

## *Embedded Real Time Systems Kvk Prasad*

This book provides some recent advances in design nanometer VLSI chips. The selected topics try to present some open problems and challenges with important topics ranging from design tools, new post-silicon devices, GPU-based parallel computing, emerging 3D integration, and antenna design. The book consists of two parts, with chapters such as: VLSI design for multi-sensor smart systems on a chip, Three-dimensional integrated circuits design for thousand-core processors, Parallel symbolic analysis of large analog circuits on GPU platforms, Algorithms for CAD tools VLSI design, A multilevel memetic algorithm for large SAT-encoded problems, etc.

The presence and use of real-time systems is becoming increasingly common. Examples of such systems range from nuclear reactors, to automotive controllers, and also entertainment software such as games and graphics animation. The growing importance of rea.

In the four previous editions the author presented a text firmly grounded in the mathematics that engineers and scientists must understand and know how to use. Tapping into decades of teaching at the US Navy Academy and the US Military Academy and serving for twenty-five years at (NASA) Goddard Space Flight, he combines a teaching and practical experience that is rare among authors of advanced engineering mathematics books. This edition offers a smaller, easier to read, and useful version of this classic textbook. While competing textbooks continue to grow, the book presents a slimmer, more concise option. Instructors and students alike are rejecting the encyclopedic tome with its higher and higher price aimed at undergraduates. To assist in the choice of topics included in this new edition, the author reviewed the syllabi of various engineering mathematics courses that are taught at a wide variety of schools. Due to time constraints an instructor can select perhaps three to four topics from the book, the most likely being ordinary differential equations, Laplace transforms, Fourier series and separation of variables to solve the wave, heat, or Laplace's equation. Laplace transforms are occasionally replaced by linear algebra or vector calculus. Sturm-Liouville problem and special functions (Legendre and Bessel functions) are included for completeness. Topics such as z-transforms and complex variables are now offered in a companion book, *Advanced Engineering Mathematics: A Second Course* by the same author. MATLAB is still employed to reinforce the concepts that are taught. Of course, this Edition continues to offer a wealth of examples and applications from the scientific and engineering literature, a highlight of previous editions. Worked solutions are given in the back of the book.

*Embedded Systems Architecture* is a practical and technical guide to understanding the components that make up an embedded system ' s architecture. This book is perfect for those starting out as technical professionals such as engineers, programmers and designers of embedded systems; and also for students of computer science, computer engineering and electrical engineering. It gives a much-needed ' big picture ' for recently graduated engineers grappling with understanding the design of real-world systems for the first time, and provides professionals with a systems-level picture of the key elements that can go into an embedded design, providing a firm foundation on which to build their skills. Real-world approach to the fundamentals, as well as the design and architecture process, makes this book a popular reference for the daunted or the inexperienced: if in doubt, the answer is in here! Fully updated with new coverage of FPGAs, testing, middleware and the latest programming techniques in C, plus complete source code and sample code, reference designs and tools online make this the complete package Visit the companion web site at <http://booksite.elsevier.com/9780123821966/> for source code, design examples, data sheets and more A true introductory book, provides a comprehensive get up and running reference for those new to the field, and updating skills: assumes no prior knowledge beyond undergrad level electrical engineering Addresses the needs of practicing engineers, enabling it to get to the point more directly, and cover more ground. Covers hardware, software and middleware in a single volume Includes a library of design examples and design tools, plus a complete set of source code and embedded systems design tutorial materials from companion website

