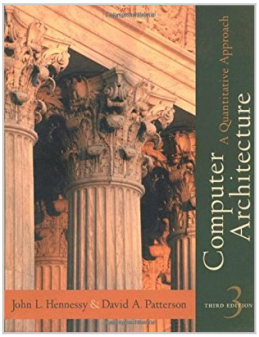

Computer Architecture: A Quantitative Approach, 3rd Edition

By John L. Hennessy, David A. Patterson

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This best-selling title, considered for over a decade to be essential reading for every serious student and practitioner of computer design, has been updated throughout to address the most important trends facing computer designers today. In this edition, the authors bring their trademark method of quantitative analysis not only to high performance desktop machine design, but also to the design of embedded and server systems. They have illustrated their principles with designs from all three of these domains, including examples from consumer electronics, multimedia and web technologies, and high performance computing.

The book retains its highly rated features: Fallacies and Pitfalls, which share the hard-won lessons of real designers; Historical Perspectives, which provide a deeper look at computer design history; Putting it all Together, which present a design example that illustrates the principles of the chapter; Worked Examples, which challenge the reader to apply the concepts, theories and methods in smaller scale problems; and Cross-Cutting Issues, which show how the ideas covered in one chapter interact with those presented in others. In addition, a new feature, Another View, presents brief design examples in one of the three domains other than the one chosen for Putting It All Together.

The authors present a new organization of the material as well, reducing the overlap with their other text, Computer Organization and Design: A Hardware/Software Approach 2/e, and offering more in-depth treatment of advanced topics in multithreading, instruction level parallelism, VLIW architectures, memory hierarchies, storage devices and network technologies.

Also new to this edition, is the adoption of the MIPS 64 as the instruction set architecture. In addition to several online appendixes, two new appendixes will be printed in the book: one contains a complete review of the basic concepts of pipelining, the other provides solutions a selection of the exercises. Both will be

invaluable to the student or professional learning on her own or in the classroom.

Hennessy and Patterson continue to focus on fundamental techniques for designing real machines and for maximizing their cost/performance.

* Presents state-of-the-art design examples including:
* IA-64 architecture and its first implementation, the Itanium
* Pipeline designs for Pentium III and Pentium IV
* The cluster that runs the Google search engine
* EMC storage systems and their performance
* Sony Playstation 2
* Infiniband, a new storage area and system area network
* SunFire 6800 multiprocessor server and its processor the UltraSPARC III
* Trimedia TM32 media processor and the Transmeta Crusoe processor

* Examines quantitative performance analysis in the commercial server market and the embedded market, as well as the traditional desktop market.
Updates all the examples and figures with the most recent benchmarks, such as SPEC 2000.
* Expands coverage of instruction sets to include descriptions of digital signal processors, media processors, and multimedia extensions to desktop processors.
* Analyzes capacity, cost, and performance of disks over two decades.
Surveys the role of clusters in scientific computing and commercial computing.
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Editorial Review

From the Back Cover

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About the Author

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 the ACM, a member of the National Academy of Engineering, the National Academy of Science, the American Academy of Arts and Sciences, and the Spanish Royal Academy of Engineering. He received the 2001 Eckert-Mauchly Award for his contributions to RISC technology, the 2001 Seymour Cray Computer Engineering Award, and shared the John von Neumann award in 2000 with David Patterson. After completing the project in 1984, he took a one-year leave from the university to co-found 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 2004, over 300 million MIPS microprocessors have been shipped in devices ranging from video games and palmtop computers to laser printers and network switches. Hennessy's more recent research at Stanford focuses on the area of designing and exploiting multiprocessors. He helped lead the design of the DASH multiprocessor architecture, the first distributed shared-memory multiprocessors supporting cache coherency, and the basis for several commercial multiprocessor designs, including the Silicon Graphics Origin multiprocessors. Since becoming president of Stanford, revising and updating this text and the more advanced Computer Architecture: A Quantitative Approach has become a primary form of recreation and relaxation.

David A. Patterson was the first in his family to graduate from college (1969 A.B UCLA), and he enjoyed it so much that he didn't stop until a PhD, (1976 UCLA). After 4 years developing a wafer-scale computer at Hughes Aircraft, he joined U.C. Berkeley in 1977. He spent 1979 at DEC working on the VAX minicomputer. He and colleagues later developed the Reduced Instruction Set Computer (RISC). By joining forces with IBM's 801 and Stanford's MIPS projects, RISC became widespread. In 1984 Sun Microsystems recruited him to start the SPARC architecture. In 1987, Patterson and colleagues wondered if tried building dependable storage systems from the new PC disks. This led to the popular Redundant Array of Inexpensive Disks (RAID). He spent 1989 working on the CM-5 supercomputer. Patterson and colleagues later tried building a supercomputer using standard desktop computers and switches. The resulting Network of Workstations (NOW) project led to cluster technology used by many startups. He is now working on the Recovery Oriented Computing (ROC) project. In the past, he served as Chair of Berkeley's CS Division, Chair and CRA. He is currently serving on the IT advisory committee to the U.S. President and has just been

elected President of the ACM. All this resulted in 150 papers, 5 books, and the following honors, some shared with friends: election to the National Academy of Engineering; from the University of California: Outstanding Alumnus Award (UCLA Computer Science Department), McEntyre Award for Excellence in Teaching (Berkeley Computer Science), Distinguished Teaching Award (Berkeley); from ACM: fellow, SIGMOD Test of Time Award, Karlstrom Outstanding Educator Award; from IEEE: fellow, Johnson Information Storage Award, Undergraduate Teaching Award, Mulligan Education Medal, and von Neumann Medal.

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