

Hardware Software Codesign of Embedded System



CPSC689-602

Rabi Mahapatra

Today's topics



- Course Organization
- Introduction to HS-CODES
- Codesign Motivation
- Some Issues on Codesign of Embedded System

Readings In Hardwaresoftware Codesign

Patrick R. Schaumont



Readings In Hardware/software Codesign:

Readings in Hardware/Software Co-Design Giovanni De Micheli, Rolf Ernst, Wayne Wolf, 2002 This title serves as an introduction and reference for the field with the papers that have shaped the hardware software co design since its inception in the early 90s

Readings in Hardware/Software Co-Design Giovanni De Micheli, Rolf Ernst, Wayne Wolf, 2001-06-19 Embedded system designers are constantly looking for new tools and techniques to help satisfy the exploding demand for consumer information appliances and specialized industrial products One critical barrier to the timely release of embedded system products is integrating the design of the hardware and software systems Hardware software co design is a set of methodologies and techniques specifically created to support the concurrent design of both systems effectively reducing multiple iterations and major redesigns In addition to its critical role in the development of embedded systems many experts believe that co design will be a key design methodology for Systems on a Chip Readings in Hardware Software Co Design presents the papers that have shaped the hardware software co design field since its inception in the early 90s Field experts Giovanni De Micheli Rolf Ernst and Wayne Wolf introduce sections of the book and provide context for the paper that follow This collection provides professionals researchers and graduate students with a single reference source for this critical aspect of computing design Over 50 peer reviewed papers written from leading researchers and designers in the field Selected edited and introduced by three of the fields most eminent researchers and educators Accompanied by an annually updated companion Web site with links and references to recently published papers providing a forum for the editors to comment on how recent work continues or breaks with previous work in the field

A Practical Introduction to Hardware/Software Codesign Patrick R. Schaumont, 2010-09-09 This is a practical book for computer engineers who want to understand or implement hardware software systems It focuses on problems that require one to combine hardware design with software design such problems can be solved with hardware software codesign When used properly hardware software co sign works better than hardware design or software design alone it can improve the overall performance of digital systems and it can shorten their design time Hardware software codesign can help a designer to make trade offs between the exibility and the performance of a digital system To achieve this a designer needs to combine two radically different ways of design the sequential way of decomposition in time using software with the parallel way of decomposition in space using hardware Intended Audience This book assumes that you have a basic understanding of hardware that you are familiar with standard digital hardware components such as registers logic gates and components such as multiplexers and arithmetic operators The book also assumes that you know how to write a program in C These topics are usually covered in an introductory course on computer engineering or in a combination of courses on digital design and software engineering

A Practical Introduction to Hardware/Software Codesign Patrick R. Schaumont, 2012-11-27 This textbook serves as an introduction to the subject of embedded systems design with emphasis on integration of custom hardware components with software The

key problem addressed in the book is the following how can an embedded systems designer strike a balance between flexibility and efficiency The book describes how combining hardware design with software design leads to a solution to this important computer engineering problem The book covers four topics in hardware software codesign fundamentals the design space of custom architectures the hardware software interface and application examples The book comes with an associated design environment that helps the reader to perform experiments in hardware software codesign Each chapter also includes exercises and further reading suggestions Improvements in this second edition include labs and examples using modern FPGA environments from Xilinx and Altera which will make the material in this book applicable to a greater number of courses where these tools are already in use More examples and exercises have been added throughout the book If I were teaching a course on this subject I would use this as a resource and text If I were a student who wanted to learn codesign I would look for a course that at least used a similar approach If I were an engineer or engineering manager who wanted to learn more about codesign from a very practical perspective I would read this book first before any other When I first started learning about codesign as a practitioner a book like this would have been the perfect introduction Grant Martin Tensilica