Arch. Programming and Applications

A Unified Hardware/Software Introduction

Embedded Systems: An Integrated Approach

The Art of Programming Embedded Systems

Embedded Microcomputer Systems: Real Time Interfacing

***Ideal for students on all construction courses Topics presented concisely in plain language and with clear drawings Updated to include revisions to Building and Construction regulations The Building Construction Handbook is THE authoritative reference for all construction students and professionals. Its detailed drawings clearly illustrate the construction of building elements, and have been an invaluable guide for builders since 1988. The principles and processes of construction are explained with the concepts of design included where appropriate. Extensive coverage of building construction practice, techniques, and regulations representing both traditional procedures and modern developments are included to provide the most comprehensive and easy to understand guide to building construction. This new edition has been updated to reflect recent changes to the building regulations, as well as new material on the latest technologies used in domestic construction. Building Construction Handbook is the essential, easy-to-use resource for undergraduate and vocational students on a wide range of courses including NVQ and BTEC National, through to Higher National Certificate and Diploma, to Foundation and three-year Degree level. It is also a useful practical reference for building designers, contractors and others engaged in the construction industry.***

***This book is a printed edition of the Special Issue "Real-Time Embedded Systems" that was published in Electronics***

***Embedded Real Time Systems: Concepts, Design Prog Bb John Wiley & Sons***

***In this new edition the latest ARM processors and other hardware developments are fully covered along with new sections on Embedded Linux and the new freeware operating system eCOS. The hot topic of embedded systems and the internet is also introduced. In addition a fascinating new case study explores how embedded systems can be developed and experimented with using nothing more than a standard PC. \* A practical introduction to the hottest topic in modern electronics design \* Covers hardware, interfacing and programming in one book \* New material on Embedded Linux for embedded internet systems***

***Embedded Software Development with C***

***Design Principles for Distributed Embedded Applications***

***An Embedded Software Primer***

***Principles of Embedded Computing System Design***

## ***Principles Of Digital Communication System & Computer Network***

Details a real-world product that applies a cutting-edge multi-core architecture. Increasingly demanding modern applications—such as those used in telecommunications networking and real-time processing of audio, video, and multimedia streams—require multiple processors to achieve computational performance at the rate of a few giga-operations per second. This necessity for speed and manageable power consumption makes it likely that the next generation of embedded processing systems will include hundreds of cores, while being increasingly programmable, blending processors and configurable hardware in a power-efficient manner. Multi-Core Embedded Systems presents a variety of perspectives that elucidate the technical challenges associated with such increased integration of homogeneous (processors) and heterogeneous multiple cores. It offers an analysis that industry engineers and professionals will need to understand the physical details of both software and hardware in embedded architectures, as well as their limitations and potential for future growth.

Discusses the available programming models spread across different abstraction levels. The book begins with an overview of the evolution of multiprocessor architectures for embedded applications and discusses techniques for autonomous power management of system-level parameters. It addresses the use of existing open-source (and free) tools originating from several application domains—such as traffic modeling, graph theory, parallel computing and network simulation. In addition, the authors cover other important topics associated with multi-core embedded systems, such as: Architectures and interconnects Embedded design methodologies Mapping of applications

'... a very good balance between the theory and practice of real-time embedded system designs.' —Jun-ichiro Ito, Jun Hagino, Ph.D., Research Laboratory, Internet Initiative Japan Inc., IETF IPv6 Operations Working Group (v6ops) co-chair

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.

Offering comprehensive coverage of the convergence of real-time embedded systems scheduling, resource access control, software design

and development, and high-level system modeling, analysis and verification Following an introductory overview, Dr. Wang delves into the specifics of hardware components, including processors, memory, I/O devices and architectures, communication structures, peripherals, and characteristics of real-time operating systems. Later chapters are dedicated to real-time task scheduling algorithms and resource access control policies, as well as priority-inversion control and deadlock avoidance. Concurrent system programming and POSIX programming for real-time systems are covered, as are finite state machines and Time Petri nets. Of special interest to software engineers will be the chapter devoted to model checking, in which the author discusses temporal logic and the NuSMV model checking tool, as well as a chapter treating real-time software design with UML. The final portion of the book explores practical issues of software reliability, aging, rejuvenation, security, safety, and power management. In addition, the book: Explains real-time embedded software modeling and design with finite state machines, Petri nets, and UML, and real-time constraints verification with the model checking tool, NuSMV Features real-world examples in finite state machines, model checking, real-time system design with UML, and more Covers embedded computer programming, designing for reliability, and designing for safety Explains how to make engineering trade-offs of power use and performance Investigates practical issues concerning software reliability, aging, rejuvenation, security, and power management Real-Time Embedded Systems is a valuable resource for those responsible for real-time and embedded software design, development, and management. It is also an excellent textbook for graduate courses in computer engineering, computer science, information technology, and software engineering on embedded and real-time software systems, and for undergraduate computer and software engineering courses.

