Xilinx Artix 7 Fpgas A New Performance Standard For Power

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NANO-CHIPS 2030 - Boris Murmann 2020-06-08
In this book, a global team of experts from academia, research institutes and industry presents their vision on how new nano-chip architectures will enable the performance and energy efficiency needed for AI-driven advancements in autonomous mobility, healthcare, and man-machine cooperation. Recent reviews of the status quo, as presented in CHIPS 2020 (Springer), have prompted the need for an urgent reassessment of opportunities in nanoelectronic information technology. As such, this book explores the foundations of a new era in nanoelectronics that will drive progress in intelligent chip systems for energy-efficient information technology, on-chip deep learning for data analytics, and quantum computing. Given its scope, this book provides a timely compendium that hopes to inspire and shape the future of nanoelectronics in the decades to come.
Architecting and Building High-Speed SoCs - Mounir Maaref 2022-12-09
Design a high-speed SoC while gaining a holistic view of the FPGA design flow and overcoming its challenges. Purchase of the print or kindle book includes a free eBook in the PDF format. Key Features Use development tools to implement and verify an SoC, including ARM CPUs and the FPGA logic Overcome the challenge of time to market by using FPGA SoCs and avoid the prohibitive ASIC NRE cost Understand the integration of custom logic accelerators and the SoC software and build them Book Description Modern and complex SoCs can adapt to many demanding system requirements by combining the processing power of ARM processors and the feature-rich Xilinx FPGAs. You'll need to understand many protocols, use a variety of internal and external interfaces, pinpoint the bottlenecks, and define the architecture of an SoC in an FPGA to produce a superior solution in a timely and cost-efficient manner. This book adopts a practical approach to helping you master both the hardware and software design flows, understand key interconnects and interfaces, analyze the system performance and enhance it using the acceleration techniques, and finally build an RTOS-based software application for an advanced SoC design. You'll start with an introduction to the FPGA SoCs technology fundamentals and their associated development design tools. Gradually, the book will guide you through building the SoC hardware and software, starting from the architecture definition to testing on a demo board or a virtual platform. The level of complexity evolves as the book progresses and covers advanced applications such as communications, security, and coherent hardware acceleration. By the end of this book, you'll have learned the concepts underlying FPGA SoCs' advanced features and you'll have constructed a high-speed SoC targeting a high-end FPGA from the ground up. What you will learn Understand SoC FPGAs' main features, advanced buses and interface protocols Develop and verify an SoC hardware platform targeting an FPGA-based SoC Explore and use the main tools for building the SoC hardware and software Build advanced SoCs using hardware acceleration with custom IPs Implement an OS-based software application targeting an FPGA-based SoC Understand the hardware and software integration techniques for SoC FPGAs Use tools to co-debug the SoC software and hardware Gain insights into communication and DSP principles in FPGA-based SoCs Who this book is for This book is for FPGA and ASIC hardware and firmware developers, IoT engineers, SoC architects, and anyone interested in understanding the process of developing a complex SoC, including all aspects of the hardware design and the associated firmware design. Prior knowledge of digital electronics, and some experience of coding in VHDL or Verilog and C or a similar language suitable for embedded systems will be required for using this book. A general understanding of FPGA and CPU architecture will also be helpful but not mandatory.
E-Business and Telecommunications - Mohammad S. Obaidat 2020-07-13
This book contains a compilation of the revised and extended versions of the best papers presented at the 16th International Joint Conference on E-Business and Telecommunications, ICETE 2019, held in Prague, Czech Republic, in July 2019. ICETE is a joint international conference integrating four major areas of knowledge that are divided into six corresponding conferences: International Conference on Data Communication Networking, DCNET; International Conference on E-Business, ICE-B; International Conference on Optical Communication Systems, OPTICS; International Conference on Security and Cryptography, SECRYPT; International Conference on Signal Processing and Multimedia, SIGMAP; International Conference on Wireless Information Systems, WINSYS. The 11 full papers presented in the volume were carefully reviewed and selected from the 166 submissions. The papers cover the following key areas of data communication networking, e-business, security and cryptography, signal processing and multimedia applications.
Industrial Networks and Intelligent Systems - Nguyen-Son Vo 2021-05-27
This book constitutes the refereed proceedings of the 7th EAI International Conference on Industrial Networks and Intelligent Systems, INISCOM 2021, held in Hanoi, Vietnam, in April 2021. The 39 full papers were selected from XX submissions and are organized thematically in tracks on telecommunications systems and networks; hardware, software and application designs; information processing and data analysis; industrial networks and intelligent systems; security and privacy.
Foundations of Embedded Systems - Alexander Barkalov 2019-02-04
This book is devoted to embedded systems (ESs), which can now be found in practically all fields of human activity. Embedded systems are essentially a special class of computing systems designed for monitoring and controlling objects of the physical world. The book begins by discussing the distinctive features of ESs, above all their cybernetic-physical character, and how they can be designed to deliver the required performance with a minimum amount of hardware. In turn, it presents a range of design methodologies. Considerable attention is paid to the hardware implementation of computational algorithms. It is shown that different parts of complex ESs could be implemented using models of finite state machines (FSMs). Also, field-programmable gate arrays (FPGAs) are very often used to implement different hardware accelerators in ESs. The book pays considerable attention to design methods for FPGA-based FSMs, before the closing section turns to programmable logic controllers widely used in industry. This book will be interesting and useful for students and postgraduates in the area of Computer Science, as well as for designers of embedded systems. In addition, it offers a good point of departure for creating embedded systems for various spheres of human activity.
Applications in Electronics Pervading Industry, Environment and Society - Sergio Saponara 2021-06-04
This book features the manuscripts accepted for the Special Issue “Applications in Electronics Pervading Industry, Environment and Society—Sensing Systems and Pervasive Intelligence” of the MDPI journal Sensors. Most of the papers come from a selection of the best papers of the 2019 edition of the “Applications in Electronics Pervading Industry, Environment and Society” (APPLEPIES) Conference, which was held in November 2019. All these papers have been significantly enhanced with novel experimental results. The papers give an overview of the trends in research and development activities concerning the pervasive application of electronics in industry, the environment, and society. The focus of these papers is

