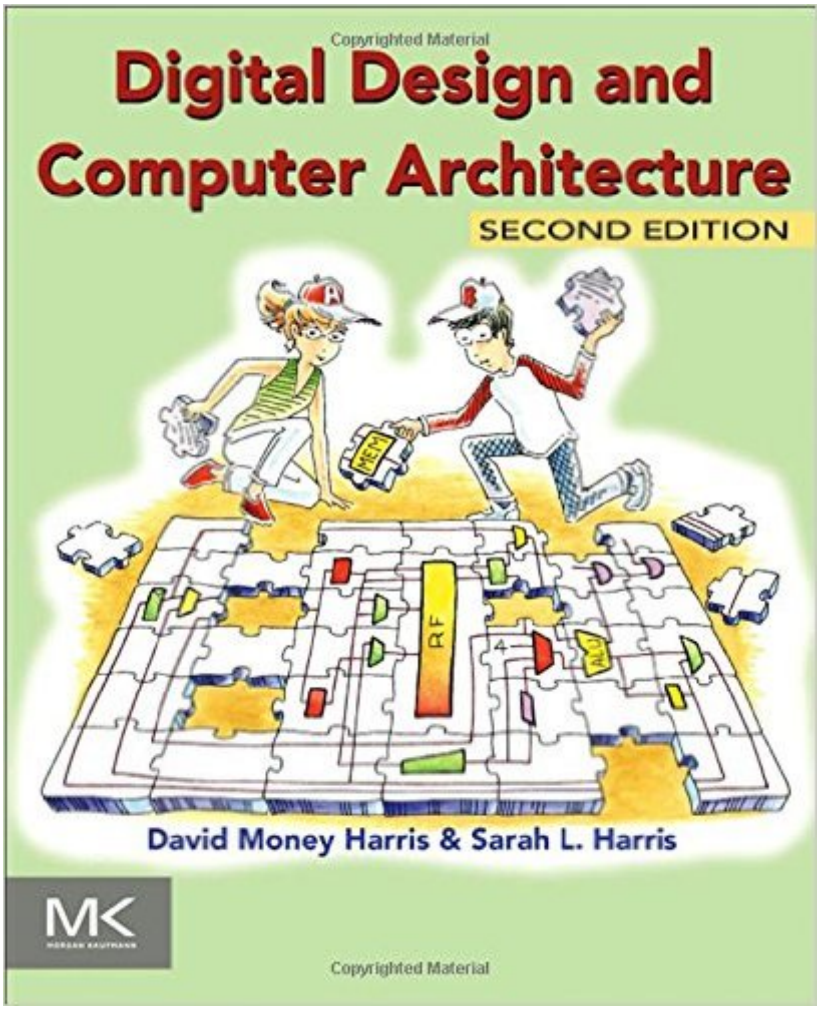
Digital Design And Computer Architecture, Second Edition



Synopsis

Digital Design and Computer Architecture takes a unique and modern approach to digital design. Beginning with digital logic gates and progressing to the design of combinational and sequential circuits, Harris and Harris use these fundamental building blocks as the basis for what follows: the design of an actual MIPS processor. SystemVerilog and VHDL are integrated throughout the text in examples illustrating the methods and techniques for CAD-based circuit design. By the end of this book, readers will be able to build their own microprocessor and will have a top-to-bottom understanding of how it works. Harris and Harris have combined an engaging and humorous writing style with an updated and hands-on approach to digital design. This second edition has been updated with new content on I/O systems in the context of general purpose processors found in a PC as well as microcontrollers found almost everywhere. The new edition provides practical examples of how to interface with peripherals using RS232, SPI, motor control, interrupts, wireless, and analog-to-digital conversion. High-level descriptions of I/O interfaces found in PCs include USB, SDRAM, WiFi, PCI Express, and others. In addition to expanded and updated material throughout, SystemVerilog is now featured in the programming and code examples (replacing Verilog), alongside VHDL. This new edition also provides additional exercises and a new appendix on C programming to strengthen the connection between programming and processor architecture. SECOND Edition Features Covers the fundamentals of digital logic design and reinforces logic concepts through the design of a MIPS microprocessor.Features side-by-side examples of the two most prominent Hardware Description Languages (HDLs)â •SystemVerilog and VHDLâ •which illustrate and compare the ways each can be used in the design of digital systems.Includes examples throughout the text that enhance the readerâ ™s understanding and retention of key concepts and techniques.Companion Web site includes links to CAD tools for FPGA design from Altera and Mentor Graphics, lecture slides, laboratory projects, and solutions to exercises.

