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Digital Circuits Foundations of Analog and Digital Electronic Circuits **Digital Circuits and Design Complex Digital Circuits** Practical Design of Digital Circuits *Digital Electronic Circuits - The Comprehensive View* **Digital Circuits and Systems** Digital Circuits & Design *Analog and Digital Electronic Circuits* **Pulse and Digital Circuits Digital Circuits Pulse and Digital Circuits FUNDAMENTALS OF DIGITAL CIRCUITS** *Power Management of Digital Circuits in Deep Sub-Micron CMOS Technologies* **Gallium Arsenide Digital Circuits** Digital Circuits and Design **Digital Circuit Design for Computer Science Students** Digital Electronics: A Primer - Introductory Logic Circuit Design **Digital Electronics 1 Digital Circuits** *PULSE AND DIGITAL CIRCUITS* Experiments With Digital Electronics **An Introduction to Digital Circuits Digital Circuits and Microprocessors** *The Logic of Digital Circuits* **Digital Circuits Pulse and Digital Circuits:** Design Automation for Differential Mos Current-Mode Logic Circuits Digital Logic Design *Integrated Electronics* **Handbook of Digital CMOS Technology, Circuits, and Systems Modern Digital Circuits** *Digital Systems* **Computer Architecture Digital Electronics 1 Digital Electronics 2 Analysis and Design of Digital Circuits and Computer Systems** *Testing Digital Circuits* **Timing Performance of Nanometer Digital Circuits Under Process Variations Electronic Circuit Design**

The omnipresence of electronic devices in our everyday lives has been accompanied by the downscaling of chip feature sizes and the ever increasing complexity of digital circuits. This book is devoted to the analysis and design of digital circuits, where the signal can assume only two possible logic levels. It deals with the basic principles and concepts of digital electronics. It addresses all aspects of combinational logic and provides a detailed understanding of logic gates that are the basic components in the implementation of circuits used to perform functions and operations of Boolean algebra. Combinational logic circuits are characterized by outputs that depend only on the actual input values. Efficient techniques to derive logic equations are proposed together with methods of analysis and synthesis of combinational logic circuits. Each chapter is well structured and is supplemented by a selection of solved exercises covering logic design practices. This book introduces the foundations and fundamentals of electronic circuits. It broadly covers the subjects of circuit analysis, as well as analog and digital electronics. It features discussion of essential theorems required for simplifying complex circuits and illustrates their applications under different conditions. Also, in view of the emerging potential of Laplace transform method for solving electrical networks, a full chapter is devoted to the topic in the book. In addition, it covers the physics and technical aspects of semiconductor diodes and transistors, as well as discrete-time digital signals, logic gates, and combinational logic circuits. Each chapter is presented as complete as possible, without the reader having to refer to any other book or supplementary material. Featuring short self-assessment questions distributed throughout, along with a large number of solved examples, supporting illustrations, and chapter-end problems and solutions, this book is ideal for any physics undergraduate lecture course on

electronic circuits. Its use of clear language and many real-world examples make it an especially accessible book for students unfamiliar or unsure about the subject matter. The second edition of this well-received text continues to provide a coherent and comprehensive coverage of Pulse and Digital Circuits, suitable as a textbook for use by undergraduate students pursuing courses in Electrical and Electronics Engineering, Electronics and Communication Engineering, Electronics and Instrumentation Engineering, and Telecommunication Engineering. It presents clear explanations of the operation and analysis of semiconductor pulse circuits. Practical pulse circuit design methods are investigated in detail. The book provides numerous fully worked-out, laboratory-tested examples to give students a solid grounding in the related design concepts. It includes a number of classroom-tested problems to encourage students to apply theory in a logical fashion. Review questions, fill in the blanks, and multiple choice questions offer the students the opportunity to test their understanding of the text material. This text will be also appropriate for self-study by AMIE and IETE students. NEW TO THIS EDITION : • Includes two new chapters—Logic Gates and Logic Families—to meet the curriculum requirements. • Provides short questions with answers at the end of each chapter. • Presents several new illustrations, examples and exercises Practical Design of Digital Circuits: Basic Logic to Microprocessors demonstrates the practical aspects of digital circuit design. The intention is to give the reader sufficient confidence to embark upon his own design projects utilizing digital integrated circuits as soon as possible. The book is organized into three parts. Part 1 teaches the basic principles of practical design, and introduces the designer to his ""tools"" — or rather, the range of devices that can be called upon. Part 2 shows the designer how to put these together into viable designs. It includes two