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IFIP WG10.3/WG10.5 International Workshop on Distributed and Parallel Embedded Systems (DIPES'98) October 5-6, 1998, Schloß Eringerfeld, Germany

Model-oriented Approaches for Complex Systems Certification

Software Engineering - ESEC/FSE '99

Applying the ARM mbed

Accelerating the Design Process

Winning the SoC Revolution

7th European Software Engineering Conference Held Jointly with the 7th ACM SIGSOFT Symposium on the Foundations of Software Engineering, Toulouse, France, September 6-10, 1999 Proceedings

Rapid System Prototyping with FPGAs

Rapid Prototyping of Digital Systems

Rapid Prototyping of Embedded Systems

Foundation for America's Information Future : a Report

The Codesign of Embedded Systems: A Unified Hardware/Software Representation

Embedded Systems Design with the Texas Instruments MSP432 32-bit Processor

High Performance Computing and Communications

Advances in Computer Systems Architecture

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RaPTEX: Rapid Prototyping Tool for Embedded Communication Systems Springer
Current practice dictates the separation of the hardware and software development paths early in the design cycle. These paths remain independent with very little interaction occurring between them until system integration. In particular, hardware is often specified without fully appreciating the computational requirements of the software. Also, software development does not influence hardware development and does not track changes made during the hardware design phase. Thus, the ability to explore hardware/software tradeoffs is restricted, such as the movement of functionality from the software domain to the hardware domain (and vice-versa) or the modification of the hardware/software interface. As a result, problems that are encountered during system integration may require modification of the software and/or hardware, resulting in potentially significant cost increases and schedule overruns. To address the problems described above, a cooperative design approach, one that utilizes a unified view of hardware and software, is described. This approach is called hardware/software codesign. The Codesign of Embedded Systems develops several fundamental hardware/software codesign concepts and a methodology that supports them. A unified representation, referred to as a decomposition graph, is presented which can be used to describe hardware or software using either functional abstractions or data abstractions. Using a unified representation based on functional abstractions, an abstract hardware/software model has been implemented in a common simulation environment called ADEPT (Advanced Design Environment Prototyping Tool). This model permits early hardware/software evaluation and tradeoff exploration. Techniques have been developed which support the identification of software bottlenecks and the evaluation of design alternatives with respect to multiple metrics. The application of the model is demonstrated on several examples. A unified representation based on data abstractions is also explored. This work leads to investigations regarding the application of object-oriented techniques to hardware design. The Codesign of Embedded Systems: A Unified Hardware/Software Representation describes a novel approach to a topic of immense importance to CAD researchers and designers alike.

Model-driven Development for Embedded Software Elsevier

Here is a laboratory workbook filled with interesting and challenging projects for digital logic design and embedded systems classes. The workbook introduces you to fully integrated modern CAD tools, logic simulation, logic synthesis using hardware description languages, design hierarchy, current generation field programmable gate array technology, and SoPC design. Projects cover such areas as serial communications, state machines with video output, video games and graphics, robotics, pipelined RISC processor cores, and designing computer systems using a commercial processor core.

From Multicores and GPU's to Petascale Institute of Electrical & Electronics Engineers(IEEE)

Rapid Prototyping of Application Specific Signal Processors presents leading-edge research that focuses on design methodology, infrastructure support and scalable architectures developed by the 150 million dollar DARPA United States Department of Defense RASSP Program. The contributions to this edited work include an introductory overview chapter that explains the origin, concepts and status of this effort. The RASSP Program is a multi-year DARPA/Tri-Service initiative intended to dramatically improve the process by which complex digital systems, particularly embedded signal processors, are designed, manufactured, upgraded and supported. This program was originally driven by military applications for signal processing. The requirements of military applications for real-time signal processing are typically more demanding than those of commercial applications, but the time gap between technology employed in advanced military prototypes and commercial products is narrowing rapidly. The research on methodologies, infrastructure and architectures presented in this book is applicable to commercial signal processing systems that are in design now, or will be developed before the end of the decade. Rapid Prototyping of Application Specific Signal Processors is a valuable reference for developers of embedded digital systems, particularly systems engineers for signal processing systems (such as digital TV, biomedical image processing systems and telecommunications) and for military contractors who are developing signal processing systems. This book will also be of interest to managers who are charged with responsibility for creating and maintaining environments and infrastructures for developing large embedded digital systems. The chief value for managers will be the defining of methods and processes that reduce development time and cost.