Multicore Systems On-Chip: Practical Software/Hardware Design Abderazek Ben Abdallah, 2013-07-20 System on chips designs have evolved from fairly simple uncore single memory designs to complex heterogeneous multicore SoC architectures consisting of a large number of IP blocks on the same silicon To meet high computational demands posed by latest consumer electronic devices most current systems are based on such paradigm which represents a real revolution in many aspects in computing The attraction of multicore processing for power reduction is compelling By splitting a set of tasks among multiple processor cores the operating frequency necessary for each core can be reduced allowing to reduce the voltage on each core Because dynamic power is proportional to the frequency and to the square of the voltage we get a big gain even though we may have more cores running As more and more cores are integrated into these designs to share the ever increasing processing load the main challenges lie in efficient memory hierarchy scalable system interconnect new programming paradigms and efficient integration methodology for connecting such heterogeneous cores into a single system capable of leveraging their individual flexibility Current design methods tend toward mixed HW SW co designs targeting multicore systems on chip for specific applications To decide on the lowest cost mix of cores designers must iteratively map the device s functionality to a particular HW SW partition and target architectures In addition to connect the heterogeneous cores the architecture requires high performance complex communication architectures and efficient communication protocols such as hierarchical bus point to point connection or Network on Chip Software development also becomes far more complex due to the difficulties in breaking a single processing task into multiple parts that can be processed separately and then reassembled later This reflects the fact that certain processor jobs cannot be easily parallelized to run concurrently on multiple processing cores and that load balancing between processing cores especially heterogeneous cores is very

difficult *The Codesign of Embedded Systems: A Unified Hardware/Software Representation* Sanjaya Kumar, James H. Aylor, Barry W. Johnson, Wm.A. Wulf, 1995-11-30 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. **Behavioral Modeling for**

Embedded Systems and Technologies: Applications for Design and Implementation Gomes, Luis, Fernandes, Jo?o M., 2009-07-31 This book provides innovative behavior models currently used for developing embedded systems, accentuating on graphical and visual notations. Provided by publisher.

Introduction to Embedded Systems Manuel Jiménez, Rogelio Palomera, Isidoro Couvertier, 2013-09-11 This textbook serves as an introduction to the subject of embedded systems design using microcontrollers as core components. It develops concepts from the ground up, covering the development of embedded systems technology, architectural and organizational aspects of controllers and systems, processor models, and peripheral devices. Since microprocessor-based embedded systems tightly blend hardware and software components in a single application, the book also introduces the subjects of data representation, formats, data operations, and programming styles. The practical component of the book is tailored around the architecture of a widely used Texas Instruments microcontroller, the

MSP430 and a companion web site offers for download an experimenter's kit and lab manual along with Powerpoint slides and solutions for instructors

Springer Handbook of Automation Shimon Y. Nof, 2009-07-16 Automation is undergoing a major transformation in scope and dimension and plays an increasingly important role in the global economy and in our daily lives. Engineers combine automated devices with mathematical and organizational tools to create complex systems for a rapidly expanding range of applications and human activities. This handbook incorporates these new developments and presents a widespread and well structured conglomeration of new emerging application areas of automation. Besides manufacturing as a primary application of automation, the handbook contains new application areas such as medical systems and health, transportation, security and maintenance, service, construction and retail, as well as production or logistics. This Springer Handbook is not only an ideal resource for automation experts but also for people new to this expanding field such as engineers, medical doctors, computer scientists, designers. It is edited by an internationally renowned and experienced expert.

Modern VLSI Design Wayne Wolf, 2008-12-21 The Number 1 VLSI Design Guide Now Fully Updated for IP Based Design and the Newest Technologies. Modern VLSI Design Fourth Edition offers authoritative up to the minute guidance for the entire VLSI design process from architecture and logic design through layout and packaging. Wayne Wolf has systematically updated his award winning book for today's newest technologies and highest value design techniques. Wolf introduces powerful new IP based design techniques at all three levels: gates, subsystems and architecture. He presents deeper coverage of logic design fundamentals, clocking and timing and much more. No other VLSI guide presents as much up to date information for maximizing performance, minimizing power utilization and achieving rapid design turnarounds.

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mittel 2 5 2 km 2 30 h 445 hm 136 hm

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winterlandschaften hinzugeben deshalb sollten schneeschuhwanderer die nachfolgenden touren in den bayerischen alpen in deutschland in Österreich in der schweiz und in südtirol nicht verpassen