Book Information

Paperback: 712 pages
Publisher: Morgan Kaufmann; 2 edition (August 7, 2012)
Language: English
ISBN-10: 0123944244
ISBN-13: 978-0123944245
Product Dimensions: 7.5 x 1.4 x 9.2 inches
Shipping Weight: 3.2 pounds (View shipping rates and policies)

Average Customer Review: 4.5 out of 5 starsÂ Â See all reviewsÂ (33 customer reviews)
Best Sellers Rank: #25,458 in Books (See Top 100 in Books) #2 inÂ Books > Computers & Technology > Programming > Software Design, Testing & Engineering > Logic #3 inÂ Books > Computers & Technology > Hardware & DIY > Microprocessors & System Design > Microprocessor Design #5 inÂ Books > Engineering & Transportation > Engineering > Electrical & Electronics > Circuits > Design

Customer Reviews

This is one of very few (arguably the only one) texts that combines and integrates digital design with actual architecture-- high and detail level. For the new (2nd) 2013 edition, Harris and Harris still teach simpler/ elegant systems that beginning Engineers and hobbyists love like MIPS and PIC 32, however they also add very recent and modern design and implementation solutions including parallel and multicore processors, the x86, multithreading, out of order and superscalar operations and branch prediction, to name a few. These topics are not only state of the art, but normally covered in grad rather than undergrad courses.The thorny issues of parallel programming start at the assembly level, and it is astonishing and refreshing that these authors integrate methods as high level as embedded C and as basic as the digital circuits that implement assembly, and then relate them to considerations like temperature, memory, component sharing of workloads (the GPU often doubles as a CAS implementer or APU in these days where "math coprocessors" have been eliminated), etc.Every Engineer and hobbyist knows that getting a serious shot at a patent means implementation beyond simulation. That is where this new edition really shines. Other texts are out of date in a few months-- Harris and Harris give web and manufacturer resources that are available NOW (we checked), from design to finished boards. The authors also assume that after you spent your entire budget on this book you will appreciate cheap, open source solutions to getting to that million dollar patent. They don’t disappoint-- the "lab" includes cheapware and freeware in the form of IDEs/SDKs like Quartus II, MPLAB and Synplify, then take your favorite HDL (Verilog OR VHDL) and move from IDE output to code. Finally, the authors give altera alternatives in boards like the DE2 that are specifically designed to execute educational, developmental and student code-- as well as hobbyists!A REALLY cool feature if you’re getting into this as a career-- each chapter has sample interview questions for your next job. Like good programming books, the authors CARE that you get that job and include examples of what you’ll be asked, with great answers on their support websites.All in all, a GREAT update to their first trend setting text, and a hands on manual on "how to" build your own chipset. If you’re an OOP person you might be shocked that they cover C so

much, but you've got to realize that "high level" at the circuit to assembly level is STILL C, and not so much Ada, Python, C# or Java (yet). Some other reviews around the web and in previous editions zinged them about this, but those reviewers aren't in the real world-- even for the most modern 2013 luxury autos with 60+ embedded chips, when designers go beyond assembly, they still default to C. Just because it's not OOP doesn't mean it's dead! If your own design prefers Python, or you're a JAVA junkie, fret not-- there are plenty of libraries that will handshake with assembly since embedded is the wave of the future, and this text is just as relevant. Eiffel even has a plug in that you can run on Visual Studio, and "lunch" off of your C# SDK to debug a second language-- although, granted, they are both OOP.NOTE FOR EDUCATORS: If you're a Junior College ID or exec/ dept. head, you might consider using this book as the basis for a year long course on circuit design to either prepare your grads for an AS/AA in electronics, or as a step to the EE. Once the grad gets into the real world of multi core, they will quickly find that "it's about the memory, stupid" that causes most performance challenges-- on board being heat and size costly, off board being time and speed costly, with cpu "work arounds" suprisingly more common than memory innovations-- a PERFECT field for that new patent.Many colleges are getting into "game programming" curricula because they offer an applied exposure to math, OOP, etc. This book gives you a non-herd alternative for your school-- with labs that ROCK. I'm an ID at ClassPros, and the schools at which we set up circuit design courses have even used the strategy to partner with name brand 4 year colleges in continuing on to the EE for the brightest students. GET THIS BOOK, and then think about how magnificently it would fit in such a curriculum!5 Stars-- a great start to getting that award-winning, financially rewarding patent on your new chip design, OR introducing a sim lab oriented, fun-project, high STEM curriculum item to your school-- go for it!

I'm a veteran software engineer, but new to FPGAs. I am not an electrical engineer, and only had a little exposure to digital logic in college.This book is a great introduction to FPGAs and HDL. The writing style and comic illustrations make it very approachable - indeed, fun to read. The implementation of a MIPS processor seems MUCH more thorough than I've seen elsewhere.I'm still working through it, and still struggling with some details. The difference between blocking and non-blocking assignment wasn't made as clear as I'd like. I found this was better addressed in Pong Chu's FPGA Prototyping By Verilog Examples. I recommend that book as well; the two are very complimentary.

