



# Computer Organization and Design, Fourth Edition: The Hardware/Software Interface (The Morgan Kaufmann Series in Computer Architecture and Design)

By David A. Patterson, John L. Hennessy

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*Computer Organization and Design, Fourth Edition*, has been updated with new exercises and improvements throughout suggested by instructors teaching from the book.

It covers the revolutionary change from sequential to parallel computing, with a chapter on parallelism and sections in every chapter highlighting parallel hardware and software topics. It includes an appendix by the Chief Scientist and the Director of Architecture of NVIDIA covering the emergence and importance of the modern GPU, describing in detail for the first time the highly parallel, highly multithreaded multiprocessor optimized for visual computing. A companion CD provides a toolkit of simulators and compilers along with tutorials for using them, as well as advanced content for further study and a search utility for finding content on the CD and in the printed text. For the convenience of readers who have purchased an ebook edition or who may have misplaced the CD-ROM, all CD content is available as a download at [bit.ly/nFXcLq](http://bit.ly/nFXcLq).

This book is recommended for professional digital system designers, programmers, application developers, and system software developers; and undergraduate students in Computer Science, Computer Engineering and Electrical Engineering courses in Computer Organization, Computer Design, ranging from Sophomore required courses to Senior Electives.

- This Revised Fourth Edition of *Computer Organization and Design* has been updated with new exercises and improvements throughout suggested by instructors teaching from the book
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## **Editorial Review**

### Review

"The new coverage of multiprocessors and parallelism lives up to the standards of this well-written classic. It provides well-motivated, gentle introductions to the new topics, as well as many details and examples drawn from current hardware." -- **John Greiner, Rice University**

"Patterson and Hennessy not only improve the pedagogy of the traditional material on pipelined processors and memory hierarchies, but also greatly expand the multiprocessor coverage to include emerging multicore processors and GPUs. *Computer Organization and Design* sets a new benchmark against which all other architecture books must be compared." -- **David A. Wood, University of Wisconsin-Madison**

"Intended for computer science students and programmers of varied experience levels, this textbook on computer design and engineering provides a firm foundation in hardware engineering and computer architecture that will aid readers not only in working with hardware design and assembly language programming, but inform software engineers as to the underlying technologies and principles at work in machines they program for. Topics discussed include computer abstractions and technologies, instructions as to the language of computer hardware, arithmetic for computers, processors, memory hierarchies, storage and I/O, and multicores and multiprocessors. A series of appendices offers detailed information on graphics and GPU processes. Chapters include numerous illustrations and code examples and an accompanying CD-ROM provides additional chapters and other resources. This fourth edition is updated to account for the latest technological improvements."--**Reference and Research Book News, Inc.**

"This book, now in its fourth edition, is a comprehensive introduction to modern computer architecture and is aimed at a variety of audiences with backgrounds in either hardware or software...While there is a great deal of technical content, concepts are lucidly described and always given meaningful context. I found this book to be an interesting read and certainly a book I'd plan to read again." --**BCS.org**

### From the Back Cover

The Fourth Edition of *Computer Organization and Design* focuses on the revolutionary change taking place in industry today: the switch from uniprocessor to multicore microprocessors. This emphasis on parallelism is supported by updates reflecting the newest technologies, with examples highlighting the latest processor designs and benchmarking standards. The MIPS processor is the core used to present the fundamentals of hardware technologies, assembly language, computer arithmetic, pipelining, memory hierarchies and I/O. Sections on the ARM and x86 architectures are also included.

### About the Author

David A. Patterson is the Pardee Chair of Computer Science, Emeritus at the University of California Berkeley. His teaching has been honored by 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 and the ACM Eckert-Mauchly Award for contributions to RISC, and he shared the IEEE Johnson Information Storage

Award for contributions to RAID. He also 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, the Computer History Museum, 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 Distinguished Service Awards from ACM, CRA, and SIGARCH.

John L. Hennessy is a Professor of Electrical Engineering and Computer Science at Stanford University, where he has been a member of the faculty since 1977 and was, from 2000 to 2016, its tenth President. Prof. Hennessy is a Fellow of the IEEE and ACM; a member of the National Academy of Engineering, the National Academy of Science, and the American Philosophical Society; 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.

## **Users Review**

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#### **Elizabeth Parker:**

This book untitled Computer Organization and Design, Fourth Edition: The Hardware/Software Interface (The Morgan Kaufmann Series in Computer Architecture and Design) to be one of several books this best seller in this year, this is because when you read this guide you can get a lot of benefit in it. You will easily to buy this specific book in the book retail outlet or you can order it by using online. The publisher of this book sells the e-book too. It makes you more easily to read this book, since you can read this book in your Smartphone. So there is no reason to you to past this book from your list.

#### **Mark Giordano:**

The reason? Because this Computer Organization and Design, Fourth Edition: The Hardware/Software Interface (The Morgan Kaufmann Series in Computer Architecture and Design) is an unordinary book that the inside of the e-book waiting for you to snap the idea but latter it will zap you with the secret it inside. Reading this book next to it was fantastic author who else write the book in such incredible way makes the content inside easier to understand, entertaining means but still convey the meaning fully. So , it is good for you for not hesitating having this nowadays or you going to regret it. This phenomenal book will give you a lot of advantages than the other book get such as help improving your expertise and your critical thinking method. So , still want to postpone having that book? If I had been you I will go to the e-book store hurriedly.

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