on cyber physical systems (CPS), with research proposals for new sensor acquisition and ADC (analog to digital converter) methods, high-speed communication systems, cybersecurity, big data management, and data processing including emerging machine learning techniques. Physical implementation aspects are discussed as well as the trade-off found between functional performance and hardware/system costs.

Recent Developments and the New Direction in Soft-Computing Foundations and Applications - Lotfi A. Zadeh 2018-05-28

This book is an authoritative collection of contributions in the field of soft-computing. Based on selected works presented at the 6th World Conference on Soft Computing, held on May 22-25, 2016, in Berkeley, USA, it describes new theoretical advances, as well as cutting-edge methods and applications. Theories cover a wealth of topics, such as fuzzy logic, cognitive modeling, Bayesian and probabilistic methods, multi-criteria decision making, utility theory, approximate reasoning, human-centric computing and many others. Applications concerns a number of fields, such as internet and semantic web, social networks and trust, control and robotics, computer vision, medicine and bioinformatics, as well as finance, security and e-Commerce, among others. Dedicated to the 50th Anniversary of Fuzzy Logic and to the 95th Birthday Anniversary of Lotfi A. Zadeh, the book not only offers a timely view on the field, yet it also discusses thought-provoking developments and challenges, thus fostering new research directions in the diverse areas of soft computing.

Logic Synthesis and SOC Prototyping - Vaibbhav Taraate 2020-01-03

This book describes RTL design, synthesis, and timing closure strategies for SOC blocks. It covers high-level RTL design scenarios and challenges for SOC design. The book gives practical information on the issues in SOC and ASIC prototyping using modern high-density FPGAs. The book covers SOC performance improvement techniques, testing, and system-level verification. The book also describes the modern Xilinx FPGA architecture and their use in SOC prototyping. The book covers the Synopsys DC, PT commands, and use of them to constraint and to optimize SOC design. The contents of this book will be of use to students, professionals, and hobbyists alike.

Advances in Communications, Signal Processing, and VLSI - T. Laxminidhi 2021-04-12

This book comprises the peer-reviewed proceedings of the International Conference on Communications, Signal Processing and VLSI (IC2SV) 2019. It explores the recent advances in the fields of signal and image processing, wireless and mobile communications, embedded systems, VLSI, microwave, and antennas. The contents provide insights into present technological challenges and discusses the emerging applications of different imaging techniques and communications systems. Given the range of topics covered, this book can be useful for students as well as researchers interested in the area of communications, signal processing, and VLSI technologies.