detailed descriptions of actual design exercises. The first of these is a fairly simple exercise in CMOS design; the second is a much more complex design for an electronic game, using TTL devices. Part 3 focuses on microprocessors. It illustrates how a particular design problem changes emphasis when a microprocessor is introduced. This book is aimed at a fairly broad market: it is intended to aid the linear design engineer to cross the barrier into digital electronics; it should provide interesting supporting reading for students studying digital electronics from the more academic viewpoint; and it should enable the enthusiast to design much more ambitious and sophisticated projects than he could otherwise attempt if restricted to linear devices. Digital Circuits and Design is a textbook dealing with the basics of digital technology including the design aspects of circuits. The book fulfils the requirements of the students of electrical, electronics, and computer science engineering for the first course on the subject. The book is divided into 16 chapters. Each chapter begin with an introduction and ends with a set of review questions and problems. All the topics have been illustrated with clear diagrams. A variety of examples are given to enable students to design digital circuits efficiently. The fifth editionof the book provides discussion of Verilog, a popular hardware description language, to demonstrate solutions to problems in digital design. The current edition also provides additional example problems. An introductory text to computer architecture, this comprehensive volume covers the concepts from logic gates to advanced computer architecture. It comes with a full spectrum of exercises and web-downloadable support materials, including assembler and simulator, which can be used in the context of different courses. The authors also make available a hardware description, which can be used in labs and assignments, for hands-on experimentation with an actual, simple processor. This unique compendium is a useful reference for undergraduates, graduates and professionals majoring in computer engineering, circuits and systems, software engineering, biomedical engineering and aerospace engineering. This book discusses the digital design of integrated circuits under process variations, with a focus on design-time solutions. The authors describe a step-by-step methodology, going from logic gates to logic paths to the circuit level. Topics are presented in comprehensively, without

overwhelming use of analytical formulations. Emphasis is placed on providing digital designers with understanding of the sources of process variations, their impact on circuit performance and tools for improving their designs to comply with product specifications. Various circuit-level “design hints” are highlighted, so that readers can use then to improve their designs. A special treatment is devoted to unique design issues and the impact of process variations on the performance of FinFET based circuits. This book enables readers to make optimal decisions at design time, toward more efficient circuits, with better yield and higher reliability. This book provides an in-depth overview of design and implementation of leakage reduction techniques. The focus is on applicability, technology dependencies, and scalability. The book mainly deals with circuit design but also addresses the interface between circuit and system level design on the one side and between circuit and physical design on the other side. The book begins with four introductory chapters devoted to Boolean algebraic functions and Binary Decision Diagrams. The rest of the book is based on original results obtained by the author from 1994 to 2014 and reflected, in particular, in English-language conference and journal publications (ISLPD, ICCAD, ED and TC, ISQED, DATE, ACM transactions, etc.), and also in multiple publications in Russian. This manuscript is divided into two parts: Chapters One through Five discuss the theory and applications of decision diagrams, while Chapters Six through Nine concentrate on the theory and applications of logic correlations between circuit signals. Chapter Five contains the results on the BDD of a special type (SP-BDD) and their applications to analysis and optimization of digital CMOS circuits. The second part contains the results on theory and applications of logic correlations between circuit signals (logic implications). The following applications are considered: noise analysis of digital circuits (both functional and delay noise), timing analysis with detecting false paths, and digital circuit obfuscation. Chapter Nine explains the use of TDD (Ternary Decision Diagrams) in digital CMOS simulation with uncertainty--in particular, with power simulation--and both with and without accounting for logic implications. The principal audiences for the book are mathematicians and software developers, primarily working in microelectronics CAD. This textbook is intended to introduce the student of electronics to the fundamentals of digital circuits, both combinational and sequential, in a reasonable and systematic manner. It proceeds from basic logic concepts to circuits and designs. Pulse and Digital Circuits is designed to cater to the needs of undergraduate students of electronics and communication engineering. Written in a lucid, student-friendly style, it covers key topics in the area of pulse and digital circuits. This is an introductory text that