Springer Science & Business Media

This book is the proceedings volume of the 10th International Conference on Field Programmable Logic and its Applications (FPL), held August 27 30, 2000 in Villach, Austria, which covered areas like reconfigurable logic (RL), reconfigurable computing (RC), and its applications, and all other aspects. Its subtitle "The Roadmap to Reconfigurable Computing" reminds us, that we are currently witnessing the runaway of a breakthrough. The annual FPL series is the eldest international conference in the world covering configware and all its aspects. It was founded 1991 at Oxford University (UK) and is 2 years older than its two most important competitors usually taking place at Monterey and Napa. FPL has been held at Oxford, Vienna, Prague, Darmstadt, London, Tallinn, and Glasgow (also see: <http://www.fpl.uni-kl.de/FPL/>). The New Case for Reconfigurable Platforms: Converging Media. Indicated by palmtops, smart mobile phones, many other portables, and consumer electronics, media such as voice, sound, video, TV, wireless, cable, telephone, and Internet continue to converge. This creates new opportunities and even necessities for reconfigurable platform usage. The new converged media require high volume, flexible, multi purpose, multi standard, low power products adaptable to support evolving standards, emerging new standards, field upgrades, bug fixes, and, to meet the needs of a growing number of different kinds of services offered to zillions of individual subscribers preferring different media mixes.

[Towards Useful Services for Elderly and People with Disabilities](#) Springer Science & Business Media

As our society experiences faster and faster rates of progress, technology becomes available to

solve the most complicated engineering problems. These new technologies allow to build much more complex systems than what current methodologies allow to design in an orderly and structured manner, which is necessary to permit easy system expansions, upgrading and maintenance. This is particularly true in the case of embedded and real-time systems, which have to exhibit correct functional and temporal behaviors. This thesis focuses on a design methodology for embedded systems that is intended to be used by the application specialists, instead of the computer specialists. This avoids the problems generated when interactions are necessary between the two specialists and when the design is done by those who are unfamiliar with the application, lacking detailed knowledge of the system requirements. The methodology is based on the multiactivity paradigm and uses two system prototypes: the Specification Prototype, which is a prototype of the behavioral and functional requirements specifications; and the Design Prototype, which is a prototype of the design specifications and can be used to observe its temporal characteristics, to see whether the system will meet the required timing constraints. Finally, the methodology is exemplified and its feasibility demonstrated through various tests that were run using a simulator.

Rapid Prototyping Software for Avionics Systems Elsevier

This book provides a thorough introduction to the Texas Instruments MSP432™ microcontroller. The MSP432 is a 32-bit processor with the ARM Cortex M4F architecture and a built-in floating point unit. At the core, the MSP432 features a 32-bit ARM Cortex-M4F CPU, a RISC-architecture processing unit that includes a built-in DSP engine and a floating point unit. As an extension of the ultra-low-power MSP microcontroller family, the MSP432 features ultra-low power consumption and integrated digital and analog hardware peripherals. The MSP432 is a new member to the MSP family. It provides for a seamless transition to applications requiring 32-bit processing at an operating frequency of up to 48 MHz. The processor may be programmed at a variety of levels with different programming languages including the user-friendly Energia rapid prototyping platform, in assembly language, and in C. A number of C programming options are also available to developers, starting with register-level access code where developers can directly configure the device's registers, to Driver Library, which provides a standardized set of application program interfaces (APIs) that enable software developers to quickly manipulate various peripherals available on the device. Even higher abstraction layers are also available, such as the extremely user-friendly Energia platform, that enables even beginners to quickly prototype an application on MSP432. The MSP432 LaunchPad is supported by a host of technical data, application notes, training modules, and software examples. All are encapsulated inside one handy package called MSPWare, available as both a stand-alone download package as well as on the TI Cloud development site: dev.ti.com The features of the MSP432 may be extended with a full line of BoosterPack plug-in modules. The MSP432 is also supported by a variety of third party modular sensors and software compiler companies. In the back, a thorough introduction to the MSP432 line of microcontrollers, programming techniques, and interface concepts are provided along with considerable tutorial information with many illustrated examples. Each chapter provides laboratory exercises to apply what has been presented in the chapter. The book is intended for an upper level undergraduate course in microcontrollers or mechatronics but may also be used as a reference for capstone design projects. Practicing engineers

