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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.

Proceedings of the 11th International Conference

on Robotics, Vision, Signal Processing and Power

Applications - Nor Muzlifah Mahyuddin

2022-02-11

The proceeding is a collection of research papers presented at the 11th International Conference on Robotics, Vision, Signal Processing & Power Applications (RoViSP 2021). The theme of

RoViSP 2021 “Enhancing Research and

Innovation through the Fourth Industrial

Revolution (IR 4.0)” served as a platform for

researchers, scientists, engineers, academicians

as well as industrial professionals from all around

the globe to present and exchange their research

findings and development activities through oral

presentations. The book covers various topics of

interest, including: Robotics, Control,

Mechatronics and Automation Telecommunication

Systems and Applications Electronic Design and

Applications Vision, Image and Signal Processing
Electrical Power, Energy and Industrial
Applications Computer and Information
Technology Biomedical Engineering and
Applications Intelligent Systems Internet-of-things
Mechatronics Mobile Technology

FPGA-BASED Hardware Accelerators - Iouliia

Skliarova 2019-05-30

This book suggests and describes a number of fast parallel circuits for data/vector processing using FPGA-based hardware accelerators. Three primary areas are covered: searching, sorting, and counting in combinational and iterative networks. These include the application of traditional structures that rely on comparators/swappers as well as alternative networks with a variety of core elements such as adders, logical gates, and look-up tables. The iterative technique discussed in the book enables the sequential reuse of relatively large combinational blocks that execute many parallel operations with small propagation delays. For each type of network discussed, the main focus is on the step-by-step development of the architectures proposed from initial concepts to synthesizable hardware description language specifications. Each type of network is taken through several stages, including modeling the desired functionality in software, the retrieval and automatic conversion of key functions, leading to specifications for optimized hardware modules.

The resulting specifications are then synthesized, implemented, and tested in FPGAs using commercial design environments and prototyping boards. The methods proposed can be used in a range of data processing applications, including traditional sorting, the extraction of maximum and minimum subsets from large data sets, communication-time data processing, finding frequently occurring items in a set, and Hamming weight/distance counters/comparators. The book is intended to be a valuable support material for university and industrial engineering courses that involve FPGA-based circuit and system design.

Advanced Digital System Design using SoC

FPGAs - Ross K. Snider 2023-01-10

This textbook teaches students techniques for the design of advanced digital systems using System-on-Chip (SoC) Field Programmable Gate Arrays (FPGAs). The author demonstrates design of custom hardware components for the FPGA fabric using VHDL, with implementation of custom hardware-software interfaces. Readers gain hands-on experience by writing programs and Linux device drivers in C to interact with custom hardware. This textbook enables laboratory experience in the design of custom digital systems using SoC FPGAs, emphasizing computational tasks such as digital signal processing, audio, or video processing.

Applications in Electronics Pervading Industry, Environment and Society - Sergio Saponara

2021-01-25

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

Modeling, Operation, and Analysis of DC Grids -
Alejandro Garces 2021-07-01

Modeling, Operation, and Analysis of DC Grids presents a unified vision of direct current grids

with their core analysis techniques, uniting power electronics, power systems, and multiple scales of applications. Part one presents high power applications such as HVDC transmission for wind energy, faults and protections in HVDC lines, stability analysis and inertia emulation. The second part addresses current applications in low voltage such as microgrids, power trains and aircraft applications. All chapters are self-contained with numerical and experimental analysis. Provides a unified, coherent presentation of DC grid analysis based on modern research in power systems, power electronics, microgrids and MT-HVDC transmission. Covers multiple scales of applications in one location, addressing DC grids in electric vehicles, microgrids, DC distribution, multi-terminal HVDC transmission and supergrids. Supported by a unified set of MATLAB and Simulink test systems designed for application scenarios.

Euro-Par 2017: Parallel Processing Workshops -
Dora B. Heras 2018-02-07

This book constitutes the proceedings of the workshops of the 23rd International Conference on Parallel and Distributed Computing, Euro-Par 2017, held in Santiago de Compostela, Spain in August 2017. The 59 full papers presented were carefully reviewed and selected from 119 submissions. Euro-Par is an annual, international conference in Europe, covering all aspects of

parallel and distributed processing. These range from theory to practice, from small to the largest parallel and distributed systems and infrastructures, from fundamental computational problems to full-edged applications, from architecture, compiler, language and interface design and implementation to tools, support infrastructures, and application performance aspects.

