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CONTENTS

Preface xiii

□ Chapter 1 **3**

DIGITAL SYSTEMS AND INFORMATION 3
1-1 Information Representation 4
The Digital Computer 6
Beyond the Computer 7
More on the Generic Computer 11
1-2 Number Systems 13
Binary Numbers 14
Octal and Hexadecimal Numbers 16
Number Ranges 17
1-3 Arithmetic Operations 18
Conversion from Decimal to Other Bases 20
1-4 Decimal Codes 23
BCD Addition 24
1-5 Alphanumeric Codes 25
ASCII Character Code 26
Parity Bit 26
1-6 Gray Codes 28
1-7 Chapter Summary 31
References 31
Problems 31

□ Chapter 2 **35**

COMBINATIONAL LOGIC CIRCUITS 35
2-1 Binary Logic and Gates 35
Binary Logic 36
Logic Gates 38

2-2	Boolean Algebra	39
	Basic Identities of Boolean Algebra	42
	Algebraic Manipulation	44
	Complement of a Function	47
2-3	Standard Forms	48
	Minterms and Maxterms	49
	Sum of Products	52
	Product of Sums	54
2-4	Two-Level Circuit Optimization	54
	Cost Criteria	55
	Map Structures	56
	Two-Variable Maps	59
	Three-Variable Maps	61
2-5	Map Manipulation	65
	Essential Prime Implicants	65
	Nonessential Prime Implicants	67
	Product-of-Sums Optimization	68
	Don't-Care Conditions	70
2-6	Pragmatic Two-Level Optimization	72
2-7	Multiple-Level Circuit Optimization	76
2-8	Other Gate Types	81
2-9	Exclusive-OR Operator and Gates	85
	Odd Function	86
2-10	High-Impedance Outputs	88
2-11	Chapter Summary	90
	References	90
	Problems	91

□ Chapter 3 **97**

COMBINATIONAL LOGIC DESIGN		97
3-1	Design Procedure	97
3-2	Beginning Hierarchical Design	104
3-3	Technology Mapping	107
3-4	Verification	111
	Manual Logic Analysis	111
	Simulation	113
3-5	Combinational Functional Blocks	113
3-6	Rudimentary Logic Functions	115
	Value-Fixing, Transferring, and Inverting	115
	Multiple-Bit Functions	116
	Enabling	119
3-7	Decoding	121
	Decoder and Enabling Combinations	124
	Decoder-Based Combinational Circuits	126
3-8	Encoding	127
	Priority Encoder	129
	Encoder Expansion	130
3-9	Selecting	131
	Multiplexers	131
	Multiplexer-Based Combinational Circuits	136
3-10	Chapter Summary	138
	References	140
	Problems	140

□ Chapter 4 **149**

ARITHMETIC FUNCTIONS AND HDLS		149
4-1	Iterative Combinational Circuits	150
4-2	Binary Adders	151
	Half Adder	151
	Full Adder	152
	Binary Ripple Carry Adder	153
4-3	Binary Subtraction	155
	Complements	157
	Subtraction Using 2s Complement	158
4-4	Binary Adder–Subtractors	159
	Signed Binary Numbers	161
	Signed Binary Addition and Subtraction	163
	Overflow	165
4-5	Other Arithmetic Functions	167
	Contraction	167
	Incrementing	169
	Decrementing	170
	Multiplication by Constants	170
	Division by Constants	172
	Zero Fill and Extension	172
4-6	Hardware Description Languages	173
	Hardware Description Languages	173
	Logic Synthesis	175
4-7	HDL Representations—VHDL	176
	Behavioral Description	186

4-8 HDL Representations—Verilog 187
Behavioral Description 195
4-9 Chapter Summary 196
References 196
Problems 197

□ Chapter 5 **207**

SEQUENTIAL CIRCUITS 207
5-1 Sequential Circuit Definitions 208
5-2 Latches 210
SR and $\overline{S}\,\overline{R}$ Latches 211
D Latch 214
5-3 Flip-Flops 215
Master–Slave Flip-Flops 216
Edge-Triggered Flip-Flop 218
Standard Graphics Symbols 219
Direct Inputs 221
5-4 Sequential Circuit Analysis 222
Input Equations 223
State Table 224
State Diagram 227
Sequential Circuit Simulation 229
5-5 Sequential Circuit Design 230
Design Procedure 231
Finding State Diagrams and State Tables 231
State Assignment 238
Designing with D Flip-Flops 240
Designing with Unused States 243
Verification 245
5-6 Other Flip-Flop Types 247
JK and T Flip-Flops 247
5-7 State-Machine Diagrams and Applications 250
State-Machine Diagram Model 250
Constraints on Input Conditions 253
Design Applications Using State-Machine Diagrams 256
5-8 HDL Representation for Sequential Circuits—VHDL 264
5-9 HDL Representation for Sequential Circuits—Verilog 272
5-10 Chapter Summary 278
References 279
Problems 280

