Fourth Edition

COMPUTER ARCHITECTURE
A Quantitative Approach

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John L. Hennessy is the president of Stanford University, where he has been a member of the faculty since 1977 in the departments of electrical engineering and computer science. Hennessy is a Fellow of the IEEE and ACM, a member of the National Academy of Engineering and the National Academy of Science, and a Fellow of the American Academy of Arts and Sciences. Among his many awards are the 2001 Eckert-Mauchly Award for his contributions to RISC technology, the 2001 Seymour Cray Computer Engineering Award, and the 2000 John von Neumann Award, which he shared with David Patterson. He has also received seven honorary doctorates.

In 1981, he started the MIPS project at Stanford with a handful of graduate students. After completing the project in 1984, he took a one-year leave from the university to cofound MIPS Computer Systems, which developed one of the first commercial RISC microprocessors. After being acquired by Silicon Graphics in 1991, MIPS Technologies became an independent company in 1998, focusing on microprocessors for the embedded marketplace. As of 2006, over 500 million MIPS microprocessors have been shipped in devices ranging from video games and palmtop computers to laser printers and network switches.

David A. Patterson has been teaching computer architecture at the University of California, Berkeley, since joining the faculty in 1977, where he holds the Pardee Chair of Computer Science. His teaching has been honored by the Abacus Award from Upsilon Pi Epsilon, the Distinguished Teaching Award from the University of California, the Karlstrom Award from ACM, and the Mulligan Education Medal and Undergraduate Teaching Award from IEEE. Patterson received the IEEE Technical Achievement Award for contributions to RISC and shared the IEEE Johnson Information Storage Award for contributions to RAID. He then shared the IEEE John von Neumann Medal and the C & C Prize with John Hennessy. Like his co-author, Patterson is a Fellow of the American Academy of Arts and Sciences, ACM, and IEEE, and he was elected to the National Academy of Engineering, the National Academy of Sciences, and the Silicon Valley Engineering Hall of Fame. He served on the Information Technology Advisory Committee to the U.S. President, as chair of the CS division in the Berkeley EECS department, as chair of the Computing Research Association, and as President of ACM. This record led to a Distinguished Service Award from CRA.

At Berkeley, Patterson led the design and implementation of RISC I, likely the first VLSI reduced instruction set computer. This research became the foundation of the SPARC architecture, currently used by Sun Microsystems, Fujitsu, and others. He was a leader of the Redundant Arrays of Inexpensive Disks (RAID) project, which led to dependable storage systems from many companies. He was also involved in the Network of Workstations (NOW) project, which led to cluster technology used by Internet companies. These projects earned three dissertation awards from the ACM. His current research projects are the RAD Lab, which is inventing technology for reliable, adaptive, distributed Internet services, and the Research Accelerator for Multiple Processors (RAMP) project, which is developing and distributing low-cost, highly scalable, parallel computers based on FPGAs and open-source hardware and software.

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