already familiar with another microcontroller, who require a quick tutorial on the microcontroller, will also find this book very useful. Finally, middle school and high school students will find the MSP432 highly approachable via the Energia rapid prototyping system.

A Summary of Research 1995 Springer Science & Business Media

The push to move products to market as quickly and cheaply as possible is fiercer than ever, and accordingly, engineers are always looking for new ways to provide their companies with the edge over the competition. Field-Programmable Gate Arrays (FPGAs), which are faster, denser, and more cost-effective than traditional programmable logic devices (PLDs), are quickly becoming one of the most widespread tools that embedded engineers can utilize in order to gain that needed edge. FPGAs are especially popular for prototyping designs, due to their superior speed and efficiency. This book hones in on that rapid prototyping aspect of FPGA use, showing designers exactly how they can cut time off production cycles and save their companies money drained by costly mistakes, via prototyping designs with FPGAs first. Reading it will take a designer with a basic knowledge of implementing FPGAs to the "next-level of FPGA use because unlike broad beginner books on FPGAs, this book presents the required design skills in a focused, practical, example-oriented manner. In-the-trenches expert authors assure the most applicable advice to practicing engineers Dual focus on successfully making critical decisions and avoiding common pitfalls appeals to engineers pressured for speed and perfection Hardware and software are both covered, in order to address the growing trend toward "cross-pollination" of engineering expertise

Shortening the Path from Specification to Prototype CRC Press

This book constitutes the refereed proceedings of the 9th International Conference on Smart Homes and Health Telematics, ICOST 2011, held in Montreal, Canada, in June 2011. The 25 revised full papers presented together with 16 short papers and 8 student papers were carefully reviewed and selected from 94 submissions. The papers are organized in topical sections on smart home and village; health telematics and healthcare technology; wellbeing, ageing friendly and enabling technology; and medical health telematics and healthcare technology.

Issues in Computer Engineering: 2013 Edition IEEE

A hands-on introduction to the field of embedded systems; A focus on fast prototyping of embedded systems; All key embedded system concepts covered through simple and effective experimentation; An understanding of ARM technology, one of the world's leaders; A practical introduction to embedded C; Applies possibly the most accessible set of tools available in the embedded world. This book is an introduction to embedded systems design, using the ARM mbed and C programming language as development tools. The mbed provides a compact, self-contained and low-cost hardware core, and the on-line compiler requires no download or installation, being accessible wherever an internet link exists. The book further combines these with a simple "breadboard" approach, whereby simple circuits are built up around the mbed, with no soldering or pcb assembly required. The book adopts a "learning through doing" approach. Each chapter is based around a major topic in embedded systems. The chapter proceeds as a series of practical experiments; the reader sets up a simple hardware system, develops and downloads a simple program, and immediately observes and tests the outcomes. The book then reflects on the experimental results, evaluating the strengths and weaknesses of the technology or technique introduced, explores how

precise the link is between theory and practice, and considers applications and the wider context. The only book that explains how to use ARM's mbed development toolkit to help the speedy and easy development of embedded systems. Teaches embedded systems core principles in the context of developing quick applications, making embedded systems development an easy task for the non specialist who does not have a deep knowledge of electronics or software. All key concepts are covered through simple and effective experimentation.