FPGA Algorithms and Applications for the Internet of Things - Sharma, Preeti 2020-03-30

In the research area of computer science, practitioners are constantly searching for faster platforms with pertinent results. With analytics that span environmental development to computer hardware emulation, problem-solving algorithms are in high demand. Field-Programmable Gate Array (FPGA) is a promising computing platform that can be significantly faster for some applications and can be applied to a variety of fields. FPGA Algorithms and Applications for the Internet of Things provides emerging research exploring the theoretical and practical aspects of computable algorithms and applications within robotics and electronics development. Featuring coverage on a broad range of topics such as neuroscience, bioinformatics, and artificial intelligence, this book is ideally designed for computer science specialists, researchers, professors, and students seeking current research on cognitive analytics and advanced computing.

Embedded and Fan-Out Wafer and Panel Level Packaging Technologies for Advanced Application Spaces - Beth Keser 2021-12-29

Discover an up-to-date exploration of Embedded and Fan-Out Wafer and Panel Level technologies In Embedded and Fan-Out Wafer and Panel Level Packaging Technologies for Advanced Application Spaces: High Performance Compute and System-in-Package, a team of accomplished semiconductor experts delivers an in-depth treatment of various fan-out and embedded die approaches. The book begins with a market analysis of the latest technology trends in Fan-Out and Wafer Level Packaging before moving on to a cost analysis of these solutions. The contributors discuss the new package types for advanced application spaces being created by companies like TSMC, Deca Technologies, and ASE Group. Finally, emerging technologies from academia are explored. Embedded and Fan-Out Wafer and Panel Level Packaging Technologies for Advanced Application Spaces is an indispensable resource for microelectronic package engineers, managers, and decision makers working with OEMs and IDMs. It is also a must-read for professors and graduate students working in microelectronics packaging research.

PLD Based Design with VHDL - Vaibbhav Taraate 2017-01-13

This book covers basic fundamentals of logic design and advanced RTL design concepts using

VHDL. The book is organized to describe both simple and complex RTL design scenarios using VHDL. It gives practical information on the issues in ASIC prototyping using FPGAs, design challenges and how to overcome practical issues and concerns. It describes how to write an efficient RTL code using VHDL and how to improve the design performance. The design guidelines by using VHDL are also explained with the practical examples in this book. The book also covers the ALTERA and XILINX FPGA architecture and the design flow for the PLDs. The contents of this book will be useful to students, researchers, and professionals working in hardware design and optimization. The book can also be used as a text for graduate and professional development courses.

[A Hands-On Guide to Designing Embedded Systems](#) - Adam Taylor 2021-10-31

This practical resource introduces readers to the design of field programmable gate array systems (FPGAs). Techniques and principles that can be applied by the engineer to understand challenges before starting a project are presented. The book provides a framework from which to work and approach development of embedded systems that will give readers a better understanding of the issues at hand and can develop solution which presents lower technical and programmatic risk and a faster time to market. Programmatic and system considerations are introduced, providing

an overview of the engineering life cycle when developing an electronic solution from concept to completion. Hardware design architecture is discussed to help develop an architecture to meet the requirements placed upon it, and the trade-offs required to achieve the budget. The FPGA development lifecycle and the inputs and outputs from each stage, including design, test benches, synthesis, mapping, place and route and power estimation, are also presented. Finally, the importance of reliability, why it needs to be considered, the current standards that exist, and the impact of not considering this is explained. Written by experts in the field, this is the first book by “engineers in the trenches” that presents FPGA design on a practical level.

Modern Digital Designs with EDA, VHDL and FPGA
- Lo Jien-Chung 2015

Architecture of Computing Systems - Martin Schulz 2022-12-13

This book constitutes the proceedings of the 35th International Conference on Architecture of Computing Systems, ARCS 2022, held virtually in July 2022. The 18 full papers in this volume were carefully reviewed and selected from 35 submissions. ARCS provides a platform covering newly emerging and cross-cutting topics, such as autonomous and ubiquitous systems, reconfigurable computing and acceleration, neural networks and artificial intelligence. The selected

papers cover a variety of topics from the ARCS core domains, including energy efficiency, applied machine learning, hardware and software system security, reliable and fault-tolerant systems and organic computing.

