

## EMBEDDED SYSTEMS AND SOFTWARE VALIDATION

**ABHIK ROYCHOUDHURY** Department of Computer Science, National University of Singapore

THE MORGAN KAUFMANN SERIES IN SYSTEMS ON SILICON

SERIES EDITOR WAYNE WOLF

Roychoudhury offers readers practical debugging and validation techniques for the entire life cycle of embedded systems design.

Modern embedded systems are a part of every modern electronic device, ranging from toys to traffic lights to nuclear power plant controllers. These processors help run factories, manage weapons systems, and enable the worldwide flow of information, products, and people. Unlike other computer systems such as those that operate personal computers, embedded systems must typically run error-free for years or even decades with little or no opportunity to reboot the system or fix problems. In addition, they require high performance, low cost, and low power consumption. Such systems typically consist of a heterogeneous collection of processors, specialized memory subsystems, and partially programmable or fixed-function component. This heterogeneity, coupled with issues such as hardware/software partitioning, mapping, and scheduling, leads to a large number of design possibilities, making performance debugging and validation of such systems a difficult problem and an imperative issue.

Roychoudhury guides readers through a host of debugging and verification methods critical to providing reliable software and systems applications. All the major abstraction levels of embedded systems design are covered. Readers will find practical information including:

- Complete coverage of the major abstraction levels, from software analysis and microarchitectural modeling to modeling of resource sharing and communication at the system level.
- Integration of formal validation techniques for hardware/software with debugging and validation of embedded system design flows.

Real-world case studies to answer the questions: Does a design meet its requirements? If not, then which parts of the system are responsible for the violation? Once these are identified, then how should the design be suitably modified?

### About the Author:

**Abhik Roychoudhury Ph.D.**, Associate Professor, *National University of Singapore*. Abihik Roychoudhury received his Ph.D. in Computer Science from the *State University of New York at Stony Brook*. His research interests are in system modeling and validation with specific focus on embedded software and systems. Abhik has published widely and has over 60 publications. His research has led to scalable and usable analysis tools for embedded software which enhance software quality as well as programmer productivity. Abhik has been the Principal Investigator of many medium and large scale funded projects in Software Engineering and Embedded Systems. His research has been recognized by various awards including an IBM Faculty Award and a Tan Kah Kee Young Inventor Award.



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