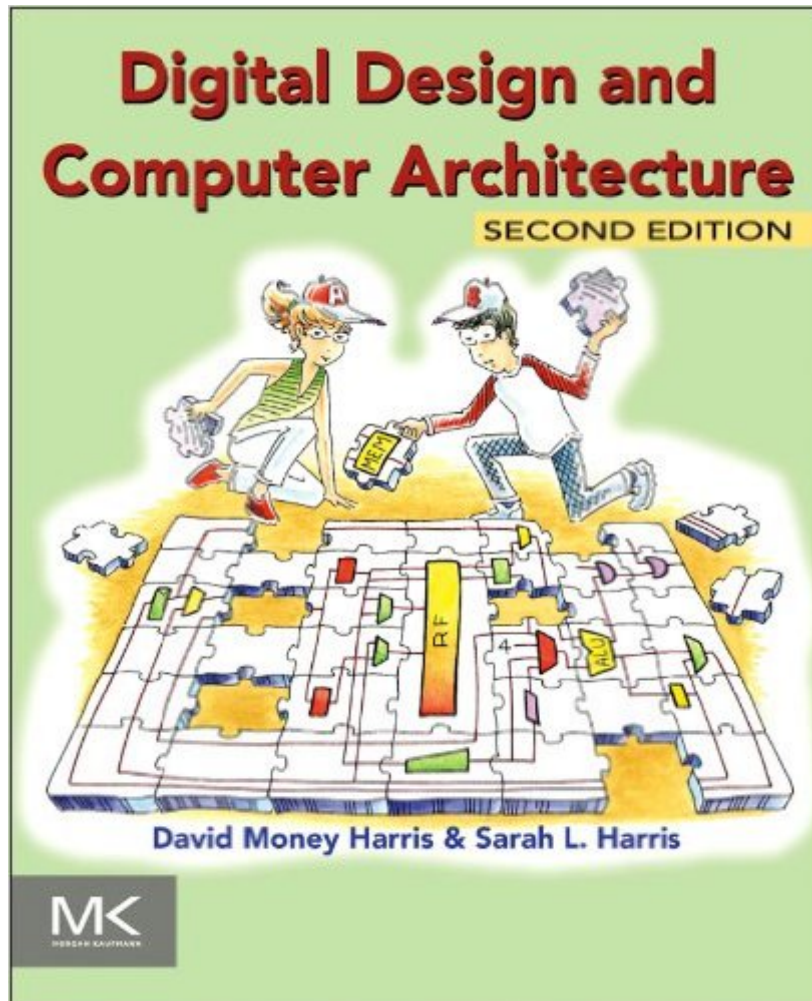


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# Digital Design And Computer Architecture



## 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

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## 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.

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