Floating Point Design With Vivado Hls Xilinx | a52384201cf9dc048176e244fae968d0

Smart Technology Applications in Business EnvironmentsReal-Time Electromagnetic Transient Simulation of AC-DC NetworksDesign of an APU-compatible, Double Precision Floating Point Unit for the Xilinx Virtex-4 FPGAxFPGA-Based Embedded System Developer's GuideEmbedded Computer Systems: Architectures, Modeling, and SimulationCommunicating Protocols 2013 & 2014 LecturesVLSI: The FundamentalsFloating Point MultiplierHigh-level SynthesisProceedings of International Ethical Hacking Conference 2018Electronic Design Automation for IC System Design, Verification, and TestingFixed-point Hardware Design for CPWC Image ReconstructionLanguages, Design Methods, and Tools for Electronic System DesignEngineering Applications of FPGAsEmbedded Microprocessor System Design using FPGAsDigital System Design with FPGA: Implementing Using Verilog and VHDLIntroduction and Implementations of the Kalman FilterParallel Computing: Technology TrendsProceeding of Fifth International Conference on Microelectronics, Computing and Communication SystemsComplex, Intelligent, and Soft ComputingIntelligent Systems 100 Power Tips for FPGA DesignersField Embedded Systems Design with Platform FPGASmart Design and Fast Machine Learning Accelerator for IoT DevicesApplied Reconfigurable Computing, Architectures, Tools, and ApplicationsRisks and Security of Internet and Systems Separation Logic for High-level SynthesisDesigning with Xilinx FPGA Applied Reconfigurable Computing, Architectures, Tools, and ApplicationsApplications in ElectronicsPervading Industry, Environment and SocietyXILINX FPGA Design for Implementation of IEEE Format 32-bit Floating-pointArithmetic [i.e. Arithmetic] FPGA Programming for BeginnersComputational Modeling and Simulation Examples in BioengineeringImage and Video Technology - PSIVT 2015 WorkshopsEmerging Technology and Architecture for Big-data AnalyticsFPGAs for Software ProgrammersComputer Vision: Concepts, Methodologies, Tools, and ApplicationsDigital Design and Computer Architecture, RISC-V EditionDigital Signal Processing with Field Programmable Gate ArraysGet 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 SystemVerilog Build real-world FPGA projects such as a calculator and a keyboard using FPGA resourcesBook DescriptionField 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 calling an LED. You’ll then complete SystemVerilog designs and their implementations. Next, you’ll get to grips with using the combinational Boolean design logic 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 book, you’ll have learned how to work with FPGAs and be able to design circuit boards using SystemVerilog programming, What you will learn: Understand the FPGA architecture and its implementationGet to grips with writing SystemVerilog RTL Make FPGA projects using SystemVerilog programming Work with computer math basics, parallelism, and pipeliningExplore the advanced topics of AXI and keyboard interfacing with PS/2 Discover how you can implement a VGA interface in your projects Who 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. This book constitutes the refereed proceedings of the 17th International Symposium on Automated Technology for Verification and Analysis, ATVA 2019, held in Taipei, Taiwan in October 2019. The 24 regular papers presented together with 3 tool papers were carefully reviewed and selected from 65 submissions. The symposium is dedicated to the promotion of research on theoretical and practical aspects of automated analysis, verification and synthesis by providing a forum for interaction between the regional and the international research communities and industry in the field. The papers focus on cyber-physical systems from techniques and tools: automatic and/or program analysis, stochastic systems and model checking. Embedded Systems Design with Platform FPGAs introduces professional engineers and students alike to system development using Platform FPGAs. The focus is on embedded systems but it also serves as a general guide to building custom computing systems. The text describes the fundamental technology in terms of hardware, software, and a set of principles to guide the development of Platform FPGA systems. The goal is to show how to systematically and creatively apply these principles to the construction of application-specific embedded system architectures. There is a strong focus on using free and open source software to increase productivity. Each chapter is organized into two parts. The white pages describe concepts, principles, and general knowledge. The gray pages provide a technical rendition of the main issues of the chapter and show the concepts applied in practice. This includes step-by-step details for a specific development board and tool chain so that the reader can carry out the same steps on their own. Rather than try to demonstrate the concepts on a broad set of tools and boards, the text uses a single set of tools (Xilinx Platform Studio, Linux, and GNU) throughout and uses a single developer board (Xilinx ML-510) for the examples. Explains how to use the Platform FPGA to meet complex design requirements and improve product performance Presents both fundamental concepts together with pragmatic, step-by-step instructions for building