Advances in Intelligent Systems and Computing II

- Natalia Shakhovska 2017-11-20

This book reports on new theories and applications in the field of intelligent systems and computing. It covers computational and artificial intelligence methods, as well as advances in computer vision, current issues in big data and cloud computing, computation linguistics, and cyber-physical systems. It also reports on data mining and knowledge extraction technologies, as well as central issues in intelligent information management. Written by active researchers, the respective chapters are based on papers presented at the International Conference on Computer Science and Information Technologies (CSIT 2017), held on September 5–8, 2017, in Lviv, Ukraine; and at two workshops accompanying the conference: one on inductive modeling, jointly organized by the Lviv Polytechnic National University and the National Academy of Science of Ukraine; and another on project management, which was jointly organized by the Lviv Polytechnic National University, the International Project Management Association, the Ukrainian Project Management Association, the Kazakhstan Project Management Association,

and Nazarbayev University. Given its breadth of coverage, the book provides academics and professionals with extensive information and a timely snapshot of the field of intelligent systems, and is sure to foster new discussions and collaborations among different groups.

Evolving OpenMP for Evolving Architectures -

Bronis R. de Supinski 2018-09-19

This book constitutes the proceedings of the 14th International Workshop on Open MP, IWOMP 2018, held in Barcelona, Spain, in September 2018. The 16 full papers presented in this volume were carefully reviewed and selected for inclusion in this book. The papers are organized in topical sections named: best paper; loops and OpenMP; OpenMP in heterogeneous systems; OpenMP improvements and innovations; OpenMP user experiences: applications and tools; and tasking evaluations.

Debugging Embedded and Real-Time Systems -

Arnold S. Berger 2020-07-17

Debugging Embedded and Real-Time Systems: The Art, Science, Technology and Tools of Real-Time System Debugging gives a unique introduction to debugging skills and strategies for embedded and real-time systems. Practically focused, it draws on application notes and white papers written by the companies who create design and debug tools. Debugging Embedded and Real Time Systems presents best practice strategies for debugging real-time systems,

through real-life case studies and coverage of specialized tools such as logic analysis, JTAG debuggers and performance analyzers. It follows the traditional design life cycle of an embedded system and points out where defects can be introduced and how to find them and prevent them in future designs. It also studies application performance monitoring, the execution trace recording of individual applications, and other tactics to debug and control individual running applications in the multitasking OS. Suitable for the professional engineer and student, this book is a compendium of best practices based on the literature as well as the author's considerable experience as a tools' developer. Provides a unique reference on Debugging Embedded and Real-Time Systems Presents best practice strategies for debugging real-time systems Written by an author with many years of experience as a tools developer Includes real-life case studies that show how debugging skills can be improved Covers logic analysis, JTAG debuggers and performance analyzers that are used for designing and debugging embedded systems

Advanced Computer Architecture - Junjie Wu

2014-07-21

This book constitutes the refereed proceedings of the 10th Annual Conference on Advanced Computer Architecture, ACA 2014, held in Shenyang, China, in August 2014. The 19 revised

full papers presented were carefully reviewed and selected from 115 submissions. The papers are organized in topical sections on processors and circuits; high performance computing; GPUs and accelerators; cloud and data centers; energy and reliability; intelligence computing and mobile computing.

Information and Communications Security -

Weizhi Meng 2020-11-28

This book constitutes the refereed proceedings of the 22nd International Conference on Information and Communications Security, ICICS 2020, held in Copenhagen, Denmark*, in August 2020. The 33 revised full papers were carefully selected from 139 submissions. The papers focus in topics about computer and communication security, and are organized in topics of security and cryptography. *The conference was held virtually due to the COVID-19 pandemic.