Design Methodologies and Tools for 5G Network Development and Application - Suresh, P. 2020-12-25

The demand for mobile broadband will continue to increase in upcoming years, largely driven by the need to deliver ultra-high definition video. 5G is not only evolutionary, it also provides higher bandwidth and lower latency than the current-generation technology. More importantly, 5G is revolutionary in that it is expected to enable fundamentally new applications with much more stringent requirements in latency and bandwidth. 5G should help solve the last-mile/last-kilometer problem and provide broadband access to the next billion users on earth at a much lower cost because of its use of new spectrum and its improvements in spectral efficiency. 5G wireless access networks will need to combine several innovative aspects of decentralized and centralized allocation looking to maximize performance and minimize signaling load. Research is currently conducted to understand the inspirations, requirements, and the promising technical options to boost and enrich activities in 5G. Design Methodologies and Tools for 5G Network Development and Application presents the enhancement methods of 5G communication, explores the methods for faster communication, and provides a promising alternative solution that equips designers with the capability to produce high performance, scalable, and adoptable communication protocol. This book provides complete design methodologies, supporting tools for 5G communication, and innovative works. The design and evaluation of different proposed 5G structures signal integrity, reliability, low-power techniques, application mapping, testing, and future trends. This book is ideal for researchers who are working in communication, networks, design and implementations, industry personnel, engineers, practitioners, academicians, and students who are interested in the evolution, importance, usage, and technology adoption for 5G applications.

Secure Smart Embedded Devices, Platforms and Applications - Konstantinos Markantonakis 2013-09-14

New generations of IT users are increasingly abstracted from the underlying devices and platforms that provide and safeguard their services. As a result they may have little awareness that they are critically dependent on the embedded security devices that are becoming pervasive in daily modern life. Secure Smart Embedded Devices, Platforms and Applications provides a broad overview of the many security and practical issues of embedded devices, tokens, and their operation systems, platforms and main applications. It also addresses a diverse range of industry/government initiatives and considerations, while focusing strongly on technical and practical security issues. The benefits and pitfalls of developing and deploying applications that rely on embedded systems and their security functionality are presented. A sufficient level of technical detail to support embedded systems is provided throughout the text, although the book is quite readable for those seeking awareness through an initial overview of the topics. This edited volume benefits from the contributions of industry and academic experts and helps provide a cross-discipline overview of the security and practical issues for embedded systems, tokens, and platforms. It is an ideal complement to the earlier work, Smart Cards Tokens, Security and Applications from the same editors.

Progress in Cryptology – INDOCRYPT 2021 - Avishek Adhikari 2021-12-08

This book constitutes the refereed proceedings of the 22nd International Conference on Cryptology in India, INDOCRYPT 2021, which was held in Jaipur, India, during December 12-15, 2021. The 27 full papers included in these proceedings were carefully reviewed and selected from 65 submissions. They were organized in topical sections as follows: authenticated encryption; symmetric cryptography; lightweight cryptography; side-channel attacks; fault attacks; post-quantum cryptography; public key encryption and protocols; cryptographic constructions; blockchains.

Hardware Oriented Authenticated Encryption Based on Tweakable Block Ciphers - Mustafa Khairallah 2021-11-17

This book presents the use of tweakable block ciphers for lightweight authenticated encryption, especially applications targeted toward hardware acceleration where such efficient schemes have demonstrated competitive performance and strong provable security with large margins. The first part of the book describes and analyzes the hardware implementation aspects of state-of-the-art tweakable block cipher-based mode ΘCB3. With this approach, a framework for studying a class of tweakable block cipher-based schemes is developed and two family of authenticated encryption algorithms are designed for the lightweight standardization project initiated by the National Institute of Standards and Technology (NIST): Romulus and Remus. The Romulus family is a finalist for standardization and targets a wide range of applications and performance trade-offs which will prove interesting to engineers, hardware designers, and students who work in symmetric key cryptography.

Smart Card Research and Advanced Applications - Vincent Grosso 2022

This book constitutes the proceedings of the 20th International Conference on Smart Card Research and Advanced Applications, CARDIS 2021, which took place in November 2021. The conference took place in Lubeck, Germany, and changed to a hybrid format due to the COVID-19 pandemic. The 16 full papers presented in this volume were carefully reviewed and selected from 32 submissions. They were organized in topical sections named Side-Channel Attacks, Fault Attacks, Public Key and Secure Implementations.

Advanced HDL Synthesis and SOC Prototyping - Vaibbhav Taraate 2018-12-15

This book describes RTL design using Verilog, synthesis and timing closure for System On Chip (SOC) design blocks. It covers the complex RTL design scenarios and challenges for SOC designs and provides practical information on performance improvements in SOC, as well as Application Specific Integrated Circuit (ASIC) designs. Prototyping using modern high density Field Programmable Gate Arrays (FPGAs) is discussed in this book with the practical examples and case studies. The book discusses SOC design, performance improvement techniques, testing and system level verification, while also describing the modern Intel FPGA/XILINX FPGA architectures and their use in SOC prototyping. Further, the book covers

the Synopsys Design Compiler (DC) and Prime Time (PT) commands, and how they can be used to optimize complex ASIC/SOC designs. The contents of this book will be useful to students and professionals alike.