a system on a Platform FPGA Includes detailed case studies, extended real-world examples, and lab exercisesSensor data fusion is the process of combining error-prone, heterogeneous, incomplete, and ambiguous data to gather a higher level of situational awareness. In principle, all living creatures are fusing information from their complementary senses to coordinate their actions and to detect and localize danger. In sensor data fusion, this process is called "sensor fusion" and occurs automatically and in certain areas of interest. By means of probability theory and statistics, it is possible to model the relationship between the state space and the sensor data. The number of ingredients of the resulting Kalman filter is limited, but its applications are not. This book focuses on biomedical engineering and its applications. More specifically, it provides the theoretical background for simulating pathological conditions in the area of bones, muscles, tissue, cardiovascular, cancer, lung, vertigo disease. The methodological approaches used for simulations include the finite element, dissipative particle dynamics and lattice boltzman. Aside from the theoretical background and knowledge, the author provides additional material consisting of a software package for simulations for the theoretical problems. In this way, the book enhances the reader's learning capabilities in the field of biomedical engineering. This book describes the current state of the art in big-data analytics, from a technology and hardware architecture perspective. The presentation is designed to be accessible to a broad
audience, with general knowledge of hardware design and some interest in big-data analytics. Coverage includes emerging technology and devices for data-analytics, circuit design for data-analytics, and architecture and algorithms to support data-analytics. Readers will benefit from the realistic context used by the authors, which demonstrates what works, what doesn’t work, and what are the fundamental problems, solutions, upcoming challenges and opportunities. Provides a single-source reference to hardware architectures for big-data analytics; Covers various levels of big-data analytics hardware design about the flow, from device levels to memory and systems (NVM) based hardware platforms can be a viable solution to existing challenges in hardware architecture for big-data analytics. The year 2019 marked four decades of cluster computing, a history that began in 1979 when the first cluster systems using Components On The Shelf (COTS) became operational. This achievement resulted in a rapidly growing interest in affordable parallel computing for solving compute intensive and large scale problems. It also directly lead to the founding of the Parco conference series. Starting in 1983, the International Conference on Parallel Computing, ParCo, has long been a leading venue for discussions of important developments, applications, and future trends in cluster computing, parallel computing, and high-performance computing. ParCo2019, held in Prague, Czech Republic, from 10 - 13 September 2019, was no exception. The invited talk addressed cutting edge topics in co-design of CPUs and GPUs, programming methods for specialized devices such as field programmable gate arrays (FPGAs) and graphical processing units (GPUs), innovative applications of parallel computers, approaches to reproducibility in parallel computations, and other relevant areas. This book presents the proceedings of ParCo2019, with the goal of making the many fascinating topics discussed at the meeting accessible to a broader audience. The proceedings contains 57 contributions in total, all of which have been peer-reviewed after their presentation. These papers give a wide ranging overview of the current status of research, developments, and applications in parallel computing. Coherent plane-wave compounding (CPCW) ultrasonography is an important imaging modality that allows for very high frame rates. During CPCW image reconstruction, computational expensive delay-and-sum beamforming can be replaced by faster Fourier-domain remapping. The thesis deals with the MATLAB and hardware implementation of one of the recently proposed Fourier-domain CPWC reconstruction methods, namely, plane-wave (PW) Stolt’s migration algorithm. We first present the floating- and fixed-point implementations of the said migration algorithm in MATLAB, and then perform quantitative evaluation of the reconstruction results, showing that it is feasible to obtain high-quality compounded images using hardware-oriented scaled fixed-point calculations, as opposed to more expensive software-oriented floating-point arithmetic. We also generate Xilinx FPGA-based implementations of both floating- and fixed-point MATLAB-based algorithms, using a high-level synthesis (HLS) design flow that collaboratively employs MATLAB Coder and Vivado HLS tool. MATLAB Coder can automatically generate a MATLAB code based on a MATLAB function or a MATLAB script, which can then be compiled into a synthesizable Verilog/VHDL description. Results show that our fixed-point FPGA implementation is more resource and power efficient and can also operate at a higher clock frequency compared to its floating-point counterpart. Are you an RTL or system designer that is