Hands-On Embedded Programming with C++17 -

Maya Posch 2019-01-31

Build safety-critical and memory-safe stand-alone and networked embedded systems Key Features Know how C++ works and compares to other languages used for embedded development Create advanced GUIs for embedded devices to design an attractive and functional UI Integrate proven strategies into your design for optimum hardware performance Book Description C++ is a great choice for embedded development, most notably, because it does not

add any bloat, extends maintainability, and offers many advantages over different programming languages. Hands-On Embedded Programming with C++17 will show you how C++ can be used to build robust and concurrent systems that leverage the available hardware resources. Starting with a primer on embedded programming and the latest features of C++17, the book takes you through various facets of good programming. You'll learn how to use the concurrency, memory management, and functional programming features of C++ to build embedded systems. You will understand how to integrate your systems with external peripherals and efficient ways of working with drivers. This book will also guide you in testing and optimizing code for better performance and implementing useful design patterns. As an additional benefit, you will see how to work with Qt, the popular GUI library used for building embedded systems. By the end of the book, you will have gained the confidence to use C++ for embedded programming. What you will learn

Choose the correct type of embedded platform to use for a project

Develop drivers for OS-based embedded systems

Use concurrency and memory management with various microcontroller units (MCUs)

Debug and test cross-platform code with Linux

Implement an infotainment system using a Linux-based single board computer

Extend an existing embedded system with a Qt-based GUI

Communicate with

the FPGA side of a hybrid FPGA/SoC system

Who this book is for

If you want to start developing effective embedded programs in C++, then this book is for you. Good knowledge of C++ language constructs is required to understand the topics covered in the book. No knowledge of embedded systems is assumed.

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, FPGA-based designs, neural networks, and languages and estimation techniques.

VLSI and Hardware Implementations using Modern Machine Learning Methods - Sandeep Saini 2021-12-30

Machine learning is a potential solution to resolve bottleneck issues in VLSI via optimizing tasks in the design process. This book aims to provide the latest machine-learning-based methods, algorithms, architectures, and frameworks designed for VLSI design. The focus is on digital, analog, and mixed-signal design techniques,

device modeling, physical design, hardware implementation, testability, reconfigurable design, synthesis and verification, and related areas. Chapters include case studies as well as novel research ideas in the given field. Overall, the book provides practical implementations of VLSI design, IC design, and hardware realization using machine learning techniques. Features: Provides the details of state-of-the-art machine learning methods used in VLSI design Discusses hardware implementation and device modeling pertaining to machine learning algorithms Explores machine learning for various VLSI architectures and reconfigurable computing Illustrates the latest techniques for device size and feature optimization Highlights the latest case studies and reviews of the methods used for hardware implementation This book is aimed at researchers, professionals, and graduate students in VLSI, machine learning, electrical and electronic engineering, computer engineering, and hardware systems.

Computer Vision Systems - Dimitrios Tzovaras
2019-11-22

This book constitutes the refereed proceedings of the 12th International Conference on Computer Vision Systems, ICVS 2019, held in Thessaloniki, Greece, in September 2019. The 72 papers presented were carefully reviewed and selected from 114 submissions. The papers are organized in the following topical sections; hardware

accelerated and real time vision systems; robotic vision; vision systems applications; high-level and learning vision systems; cognitive vision systems; movement analytics and gesture recognition for human-machine collaboration in industry; cognitive and computer vision assisted systems for energy awareness and behavior analysis; and vision-enabled UAV and counter UAV technologies for surveillance and security of critical infrastructures.

AI 2018: Advances in Artificial Intelligence - Tanja Mitrovic 2018-12-03

This book constitutes the proceedings of the 31st Australasian Joint Conference on Artificial Intelligence, AI 2018, held in Wellington, New Zealand, in December 2018. The 50 full and 26 short papers presented in this volume were carefully reviewed and selected from 125 submissions. The paper were organized in topical sections named: agents, games and robotics; AI applications and innovations; computer vision; constraints and search; evolutionary computation; knowledge representation and reasoning; machine learning and data mining; planning and scheduling; and text mining and NLP.