Secure Smart Embedded Devices, Platforms and Applications

Embedded Real Time Systems: Concepts, Design Prog Bb

Embedded Systems Architecture

Real-Time Systems

Computers as Components

The aim of the book is to lay the foundation in using the popular commercial tools for developing data warehouse in real-time. With illustrative examples and case studies, the complete process of data warehouse development is explained using Informatica, Cognos, Business Objects and DataStage tools.

Real-Time Systems Development introduces computing students and professional programmers to the development of real-time applications. Based on the academic and commercial experience of the author, the book is an ideal companion for year undergraduate options or MSc modules in the area of real-time systems design and implementation. Assuming a background of general systems design and programming experience, this text will extend students' knowledge and skills into an area of computing which has increasing relevance in a modern world of telecommunications and 'intelligent' equipment using embedded microcontrollers. This book takes a broad, practical approach in discussing real-time systems. It covers topics such as basic input and output; cyclic executives for bare hardware; finite state machines; task communication and synchronization; input/output interfaces; structured design for real-time systems; designing for multitasking; UML for real-time systems; an object-oriented approach to real-time systems; selecting languages for RTS development; Linux device drivers; and hardware

co-design. Programming examples using GNU/Linux are included, along with a supporting website containing slides; solutions to problems; and software examples. This book will appeal to advanced undergraduate Computer Science students; MS and, undergraduate software engineering and electronic engineering students. \* Concise treatment delivers material in manageable sections \* Includes handy glossary, references and practical exercises based on familiar scenarios \* Supporting website contains slides, solutions to problems and software examples

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This book comprehensively covers the three main areas of the subject: concepts, design and programming. Information applications of the embedded/real-time systems are woven into almost every aspect discussed which of course is in Hardware architecture and the various hardware platforms, design & development, operating systems, programming and RTLinux, navigation systems and protocol converter are discussed extensively. Special emphasis is given to embedded database and Java applications, and embedded software development. · Introduction to Embedded Systems· Architecture of Embedded Systems· Programming for Embedded Systems· The Process of Embedded System Development· Hardware Communication Interfaces· Embedded/Real-Time Operating System Concepts· Overview of Embedded/Real-Time Operating Systems· Target Image Creation· Representative Embedded Systems· Programming in Linux· Programming in RTLinux· Development of Navigation System· Development of Protocol Converter· Embedded Database Application· Mobile Java Applications· Embedded Software Development on 89C51 Micro-Controller Platform· Embedded Software Development on Micro-Controller Platform· Embedded Systems Applications Using Intel StrongARM Platform· Future Trends

An Introduction to Processes, Tools, and Techniques

International Dagstuhl Workshop, Dagstuhl Castle, Germany, November 4-9, 2007. Revised Selected Papers

Advanced Engineering Mathematics with MATLAB

VLSI Design

Model-Based Engineering of Embedded Real-Time Systems

*Thoroughly researched practical and comprehensive book that aims: To introduce you to the concepts of software quality assurance and testing process, and help you achieve high performance levels. It equips you with the requisite practical expertise in the most widely used software testing tools and motivates you to take up software quality assurance and software testing as a career option in true earnest. · Software Quality Assurance: An Overview · Software Testing Process · Software Testing Tools: An Overview · WinRunner · Silk Test · SQA Robot · LoadRunner · JMeter · Test Director · Source Code Testing Utilities in Unix/Linux Environment*  
Appropriate for a first course in Real-Time System Design and Programming for junior/senior-level courses in Computer Science and Electrical Engineering. This text introduces the nature of real-time, concurrent, distributed systems, presenting a specific set of techniques for designing and implementing such systems. It develops a "systems way of thinking" about software that is intended to serve readers throughout their careers.