currently using, moving, or planning to move to an HLS design environment? Finally, a comprehensive guide for designing hardware using C++ is here. Michael Fingeroff’s High-Level Synthesis Blue Book presents the most effective C++ synthesis coding style for achieving high quality RTL. Master a totally new design methodology for coding increasingly complex designs! This book provides a step-by-step approach to using C++ as a hardware design language, including an introduction to the basics of HLS using concepts familiar to RTL designers. Each chapter provides coverage on M-LAB and C++ examples, with a hardware and timing examples when appropriate. The book progresses from simple concepts such as sequential logic design to more complicated topics such as memory architecture and hierarchical sub-system design. Later chapters bring together many of the earlier HLS design concepts through their application in simplified design examples. These examples illustrate the fundamental principles behind C++ hardware design, which will translate to much larger designs. Although this book focuses primarily on C and C++ to present the basics of C++ synthesis, all of the concepts are equally applicable to SystemC when describing the core algorithmic part of a design. On completion of this book, readers should be well on their way to becoming experts in high-level synthesis. This book discusses the implications of new technologies for a secured society. As such, it reflects the main focus of the International Conference on Ethics in Hacking, EthCo 2019, which is essentially in evaluating the security of computer systems using penetration testing techniques. Showcasing the most outstanding research papers presented at the conference, the book shares new findings on computer network attacks and defenses, commercial security solutions, and hands-on, real-world security experience. The respective sections include network security, ethical hacking, cryphography, digital forensics, cloud security, information security, mobile communications security, and cyber security. Starts with an overview of today’s FPGA technology, devices, and tools for designing state-of-the-art DSP systems. A case study in the first chapter is the basis for more than 30 design examples throughout. The following chapters deal with computer arithmetic concepts, theory and the implementation of FIR and IIR filters, multirate digital signal processing systems, DFT and FFT algorithms, and advanced algorithms for the future potential. Each chapter contains exercises. The VERLOG source code and a glossary are given in the appendices, while the accompanying CD-ROM contains the examples in VHDL and Verilog code as well as the newest Altera “Baseline” software. This edition has a new chapter on adaptive filters, new sections on division and floating point arithmetics, an up-date to the current Altera software, and some new exercises. This book helps readers to implement their designs on Xilinx® FPGAs. The authors demonstrate how to get the greatest impact from using the Vivado® Design Suite, which delivers a SoC-strength, IP-centric and system-centric, next generation development environment that has been built from the ground up to address the productivity bottlenecks in system-level integration and implementation. This book is a hands-on guide for both users who are new to FPGA designs, as well as those currently using the legacy Xilinx tool set (ISE) but are now moving to Vivado. Throughout the presentation, the authors focus on key concepts, major mechanisms for design entry, and methods to realize the most efficient implementation of the target design, with the least number of iterations. This book constitutes the revised selected papers from the 14th International Conference on Risks and Security of Internet and Systems, CRiSIS 2019, held in Hammamet, Tunisia, in October 2019. The 20 full papers and 4 short papers presented in this volume were carefully reviewed and selected from 64 submissions. They cover diverse research themes that range from classic topics, such as risk analysis and management; access control and permission; secure embedded systems; network and cloud security; information security policy; data protection and machine learning for security; distributed detection system and blockchain. The Floating Point Multiplier is a wide variety for increasing accuracy, high speed and high performance in reducing delay, area and power consumption. The floating point multiplication, a major component of Digital Signal Processors (DSP) or Floating Point Processors are used to reduce the area that perform in both the single precision and the double precision in multiplication, addition and subtraction. Here, the scientific notations sign bit, mantissa and exponent are used. The real numbers are divided into two components: fixed component of significant range (lack of dynamic range) and exponential component in floating point (largest dynamic range). The authors convert decimal to floating point and normalize the exponent part and rounding operation to reduce
latency. The mantissa of two values are multiplied and the exponent part is added. The sign results with exclusive-or are obtained. Then, the final result of shift and add floating point multiplier is compared with booth multiplication.

