Energy-Aware System Design: Algorithms and Architectures

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Power consumption becomes the most important design goal in a wide range of electronic systems. There are two driving forces towards this trend: continuing device scaling and ever increasing demand of higher computing power. First, device scaling continues to satisfy Moore's law via a conventional way of scaling (More Moore) and a new way of exploiting the vertical integration (More than Moore). Second, mobile and IT convergence requires more computing power on the silicon chip than ever. Cell phones are now evolving towards mobile PC. PCs and data centers are becoming commodities in house and a must in industry. Both supply enabled by device scaling and demand triggered by the convergence trend realize more computation on chip (via multi-core, integration of diverse functionalities on mobile SoCs, etc.) and finally more power consumption incurring power-related issues and constraints.

Energy-Aware System Design: Algorithms and Architectures provides state-of-the-art ideas for low power design methods from circuit, architecture to software level and offers design case studies in three fast growing areas of mobile storage, biomedical and security.

Important topics and features:

- Describes very recent advanced issues and methods for energy-aware design at each design level from circuit and architecture to algorithm level, and also covering important blocks including low power main memory subsystem and on-chip network at architecture level

- Explains efficient power conversion and delivery which is becoming important as heterogeneous power sources are adopted for digital and non-digital parts

- Investigates 3D die stacking emphasizing temperature awareness for better perspective on energy efficiency

- Presents three practical energy-aware design case studies; novel storage device (e.g., solid state disk), biomedical electronics (e.g., cochlear and retina implants), and wireless surveillance camera systems.

Researchers and engineers in the field of hardware and software design will find this book an excellent starting point to catch up with the state-of-the-art ideas of low power design.

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