□ Chapter 6 **295**

SELECTED DESIGN TOPICS 295
6-1 The Design Space 295
Integrated Circuits 296
CMOS Circuit Technology 296
Technology Parameters 302
6-2 Gate Propagation Delay 304
6-3 Flip-Flop Timing 306
6-4 Sequential Circuit Timing 308
6-5 Asynchronous Interactions 310
6-6 Synchronization and Metastability 312
6-7 Synchronous Circuit Pitfalls 318
6-8 Programmable Implementation Technologies 319
Read-Only Memory 322
Programmable Logic Array 323
Programmable Array Logic Devices 327
6-9 Chapter Summary 329
References 329
Problems 330

□ Chapter 7 **335**

REGISTERS AND REGISTER TRANSFERS 335
7-1 Registers and Load Enable 336
Register with Parallel Load 337
7-2 Register Transfers 339
7-3 Register Transfer Operations 341
7-4 A Note for VHDL and Verilog Users Only 344
7-5 Microoperations 344
Arithmetic Microoperations 345
Logic Microoperations 347
Shift Microoperations 349
7-6 Microoperations on a Single Register 350
Multiplexer-Based Transfers 350
Shift Registers 353
Ripple Counter 357
Synchronous Binary Counters 359
Other Counters 363

7-7	Register-Cell Design	366
7-8	Multiplexer and Bus-Based Transfers for Multiple Registers	372
	Three-State Bus	374
7-9	Serial Transfer and Microoperations	375
	Serial Addition	377
7-10	Control of Register Transfers	378
	Design Procedure	380
7-11	HDL Representation for Shift Registers and Counters—VHDL	395
7-12	HDL Representation for Shift Registers and Counters—Verilog	398
7-13	Microprogrammed Control	399
7-14	Chapter Summary	402
	References	402
	Problems	402

□ Chapter 8 **413**

MEMORY BASICS		413
8-1	Memory Definitions	413
8-2	Random-Access Memory	414
	Write and Read Operations	416
	Timing Waveforms	417
	Properties of Memory	419
8-3	SRAM Integrated Circuits	419
	Coincident Selection	422
8-4	Array of SRAM ICs	425
8-5	DRAM ICs	429
	DRAM Cell	429
	DRAM Bit Slice	431
8-6	DRAM Types	435
	Synchronous DRAM (SDRAM)	436
	Double-Data-Rate SDRAM (DDR SDRAM)	439
	RAMBUS® DRAM (RDRAM)	439
8-7	Arrays of Dynamic RAM ICs	440
8-8	Chapter Summary	441
	References	441
	Problems	441

□ Chapter 9 **443**

COMPUTER DESIGN BASICS		443
9-1	Introduction	444
9-2	Datapaths	444
9-3	The Arithmetic/Logic Unit	447
	Arithmetic Circuit	448
	Logic Circuit	450
	Arithmetic/Logic Unit	451
9-4	The Shifter	453
	Barrel Shifter	454
9-5	Datapath Representation	455
9-6	The Control Word	458
9-7	A Simple Computer Architecture	464
	Instruction Set Architecture	464
	Storage Resources	465
	Instruction Formats	466
	Instruction Specifications	468
9-8	Single-Cycle Hardwired Control	471
	Instruction Decoder	472
	Sample Instructions and Program	474
	Single-Cycle Computer Issues	477
9-9	Multiple-Cycle Hardwired Control	478
	Sequential Control Design	482
9-10	Chapter Summary	489
	References	490
	Problems	490

□ Chapter 10 **497**

INSTRUCTION SET ARCHITECTURE		497
10-1	Computer Architecture Concepts	497
	Basic Computer Operation Cycle	498
	Register Set	499
10-2	Operand Addressing	499
	Three-Address Instructions	500
	Two-Address Instructions	501
	One-Address Instructions	501
	Zero-Address Instructions	502
	Addressing Architectures	503

10-3 Addressing Modes 506
Implied Mode 507
Immediate Mode 507
Register and Register-Indirect Modes 508
Direct Addressing Mode 508
Indirect Addressing Mode 510
Relative Addressing Mode 510
Indexed Addressing Mode 511
Summary of Addressing Modes 511
10-4 Instruction Set Architectures 513
10-5 Data-Transfer Instructions 514
Stack Instructions 515
Independent versus Memory-Mapped I/O 517
10-6 Data-Manipulation Instructions 518
Arithmetic Instructions 518
Logical and Bit-Manipulation Instructions 519
Shift Instructions 520
10-7 Floating-Point Computations 522
Arithmetic Operations 523
Biased Exponent 524
Standard Operand Format 525
10-8 Program Control Instructions 527
Conditional Branch Instructions 528
Procedure Call and Return Instructions 530
10-9 Program Interrupt 531
Types of Interrupts 533
Processing External Interrupts 534
10-10 Chapter Summary 535
References 536
Problems 537