This book constitutes the proceedings of the 14th International Conference on Applied Reconfigurable Computing, ARC 2018, held in Santorini, Greece, in May 2018. The 29 full papers and 22 short presented in this volume were carefully reviewed and selected from 78 submissions. In addition, the volume contains 9 contributions from research projects. The papers were organized in sections on online learning; neural networks; FPGA-based algorithms; CGRA-based algorithms; applications and surveys; fault-tolerance, security and communication architectures; reconfigurable and adaptive architectures; design methods and fast prototyping; FPGA-based design and applications; and special session: research projects. This edited volume "Field-Programmable Gate Array" is a collection of reviewed and relevant research chapters, offering a comprehensive overview of recent developments in the field of semiconductors. The book comprises single chapters authored by various researchers and edited by an expert active in the aerospace engineering systems research area. All chapters are complete within themselves but united under a common research study topic. This publication aims at providing a thorough overview of the latest research efforts by international authors and open new possible research paths for future developments. It is of interest to researchers and students evolving in the field of hardware synthesis, including discussion of VHDL programming and co-simulation issues. Coverage includes FPGA realizations as: chaos generators that are described from their mathematical models; artificial neural networks (ANNs) to predict chaotic time series, for which a discussion of different ANN topologies is included, with different learning techniques and activation functions; random number generators (RNGs) that are realized using different chaos generators, annulators, and other chaotic systems; Lyapunov exponents; cryptographic chaos; and applications in these areas emerge. Staying abreast of the most up-to-date developments in this field is necessary in order to promote further research and apply these developments in real-world settings. Computer Vision: Concepts, Methodologies, Tools, and Applications is an innovative reference source for the latest academic material on development of computers for gaining understanding about videos and digital images. Highlighting a range of topics, such as computational models, machine learning, and image processing, this multi-volume book is ideally designed for academicians, technology professionals, students, and researchers interested in uncovering the latest innovations in the field. This book constitutes the refereed proceedings of the 20th International Conference on Embedded Computer Systems: Architectures, Modeling, and Simulation, SAMOS 2020, held in Samos, Greece, in July 2020. * The 16 regular papers presented were carefully reviewed and selected from 35 submissions. In addition, 9 papers from two special sessions were included, which were organized on topics of current interest: innovative architectures for security and European projects on embedded and high performance computing for health applications. * The conference was held virtually due to the COVID-19 pandemic. Technology continues to make great strides in society by providing opportunities for advancement, inclusion, and global competency. As new systems and tools arise, novel applications are created as well. Smart Technology Applications in Business Environments is an essential reference source for the latest scholarly research on the risks and opportunities of utilizing the latest technologies in different aspects of society such as education, healthcare systems, and corporations. A focus on utilizing extensive coverage on a broad range of topics and perspectives incudes applications in artificial intelligence, and social media, this publication is ideally designed for academicians, researchers, students, and practitioners seeking current research on the improvement and increased productivity from the implementation of smart technologies. This book offers readers a clear guide to implementing engineering applications with FPGAs, from the mathematical description to the hardware synthesis, including discussion of VHDL programming and co-simulation issues. Coverage includes FPGA realizations such as: chaos generators that are described from their mathematical models; artificial