FPGA-based Implementation of Signal Processing Systems - Roger Woods 2017-02-06

An important working resource for engineers and researchers involved in the design, development, and implementation of signal processing systems The last decade has seen a rapid expansion of

the use of field programmable gate arrays (FPGAs) for a wide range of applications beyond traditional digital signal processing (DSP) systems. Written by a team of experts working at the leading edge of FPGA research and development, this second edition of FPGA-based Implementation of Signal Processing Systems has been extensively updated and revised to reflect the latest iterations of FPGA theory, applications, and technology. Written from a system-level perspective, it features expert discussions of contemporary methods and tools used in the design, optimization and implementation of DSP systems using programmable FPGA hardware. And it provides a wealth of practical insights—along with illustrative case studies and timely real-world examples—of critical concern to engineers working in the design and development of DSP systems for radio, telecommunications, audio-visual, and security applications, as well as bioinformatics, Big Data applications, and more. Inside you will find up-to-date coverage of: FPGA solutions for Big Data Applications, especially as they apply to huge data sets The use of ARM processors in FPGAs and the transfer of FPGAs towards heterogeneous computing platforms The evolution of High Level Synthesis tools—including new sections on Xilinx's HLS Vivado tool flow and Altera's OpenCL approach Developments in Graphical Processing Units (GPUs), which are rapidly replacing more traditional DSP systems

FPGA-based Implementation of Signal Processing Systems, 2nd Edition is an indispensable guide for engineers and researchers involved in the design and development of both traditional and cutting-edge data and signal processing systems. Senior-level electrical and computer engineering graduates studying signal processing or digital signal processing also will find this volume of great interest.

Cross Reality and Data Science in Engineering -

Michael E. Auer 2020-08-20

Today, online technologies are at the core of most fields of engineering and society as a whole . This book discusses the fundamentals, applications and lessons learned in the field of online and remote engineering, virtual instrumentation, and other related technologies like Cross Reality, Data Science & Big Data, Internet of Things & Industrial Internet of Things, Industry 4.0, Cyber Security, and M2M & Smart Objects. Since the first Remote Engineering and Virtual Instrumentation (REV) conference in 2004, the event has focused on the use of the Internet for engineering tasks, as well as the related opportunities and challenges. In a globally connected world, interest in online collaboration, teleworking, remote services, and other digital working environments is rapidly increasing. In this context, the REV conferences discuss fundamentals, applications and experiences in the field of Online and Remote Engineering as well

as Virtual Instrumentation. Furthermore, the conferences focus on guidelines and new concepts for engineering education in higher and vocational education institutions, including emerging technologies in learning, MOOCs & MOOLs, and open resources. This book presents the proceedings of REV2020 on “Cross Reality and Data Science in Engineering” which was held as the 17th in series of annual events. It was organized in cooperation with the Engineering Education Transformations Institute and the Georgia Informatics Institutes for Research and Education and was held at the College of Engineering at the University of Georgia in Athens (GA), USA, from February 26 to 28, 2020.

Frontiers of Quality Electronic Design (QED) - Ali Iranmanesh 2023-01-11

Quality Electronic Design (QED)’s landscape spans a vast region where territories of many participating disciplines and technologies overlap.

This book explores the latest trends in several key topics related to quality electronic design, with emphasis on Hardware Security, Cybersecurity, Machine Learning, and application of Artificial Intelligence (AI). The book includes topics in nonvolatile memories (NVM), Internet of Things (IoT), FPGA, and Neural Networks.

Biomedical Signals Based Computer-Aided Diagnosis for Neurological Disorders - M.

Murugappan 2022-06-17

Biomedical signals provide unprecedented insight

into abnormal or anomalous neurological conditions. The computer-aided diagnosis (CAD) system plays a key role in detecting neurological abnormalities and improving diagnosis and treatment consistency in medicine. This book covers different aspects of biomedical signals-based systems used in the automatic detection/identification of neurological disorders. Several biomedical signals are introduced and analyzed, including electroencephalogram (EEG), electrocardiogram (ECG), heart rate (HR), magnetoencephalogram (MEG), and electromyogram (EMG). It explains the role of the CAD system in processing biomedical signals and the application to neurological disorder diagnosis. The book provides the basics of biomedical signal processing, optimization methods, and machine learning/deep learning techniques used in designing CAD systems for neurological disorders.