*Computers as Components, Second Edition, updates the first book to bring essential knowledge on embedded systems technology and techniques under a single cover. This edition has been updated to the state-of-the-art by reworking and expanding performance analysis with more examples and exercises, and coverage of electronic systems now focuses on the latest applications. It gives a more comprehensive view of multiprocessors including VLIW and superscalar architectures as well as more detail about power consumption. There is also more advanced treatment of all the components of the system as well as in-depth coverage of networks, reconfigurable systems, hardware-software co-design, security, and program analysis. It presents an updated discussion of current industry development software including Linux and Windows CE. The new edition's case studies cover SHARC DSP with the TI C5000 and C6000 series, and real-world applications such as DVD players and cell phones. Researchers, students, and savvy professionals schooled in hardware or software design, will value Wayne Wolf's integrated engineering design approach. \* Uses real processors (ARM processor and TI C55x DSP) to demonstrate both technology and techniques...Shows readers how to apply principles to actual design practice. \* Covers all*

*necessary topics with emphasis on actual design practice...Realistic introduction to the state-of-the-art for both students and practitioners. \* Stresses necessary fundamentals which can be applied to evolving technologies...helps readers gain facility to design large, complex embedded systems that actually work.*

*This book covers the basic concepts and principles of operating systems, showing how to apply them to the design and implementation of complete operating systems for embedded and real-time systems. It includes all the foundational and background information on ARM architecture, ARM instructions and programming, toolchain for developing programs, virtual machines for software implementation and testing, program execution image, function call conventions, run-time stack usage and link C programs with assembly code. It describes the design and implementation of a complete OS for embedded systems in incremental steps, explaining the design principles and implementation techniques. For Symmetric Multiprocessing (SMP) embedded systems, the author examines the ARM MPcore processors, which include the SCU and GIC for interrupts routing and interprocessor communication and synchronization by Software Generated Interrupts (SGIs). Throughout the book, complete working sample systems demonstrate the design principles and implementation techniques. The content is suitable for advanced-level and graduate students working in software engineering, programming, and systems theory.*

*C Programming for Embedded Systems*

*Embedded Systems Design*

*Real-Time Embedded Systems*

*Real-Time Concepts for Embedded Systems*

*The Real Time Kernel*

*This work covers all the major issues that go into designing a real-time system, including task allocation, synchronization, fault-tolerance and reliability. Also included are exercises, performance measures, scheduling, real-time architectures and algorithms.*

*&quot;VLSI Physical Design Automation: Theory and Practice is an essential introduction for senior undergraduates, postgraduates and anyone starting work in the field of CAD for VLSI. It covers all aspects of physical design, together with such related areas as automatic cell generation, silicon compilation, layout editors and compaction. A problem-solving approach is adopted and each solution is illustrated with examples. Each topic is treated in a standard format: Problem Definition, Cost Functions and Constraints, Possible Approaches and Latest Developments."--BOOK JACKET.*

*Over the last ten years, the ARM architecture has become one of the most pervasive architectures in the world, with more than 2 billion ARM-based processors embedded in products ranging from cell phones to automotive braking systems. A world-wide community of ARM developers in semiconductor and product design companies includes software developers, system designers and hardware*



