Switching Theory And Logic Design 2nd Edition

Covers Boolean algebra, functions, and logical operations, the Karnaugh map, computer-aided minimization procedures, logic synthesis, programmable logic arrays, sequential machines, and designing for testing

Logic Design: A Review of Theory and Practice describes computer design focusing on the theoretical and practical relationships of sequential machines. This book reviews the major technologies that make the computer, particularly the switching circuit design involving vacuum tubes, discrete transistors, and integrated circuits. The switching theory associated in the logic design of sequential machine models and synthesis techniques lead to understanding of constraints due to stray delays, input change restrictions, and memory element operation. This text also describes the logic design processes including the use of flow charts, design languages, simulations, and system timing. Three aspects needed prior to the design phase that should be considered by the programmer are data flow, the micro-operations (and their sequencing), and the timing (machine cycle or logic). The significance between theoretical and mathematical models can then be determined through fault detection, masking, digital simulation, and test generation. This book can be beneficial for computer engineering instructors and advanced students in computer science.

SWITCHING THEORY AND LOGIC DESIGNPHI Learning Pvt. Ltd.

Foundations of Digital Logic Design

Recent Developments in Switching Theory

Fundamentals of Switching Theory and Logic Design

SWITCHING THEORY AND LOGIC DESIGN

Modeling Digital Switching Circuits with Linear Algebra describes an approach for modeling digital information and circuitry that is an alternative to Boolean algebra. While the Boolean algebraic model has been wildly successful and is responsible for many advances in modern information technology, the approach described in this book offers new insight and different ways of solving problems. Modeling the bit as a vector instead of a scalar value in the set {0, 1} allows digital circuits to be characterized with transfer functions in the form of a linear transformation matrix. The use of transfer functions is ubiquitous in many areas of engineering and their rich background in linear systems theory and signal processing is easily applied to digital switching circuits with this model. The common tasks of circuit simulation and justification are specific examples of the application of the linear algebraic model and are described in detail. The advantages offered by the new model as compared to traditional methods are emphasized throughout the book. Furthermore, the new approach is easily generalized to other types of information processing circuits such as those based upon multiple-valued or quantum logic; thus providing a unifying mathematical framework common to each of these areas. Modeling Digital Switching Circuits with Linear Algebra provides a blend of theoretical concepts and practical issues involved in implementing the method for circuit design tasks. Data structures are described and are shown to not require any more resources for representing the underlying matrices and vectors than those currently used in modern electronic design automation (EDA) tools based on the Boolean model. Algorithms are described that perform simulation, justification, and other common EDA tasks in an efficient manner that are competitive with conventional design tools. The linear algebraic model can be used to implement common EDA tasks directly upon a structural netlist thus avoiding the intermediate step of transforming a circuit description into a representation of a set of switching functions as is commonly the case when conventional Boolean techniques are used. Implementation results are provided that empirically demonstrate the practicality of the linear algebraic model.

This comprehensive text on switching theory and logic design is designed for the undergraduate students of electronics and communication engineering, electrical and electronics engineering, electronics and computers engineering, electronics and instrumentation engineering, telecommunication engineering, computer science and engineering, and information technology. It will also be useful to M.Sc (electronics), M.Sc (computers), AMIE, IETE and diploma students. Written in a student-friendly style, this book, now in its Third Edition, provides an in-depth knowledge of switching theory and the design techniques of digital circuits. Striking a balance between theory and practice, it covers topics ranging from number systems, binary codes, logic gates and Boolean algebra to minimization using K-maps and tabular method, design of combinational logic circuits, synchronous and asynchronous sequential circuits, and algorithmic state machines. The book discusses threshold gates and programmable logic devices (PLDs). In addition, it elaborates on flip-flops and shift registers. Each chapter includes several fully worked-out examples so that the students get a thorough grounding in related design concepts. Short questions with answers, review questions, fill in the blanks, multiple choice questions and problems are provided at the end of each chapter. These help the students test their level of understanding of the subject and prepare for examinations confidently.

Modern Digital Design and Switching Theory is an important text that focuses on promoting an understanding of digital logic and the computer programs used in the minimization of logic expressions. Several computer approaches are explained at an elementary level, including the Quine-McCluskey method as applied to single and multiple output functions, the Shannon expansion approach to multilevel logic, the Directed Search Algorithm, and the method of Consensus. Chapters 9 and 10 offer an introduction to current research in field programmable devices and multilevel logic synthesis. Chapter 9 covers more advanced topics in programmed logic devices, including techniques for input decoding and Field-Programmable Gate Arrays (FPGAs). Chapter 10 includes a discussion of boolean division, kernels and factoring, boolean tree structures, rectangle covering, binary decision diagrams, and if-then-else operators. Computer algorithms covered in these two chapters include weak division, iterative weak division, and kernel extraction by tabular methods and by rectangle covering theory. Modern Digital Design and Switching Theory is an excellent textbook for electrical and computer engineering students, in addition to a worthwhile reference for professionals working with integrated circuits.