discusses the basic concepts involved in the design, operation and analysis of waveshaping circuits. The book includes a preliminary chapter that reviews the concepts needed to understand the subject matter. Each concept in the book is accompanied by self-explanatory circuit diagrams. Interspersed with numerous solved problems, the text presents detailed analysis of key concepts. Multivibrators and sweep generators are covered in great detail in the book. This book discusses the implementation of digital circuits by using MCML gates. Although digital circuit implementation is possible with other elements, such as CMOS gates, MCML implementations can provide superior performance in certain applications. This book provides a complete automation methodology for the implementation of digital circuits in MCML and provides an extensive explanation on the technical details of design of MCML. A systematic methodology is presented to build efficient MCML standard-cell libraries, and a complete top-down design flow is shown to implement complex systems using such building blocks. The author is the leading programming language designer of our time and in this book, based on a course for 2nd-year students at, he closes the gap between hardware and software design. He encourages students to put the theory to work in exercises that include lab work culminating in the design of a simple yet complete computer. In short, a modern introduction to designing circuits using state-of-the-

art technology and a concise, easy to master hardware description language (Lola). Gallium Arsenide technology has come of age. GaAs integrated circuits are available today as gate arrays with an operating speed in excess of one Gigabits per second. Special purpose GaAs circuits are used in optical fiber digital communications systems for the purpose of regeneration, multiplexing and switching of the optical signals. As advances in fabrication and packaging techniques are made, the operat ing speed will further increase and the cost of production will reach a point where large scale application of GaAs circuits will be economical in these and other systems where speed is paramount. This book is written for students and engineers who wish to enter into this new field of electronics for the first time and who wish to embark on a serious study of the subject of GaAs circuit design. No prior knowledge of GaAs technology is assumed though some previous experience with MOS circuit design will be helpful. A good part of the book is devoted to circuit analysis, to the extent that is possible for non linear circuits. The circuit model of the GaAs transistor is derived from first principles and analytic formulas useful in predicting the approxi mate circuit performance are also derived. Computer simulation is used throughout the book to show the expected performance and to study the effects of parameter variations. This textbook, based on the author's fifteen years of teaching, is a complete teaching tool for turning students into logic designers in one semester. Each chapter describes new concepts, giving extensive applications and examples. Assuming no prior knowledge of discrete mathematics, the authors introduce all background in propositional logic, asymptotics, graphs, hardware and electronics. Important features of the presentation are: • All material is presented in full detail. Every designed circuit is formally specified and implemented, the correctness of the implementation is proved, and the cost and delay are analyzed • Algorithmic solutions are offered for logical simulation, computation of propagation delay and minimum clock period • Connections are drawn from the physical analog world to the digital abstraction • The language of graphs is used to describe formulas and circuits • Hundreds of figures, examples and exercises enhance understanding. The extensive website (http://www.eng.tau.ac.il/~guy/Even-Medina/) includes teaching slides, links to Logisim and a DLX assembly simulator. This book deals with key aspects of design of digital electronic circuits for different families of elementary electronic devices. Implementation of both simple and complex logic circuits are considered in detail, with special attention paid to the design of digital systems based on complementary metal-oxide-semiconductor (CMOS) and Pass-Transistor Logic (PTL) technologies acceptable for use in planar microelectronics technology. It is written for students in electronics and microelectronics, with exercises and solutions provided. Unlike books currently on the market, this book attempts to satisfy two goals: combine circuits and electronics into a single, unified treatment, and establish a strong connection with the contemporary world of digital systems. It will introduce a new way of looking not only at the treatment of circuits, but also at the treatment of introductory coursework in engineering in general. Using the concept of "abstraction," the book attempts to form a bridge between the world of physics and the world of large computer systems. In particular, it attempts to unify electrical engineering and computer science as the art of creating and exploiting successive abstractions to manage the complexity of building useful electrical systems. Computer systems are simply one type of electrical systems. +Balances circuits theory with practical digital electronics applications. +Illustrates concepts with real devices. +Supports the popular circuits and electronics course on the MIT OpenCourse Ware from which professionals worldwide study this new approach. +Written by two educators well known for their innovative teaching and research and their collaboration with industry. +Focuses on contemporary MOS technology. Point set theory in digital logic; Gating by definition; Boolean algebra for design and troubleshooting; Minimization aids for least minterm forms; Minimization aids for least maxterm forms; Troubleshooting digital systems with the aid of the karnaugh map;