Embedded Microprocessor System Design using FPGAs - Uwe Meyer-Baese 2021-04-16

This textbook for courses in Embedded Systems introduces students to necessary concepts, through a hands-on approach. It gives a great introduction to FPGA-based microprocessor system design using state-of-the-art boards, tools, and microprocessors from Altera/Intel® and Xilinx®. HDL-based designs (soft-core), parameterized cores (Nios II and MicroBlaze), and ARM Cortex-A9 design are discussed, compared and explored using many hand-on designs projects. Custom IP for HDMI coder, Floating-point operations, and FFT bit-swap are developed, implemented, tested and speed-up is measured. Downloadable files include all design examples such as basic processor synthesizable code for Xilinx and Altera tools for PicoBlaze, MicroBlaze, Nios II and ARMv7 architectures in VHDL and Verilog code, as well as the custom IP projects. Each Chapter has a substantial number of short quiz questions, exercises, and challenging projects. Explains soft, parameterized, and hard core systems design tradeoffs; Demonstrates design of popular KCPSM6 8 Bit microprocessor step-by-step; Discusses the 32 Bit ARM Cortex-A9 and a basic processor is synthesized; Covers design flows for both FPGA Market leaders Nios II Altera/Intel and MicroBlaze Xilinx system; Describes Compiler-Compiler Tool development; Includes a substantial number of Homework's and FPGA exercises and design projects in each chapter.

Selected Areas in Cryptography -- SAC 2014 - Antoine Joux 2014-12-04

This book constitutes the proceedings of the 21st International Conference on Selected Areas in Cryptography, SAC 2014, held in Montreal, QC, Canada, in August 2014. The 22 papers presented in this volume were carefully reviewed and selected from 103 submissions. There are four areas covered at each SAC conference. The three permanent areas are: design and analysis of symmetric key primitives and cryptosystems, including block and stream ciphers, hash function, MAC algorithms, cryptographic permutations, and authenticated encryption schemes; efficient implementations of symmetric and public key algorithms; mathematical and algorithmic aspects of applied cryptology. This year, the fourth area for SAC 2014 is: algorithms for cryptography, cryptanalysis and their complexity analysis.

Topics in Cryptology – CT-RSA 2020 - Stanislaw Jarecki 2020-02-14

This book constitutes the refereed proceedings of the Cryptographer's Track at the RSA Conference 2020, CT-RSA 2020, held in San Francisco, CA, USA, in February 2020. The 28 papers presented in this volume were carefully reviewed and selected from 95 submissions. CT-RSA is the track devoted to scientific papers on cryptography, public-key to symmetric-key cryptography and from crypto-graphic protocols to primitives and their implementation security.

Highly Integrated Low Power Radars - Sergio Saponara 2014-06-01

In recent years, advances in radio detection and ranging technology, sustained by new achievements in the fields of signal processing and electronic components, have permitted the adoption of radars in many civil and defense applications. This resource discusses how highly integrated radar has been adopted by several new markets such as contactless vital sign monitoring (heart rate, breath rate) or harbour traffic control, as well as several applications for vehicle driver assistance. You are provided with scenarios, applications, and requirements, while focusing on the trade-offs between flexibility, programmability, power consumption, size and weight, and complexity.

Communication, Software and Networks - Vikrant Bhateja 2022-12-08

This book highlights a collection of high-quality peer-reviewed research papers presented at the 7th International Conference on Information System Design and Intelligent Applications (INDIA 2022), held at BVRIT Hyderabad College of Engineering for Women, Hyderabad, Telangana, India, from February 25–26, 2022. It covers a wide range of topics in computer science and information technology, from wireless networks, social networks, wireless sensor networks, information and network security, to web security, Internet of Things, bioinformatics, geoinformatics, and computer networks.

Image Processing Using FPGAs - Donald Bailey 2019-06-11

This book presents a selection of papers representing current research on using field programmable gate arrays (FPGAs) for realising image processing algorithms. These papers are reprints of papers selected for a Special Issue of the Journal of Imaging on image processing using FPGAs. A diverse range of topics is covered, including parallel soft processors, memory management, image filters, segmentation, clustering, image analysis, and image compression. Applications include traffic sign recognition for autonomous driving, cell detection for histopathology, and video compression. Collectively, they represent the current state-of-the-art on image processing using FPGAs.