engineers. To date no book has directly addressed their need to develop the system and software for an ARM-based system. This text fills that gap. This book provides a comprehensive description of the operation of the ARM core from a developer's perspective with a clear emphasis on software. It demonstrates not only how to write efficient ARM software in C and assembly but also how to optimize code. Example code throughout the book can be integrated into commercial products or used as templates to enable quick creation of productive software. The book covers both the ARM and Thumb instruction sets, covers Intel's XScale Processors, outlines distinctions among the versions of the ARM architecture, demonstrates how to implement DSP algorithms, explains exception and interrupt handling, describes the cache technologies that surround the ARM cores as well as the most efficient memory management techniques. A final chapter looks forward to the future of the ARM architecture considering ARMv6, the latest change to the instruction set, which has been designed to improve the DSP and media processing capabilities of the architecture. \* No other book describes the ARM core from a system and software perspective. \* Author team combines extensive ARM software engineering experience with an in-depth knowledge of ARM developer needs. \* Practical, executable code is fully explained in the book and available on the publisher's Website. \* Includes a simple embedded operating system.

This book aims at providing the necessary knowledge in understanding the concepts of software testing and software quality assurance so that you can take any internationally recognized software testing / quality assurance certification examination and come out with flying colors. Also, equipped with this knowledge, you can do a great job as a testing and quality assurance professional in your career and contribute in developing reliable software for different applications, which in turn improves the quality of life of everyone on this earth. · Introduction · Software Development Life Cycle and Quality Assurance · Fundamentals of Testing · Testing Levels and Types · Static Testing Techniques · Dynamic Testing and Test Case Design Techniques · Managing the Testing Process · Software Testing Tools · Code of Ethics for Software Professionals

A Comprehensive Guide for Engineers and Programmers

MicroC/OS-II

ARM System Developer's Guide

Real-Time Systems Development

MicroC/OS II Second Edition describes the design and implementation of the MicroC/OS-II real-time operating system (RTOS). In addition to its value as a reference to the kernel, it is an extremely detailed and highly readable design study particularly useful to the embedded systems student. While documenting the design and implementation of the kernel, it provides a superior primer on software testing and quality assurance, from integration to execution and automation. This important new work fills the pressing need for a user-friendly text that aims to provide software engineers, software quality professionals, software developers, and students with the fundamental developments in testing theory and common testing practices. Software Testing and Quality Assurance: Theory and Practice equips readers with a solid understanding of: Practices that support the production of quality software Software testing techniques Life-cycle models for requirements, defects, test cases, and test results Process models for units, integration, system, and acceptance testing How to build test teams, including recruiting and retaining test engineers Quality Models, Capability Maturity Model, Testing Maturity Model, and Test Process Improvement Model Expertly balancing theory with practice, and complemented with an abundance of

pedagogical tools, including test questions, examples, teaching suggestions, and chapter summaries, this book is a valuable, self-contained tool for professionals and an ideal introductory text for courses in software testing, quality assurance, and software engineering.

Simon introduces the broad range of applications for embedded software and then reviews each major issue facing developers, offering practical solutions, techniques, and good habits that apply no matter which processor, real-time operating systems, methodology, or application is used.

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

Embedded Systems

Istqb Certification Study Guide: Iseb, Istqb/ Itb, Qai Certification, 2008 Ed

Real-time Systems

Theory and Practice

Designing and Optimizing System Software

The topic of "Model-Based Engineering of Real-Time Embedded Systems" brings together a challenging problem domain (real-time embedded systems) and a solution domain (model-based engineering). It is also at the forefront of integrated software and systems engineering, as software in this problem domain is an essential tool for system implementation and integration. Today, real-time embedded software plays a crucial role in most advanced technical systems such as airplanes, mobile phones, and cars, and has become the main driver and enabler for innovation. Development, evolution, verification, configuration, and maintenance of embedded and distributed software nowadays are often serious challenges as drastic increases in complexity can be observed in practice. Model-based engineering in general, and model-based software development in particular, advocates the notion of using models throughout the development and life-cycle of an engineered system. Model-based software engineering reinforces this notion by promoting models not only as the tool of abstraction, but also as the tool for verification,

implementation, testing, and maintenance. The application of such model-based engineering techniques to embedded real-time systems appears to be a good candidate to tackle some of the problems arising in the problem domain.