Embedded Systems Scholarly Editions

In 1998-99, at the dawn of the SoC Revolution, we wrote *Surviving the SOC Revolution: A Guide to Platform Based Design*. In that book, we focused on presenting guidelines and best practices to aid engineers beginning to design complex System-on-Chip devices (SoCs). Now, in 2003, facing the mid-point of that revolution, we believe that it is time to focus on winning. In this book, *Winning the SoC Revolution: Experiences in Real Design*, we gather the best practical experiences in how to design SoCs from the most advanced design groups, while setting the issues and techniques in the context of SoC design methodologies. As an edited volume, this book has contributions from the leading design houses who are winning in SoCs - Altera, ARM, IBM, Philips, TI, UC Berkeley, and Xilinx. These chapters present the many facets of SoC design - the platform based approach, how to best utilize IP, Verification, FPGA fabrics as an alternative to ASICs, and next generation process technology issues. We also include observations from Ron Wilson of CMP Media on best practices for SoC design team collaboration. We hope that by utilizing this book, you too, will win the SoC Revolution.

A Contemporary Design Tool Springer Science & Business Media

On behalf of the Program Committee, we are pleased to present the proceedings of the 2005 Asia-Pacific Computer Systems Architecture Conference (ACSAC 2005) held in the beautiful and dynamic country of Singapore. This conference was the tenth in its series, one of the leading forums for sharing the emerging research findings in this field. In consultation with the ACSAC Steering Committee, we selected a 12-member Program Committee. This Program Committee represented a broad spectrum of research expertise to ensure a good balance of research areas, institutions and experience while maintaining the high quality of this conference series. This year's committee was of the same size as last year but had 19 new faces. We received a total of 173 submissions which is 14% more than last year. Each paper was assigned to at least three and in some cases four Program Committee members for review. Wherever necessary, the committee members called upon the expertise of their colleagues to ensure the highest possible quality in the reviewing process. As a result, we received 415 reviews from the Program Committee members and their 105 co-reviewers whose names are acknowledged in the proceedings. The conference committee adopted a systematic blind review process to provide a fair assessment of all submissions. In the end, we accepted 65 papers on a broad range of topics giving an acceptance rate of 37.5%. We are grateful to all the Program Committee members and the co-reviewers for their efforts in completing the reviews within a tight schedule.

CMOSET 2012 Embedded Systems and Microsystem Track Presentation Slides John Wiley & Sons

Advances in microprocessors, memory, and radio technology have enabled the emergence of

embedded systems that rely on communication systems to exchange information and coordinate their activity in spatially distributed applications. Developing embedded communication systems that are efficient and reliable, is a challenge due to the trade-offs imposed by the conflicts between application requirements and hardware constraints. In this thesis, we present RaPTEX, an integrated development environment (IDE) for embedded communication systems. RaPTEX consists of three major subsystems: a graphical module to facilitate component composition, code generation with access to component-level parameters, and a performance evaluation framework for allowing system designers to explore what-if scenarios and clearly expose the trade-offs of their choices. We also present two case studies of developing wireless sensor network applications using RaPTEX.

10th Asia-Pacific Conference, ACSAC 2005, Singapore, October 24-26, 2005, Proceedings Springer Science & Business Media

Embedded systems take over complex control and data processing tasks in diverse applications such as automotive, avionics, consumer products, and telecommunications. They are the primary driver for improving overall system safety, efficiency, and comfort. The demand for further improvement in these aspects can only be satisfied by designing embedded systems of increasing complexity, which in turn necessitates the development of new system design methodologies based on specification, design, and verification languages. The objective of the book at hand is to provide researchers and designers with an overview of current research trends, results, and application experiences in computer languages for embedded systems. The book builds upon the most relevant contributions to the 2008 conference Forum on Design Languages (FDL), the premier international conference specializing in this field. These contributions have been selected based on the results of reviews provided by leading experts from research and industry. In many cases, the authors have improved their original work by adding breadth, depth, or explanation.

