank Vahid 2010-03-09

An eagerly anticipated, up-to-date guide to essential digital design fundamentals Offering a modern, updated approach to digital design, this much-needed book reviews basic design fundamentals before diving into specific details of design optimization. You begin with an examination of the low-levels of design, noting a clear distinction between design and gate-level minimization. The author then progresses to the key uses of digital design today, and how it is used to build high-performance alternatives to software. Offers a fresh, up-to-date approach to digital design, whereas most literature available is sorely outdated Progresses through low levels of design, making a clear distinction between design and gate-level minimization Addresses the various uses of digital design today Enables you to gain a clearer understanding of applying digital design to your life With this book by your side, you'll gain a better understanding of how to apply the material in the book to real-world scenarios.

Engineering Digital Design - Richard F. Tinker 2000-01-18

Engineering Digital Design, Second Edition provides the most extensive coverage of any available textbook in digital logic and design. The new REVISED Second Edition published in September of 2002 provides 5 productivity tools free on the accompanying CD ROM. This software is also included on the Instructor's Manual CD ROM and complete instructions accompany each software program. In the REVISED Second Edition modern notation combines with 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. Combinatorial logic design and synchronous and asynchronous sequential machine design methods are given equal weight, and new ideas and design approaches are explored. The productivity tools provided on the accompanying CD are outlined below: [1] EXL-Sim2002 logic simulator: EXL-Sim2002 is a full-featured, interactive, schematic-capture and simulation program that is ideally suited for use with the text at either the entry or advanced-level of logic design. Its many features include drag-and-drop capability, rubber banding, mixed logic and positive logic simulations, macro generation, individual and global (or randomized) delay assignments, connection features that eliminate the need for wire connections, schematic page sizing and zooming, waveform zooming and scrolling, a variety of printout capabilities, and a host of other useful features. [2] BOOZER logic minimizer: BOOZER is a software minimization tool that is recommended for use with the text. It accepts entered variable (EV) or canonical (1's and 0's) data from K-maps or truth tables, with or without don't cares, and returns an optimal or near optimal single or multi-output solution. It can handle up to 12 functions Boolean functions and as many inputs when used on modern computers. [3] ESPRESSO II logic minimizer: ESPRESSO II is another software minimization tool widely used in schools and industry. It supports advanced heuristic algorithms for minimization of two-level, multi-output Boolean functions but does not accept entered variables. It is

also readily available from the University of California, Berkeley, 1986 VLSI Tools Distribution. [4] ADAM design software: ADAM (for Automated Design of Asynchronous Machines) is a very powerful productivity tool that permits the automated design of very complex asynchronous state machines, all free of timing defects. The input files are state tables for the desired state machines. The output files are given in the Berkeley format appropriate for directly programming PLAs. ADAM also allows the designer to design synchronous state machines, timing-defect-free. The options include the lumped path delay (LPD) model or NESTED CELL model for asynchronous FSM designs, and the use of D FLIP-FLOPs for synchronous FSM designs. The background for the use of ADAM is covered in Chapters 11, 14 and 16 of the REVISED 2nd Edition. [5] A-OPS design software: A-OPS (for Asynchronous One-hot Programmable Sequencers) is another very powerful productivity tool that permits the design of asynchronous and synchronous state machines by using a programmable sequencer kernel. This software generates a PLA or PAL output file (in Berkeley format) or the VHDL code for the automated timing-defect-free designs of the following: (a) Any 1-Hot programmable sequencer up to 10 states. (b) The 1-Hot design of multiple asynchronous or synchronous state machines driven by either PLDs or RAM. The input file is that of a state table for the desired state machine. This software can be used to design systems with the capability of instantly switching between several radically different controllers on a time-shared basis. The background for the use of A-OPS is covered in Chapters 13, 14 and 16 of the REVISED 2nd Edition.

Design Recipes for FPGAs: Using Verilog and VHDL - Peter Wilson 2011-02-24

Design Recipes for FPGAs: Using Verilog and VHDL provides a rich toolbox of design techniques and templates to solve practical, every-day problems using FPGAs. Using a modular structure, the book gives 'easy-to-find' design techniques and templates at all levels, together with functional code. Written in an informal and 'easy-to-grasp' style, it goes beyond the principles of FPGA s and hardware description languages to actually demonstrate how specific designs can be synthesized, simulated and downloaded onto an FPGA. This book's 'easy-to-find' structure begins with a design application to demonstrate the key building blocks of FPGA design and how to connect them, enabling the experienced FPGA designer to quickly select the right design for their application, while providing the less experienced a 'road map' to solving their specific design problem. The book also provides advanced techniques to create 'real world' designs that fit the device required and which are fast and reliable to implement. This text will appeal to FPGA designers of all levels of experience. It is also an ideal resource for embedded system development engineers, hardware and software engineers, and undergraduates and postgraduates studying an embedded system which focuses on FPGA design. A rich toolbox of practical FGPA design techniques at an engineer's finger tips Easy-to-find structure that allows the engineer to quickly locate the information to solve their FGPA design problem, and obtain the level of detail and understanding needed

VHDL and FPLDs in Digital Systems Design, Prototyping and Customization - Zoran Salcic 1998-04-30

This book represents an attempt to treat three aspects of digital systems, design, prototyping and customization, in an integrated manner using two major technologies: VHSIC Hardware Description Language (VHDL) as a modeling and specification tool, and Field-Programmable Logic Devices (FPLDs) as an implementation technology. They together make a very powerful combination for complex digital systems rapid design and prototyping as the important steps towards manufacturing, or, in the case of feasible quantities, they also provide fast system manufacturing. Combining these two technologies makes possible implementation of very complex digital systems at the desk. VHDL has become a standard tool to capture features of digital systems in a form of behavioral, dataflow or structural models providing a high degree of flexibility. When augmented by a good simulator, VHDL enables extensive verification of features of the system under design, reducing uncertainties at the latter phases of design process. As such, it becomes an unavoidable modeling tool to model digital systems at various levels of abstraction.