A Comprehensive coverage of Digital communication, Data Communication Protocols and Mobile Computing Covers: " Multiplexing & Multiple accesses" Radio Communications- Terrestrial & Satellite" Error Detection & Correction" ISO/ OSI Protocol Architecture" Wired Internet DNS, RADIUS, Firewalls, VPN"

Cellular Mobile Communication" GPS, CTI, Wireless Internet" Multimedia Communication over IP Networks

Eager to transfer your C language skills to the 8-bit microcontroller embedded environment? This book will get you up and running fast with clear explanations of the common architectural elements of most 8-bit microcontrollers and the embedded-specific de

Embedded systems are products such as microwave ovens, cars, and toys that rely on an internal microprocessor. This book is oriented toward the design engineer or programmer who writes the computer code for such a system. There are a number of problems specific to the embedded systems designer, and this book addresses them and offers practical solutions. Offers cookbook routines, algorithms, and design techniques Includes tips for handling debugging management and testing Explores the philosophy of tightly coupling software and hardware in programming and developing an embedded system Provides one of the few coherent references on this subject

Embedded and Real-Time Operating Systems

From Design to Multitasking with C/C++

A Contemporary Design Tool

An Introduction to Real-time Systems

Building Construction Handbook

**Embedded Software Development With C offers both an effectual reference for professionals and researchers, and a valuable learning tool for students by laying the groundwork for a solid foundation in the hardware and software aspects of embedded systems development. Key features include a resource for the fundamentals of embedded systems design and development with an emphasis on software, an exploration of the 8051 microcontroller as it pertains to embedded systems, comprehensive tutorial materials for instructors to provide students with labs of varying lengths and levels of difficulty, and supporting website including all sample codes, software tools and links to additional online references. Embedded Systems: An Integrated Approach is exclusively designed for the undergraduate courses in electronics and communication engineering as well as computer science**

**engineering. This book is well-structured and covers all the important processors and their applications in a sequential manner. It begins with a highlight on the building blocks of the embedded systems, moves on to discuss the software aspects and new processors and finally concludes with an insightful study of important applications. This book also contains an entire part dedicated to the ARM processor, its software requirements and the programming languages. Relevant case studies and examples supplement the main discussions in the text. This book introduces a modern approach to embedded system design, presenting software design and hardware design in a unified manner. It covers trends and challenges, introduces the design and use of single-purpose processors ("hardware") and general-purpose processors ("software"), describes memories and buses, illustrates hardware/software tradeoffs using a digital camera example, and discusses advanced computation models, controls systems, chip technologies, and modern design tools. For courses found in EE, CS and other engineering departments.**

**Embedded Microcomputer Systems: Real Time Interfacing provides an in-depth discussion of the design of real-time embedded systems using 9S12 microcontrollers. This book covers the hardware aspects of interfacing, advanced software topics (including interrupts), and a systems approach to typical embedded applications. This text stands out from other microcomputer systems books because of its balanced, in-depth treatment of both hardware and software issues important in real time embedded systems design. It features a wealth of detailed case studies that demonstrate basic concepts in the context of actual working examples of systems. It also features a unique simulation software package on the bound-in CD-ROM (called Test Execute and Simulate, or TExaS, for short) that provides a self-contained software environment for designing, writing, implementing, and testing both the hardware and software components of embedded systems. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.**

**Embedded Realtime Systems Programming**

**Embedded System Design**

**Multi-Core Embedded Systems**

**8051 Microcontroller**

## **The Database Hacker's Handbook Defending Database**

\* Hardware/Software Partitioning \* Cross-Platform Development \* Firmware Debugging \* Performance Analysis \* Testing & Integration Get into embedded systems programming with a clear understanding of the development cycle and the specialized aspects of  
Software Testing and Quality Assurance  
Data Warehouse Development Tools  
VLSI Physical Design Automation  
Software Testing Tools: Covering WinRunner, Silk Test, LoadRunner, JMeter and TestDirector with case studies w/CD