neural networks (ANNs) to predict chaotic time series, for which a discussion of different ANN topologies is included, with different learning techniques and activation functions; random number generators (RNGs) that are realized using different chaos generators, annulators, and other chaotic systems; Lyapunov exponents; cryptographic chaos; and applications in these areas emerge. The whole book provides a practical guide to implementing a variety of engineering applications from VHDL programming and co-simulation issues, to FPGA realizations of chaos generators, ANNs for chaotic time-series prediction, RNGs and chaotic secure communications for image transmission. 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, with special emphasis on the use of VLSI technology, digital circuits design with VHDL, programming, components and procedures, and arithmetic designs followed by coverage of the core of external I/O programming, algorithmic state machine based system design, and real-world interfacing examples. * Focus on real-world applications and peripherals interfacing for different applications like data acquisition, control, communication, display, computing, instrumentation, digital signal processing and top module design * Aims to be a quick reference guide to design digital architecture in the FPGA and develop system with RTC, data transmission protocols This book constitutes the thoroughly refereed post-conference proceedings of six international workshops held in the framework of the 7th Pacific-Rim Symposium on Image and Video Technology, PSIVT 2015, during November 23-24, 2015, in Auckland, New Zealand. The 29 revised full papers presented were carefully selected from 38 submissions. Their topics diversely ranged from well-established areas to novel current trends: robot vision, RV 2015; 2D and 3D geometric properties from incomplete data, GPID 2015; vision meets graphics, VG 2015; passive and active electro-optical sensors for aerial and space imaging, EO4AS 2015; mathematical and computational methods in biomedical imaging and image analysis, MCBMIIA 2015; and video surveillance, VSWS 2015. This book brings together a selection of the best papers from the eighteenth edition of the Forum on specification and Design Languages Conference (FDL), which took place on September 14-16, 2015, in Barcelona, Spain. FDL is a well-established international forum devoted to dissemination of research results, practical experiences and new ideas in the application of specification, design and verification languages to the design, modeling and verification of integrated circuits, complex hardware and embedded systems. This book provides a platform for discussion and interaction between the three challenging and closely linked areas of ICT-enabled-application research and development: software intensive systems, complex systems and intelligent systems. Software intensive systems strongly interact with other systems, sensors, actuators, devices, other software systems and users. More and more domains are using software intensive systems, e.g. automotive and telecommunication systems, embedded systems in general, industrial automation.
systems and business applications. Moreover, web services offer a new platform for enabling software intensive systems. Complex systems research is focused on the overall understanding of systems rather than their components. Complex systems are characterized by the changing environments in which they interact. They evolve and adapt through internal and external dynamic interactions. The development of intelligent systems and agents, which are increasingly characterized by their use of ontologies and their logical foundations, offer impulses for both software intensive systems and complex systems. Research in intelligent systems research in the areas of robotics, neuroscience, and artificial intelligence systems are vital for the future development and innovation of software intensive and complex systems. The newest addition to the Harris and Harris family of Digital Design and Computer Architecture books, this RISC-V Edition covers the fundamentals of digital logic design and reinforces logic concepts through the design of a RISC-V 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 a processor. By the end of this book, readers will be able to build their own RISC-V microprocessor and will have a top-to-bottom understanding of how it works.