Engineering the Complex SOC - Chris Rowen 2008-11-11

Engineering the Complex SOC The first unified hardware/software guide to processor-centric SOC design Processor-centric approaches enable SOC designers to complete far larger projects in far less time. Engineering the Complex SOC is a comprehensive, example-driven guide to creating designs with configurable, extensible processors. Drawing upon Tensilica’s Xtensa architecture and TIE language, Dr. Chris Rowen systematically

illuminates the issues, opportunities, and challenges of processor-centric design. Rowen introduces a radically new design methodology, then covers its essential techniques: processor configuration, extension, hardware/software co-generation, multiple processor partitioning/communication, and more. Coverage includes: Why extensible processors are necessary: shortcomings of current design methods Comparing extensible processors to traditional processors and hardwired logic Extensible processor architecture and mechanisms of processor extensibility Latency, throughput, coordination of parallel functions, hardware interconnect options, management of design complexity, and other issues Multiple-processor SOC architecture for embedded systems Task design from the viewpoints of software and hardware developers Advanced techniques: implementing complex state machines, task-to-task synchronization, power optimization, and more Toward a “sea of processors”: Long-term trends in SOC design and semiconductor technology For all architects, hardware engineers, software designers, and SOC program managers involved with complex SOC design; and for all managers investing in SOC designs, platforms, processors, or expertise.

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Recent Advances in Electrical and Information Technologies for Sustainable Development -

Soumia El Hani 2019-02-08

The book includes the best extended papers which were selected from the 3rd International Conference of Electrical and Information Technologies (ICEIT 2017, Morocco). The book spans two inter-related research domains which shaped modern societies, solved many of their development problems, and contributed to their unprecedented economic growth and social welfare. Selected papers are based on original and high quality research. They were peer reviewed by experts in the field. They are grouped into five parts. Part I deals with Power System and Electronics topics that include Power Electronics & Energy Conversion, Actuators & Micro/Nanotechnology, etc. Part II relates to Control Systems and their applications. Part III concerns the topic of Information Technology that basically includes Smart Grid, Information Security, Cloud Computing Distributed, Big Data, etc. Part IV discusses Telecommunications and Vehicular Technologies topics that include, Green Networking and Communications, Wireless Ad-hoc and Sensor Networks, etc. Part V covers Green Applications and Interdisciplinary topics, that include intelligent and Green Technologies for Transportation Systems, Smart Cities, etc.

This book offers a good opportunity for young researchers, novice scholars and whole academic

sphere to explore new trends in Electrical and information Technologies.

Applied Reconfigurable Computing - Christian Hochberger 2019-04-02

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

Design of FPGA-Based Computing Systems with OpenCL - Hasitha Muthumala Waidyasoorya 2017-10-24

This book provides wide knowledge about designing FPGA-based heterogeneous computing systems, using a high-level design environment based on OpenCL (Open Computing language), which is called OpenCL for FPGA. The OpenCL-based design methodology will be the key technology to exploit the potential of FPGAs in various applications such as low-power embedded applications and high-performance computing. By understanding the OpenCL-based

design methodology, readers can design an entire FPGA-based computing system more easily compared to the conventional HDL-based design, because OpenCL for FPGA takes care of computation on a host, data transfer between a host and an FPGA, computation on an FPGA with a capable of accessing external DDR memories. In the step-by-step way, readers can understand followings: how to set up the design environment how to write better codes systematically considering architectural constraints how to design practical applications

Cognitive Radio Oriented Wireless Networks - Paulo Marques 2018-02-26

This book constitutes the thoroughly refereed conference proceedings of the 12th International Conference on Cognitive Radio Oriented Wireless Networks, CROWNCOM 2017, held in Lisbon, Portugal, in September 2017. The 28 revised full papers presented were carefully reviewed and selected from numerous submissions and cover the evolution of cognitive radio technology pertaining to 5G networks. The papers are clustered to topics on spectrum management; network management; trials, test beds, and tools; PHY and sensing; spectrum management.

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.