Nor logic: synthesis and analysis; Nand logic: synthesis and analysis; Digital logic: characteristics of families, packages, and signals; Digital signals and coupling; Sequential circuits: the marvelous multivibrators; Sequential systems operations; The arithmetic logic unit; Interfacing to the analog world; So where should we go from here? This book was written specifically for the newcomer to the field of digital electronics. If you've always wanted to know how the digital world works, then keep reading. The only requirements are an interest in digital electronics and a desire to learn. In Learn Digital Circuits book: It can teach you to know how to analyze and implement the combinational circuits and sequential circuits, will provide the fundamentals of digital circuits and how to use them in different applications. The field of digital electronics is central to modern technology. This book presents fundamental circuits using gates, flip-flops and counters from the CMOS 4000 Series. Each of the 50 experiments has a circuit diagram as well as a detailed illustration of the circuits construction on solderless breadboard. Learning these fundamentals is best done using practical experiments. Building these digital circuits will improve your knowledge and will be fun to boot. Many of the circuits presented here have practical real-life applications. With a good overview of the field, you will be well-equipped to find simple and cost-effective solutions for any application. The book is targeted essentially at students, trainees and anyone with an interest in and requiring an introduction to digital control electronics. Moreover, the knowledge gleaned here is the foundation for further projects in the field of microcontrollers and programming. This student friendly, practical and example-driven book gives students a solid foundation in the basics of digital circuits and design. The fundamental concepts of digital electronics such as analog/digital signals and waveforms, digital information and digital integrated circuits are discussed in detail using relevant pedagogy The Fourth edition of this well-received text continues to provide coherent and comprehensive coverage of digital circuits. It is designed for the undergraduate students pursuing courses in areas of engineering disciplines such as Electrical and Electronics, Electronics and Communication, Electronics and Instrumentation, Telecommunications, Medical Electronics, Computer Science and Engineering, Electronics, and Computers and Information Technology. It is also useful as a text for MCA, M.Sc. (Electronics) and M.Sc. (Computer Science) students. Appropriate for self study, the book is useful even for AMIE and grad IETE students. Written in a student-friendly style, the book provides an excellent introduction to digital concepts and basic design techniques of digital circuits. It discusses Boolean algebra concepts and their application to digital circuitry, and elaborates on both combinational and sequential circuits. It provides numerous fully worked-out, laboratory tested examples to give students a solid grounding in the related design concepts. It includes a number of short questions with answers, review questions, fill in the blanks with answers, multiple choice questions with answers and exercise problems at the end of each chapter. There is more to circuit design than a good theoretical foundation coupled with a considerable amount of laboratory experience. While recognizing that theoretical knowledge is essential, Dr. O'Dell discusses the practical element of electronic circuit design with emphasis on learning by doing. Where do new circuit ideas come from? This is the topic of the first eight chapters, which deal with high and low frequency small signal circuits, opto-electronic circuits, digital circuits, oscillators, translinear circuits, and power amplifiers. In each chapter, one or more experimental circuits are described in detail for the reader to construct: a total of thirteen project exercises in all. The final chapter draws some conclusions about the fundamental problem of design in light of the circuits that have been dealt with in the book. The 109 articles making up the book have all appeared in Electronics magazine (from) 1961 to 1963. This practical introduction explains exactly how digital circuits are designed, from the basic circuit to the advanced system. It covers combinational logic circuits, which collect logic signals, to sequential logic circuits, which embody time and memory to progress through sequences of