Digital Logic Design

Fundamentals of Logic Design

Multiple-Valued Logic Design

Logic Design and Switching Theory

Introductory treatment begins with set theory and fundamentals of Boolean algebra, proceeding to concise accounts of applications to symbolic logic, switching circuits, relay circuits, binary arithmetic, and probability theory. 1961 edition.

Switching Theory and Logic Design is for a first-level introductory course on digital logic design. This book illustrates the usefulness of switching theory and its applications, with examples to acquaint the student with the necessary background. This book has been designed as a prerequisite to many other courses like Digital Integrated Circuits, Computer Organisation, Digital Instrumentation, Digital Control, Digital Communications and Hardware Description Languages.

Good,No Highlights,No Markup,all pages are intact, Slight Shelfwear,may have the corners slightly dented, may have slight color changes/slightly damaged spine.

Logic Circuit Design

Introduction to Switching Theory and Logical Design

Switching Theory & Logic Design

Fundamentals of Logic Design and Switching Theory

Logic networks and automata are facets of digital systems. The change of the design of logic networks from skills and art into a scientific discipline was possible by the development of the underlying mathematical theory called the Switching Theory. The fundamentals of this theory come from the attempts towards an algebraic description of laws of thoughts presented in the works by George J. Boole and the works on logic by Augustus De Morgan. As often the case in engineering, when the importance of a problem and the need for solving it reach certain limits, the solutions are searched by many scholars in different parts of the word, simultaneously or at about the same time, however, quite independently and often unaware of the work by other scholars. The formulation and rise of Switching Theory is such an example. This book presents a brief account of the developments of Switching Theory and highlights some less known facts in the history of it. The readers will find the book a fresh look into the development of the field revealing how difficult it has been to arrive at many of the concepts that we now consider obvious . Researchers in the history or philosophy of computing will find this book a valuable source of information that complements the standard presentations of the topic.

Electrical Science Series: Recent Developments in Switching Theory covers the progress in the study of the switching theory. The book discusses the simplified proof of Post's theorem on completeness of logic primitives; the role of feedback in combinational switching circuits; and the systematic procedure for the design of Lupanov decoding networks. The text also describes the classical results on counting theorems and their application to the classification of switching functions under different notions of equivalence, including linear and affine equivalences. The development of abstract harmonic analysis of combinational switching functions; the theory of universal logic modules, methods of their construction, and upper bounds on the input terminals; and cellular logic are also considered. The book further tackles the systematic techniques for the realization of multi-output logic function by means of multirail cellular cascades; the programmable cellular logic; and the logical design of programmable arrays. Electrical engineers, electronics engineers, computer professionals, and student taking related courses will find the book invaluable.

Updated with modern coverage, a streamlined presentation, and an excellent CD-ROM, this fifth edition achieves a balance between theory and application. Author Charles H. Roth, Jr. carefully presents the theory that is necessary for understanding the fundamental concepts of logic design while not overwhelming students with the mathematics of switching theory. Divided into 20 easy-to-grasp study units, the book covers such fundamental concepts as Boolean algebra, logic gates design, flip-flops, and state machines. By combining flip-flops with networks of logic gates, students will learn to design counters, adders, sequence detectors, and simple digital systems. After covering the basics, this text presents modern design techniques using programmable logic devices and the VHDL hardware description language.

SWITCHING THEORY AND LOGIC DESIGN.