AI Techniques for Reliability Prediction for Electronic Components - Bhargava, Cherry 2019-12-06

In the industry of manufacturing and design, one major constraint has been enhancing operating performance using less time. As technology continues to advance, manufacturers are looking for better methods in predicting the condition and residual lifetime of electronic devices in order to save repair costs and their reputation. Intelligent systems are a solution for predicting the reliability of these components; however, there is a lack of research on the advancements of this smart technology within the manufacturing industry. AI Techniques for Reliability Prediction for Electronic Components provides emerging research exploring the theoretical and practical aspects of prediction methods using artificial intelligence and machine learning in the manufacturing field. Featuring coverage on a broad range of topics such as data collection, fault tolerance, and health prognostics, this book is ideally designed for reliability engineers, electronic engineers, researchers, scientists, students, and faculty members seeking current research on the advancement of reliability analysis using AI.

Sensors for Everyday Life - Octavian Adrian Postolache 2016-10-27

Sensors were developed to detect and quantify structures and functions of human body as well as to gather information from the environment in order to optimize the efficiency, cost-effectiveness and quality of healthcare services as well as to improve health and quality of life. This book offers an up-to-date overview of the concepts, modeling, technical and technological details and practical applications of different types of sensors. It also discusses the trends for the next generation of sensors and systems for healthcare settings. It is aimed at researchers and graduate students in the field of healthcare technologies, as well as academics and industry professionals involved in developing sensing systems for human body structures and functions, and for monitoring activities and health.

FPGA Programming for Beginners - Frank Bruno 2021-03-05

Get started with FPGA programming using SystemVerilog, and develop real-world skills by building projects, including a calculator and a keyboard Key FeaturesExplore different FPGA usage methods and the FPGA tool flowLearn how to design, test, and implement hardware circuits using SystemVerilogBuild real-world FPGA projects such as a calculator and a keyboard using FPGA resourcesBook Description Field Programmable Gate Arrays (FPGAs) have now become a core part of most modern electronic and computer systems. However, to implement your ideas in the real world, you need to get your head around the FPGA architecture, its toolset, and critical design considerations. FPGA Programming for Beginners will help you bring your ideas to life by guiding you through the entire process of programming FPGAs and designing hardware circuits using SystemVerilog. The book will introduce you to the FPGA and Xilinx architectures and show you how to work on your first project, which includes toggling an LED. You'll then cover SystemVerilog RTL designs and their implementations. Next, you'll get to grips with using the combinational Boolean logic design and work on several projects, such as creating a calculator and updating it using FPGA resources. Later, the book will take you through the advanced concepts of AXI and show you how to create a keyboard using PS/2. Finally, you'll be able to consolidate all the projects in the book to create a unified output using a Video Graphics Array (VGA) controller that you'll design. By the end of this SystemVerilog FPGA book, you'll have learned how to work with FPGA systems and be able to design hardware circuits and boards using SystemVerilog programming. What you will learnUnderstand the FPGA architecture and its implementationGet to grips with writing SystemVerilog RTLMake FPGA projects using SystemVerilog programmingWork with computer math basics, parallelism, and pipeliningExplore the advanced topics of AXI and keyboard interfacing with PS/2Discover how you can implement a VGA interface in your projectsWho this book is for This FPGA design book is for embedded system developers, engineers, and programmers who want to learn FPGA and SystemVerilog programming from scratch. FPGA designers looking to gain hands-on experience in working on real-world projects will also find this book useful.

Design for Embedded Image Processing on FPGAs - Donald G. Bailey 2011-06-13

Dr Donald Bailey starts with introductory material considering the problem of embedded image processing,

and how some of the issues may be solved using parallel hardware solutions. Field programmable gate arrays (FPGAs) are introduced as a technology that provides flexible, fine-grained hardware that can readily exploit parallelism within many image processing algorithms. A brief review of FPGA programming languages provides the link between a software mindset normally associated with image processing algorithms, and the hardware mindset required for efficient utilization of a parallel hardware design. The design process for implementing an image processing algorithm on an FPGA is compared with that for a conventional software implementation, with the key differences highlighted. Particular attention is given to the techniques for mapping an algorithm onto an FPGA implementation, considering timing, memory bandwidth and resource constraints, and efficient hardware computational techniques. Extensive coverage is given of a range of low and intermediate level image processing operations, discussing efficient implementations and how these may vary according to the application. The techniques are illustrated with several example applications or case studies from projects or applications he has been involved with. Issues such as interfacing between the FPGA and peripheral devices are covered briefly, as is designing the system in such a way that it can be more readily debugged and tuned. Provides a bridge between algorithms and hardware Demonstrates how to avoid many of the potential pitfalls Offers practical recommendations and solutions Illustrates several real-world applications and case studies Allows those with software backgrounds to understand efficient hardware implementation Design for Embedded Image Processing on FPGAs is ideal for researchers and engineers in the vision or image processing industry, who are looking at smart sensors, machine vision, and robotic vision, as well as FPGA developers and application engineers. The book can also be used by graduate students studying imaging systems, computer engineering, digital design, circuit design, or computer science. It can also be used as supplementary text for courses in advanced digital design, algorithm and hardware implementation, and digital signal processing and applications. Companion website for the book: www.wiley.com/go/bailey/fpga