Beginning with digital logic design and progressing to the design of combinational and sequential circuits, this book uses the foundational building blocks of RISC-V processor: blocks of combinational logic, both SystemVerilog and Verilog HDL designs of fundamental building blocks as well as single-cycle, multicycle, and pipelined versions of the RISC-V architecture. Features a companion website with a bonus chapter on I/O systems with practical examples that show how to use SparkFun’s RED-V RedBoard 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 a RISC-V microprocessor. Gives students a full understanding of the RISC-V instruction set architecture, enabling them to build a RISC-V processor and program the RISC-V processor in hardware simulation, software simulation, and in hardware. Includes both SystemVerilog and Verilog HDL designs of fundamental building blocks as well as single-cycle, multicycle, and pipelined versions of the RISC-V architecture. Features a companion website with a bonus chapter on I/O systems with practical examples that show how to use SparkFun’s RED-V RedBoard 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. See the companion EdX MOOCs ENGR85A and ENGR85B with video lectures and interactive problems. Explore a comprehensive and state-of-the-art presentation of real-time electromagnetic transient simulation technology by leaders in the field. Real-Time Electromagnetic Transient Simulation of AC-DC Networks delivers a detailed exposition of programmable gate array (FPGA)-based real-time electromagnetic transient (EMT) simulation for all fundamental hardware equipment used in AC-DC power grids. The book focuses specifically on detailed device-level models for their hardware realization in a massively parallel and deeply pipelined manner as well as decomposition techniques for emulating large systems. Each chapter contains fundamental concepts, apparatus models, solution algorithms, and hardware emulation to assist the reader in understanding the material contained within. Case studies are peppered throughout the book, ranging from small didactic test circuits to realistically sized large-scale AC-DC grids. The book also provides introductions to FPGA and hardware-in-the-loop (HIL) emulation procedures, and large-scale networks constructed by the foundational components described in earlier chapters. With a strong focus on high-voltage direct-current (HVDC) power transmission grid applications, Real-Time Electromagnetic Transient Simulation of AC-DC Networks covers both system-level and device-level mathematical models. Readers will also enjoy the inclusion of: A thorough introduction to field programmable gate array technology, including the evolution of FPGAs, technology trends, hardware architectures, and programming tools. An exploration of classical power system components, e.g., linear and nonlinear passive power system components, transmission lines, power transformers, rotating machines, and protective relays. A comprehensive discussion of power semiconductor switches and converters, i.e., AC-DC and DC-DC converters, and specific power electronic apparatus such as DC circuit breakers. An examination of decomposition techniques used at the equipment-level as well as the large-scale system-level for real-time EMT simulation of AC-DC networks. Chapters that are supported by simulation for well-designed test cases and the corresponding system parameters are provided in the Appendix. Perfect for graduate students and professional engineers working or working in electrical power engineering, Real-Time Electromagnetic Transient Simulation of AC-DC Networks will also earn a place in the libraries of simulation specialists, senior modeling and simulation engineers, planning and design engineers, and system studies engineers. This book presents the latest techniques for machine learning based data analytics on IoT edge devices. A comprehensive literature review on neural network compression and machine learning accelerator is presented from both algorithm level optimization and hardware architecture optimization. Coverage focuses on shallow and deep neural network with real applications on smart buildings. The authors also discuss hardware architecture design with coverage focusing on both CMOS based computing systems and the new emerging Resistive Random-Access Memory (RRAM) based systems. Detailed case studies such as indoor positioning, energy management and intrusion detection are also presented for smart buildings. 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, VHDL designs of SystemVerilog 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. This book presents the proceedings of two conferences, the 37th and 38th in the WoTUG series; Communicating Process Architectures (CPA) 2015, held in Canterbury, England, in August 2015, and CPA 2016, held in Copenhagen, Denmark, in August 2016. Fifteen papers were accepted for presentation at the 2015 conference. They cover a spectrum of concurrency concerns: mathematical theory, programming languages, design of parallel core infrastructures, and applications. Application domains range from supercomputing to embedded. Three workshops and two evening fringe sessions also formed part of the conference, and the workshop position papers and fringe abstracts are included in this book. Fourteen papers covering the same broad spectrum of topics were presented at the 2016 conference, one of them in the form of a workshop. They are all included here, together with abstracts of the five fringe sessions from the conference. 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 FPGAs