Switching Theory and Logic Design

Switching Theory for Logic Synthesis

From Boolean Logic to Switching Circuits and Automata

In this volume drawn from the VLSI Handbook, the focus is on logic design and compound semiconductor digital integrated circuit technology. Expert discussions cover topics ranging from the basics of logic expressions and switching theory to sophisticated programmable logic devices and the design of GaAs MESFET and HEMT logic circuits. Logic Design

Switching theory is concerned with the development of models and techniques for the analysis and synthesis of those circuits in which information is represented in discrete or digital form, as opposed to the analog form in which information is represented in a continuous manner. The application of digital techniques over a wider range of human activities has already profoundly affected modern life, and there is no visible limit to their future utility. This book is the outgrowth of a course on switching circuits that the author has taught since 1960, and it is designed as a text to provide a unified treatment of the subject with particular emphasis on sequential circuit theory. An attempt has been made to include only those techniques that have been generally accepted and seem to have lasting application. The first four of the nine chapters are devoted to basic principles and to combinational circuit theory. They introduce number systems, binary codes, Boolean algebra, switching functions, the analysis and synthesis of combinational gate circuits (including NAND, NOR, EXCLUSIVE-OR, and EXCLUSIVE-NOR), and threshold logic, among other topics. Also covered are algebraic, geometric, and tabular techniques for the minimization of algebraic expressions. The remainder of this book is on sequential circuit theory. A general treatment is emphasized by classification of the sequential-circuit operation as either fundamental mode or pulse mode, and as either clocked or not clocked. A comparison of the two modes is enhanced by design examples in which the same problem specifications are used for each mode. Both algebraic and tablular techniques are presented for the analysis and synthesis of these circuits. The timely topics of control states and register transfers in sequential design are included. The book closes with a discussion of sequential-circuit minimization associated with the reduction of flow tables, and the state-assignment problem. Answers are provided to selected problems.

Fundamentals of Switching Theory and Logic Design discusses the basics of switching theory and logic design from a slightly alternative point of view and also presents links between switching theory and related areas of signal processing and system theory. Switching theory is a branch of applied mathematic providing mathematical foundations for logic design, which can be considered as a part of digital system design concerning realizations of systems whose inputs and outputs are described by logic functions.

Introduction to Switching Theory and Logic Design Fourth Edition

The Principles of Switching Circuits

Fundamentals Of Switching Theory And Logic Design: A Hands On Approach

Switching Circuits; Theory and Logic Design

Provides the knowledge and skills that are basic to all digital system design. Solid foundation of theory permits development of systematic design procedures. Presents classical methods, such as Karnaugh maps. Quine-McCluskey minimization. Mealy and Moore circuits, state-table minimization, hazard-free asynchronous designs, etc. This edition features design with MSI circuits, including PLA's, and register transfer (state machine) approaches to sequential system design.

New, updated and expanded topics in the fourth edition include: EBCDIC, Grey code, practical applications of flip-flops, linear and shaft encoders, memory elements and FPGAs. The section on fault-finding has been expanded. A new chapter is dedicated to the interface between digital components and analog voltages. *A highly accessible, comprehensive and fully up to date digital systems text *A well known and respected text now revamped for current courses *Part of the Newnes suite of texts for HND/1st year modules

Characteristics of digital system, Types of Digital circuits, Number system: Direct conversion between bases Negative numbers & BCD and their arithmetic's, Boolean Algebra, Minimization of Boolean Functions : Map & Tabular method upto 6 variable and miltiple output circuits Error detecting & correcting codes, Hamming & cyclic codes. Combinational Logic CircuitsDesign Procedure, Adders, subtractors & code conversion, Multiplexers/ Demultiplexers, encoder / decoders, decimal adders & amplitude comparators, ROM as decoder, PLA & PAL.Sequential Logic CircuitsFlip - Flops and their conversions, Analysis and synthesis of synchronous sequential circuit, excitation table, state table & state diagram. Design of synchronous counters, shift registers and their e applications.Algorithm State Machine: ASM chart, Timing considerations, Control Implementation Design with Multiplexers, PLA controlAsynchronous Sequential Circuits: Analysis Procedure Reduction of state & flow table, Race free state assignment. Logic Families Diode, B JT & MOS as a switching element concept of transfer characteristics, Input characteristics and output characteristics of logic gates, Fan-in, Fan-out, Noise margin, circuit concept and comparison of various logic families: TTL, IIL, ECL, NMOS, CMOS Tri-state logic, open collector output, Interfacing between logic families, packing density, power consumption & gate delay. -tJui4=&Ur. Hazard and Fault DetectionStatic and dynamic Hazard : Gate delay, Generation of spikes, Determination of hazard in combinational circuits, Fault detection methods: Fault Table & Path sensitizing methods. MemoriesSequential, Random Access, NMOS & CMOS Static and Dynamic Memory elements, one and multi-dimensional selection arrangement, Read-only memories, Formation of memory banks.