Architecting High-Performance Embedded Systems - Jim Ledin 2021-02-05

Explore the complete process of developing systems based on field-programmable gate arrays (FPGAs), including the design of electronic circuits and the construction and debugging of prototype embedded devices Key FeaturesLearn the basics of embedded systems and real-time operating systemsUnderstand how FPGAs implement processing algorithms in hardwareDesign, construct, and debug custom digital systems from scratch using KiCadBook Description Modern digital devices used in homes, cars, and wearables contain highly sophisticated computing capabilities composed of embedded systems that generate, receive, and process digital data streams at rates up to multiple gigabits per second. This book will show you how to use Field Programmable Gate Arrays (FPGAs) and high-speed digital circuit design to create your own cutting-edge digital systems. Architecting High-Performance Embedded Systems takes you through the fundamental concepts of embedded systems, including real-time operation and the Internet of Things (IoT), and the architecture and capabilities of the latest generation of FPGAs. Using powerful free tools for FPGA design and electronic circuit design, you'll learn how to design, build, test, and debug high-performance FPGA-based IoT devices. The book will also help you get up to speed with embedded system design, circuit design, hardware construction, firmware development, and debugging to produce a high-performance embedded device – a network-based digital oscilloscope. You'll explore techniques such as designing four-layer printed circuit boards with high-speed differential signal pairs and assembling the board using surface-mount components. By the end of the book, you'll have a solid understanding of the concepts underlying embedded systems and FPGAs and will be able to design and construct your own sophisticated digital devices. What you will learnUnderstand the fundamentals of real-time embedded systems and sensorsDiscover the capabilities of FPGAs and how to use FPGA development toolsLearn the principles of digital circuit design and PCB layout with KiCadConstruct high-speed circuit board prototypes at low costDesign and develop high-performance algorithms for FPGAsDevelop robust, reliable, and efficient firmware in CThoroughly test and debug embedded device hardware and firmwareWho this book is for This book is for software developers, IoT engineers, and anyone who wants to understand the process of developing high-performance embedded systems. You'll also find this book useful if you want to learn about the fundamentals of FPGA development and all aspects of firmware development in C and C++. Familiarity with the C language, digital circuits, and electronic soldering is necessary to get started.

Ubiquitous Security - Guojun Wang 2022

This volume constitutes selected papers presented at the First International Conference on Ubiquitous Security, UbiSec 2021, held in Guangzhou, China, in December 2021. The presented 26 full papers and 2 short papers were thoroughly reviewed and selected from the 96 submissions. They focus on security, privacy and anonymity aspects in cyberspace, physical world, and social networks.

Analysis for Power Quality Monitoring - Juan-José González de la Rosa 2020-05-22

We are immersed in the so-called digital energy network, continuously introducing new technological advances for a better way of life. Numerous emerging words are in the spotlight, namely: Internet of Things (IoT), Big Data, Smart Cities, Smart Grid, Industry 4.0, etc. To achieve this formidable goal, systems should work more efficiently, and this fact inevitably leads to power quality (PQ) assurance. Apart from its economic losses, a bad PQ implies serious risks for machines, and consequently for people. Many researchers are endeavoring to develop new analysis techniques, instruments, measurement methods, and new indices and norms that match and fulfil the requirements regarding the current operation of the electrical network. This book offers a compilation of the some recent advances in this field. The chapters range from computing issues to technological implementations, going through event detection strategies and new indices and measurement methods that contribute significantly to the advancement of PQ analysis. Experiments have been developed within the frames of research units and projects, and deal with real data from industry and public buildings. Human beings have an unavoidable commitment with sustainability, which implies adapting PQ monitoring techniques to our dynamic world, defining a digital and smart concept of quality for electricity.

Applied Reconfigurable Computing. Architectures, Tools, and Applications - Steven Derrien 2021-06-23

This book constitutes the proceedings of the 17th International Symposium on Applied Reconfigurable Computing, ARC 2021, held as a virtual event, in June 2021. The 14 full papers and 11 short presentations presented in this volume were carefully reviewed and selected from 40 submissions. The papers cover a broad spectrum of applications of reconfigurable computing, from driving assistance, data and graph processing acceleration, computer security to the societal relevant topic of supporting early diagnosis of Covid infectious conditions.