This book presents novel compiler techniques, which combine a rigorous mathematical framework, novel program analyses and digital hardware design to advance current high-level synthesis tools and extend their scope beyond the industrial ‘state of the art’. Implementing computation on customised digital hardware plays an increasingly important role in the quest for energy-efficient high-performance computing. Field-programmable gate arrays (FGAs) gain efficiency by encoding the computing task into the chip’s physical circuitry and are gaining rapidly increasing importance in the processor market, especially after recent announcements of large-scale deployments in the data centre. This is driving, more than ever, the demand for higher design entry abstraction levels, such as the automatic circuit synthesis from high-level languages (high-level synthesis). The techniques in this book apply formal reasoning to high-level synthesis in the context of demonstrably practical applications. pp

This book presents high-quality papers from the Fifth International Conference on Microelectronics, Computing & Communication Systems (MCCS 2020). It discusses the latest technological trends and advances in MEMS and nanoelectronics, wireless communication, optical communication, instrumentation, signal processing, image processing, bioengineering, green energy, hybrid vehicles, environmental science, weather forecasting, cloud computing, renewable energy, RFID, CMOS sensors, actuators, transducers, telemetry systems, embedded systems and sensor network applications. It includes papers based on original theoretical, practical and experimental simulations, development, applications, measurements and testing. The applications and solutions discussed here provide excellent reference material for future product development. The first of two volumes in the Electronic Design Automation for Integrated Circuits Handbook, Second Edition, Electronic Design Automation for IC System Design, Verification, and Testing thoroughly examines system-level design, microarchitectural design, logic verification, and testing. Chapters contributed by leading experts authoritatively discuss processor modeling and design tools, using performance metrics to select microprocessor cores for integrated circuit (IC) designs, design and verification languages, digital simulation, hardware acceleration and emulation, and much more. New to This Edition: Major updates appearing in the initial phases of the design flow, where the level of abstraction keeps rising to support more functionality with lower non-recurring engineering (NRE) costs Significant revisions reflected in the final phases of the design flow, where the complexity due to smaller and smaller geometries is compounded by the slow progress of shorter wavelength lithography. New coverage of cutting-edge applications and approaches realized in the decade since publication of the previous edition—these are illustrated by new chapters on high-level synthesis, system-on-chip (SoC) block-based design, and back-annotating system-level models offering improved depth and modernity. Electronic Design Automation for IC System Design, Verification, and Testing provides a valuable, state-of-the-art reference for electronic design automation (EDA) students, researchers, and professionals. 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. This book describes methodologies in the design of VLSI devices, circuits and their applications at nanoscale levels. The book begins with the discussion on the dominant role of power dissipation in highly scaled devices. The 15 Chapters of the book are classified under four sections that cover design, modeling, and simulation of electronic, magnetic and compound semiconductors for their applications in VLSI devices, circuits, and systems. This comprehensive volume eloquently presents the design methodologies for ultra-low power VLSI design, potential post-CMOS devices, and their applications from the architectural and system perspectives. The book shall serve as an invaluable reference book for the graduate students, Ph.D./ M.S./ M.Tech. Scholars, researchers, and practicing engineers working in the frontier areas of nanoscale VLSI design. This book makes powerful Field Programmable Gate Array (FPGA) and reconfigurable technology accessible to software engineers by covering different state-of-the-art high-level synthesis approaches (e.g., OpenCL and several C-to-gates compilers). It introduces FPGA technology, its programming model, and how various applications can be implemented on FPGAs without going through low-level hardware design phases. Readers will get a realistic sense for problems that are suited for FPGAs and how to implement them from a software designer’s point of view. The authors demonstrate that FPGAs and their programming model reflect the needs of stream processing problems much better than traditional CPU or GPU architectures, making them well-suited for a wide variety of systems, from embedded systems performing sensor processing to large setups for Big Data number crunching. This book serves as an invaluable tool for software designers and FPGA design engineers who are interested in high design productivity through behavioural synthesis, domain-specific compilation, and FPGA overlays. Introduces FPGA technology to software developers by giving an overview of FPGA programming models and design tools, as well as various application examples; Provides a holistic analysis of the topic and enables developers to tackle the architectural needs for Big Data processing with FPGAs; Explains the reasons for the energy efficiency and performance benefits of FPGA processing; Provides a user-oriented approach and a sense for where and how to apply FPGA technology.