Quartus® II Edition Springer Science & Business Media

The 11th International Workshop on Rapid System Prototyping was held in 2000. These proceedings cover: communication and distributed systems; reconfigurable architectures; partitioning, scheduling and performance analysis; design methodologies; interface technologies; and more.

10th International Conference, FPL 2000 Villach, Austria, August 27-30, 2000 Proceedings Ed.

Universidad de Cantabria

Embedded systems are becoming one of the major driving forces in computer science. Furthermore, it is the impact of embedded information technology that dictates the pace in most engineering domains. Nearly all technical products above a certain level of complexity are not only controlled but increasingly even dominated by their embedded computer systems. Traditionally, such embedded control systems have been implemented in a monolithic, centralized way. Recently, distributed solutions are gaining increasing importance. In this approach, the control task is carried out by a number of controllers distributed over the entire system and connected by some interconnect network, like fieldbuses. Such a distributed embedded system may consist of a few controllers up to several hundred, as in today's top-range automobiles. Distribution and parallelism in embedded systems design increase the engineering challenges and require new development methods and tools. This book is the result of the International Workshop on Distributed and Parallel Embedded Systems (DIPES'98), organized by the International Federation for Information Processing (IFIP)

Working Groups 10.3 (Concurrent Systems) and 10.5 (Design and Engineering of Electronic Systems). The workshop took place in October 1998 in Schloss Eringerfeld, near Paderborn, Germany, and the resulting book reflects the most recent points of view of experts from Brazil, Finland, France, Germany, Italy, Portugal, and the USA. The book is organized in six chapters: `Formalisms for Embedded System Design': IP-based system design and various approaches to multi-language formalisms. `Synthesis from Synchronous/Asynchronous Specification': Synthesis techniques based on Message Sequence Charts (MSC), StateCharts, and Predicate/Transition Nets. `Partitioning and Load-Balancing': Application in simulation models and target systems. `Verification and Validation': Formal techniques for precise verification and more pragmatic approaches to validation. `Design Environments' for distributed embedded systems and their impact on the industrial state of the art. `Object Oriented Approaches': Impact of OO-techniques on distributed embedded systems. £/LIST£ This volume will be essential reading for computer science researchers and application developers.

Rapid BeagleBoard Prototyping with MATLAB and Simulink John Wiley & Sons

The design, implementation and validation of avionics and aeronautical systems have become extremely complex tasks due to the increase of functionalities that are deployed in current avionics systems and the need to be able certify them before putting them into production. This book proposes a methodology to enable the rapid prototyping of such a system by considering from the start the certification aspects of the solution produced. This method takes advantage of the model-based design approaches as well as the use of formal methods for the validation of these systems. Furthermore, the use of automatic software code generation tools using models makes it possible to reduce the development phase as well as the final solution testing. This book presents, firstly, an overview of the model-based design approaches such as those used in the field of aeronautical software engineering. Secondly, an original methodology that is perfectly adapted to the field of aeronautical embedded systems is introduced. Finally, the authors illustrate the use of this method using a case study for the design, implementation and testing of a new generation aeronautical router.

Ninth International Workshop on Rapid System Prototyping John Wiley & Sons

Fast and Effective Embedded Systems Design is a fast-moving introduction to embedded systems design, applying the innovative ARM mbed and its web-based development environment. Each chapter introduces a major topic in embedded systems, and proceeds as a series of practical experiments, adopting a "learning through doing" strategy. Minimal background knowledge is needed to start. C/C++ programming is applied, with a step-by-step approach which allows you to get coding quickly. Once the basics are covered, the book progresses to some "hot" embedded issues - intelligent instrumentation, wireless and networked systems, digital audio and digital signal processing. In this new edition all examples and peripheral devices are updated to use the most recent libraries and peripheral devices, with increased technical depth, and introduction of the "mbed enabled" concept. Written by two experts in the field, this book reflects on the experimental results, develops and matches theory to practice, evaluates the strengths and weaknesses of the technology and techniques introduced, and considers applications in a wider context. New Chapters on: Bluetooth and ZigBee communication Internet communication and control, setting the scene for

the 'Internet of Things' Digital Audio, with high-fidelity applications and use of the I2S bus Power supply, and very low power applications The development process of moving from prototyping to small-scale or mass manufacture, with a commercial case study. Updates all examples and peripheral devices to use the most recent libraries and peripheral products Includes examples with touch screen displays and includes high definition audio input/output with the I2S interface Covers the development process of moving from prototyping to small-scale or mass manufacture with commercial case studies Covers hot embedded issues such as intelligent instrumentation, networked systems, closed loop control, and digital signal processing