Applied Reconfigurable Computing - Vanderlei Bonato 2016-03-15

This book constitutes the refereed proceedings of the 12th International Symposium on Applied Reconfigurable Computing, ARC 2016, held in Rio de Janeiro, Brazil, in March 2016. The 20 full papers presented in this volume were carefully reviewed and selected from 47 submissions. They are organized in topical headings named: video and image processing; fault-tolerant systems; tools and architectures; signal processing; and multicore systems. In addition, the book contains 3 invited papers and 8 poster papers on funded RD running and completed projects.

Principles and Structures of FPGAs - Hideharu Amano 2018-09-03

This comprehensive textbook on the field programmable gate array (FPGA) covers its history, fundamental knowledge, architectures, device technologies, computer-aided design technologies, design tools, examples of application, and future trends. Programmable logic devices represented by FPGAs have been rapidly developed in recent years and have become key electronic devices used in most IT products. This book provides both complete introductions suitable for students and beginners, and high-level techniques useful for engineers and researchers in this field. Differently developed from usual integrated circuits, the FPGA has unique structures, design methodologies, and application techniques. Allowing programming by users, the device can dramatically reduce the rising cost of development in advanced semiconductor chips. The FPGA is now driving the most advanced semiconductor processes and is an all-in-one platform combining memory, CPUs, and various peripheral interfaces. This book introduces the FPGA from various aspects for readers of different levels. Novice learners can acquire a fundamental knowledge of the FPGA, including its history, from Chapter 1; the first half of Chapter 2; and Chapter 4. Professionals who are already familiar with the device will gain a deeper understanding of the structures and design methodologies from Chapters 3 and 5. Chapters 6–8 also provide advanced techniques and cutting-edge applications and trends useful for professionals. Although the first parts are mainly suitable for students, the advanced sections of the book will be valuable for professionals in acquiring an in-depth understanding of the FPGA to maximize the

performance of the device.

Wireless Multimedia Sensor Networks on Reconfigurable Hardware - Li-minn Ang 2013-11-19

Traditional wireless sensor networks (WSNs) capture scalar data such as temperature, vibration, pressure, or humidity. Motivated by the success of WSNs and also with the emergence of new technology in the form of low-cost image sensors, researchers have proposed combining image and audio sensors with WSNs to form wireless multimedia sensor networks (WMSNs). This introduces practical and research challenges, because multimedia sensors, particularly image sensors, generate huge amounts of data to be processed and distributed within the network, while sensor nodes have restricted battery power and hardware resources. This book describes how reconfigurable hardware technologies such as field-programmable gate arrays (FPGAs) offer cost-effective, flexible platforms for implementing WMSNs, with a main focus on developing efficient algorithms and architectures for information reduction, including event detection, event compression, and multicamera processing for hardware implementations. The authors include a comprehensive review of wireless multimedia sensor networks, a complete specification of a very low-complexity, low-memory FPGA WMSN node processor, and several case studies that illustrate information reduction algorithms for visual event compression, detection, and fusion. The book will be of interest to academic researchers, R&D engineers, and computer science and engineering graduate students engaged with signal and video processing, computer vision, embedded systems, and sensor networks.

Tools for High Performance Computing 2016 - Christoph Niethammer 2017-05-06

This book presents the proceedings of the 10th International Parallel Tools Workshop, held October 4-5, 2016 in Stuttgart, Germany – a forum to discuss the latest advances in parallel tools. High-performance computing plays an increasingly important role for numerical simulation and modelling in academic and industrial research. At the same time, using large-scale parallel systems efficiently is becoming more difficult. A number of tools addressing parallel program development and analysis have emerged from the high-performance computing community over the last decade, and what may have started as collection of small helper script has now matured to production-grade frameworks. Powerful user interfaces and an extensive body of documentation allow easy usage by non-specialists.

Synthesis and Optimization of FPGA-Based Systems - Valery Sklyarov 2014-03-14

The book is composed of two parts. The first part introduces the concepts of the design of digital systems using contemporary field-programmable gate arrays (FPGAs). Various design techniques are discussed and illustrated by examples. The operation and effectiveness of these techniques is demonstrated through experiments that use relatively cheap prototyping boards that are widely available. The book begins with easily understandable introductory sections, continues with commonly used digital circuits, and then gradually extends to more advanced topics. The advanced topics include novel techniques where parallelism is applied extensively. These techniques involve not only core reconfigurable logical elements, but also use embedded blocks such as memories and digital signal processing slices and interactions with general-purpose and application-specific computing systems. Fully synthesizable specifications are provided in a hardware-description language (VHDL) and are ready to be tested and incorporated in engineering designs. A number of practical applications are discussed from areas such as data processing and vector-based computations (e.g. Hamming weight counters/comparators). The second part of the book covers the more theoretical aspects of finite state machine synthesis with the main objective of reducing basic FPGA resources, minimizing delays and achieving greater optimization of circuits and systems.