Field-Programmable Gate Array (FPGA)

Technologies for High Performance

Instrumentation - Gazzano, Julio Daniel Dondo

2016-07-05

Field-Programmable Gate Array (FPGA)

technologies have increased in popularity in recent years due to their adaptability and high computing potential. Further research in this area illustrates the potential for further advancements and applications of this useful technology. Field-Programmable Gate Array (FPGA) Technologies for High Performance Instrumentation presents experimental and theoretical research on FPGA-based design and the development of virtual scientific instrumentation that can be used by a broad segment of scientists across a variety of research fields. Focusing on crucial innovations and algorithms for signal processing, data acquisition mechanisms, FPGA-based hardware design, and parallel computing, this publication is a critical resource for researchers, development engineers, and graduate-level students.

Applied Computer Sciences in Engineering - Juan Carlos Figueroa-García 2021-09-29

This volume constitutes the refereed proceedings of the 8th Workshop on Engineering Applications, WEA 2021, held in Medellín, Colombia, in

October 2021. Due to the COVID-19 pandemic the conference was held in a hybrid mode. The 33 revised full papers and 11 short papers presented in this volume were carefully reviewed and selected from 127 submissions. The papers are organized in the following topical sections: computational intelligence; bioengineering; Internet of Things (IoT); optimization and operations research; engineering applications.

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.

Integrated Circuit Test Engineering - Ian A. Grout 2005-08-22

Using the book and the software provided with it, the reader can build his/her own tester arrangement to investigate key aspects of analog-, digital- and mixed system circuits. Plan of attack based on traditional testing, circuit design and circuit manufacture allows the reader to appreciate a testing regime from the point of view of all the participating interests. Worked examples based on theoretical bookwork, practical experimentation and simulation exercises teach the reader how to test circuits thoroughly and effectively.

Advanced HDL Synthesis and SOC Prototyping - Vaibhav 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.

High Performance Computing - Michèle Weiland
2019-12-02

This book constitutes the refereed post-conference proceedings of 13 workshops held at the 34th International ISC High Performance 2019 Conference, in Frankfurt, Germany, in June 2019: HPC I/O in the Data Center (HPC-IODC), Workshop on Performance & Scalability of Storage Systems (WOPSSS), Workshop on Performance & Scalability of Storage Systems (WOPSSS), 13th Workshop on Virtualization in High-Performance Cloud Computing (VHPC '18), 3rd International Workshop on In Situ Visualization: Introduction and Applications, ExaComm: Fourth International Workshop on Communication Architectures for HPC, Big Data, Deep Learning and Clouds at Extreme Scale, International Workshop on OpenPOWER for HPC

(IWOPH18), IXPUG Workshop: Many-core Computing on Intel, Processors: Applications, Performance and Best-Practice Solutions, Workshop on Sustainable Ultrascale Computing Systems, Approximate and Transprecision Computing on Emerging Technologies (ATCET), First Workshop on the Convergence of Large Scale Simulation and Artificial Intelligence, 3rd Workshop for Open Source Supercomputing (OpenSuCo), First Workshop on Interactive High-Performance Computing, Workshop on Performance Portable Programming Models for Accelerators (P³MA). The 48 full papers included in this volume were carefully reviewed and selected. They cover all aspects of research, development, and application of large-scale, high performance experimental and commercial systems. Topics include HPC computer architecture and hardware; programming models, system software, and applications; solutions for heterogeneity, reliability, power efficiency of systems; virtualization and containerized environments; big data and cloud computing; and artificial intelligence.

VLSI-SoC: Design Methodologies for SoC and SiP - Christian Piguet 2010-04-06

This book contains extended and revised versions of the best papers that were presented during the 16th edition of the IFIP/IEEE WG10.5 International Conference on Very Large Scale Integration, a global System-on-a-Chip Design &

CAD conference. The 16th conference was held at the Grand Hotel of Rhodes Island, Greece (October 13–15, 2008). Previous conferences have taken place in Edinburgh, Trondheim, Vancouver, Munich, Grenoble, Tokyo, Gramado, Lisbon, Montpellier, Darmstadt, Perth, Nice and Atlanta. VLSI-SoC 2008 was the 16th in a series of international conferences sponsored by IFIP

TC 10 Working Group 10.5 and IEEE CEDA that explores the state of the art and the new developments in the field of VLSI systems and their designs. The purpose of the conference was to provide a forum to exchange ideas and to present industrial and research results in the fields of VLSI/ULSI systems, embedded systems and - croelectronic design and test.