Rapid Prototyping of Digital Systems Elsevier

This book is a fast-paced guide with practical, hands-on recipes which will show you how to prototype Beagleboard-based audio/video applications using Matlab/Simulink and Sourcery Codebench on a Windows host. Beagleboard Embedded Projects is great for students and academic researchers who have practical ideas and who want to build a proof-of-concept system on an embedded hardware platform quickly and efficiently. It is also useful for product design engineers who want to ratify their applications and reduce the time-to-market. It is assumed that you are familiar with Matlab/Simulink and have some basic knowledge of computer hardware. Experience in Linux is favoured but not necessary, as our software development is purely on a Windows host.

Experiences in Real Design Packt Publishing Ltd

Specification and design methodology has seen significant growth as a research area over the last decade, tracking but lagging behind VLSI design technology in general and the CAD industry in particular. The commercial rush to market tries to leverage existing technology which fuels CAD design tool development. Paralleling this is very active basic and applied research to investigate and move forward rational and effective methodologies for accomplishing digital design, especially in the field of hardware/software codesign. It is this close relationship between industry and academia that makes close cooperation between researchers and practitioners so important-and monographs like this that combine both abstract concept and pragmatic implementation deftly bridge this often gaping chasm. It was at the IEEE/ACM Eighth International Symposium on Hardware/Software Codesign where I met the author of this monograph, Dr. Randall Janka, who was presenting some of his recent dissertation research results on specification and design methodology, or as he has so succinctly defined this sometimes ambiguous concept, "the tools and rules." Where so many codesign researchers are trying to prove out different aspects of codesign and using toy applications to do so, Dr. Janka had developed a complete specification and design methodology and prototyped the infrastructure-and proven its viability, utility, and effectiveness using a demanding real-world application of a real-time synthetic aperture radar imaging processor that was implemented with embedded parallel processors.

Rapid Prototyping of Application Specific Signal Processors Springer

Embedded Systems: A Contemporary Design Tool, Second Edition Embedded systems are one of the foundational elements of today's evolving and growing computer technology. From operating our cars, managing our smart phones, cleaning our homes, or cooking our meals, the special computers we call embedded systems are quietly and unobtrusively making our lives easier, safer, and more connected. While working in increasingly challenging environments, embedded systems give us the

ability to put increasing amounts of capability into ever-smaller and more powerful devices. Embedded Systems: A Contemporary Design Tool, Second Edition introduces you to the theoretical hardware and software foundations of these systems and expands into the areas of signal integrity, system security, low power, and hardware-software co-design. The text builds upon earlier material to show you how to apply reliable, robust solutions to a wide range of applications operating in today's often challenging environments. Taking the user's problem and needs as your starting point, you will explore each of the key theoretical and practical issues to consider when designing an application in today's world. Author James Peckol walks you through the formal hardware and software development process covering: Breaking the problem down into major functional blocks;

Planning the digital and software architecture of the system; Utilizing the hardware and software co-design process; Designing the physical world interface to external analog and digital signals; Addressing security issues as an integral part of the design process; Managing signal integrity problems and reducing power demands in contemporary systems; Debugging and testing throughout the design and development cycle; Improving performance. Stressing the importance of security, safety, and reliability in the design and development of embedded systems and providing a balanced treatment of both the hardware and the software aspects, Embedded Systems: A Contemporary Design Tool, Second Edition gives you the tools for creating embedded designs that solve contemporary real-world challenges.

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