states. The primer also highlights digital arithmetic and the integrated circuits that implement the logic functions.Based on the author's extensive experience in teaching digital electronics to undergraduates, the book translates theory directly into practice and presents the essential information in a compact, digestible style. Worked problems and examples are accompanied by abbreviated solutions, with demonstrations to ensure that the design material and the circuits' operation are fully understood.This is essential reading for any electronic or electrical engineering student new to digital electronics and requiring a succinct yet comprehensive introduction. This textbook is designed for a second course on digital systems, focused on the design of digital circuits. It was originally designed to accompany a MOOC (Massive Open Online Course) created at the Autonomous University of Barcelona (UAB), currently available on the Coursera platform. Readers will learn to develop complex digital circuits, starting from a functional specification, will know the design alternatives that a development engineer can choose to reach the specified circuit performance, and will understand which design tools are available to develop a new circuit. A General Guide on Logic Design. The Book Expands upon the Applications of Logic Design in Relation to Microprocessors As electronic devices become increasingly prevalent in everyday life, digital circuits are becoming even more complex and smaller in size. This book presents the basic principles of digital electronics in an accessible manner, allowing the reader to grasp the principles of combinational and sequential logic and the underlying techniques for the analysis and design of digital circuits. Providing a hands-on approach, this work introduces techniques and methods for establishing logic equations and designing and analyzing digital circuits. Each chapter is supplemented with practical examples and well-designed exercises with worked solutions. This second of three volumes focuses on sequential and arithmetic logic circuits. It covers various aspects related to the following topics: latch and flip-flop; binary counters; shift registers; arithmetic and logic circuits; digital integrated circuit technology; semiconductor memory; programmable logic circuits. Along with the two accompanying volumes, this book is an indispensable tool for students at a bachelors or masters level seeking to improve their understanding of digital electronics, and is detailed enough to serve as a reference for electronic, automation and computer engineers. The omnipresence of electronic devices in our everyday lives has been accompanied by the downscaling of chip feature sizes and the ever increasing complexity of digital circuits. This book is devoted to the analysis and design of digital circuits, where the signal can assume only two possible logic levels. It deals with the basic principles and concepts of digital electronics. It addresses all aspects of combinational logic and provides a detailed understanding of logic gates that are the basic components in the implementation of circuits used to perform functions and operations of Boolean algebra. Combinational logic circuits are characterized by outputs that depend only on the actual input values. Efficient techniques to derive logic equations are proposed together with methods of analysis and synthesis of combinational logic circuits. Each chapter is well structured and is supplemented by a selection of solved exercises covering logic design practices. Pulse and Digital Circuits caters to the needs of undergraduate students of electronics and communication engineering. It covers key topics in the area of pulse and digital circuits. It is an introductory text on the basic concepts involved in the This textbook for a one-semester course in Digital Systems Design describes the basic methods used to develop “traditional” Digital Systems, based on the use of logic gates and flip flops, as well as more advanced techniques that enable the design of very large circuits, based on Hardware Description Languages and Synthesis tools. It was originally designed to accompany a MOOC (Massive Open Online Course) created at the Autonomous University of Barcelona (UAB), currently available on the Coursera platform. Readers will learn what a digital system is and how it can be developed, preparing them for steps toward other technical disciplines, such as Computer Architecture, Robotics, Bionics, Avionics

and others. In particular, students will learn to design digital systems of medium complexity, describe digital systems using high level hardware description languages, and understand the operation of computers at their most basic level. All concepts introduced are reinforced by plentiful illustrations, examples, exercises, and applications. For example, as an applied example of the design techniques presented, the authors demonstrate the synthesis of a simple processor, leaving the student in a position to enter the world of Computer Architecture and Embedded Systems. This book provides a comprehensive reference for everything that has to do with digital circuits. The author focuses equally on all levels of abstraction. He tells a bottom-up story from the physics level to the finished product level. The aim is to provide a full account of the experience of designing, fabricating, understanding, and testing a microchip. The content is structured to be very accessible and self-contained, allowing readers with diverse backgrounds to read as much or as little of the book as needed. Beyond a basic foundation of mathematics and physics, the book makes no assumptions about prior knowledge. This allows someone new to the field to read the book from the beginning. It also means that someone using the book as a reference will be able to answer their questions without referring to any external sources.