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Hard Real-Time Computing Systems: Predictable Scheduling Algorithms And Applications (Real-Time Systems Series)



Synopsis

This updated edition offers an indispensable exposition on real-time computing, with particular emphasis on predictable scheduling algorithms. It introduces the fundamental concepts of real-time computing, demonstrates the most significant results in the field, and provides the essential methodologies for designing predictable computing systems used to support time-critical control applications. Along with an in-depth guide to the available approaches for the implementation and analysis of real-time applications, this revised edition contains a close examination of recent developments in real-time systems, including limited preemptive scheduling, resource reservation techniques, overload handling algorithms, and adaptive scheduling techniques. This volume serves as a fundamental advanced-level textbook. Each chapter provides basic concepts, which are followed by algorithms, illustrated with concrete examples, figures and tables. Exercises and solutions are provided to enhance self-study, making this an excellent reference for those interested in real-time computing for designing and/or developing predictable control applications.

Book Information

Series: Real-Time Systems Series (Book 24)

Hardcover: 524 pages

Publisher: Springer; 3rd ed. 2011 edition (September 15, 2011)

Language: English

ISBN-10: 1461406757

ISBN-13: 978-1461406754

Product Dimensions: 6.1 x 1.2 x 9.2 inches

Shipping Weight: 1.7 pounds (View shipping rates and policies)

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POINT OF VIEW=====My point of view to use books about real-time systems is teaching: basic courses for bachelor and more advanced for master programs. The bachelor students have usually no knowledge about real-time systems, the programming skills are weak or moderate. In the master courses you have a variety between those who still have no knowledge

(because master programs have students from different kinds of bachelor courses) and those who have done at least one basic course. Nearly all have had some industrial experience with software systems, but very rarely with real-time systems programming. With regard to the field of real-time systems you have also a very broad field of requirements: some companies are demanding for students which are skilled to program real pieces of hardware directly; others are using existing real-time operating systems which are the interface for programming. Still others have modeling tools which require the students to elaborate everything in formal models which then will be fed into simulators testing real hardware components. Fact is that the variety of concrete systems for real-time programming is enormous and to cope with only some of them is during a normal real-time system courses seldom manageable. Furthermore I have often experienced students which have done some programming of real hardware without a real understanding of the general concepts; the system worked but they were not able to argue about their system. Thus I developed through the last years the concept, that the students have to learn general concepts about real-time systems which they in parallel have to simulate by own programs. Besides this they can then either opt for more theory or for more concrete systems experience.

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