Modern Digital Design and Switching Theory

Logical Design of Switching Circuits

A Hands on Approach

This text is intended for a first course in digital logic design, at the sophomore or junior level, for electrical engineering, computer engineering and computer science programs, as well as for a number of other disciplines such as physics and mathematics. The book can also be used for self-study or for review by practicing engineers and computer scientists not intimately familiar with the subject. After completing this text, the student should be prepared for a second (advanced) course in digital design, switching and automata theory, microprocessors or computer organization. Request Inspection Copy

Switching Theory for Logic Synthesis covers the basic topics of switching theory and logic synthesis in fourteen chapters. Chapters 1 through 5 provide the mathematical foundation. Chapters 6 through 8 include an introduction to sequential circuits, optimization of sequential machines and asynchronous sequential circuits. Chapters 9 through 14 are the main feature of the book. These chapters introduce and explain various topics that make up the subject of logic synthesis: multi-valued input two-valued output function, logic design for PLDs/FPGAs, EXOR-based design, and complexity theories of logic networks. An appendix providing a history of switching theory is included. The reference list consists of over four hundred entries. Switching Theory for Logic Synthesis is based on the author's lectures at Kyushu Institute of Technology as well as seminars for CAD engineers from various Japanese technology companies. Switching Theory for Logic Synthesis will be of interest to CAD professionals and students at the advanced level. It is also useful as a textbook, as each chapter contains examples, illustrations, and exercises.

In three main divisions the book covers combinational circuits, latches, and asynchronous sequential circuits. Combinational circuits have no memorising ability, while sequential circuits have such an ability to various degrees. Latches are the simplest sequential circuits, ones with the shortest memory. The presentation is decidedly non-standard. The design of combinational circuits is discussed in an orthodox manner using normal forms and in an unorthodox manner using set-theoretical evaluation formulas relying heavily on Karnaugh maps. The latter approach allows for a new design technique called composition. Latches are covered very extensively. Their memory functions are expressed mathematically in a time-independent manner allowing the use of (normal, non-temporal) Boolean logic in their calculation. The theory of latches is then used as the basis for calculating asynchronous circuits. Asynchronous circuits are specified in a tree-representation, each internal node of the tree representing an internal latch of the circuit, the latches specified by the tree itself. The tree specification allows solutions of formidable problems such as algorithmic state assignment, finding equivalent states non-recursively, and verifying asynchronous circuits.

Switching and Finite Automata Theory

Switching Theory

Fundamentals of Logic Design, Enhanced Edition, Loose-Leaf Version

Logic Design Theory

Multiple-Valued Logic Design: An Introduction explains the theory and applications of this increasingly important subject. Written in a clear and understandable style, the author develops the material in a skillful way. Without using a huge mathematical apparatus, he introduces the subject in a general form that includes the well-known binary logic as a special case. The book is further enhanced by more 200 explanatory diagrams and circuits, hardware and software applications with supporting PASCAL programming, and comprehensive exercises with even-numbered answers for every chapter. Requiring introductory knowledge in Boolean algebra, 2-valued logic, or 2-valued switching theory, Multiple-Valued Logic Design: An Introduction is an ideal book for courses not only in logic design, but also in switching theory, nonclassical logic, and computer arithmetic. Computer scientists, mathematicians, and electronic engineers can also use the book as a basis for research into multiple-valued logic design.

Number Systems and CodesPhilosophy of number systems - complement representation of negative numbers - binary arithmetic - binary codes - error detecting and error correcting codes - hamming codes.Boolean Algebra and Switching FunctionsFundamental postulates of Boolean Algebra-Basic theorems and properties - switching functions - Canonical and Standard forms - Algebraic simplification - digital logic gates, properties of XOR gates - universal gates - Multilevel NAND/NOR realizations.Minimization of Switching FunctionsMap method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime - Implicant chart, simplification rules.Combinational Logic DesignDesign using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design IC chips, MUX Realization of switching functions Parity bit generator, Code-converters, Hazards and hazard free realizations.Programmable Logic Devices, Threshold LogicBasic PLD's-ROM, PROM, PLA, PLD Realization of Switching functions using PLD's. Capabilities and limitations of Threshold gate, Synthesis of Threshold functions, Multigate Synthesis.Sequential Circuits - IClassification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples) Basic flop-flops-Triggering and excitation tables. Steps in synchronous sequential circuit design. Design of modulo-N Ring and shift counters, Serial binary adder, sequence detector.Sequential Circuits - IIFinite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.Algorithmic State MachinesSalient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

Modeling Digital Switching Circuits with Linear Algebra

Switching Theory And Logic Design (for Jntu)

Towards Modern Information Technology

Computer Logic Design