



Essentials of Computer Organization and Architecture, Fifth Edition Transition Guide

By Linda Null • Julia Lobur
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Main Updates

- **NEW** – *Null Pointers* side bars include helpful hints to simplify concepts students typically struggle with
- **REORGANIZED** - Streamlined presentation of content with material not deemed “essential” available online
- **UPDATED** - Discussions of hardware updated and expanded throughout the text
- **NEW**- Animations within the Navigate 2 eBook help simplify difficult concepts
- **STUDENT FAVORITE** – The MARIE Simulator package allows students to learn the essential concepts of computer organization and architecture, including assembly language, without getting caught up in unnecessary and confusing details

Major Chapter Changes Are Listed Below

Chapter 1 has been updated to include new examples, as well as additional information on smart phones and tablets. The hardware overview has been updated, and further information has been added regarding input/output components, the ALU, memory, the data path, and interconnection structures (memory modules, I/O modules, the CPU, and buses). Transistors have been deemphasized and more importance has been placed on computer systems. The storage hierarchy is introduced, and various types of memory (such as RAM and RDRAM) are covered in more detail. The discussion of cloud computing has been expanded and the basic concepts have been made more accessible. Pertinent sections of Chapter 12 have been integrated into Chapter 1.

Chapter 2 has dropped the author-invented format for floating point and now introduces the floating-point format using the IEEE format. More details and examples have been provided for floating-point numbers, and the “Codes for Data Recording and Transmission” section has been moved online.

Chapter 3 brings Kmaps back into the main chapter, devotes more time to optimization, and includes the concepts of prime implicants and essential implicants. More arithmetic circuits have been introduced, and step-by-step techniques for analyzing and designing flip-flops and synchronous sequential machines have been added. A section on hardware description languages (including Verilog and VHDL) has been included, and the section on finite state machines has been rewritten to make it more accessible and to relate it to concepts introduced in Chapter 4.

Chapter 4 has expanded sections to include more MIPS and Intel programs for comparison with MARIE programs. In addition, there are now more exercises for the MARIE assembly language.

Chapter 5 has been updated to include the MIPS architecture in the “real world section.” It also has additional material to help make design choices more relevant by connecting the architectural considerations to the implications these decisions have on the programmer.

Chapter 6 expands the real-world memory study and includes a new section on the MIPS architecture.

Chapter 7 has an updated disk technology section, and data compression has been moved online. The discussion of how interrupts work has been expanded.

Chapter 8 has been updated by moving the database software and transaction manager sections online. More focus has been placed on software/hardware interaction.

Chapter 12 (what remains after integrating parts into Chapter 1) has been moved online.

Chapter 13 has been moved online.

Appendix A has been moved online.

Table of Contents Comparison Outlines Chapter Reorganization

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Chapter 4	MARIE: An Introduction to a Simple Computer	Chapter 4	MARIE: An Introduction to a Simple Computer
Chapter 5	A Closer Look at Instruction Set Architectures	Chapter 5	A Closer Look at Instruction Set Architectures
Chapter 6	Memory	Chapter 6	Memory
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Chapter 12	Network Organization and Architecture	Chapter 12	Network Organization and Architecture (online only)
Chapter 13	Selected Storage Systems and Interfaces	Chapter 13	Selected Storage Systems and Interfaces (online only)
Appendix A	Data Structures and the Computer	Appendix A	Data Structures and the Computer (online only)