Are you a student looking for a rapid-paced, single-semester introduction to digital design and

computer architecture! If you are, then this book is for you. Authors David Harris and Sarah Harris, have done an outstanding job of writing a second edition of a book that presents digital logic design from the perspective of computer architecture, starting at the beginning with 1's and 0's, and leading students through the design of a MIPS microprocessor.Both authors, begin by focusing on the principles for understanding and designing complex systems. In addition, they focus on combinational circuits, circuits whose outputs depend only on the current values of the inputs. The authors then, cover the analysis and design of sequential logic. Next, they discuss how System Verilog and VHDL are built on similar principles, but have a different syntax. The authors then explore the digital building blocks that are used in many digital systems. They continue by discussing the most commonly used MIPS instructions. In addition, the authors describe different ways to build MIPS processors, each with a different performance and cost trade-offs. Finally, they introduce cache and virtual memory organizations that use a hierarchy of memories to approximate an ideal large, fast, inexpensive memory.This excellent book is unique in its side-by-side presentation of System Verilog and VHDL, enabling the reader to learn two languages. Perhaps more importantly, this great book has conveyed the beauty and thrill of the art; as well as, the engineering knowledge.

This book is extremely well written. It gives a side by side presentation of verilog and vhdl along with a piece by piece explanation on how to design a MIPS processor. I would have gladly paid three times as much for this book.

I used this book as a supplement for my computer architecture class. It does a great job of walking the student through everything from the basic construction of a transistor, to a complete microarchitecture, to programming.The writing style is precise, the knowledge contained in the book is thorough, and the exercises and examples are challenging. This is a beast of a textbook.Comparing it to the main textbook we used in class (Lobur, 2002), I think the writing from Harris & Harris is better and the examples are clearer. They also cover the material differently. Harris & Harris spends a lot more time on the physical aspects of digital circuit design, while Lobur spends more time on various other higher-level concepts such as compressing data for transmission, magnetic data storage, etc.

I bought this book after I was 6 chapters deep into Fundamentals of Logic Design 7th Ed. This book is the one you want to learn from. It explains things concisely, provides motivation and distinction

between concepts, while remaining making you laugh. It will not provide you with everything you will need for an introductory course in Digital Logic Design, but I firmly believe that this book, along with Wikipedia (or the use of a search engine for diagrams) will do a much better job than that disgusting FLD 7th Ed.

Digital Logic Design and Computer Organization with Computer Architecture for Security Digital Design and Computer Architecture, Second Edition Computer Organization and Design, Fifth Edition: The Hardware/Software Interface (The Morgan Kaufmann Series in Computer Architecture and Design) Computer Organization and Design: The Hardware/Software Interface (The Morgan Kaufmann Series in Computer Architecture and Design) Digital Design and Computer Architecture: ARM Edition Cryptocurrency: Guide To Digital Currency: Digital Coin Wallets With Bitcoin, Dogecoin, Litecoin, Speedcoin, Feathercoin, Fedoracoin, Infinitecoin, and ... Digital Wallets, Digital Coins Book 1) Python: Python Programming For Beginners - The Comprehensive Guide To Python Programming: Computer Programming, Computer Language, Computer Science Python: Python Programming For Beginners - The Comprehensive Guide To Python Programming: Computer Programming, Computer Language, Computer Science (Machine Language) A-Life for Music: Music and Computer Models of Living Systems (Computer Music and Digital Audio Series) A Digital Signal Processing Primer: With Applications to Digital Audio and Computer Music Digital Storytelling: Capturing Lives, Creating Community (Digital Imaging and Computer Vision) The Art and Science of Digital Compositing, Second Edition: Techniques for Visual Effects, Animation and Motion Graphics (The Morgan Kaufmann Series in Computer Graphics) Photography: DSLR Photography Secrets and Tips to Taking Beautiful Digital Pictures (Photography, DSLR, cameras, digital photography, digital pictures, portrait photography, landscape photography) Digital Painting Techniques: Practical Techniques of Digital Art Masters (Digital Art Masters Series) Photography: Complete Guide to Taking Stunning,Beautiful Digital Pictures (photography, stunning digital, great pictures, digital photography, portrait ... landscape photography, good pictures) The Basics of Digital Forensics, Second Edition: The Primer for Getting Started in Digital Forensics Logical Effort: Designing Fast CMOS Circuits (The Morgan Kaufmann Series in Computer Architecture and Design) Career Building Through Using Digital Design Tools (Digital Career Building) The Adobe Photoshop Lightroom: 17 Tips You Should Know to Get Started Using Photoshop Lightroom (For Digital Photographers) (Graphic Design, Adobe Photoshop, Digital Photography, Lightroom) Digital Textile Design, Second edition