Applied Reconfigurable Computing - Stephan Wong 2017-03-30

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, FGPA-based designs, neural neworks, and languages and estimation techniques.

Handbook of Signal Processing Systems - Shuvra S. Bhattacharyya 2013-06-20

Handbook of Signal Processing Systems is organized in three parts. The first part motivates representative applications that drive and apply state-of-the art methods for design and implementation of signal processing systems; the second part discusses architectures for implementing these applications; the third part focuses on compilers and simulation tools, describes models of computation and their associated design tools and methodologies. This handbook is an essential tool for professionals in many fields and researchers of all levels.

Parallel Computing is Everywhere - S. Bassini 2018-03-07

The most powerful computers work by harnessing the combined computational power of millions of processors, and exploiting the full potential of such large-scale systems is something which becomes more difficult with each succeeding generation of parallel computers. Alternative architectures and computer paradigms are increasingly being investigated in an attempt to address these difficulties. Added to this, the pervasive presence of heterogeneous and parallel devices in consumer products such as mobile phones, tablets, personal computers and servers also demands efficient programming environments and applications aimed at small-scale parallel systems as opposed to large-scale supercomputers. This book presents a selection of papers presented at the conference: Parallel Computing (ParCo2017), held in Bologna, Italy, on 12 to 15 September 2017. The conference included contributions about alternative approaches to achieving High Performance Computing (HPC) to potentially surpass exa- and zetascale performances, as well as papers on the application of quantum computers and FPGA processors. These developments are aimed at making available systems better capable of solving intensive computational scientific/engineering problems such as climate models, security applications and classic NP-problems, some of which cannot currently be managed by even the most powerful supercomputers available. New areas of application, such as robotics, AI and learning systems, data science, the Internet of Things (IoT), and in-car systems and autonomous vehicles were also covered. As always, ParCo2017 attracted a large number of notable contributions covering present and future developments in parallel computing, and the book will be of interest to all those working in the field.

Information and Communication Technology for Intelligent Systems (ICTIS 2017) - Volume 1 - Suresh Chandra Satapathy 2017-08-07

This volume includes 74 papers presented at ICTIS 2017: Second International Conference on Information and Communication Technology for Intelligent Systems. The conference was held on 25th and 26th March 2017, in Ahmedabad, India and organized jointly by the Associated Chambers of Commerce and Industry of India (ASSOCHAM) Gujarat Chapter, the G R Foundation, the Association of Computer Machinery, Ahmedabad Chapter and supported by the Computer Society of India Division IV – Communication and Division V – Education and Research. The papers featured mainly focus on information and communications technology (ICT) for computation, algorithms and data analytics. The fundamentals of various data analytics and algorithms discussed are useful to researchers in the field.

Applied Digital Logic Exercises Using FPGAs - Kurt Wick 2017-10-03

FPGAs have almost entirely replaced the traditional Application Specific Standard Parts (ASSP) such as the 74xx logic chip families because of their superior size, versatility, and speed. For example, FPGAs provide over a million fold increase in gates compared to ASSP parts. The traditional approach for hands-on exercises has relied on ASSP parts, primarily because of their simplicity and ease of use for the novice. Not only is this approach technically outdated, but it also severely limits the complexity of the designs that can be implemented. By introducing the readers to FPGAs, they are being familiarized with current digital technology and the skills to implement complex, sophisticated designs. However, working with FGPAs comes at a cost of increased complexity, notably the mastering of an HDL language, such as Verilog. Therefore, this book accomplishes the following: first, it teaches basic digital design concepts and then applies them through exercises; second, it implements these digital designs by teaching the user the syntax of the Verilog language while implementing the exercises. Finally, it employs contemporary digital hardware, such as the FPGA, to build a simple calculator, a basic music player, a frequency and period counter and it ends with a microprocessor being embedded in the fabric of the FGPA to communicate with the PC. In the process, readers learn about digital mathematics and digital-to-analog converter concepts through pulse width modulation.

Emerging Topics in Hardware Security - Mark Tehranipoor 2021-04-30

This book provides an overview of emerging topics in the field of hardware security, such as artificial

intelligence and quantum computing, and highlights how these technologies can be leveraged to secure hardware and assure electronics supply chains. The authors are experts in emerging technologies, traditional hardware design, and hardware security and trust. Readers will gain a comprehensive understanding of hardware security problems and how to overcome them through an efficient combination of conventional approaches and emerging technologies, enabling them to design secure, reliable, and trustworthy hardware.