□ Chapter 11 **543**

RISC AND CISC CENTRAL PROCESSING UNITS 543
11-1 Pipelined Datapath 544
Execution of Pipeline Microoperations 548
11-2 Pipelined Control 549
Pipeline Programming and Performance 551
11-3 The Reduced Instruction Set Computer 553
Instruction Set Architecture 554
Addressing Modes 557
Datapath Organization 557

Control Organization 560
Data Hazards 563
Control Hazards 570
11-4 The Complex Instruction Set Computer 574
ISA Modifications 575
Datapath Modifications 577
Control Unit Modifications 577
Microprogrammed Control 579
Microprograms for Complex Instructions 582
11-5 More on Design 586
Advanced CPU Concepts 586
Recent Architectural Innovations 589
11-6 Chapter Summary 592
References 593
Problems 593

□ Chapter 12 **597**

INPUT–OUTPUT AND COMMUNICATION 597
12-1 Computer I/O 597
12-2 Sample Peripherals 598
Keyboard 598
Hard Drive 599
Liquid Crystal Display Screen 601
I/O Transfer Rates 604
12-3 I/O Interfaces 604
I/O Bus and Interface Unit 605
Example of I/O Interface 606
Strobing 608
Handshaking 609
12-4 Serial Communication 611
Synchronous Transmission 612
The Keyboard Revisited 612
A Packet-Based Serial I/O Bus 613
12-5 Modes of Transfer 617
Example of Program-Controlled Transfer 618
Interrupt-Initiated Transfer 620
12-6 Priority Interrupt 620
Daisy Chain Priority 621
Parallel Priority Hardware 623
12-7 Direct Memory Access 624
DMA Controller 625
DMA Transfer 627

12-8 Chapter Summary 628
References 628
Problems 629

□ Chapter 13 **633**

MEMORY SYSTEMS 633
13-1 Memory Hierarchy 633
13-2 Locality of Reference 636
13-3 Cache Memory 638
Cache Mappings 640
Line Size 645
Cache Loading 647
Write Methods 647
Integration of Concepts 648
Instruction and Data Caches 651
Multiple-Level Caches 651
13-4 Virtual Memory 652
Page Tables 654
Translation Lookaside Buffer 656
Virtual Memory and Cache 658
13-5 Chapter Summary 658
References 659
Problems 659

INDEX 663

PREFACE

The objective of this text is to serve as a cornerstone for the learning of logic design, digital system design, and computer design by a broad audience of readers. This fourth edition marks the decade point in the evolution of the text contents. Beginning as an adaptation of a previous book by the first author in 1997, it continues to offer a unique combination of logic design and computer design principles with a strong hardware emphasis. Over the years, the text has followed industry trends by adding new material such as hardware description languages, removing or de-emphasizing material of declining importance, and revising material to track changes in computer technology and computer-aided design.

In the fourth edition, revisions address pedagogical considerations as well as industrial trends. Sixty "real world" examples and problems, most drawn from design problems for products encountered in contemporary day-to-day life, motivate interest and provide practice in solution formulation. Changes in chapter organization permit instructors to more easily tailor the degree of technology coverage, accommodating both electrical and computer engineering and computer science audiences.

The organizational changes begin with the combining of the introduction to design from Chapter 3 and the functional block material from Chapter 4 into a new Chapter 3. The design science content from the old Chapter 3 is now distributed over multiple chapters on an "as needed" basis and is accompanied by illustrations. Hardware description language coverage for combinational circuits has been combined in Chapter 4 with that for arithmetic circuits to balance chapter size. Material on technology from the old Chapter 3, including timing and programmable logic, appears in a new Chapter 6 and can be selectively covered and scheduled by the instructor as appropriate for the course syllabus. The placement of this material in Chapter 6 permits earlier coverage of sequential circuits for those with lesser technology-related needs and provides the more extensive background needed for some of the topics covered. Further, technology topics fit better within digital system design rather than within basic logic design material presented earlier in the text. Chapter 6 also contains new information on CMOS circuits and asynchronous interaction between systems including synchronization of inputs and metastability.

Chapter 8 has been eliminated along with the algorithmic state machine (ASM) to streamline the treatment of design of complex sequential circuits and control units. Concepts from Chapter 8 are split between Chapter 5 (Sequential Circuits) and Chapter 7 (Registers and Register Transfers). A new state machine