Real-Time Embedded Systems: Design Principles and Engineering Practices

By Xiaocong Fan

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This book integrates new ideas and topics from real time systems, embedded systems, and software engineering to give a complete picture of the whole process of developing software for real-time embedded applications. You will not only gain a thorough understanding of concepts related to microprocessors, interrupts, and system boot process, appreciating the importance of real-time modeling and scheduling, but you will also learn software engineering practices such as model documentation, model analysis, design patterns, and standard conformance.

This book is split into four parts to help you learn the key concept of embedded systems; Part one introduces the development process, and includes two chapters on microprocessors and interrupts---fundamental topics for software engineers; Part two is dedicated to modeling techniques for real-time systems; Part three looks at the design of software architectures and Part four covers software implementations, with a focus on POSIX-compliant operating systems.

With this book you will learn:

- The pros and cons of different architectures for embedded systems
- POSIX real-time extensions, and how to develop POSIX-compliant real time applications
- How to use real-time UML to document system designs with timing constraints
- The challenges and concepts related to cross-development
- Multitasking design and inter-task communication techniques (shared memory objects, message queues, pipes, signals)
- How to use kernel objects (e.g. Semaphores, Mutex, Condition variables) to address resource sharing issues in RTOS applications
- The philosophy underpinning the notion of "resource manager" and how to implement a virtual file system using a resource manager
- The key principles of real-time scheduling and several key algorithms

- Coverage of the latest UML standard (UML 2.4)
- Over 20 design patterns which represent the best practices for reuse in a wide

range of real-time embedded systems
- Example codes which have been tested in QNX---a real-time operating system widely adopted in industry

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Real-Time Embedded Systems: Design Principles and Engineering Practices By Xiaocong Fan Bibliography

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Editorial Review

Review
"...does an excellent job of covering the details no one talks about, like ELF/COFF files and link sections (e.g., .bss)...I recommend it...you'll get some really worthwhile ideas." --**Embedded**

From the Back Cover

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Key features include:

The key principles of real-time scheduling and several key algorithms About the Author
Dr. Xiaocong (Simon) Fan is an Associate Professor of Computer Science and Software Engineering at Pennsylvania State University. He received his Ph.D. in Software Engineering from Nanjing University, China. He has been an active researcher in the fields of Multi-Agent Systems, Formal Methods in Software Engineering, and Advanced Decision-Support Systems. He is a key architect of several intelligent agent systems, including RCAST and SMMall. Dr. Fan is a Senior Member of IEEE. Users Review**From reader reviews:**
Grady Long:People live in this new day time of lifestyle always make an effort to and must have the spare time or they will get large amount of stress from both lifestyle and work. So , whenever we ask do people have time, we will say absolutely without a doubt. People is human not just a robot. Then we consult again, what kind of activity have you got when the spare time coming to an individual of course your answer will unlimited right. Then ever try this one, reading ebooks. It can be your alternative inside spending your spare time, typically the book you have read is actually Real-Time Embedded Systems: Design Principles and Engineering Practices.
Joseph Vargas:Playing with family inside a park, coming to see the coastal world or hanging out with friends is thing that usually you could have done when you have spare time, then why you don't try issue that really opposite from that. 1 activity that make you not experiencing tired but still relaxing, trilling like on roller coaster you have been ride on and with addition of knowledge. Even you love Real-Time Embedded Systems: Design Principles and Engineering Practices, you can enjoy both. It is great combination right, you still would like to miss it? What kind of hangout type is it? Oh can occur its mind hangout people. What? Still don't obtain it, oh come on its known as reading friends.
Shawn Martinez:Real-Time Embedded Systems: Design Principles and Engineering Practices can be one of

your beginning books that are good idea. Most of us recommend that straight away because this guide has good vocabulary that may increase your knowledge in vocabulary, easy to understand, bit entertaining but still delivering the information. The article author giving his/her effort that will put every word into satisfaction arrangement in writing Real-Time Embedded Systems: Design Principles and Engineering Practices however doesn't forget the main stage, giving the reader the hottest along with based confirm resource info that maybe you can be certainly one of it. This great information may drawn you into new stage of crucial imagining.

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