Fundamentals Of Digital Circuits By Anand Kumar

Digital Circuits & DesignDigital Electronic Circuits - The Comprehensive ViewPractical Design of Digital CircuitsDigital Electronic CircuitsDigital CircuitsSemantics of Digital CircuitsDigital Electronics 2Digital ElectronicsIntroduction to Digital Electronics, 1/eAn Introduction to Logical Design of Digital CircuitsThe Logic of Digital CircuitsDigital Electronics 1Digital Circuits and MicrocomputersDigital Circuit ProjectsAnalysis and Design of Digital Integrated CircuitsEquivalence Checking of Digital CircuitsDigital Circuit ProjectsPRINCIPLES OF DIGITAL ELECTRONICSIntroduction Digital CircuitsDigital Circuit Design for Computer Science Students D.P Kothari Alexander Axelevitch Ian Kampel Shuqin Lou Emery Carlos Delgado Kloos Tertulien Ndjountche John Morris Betty Lincoln C. M. Reeves Alexei L. Glebov Tertulien Ndjountche David E. Johnson Charles W. Kann David A. Hodges Paul Molitor Charles Kann MEENA, K. Cordia Tuorto Niklaus Wirth

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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

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 related link s

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

this book presents three aspects of digital circuits digital principles digital electronics and digital design the modern design methods of using electronic design automation eda are also introduced including the hardware description language hdl designs with programmable logic devices and large scale integrated circuit lsi the applications of digital devices and integrated circuits are discussed in detail as well

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

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

an essential companion to john c morris s analogue electronics this clear and accessible text is designed for electronics students teachers and enthusiasts who already have a basic understanding of electronics and who wish to develop their knowledge of digital techniques and applications employing a discovery based approach the author covers fundamental theory before going on to develop an appreciation of logic networks integrated circuit applications and analogue digital conversion a section on digital fault finding and useful ic data sheets completes the book

designed to provide a comprehensive and practical insight to the basic concepts of digital electronics this book brings together information on theory operational aspects and practical applications of digital circuits in a succinct style that is suitable for undergraduate students spread across 16 chapters the book walks the student through the first principles and the karnaugh mapping reduction technique before proceeding to elaborate on the design and implementation of complex digital circuits with ample examples and exercises to reinforce theory and an exclusive chapter allotted for electronic experiments this textbook is an ideal classroom companion for students

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

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 is a state of the art treatment of the circuit design of digital integrated circuits it includes coverage of the basic concepts of static characteristics voltage transfer characteristics noise margins fanout power dissipation and dynamic characteristics propagation delay times and the interrelationships among these parameters the authors are regarded as leading authorities in integrated circuits and mos technology

hardware veri cation is the process of checking whether a design conforms to its speci cations of functionality and timing in today s design processes it becomes more and more important very large scale integrated vlsi circuits and the resulting digital systems have conquered a place in almost all areas of our life even in security sensitive applications complex digital systems control airplanes have been used in banks and on intensive care units hence

the demand for error free designs is more important than ever in addition economic reasons underline this demand as well the design and production process of present day vlsi circuits is highly time and cost intensive mo over it is nearly impossible to repair integrated circuits thus it is desirable to detect design errors early in the design process and not just after producing the prototype chip all these facts are re ected by developing and prod tion statistics of present day companies for example in neon technologies 118 assumed that about 60 to 80 of the overall design time was spent for veri cation in 2000 other sources cite the 3 to 1 head count ratio between veri cation engineers and logic designers this shows that verifying logical correctness of the design of hardware systems is a major gate to the problem of time to market cf 113 with the chip complexity constantly increasing the dif culty as well as the portance of functional veri cation of new product designs has been increased it is not only more important to get error free designs

this book teaches the basic principles of digital circuits it is appropriate for an introductory course in digital electronics for the students of b sc computer science b sc electronics b sc information technology b sc physics bachelor of computer applications bca postgraduate diploma in computer applications master of computer applications mca the book emphasizes the must know concepts that should be covered in an introductory course and provides an abundance of clearly explained examples so essential for a thorough understanding of the principles involved in the analysis and design of digital computers the book takes students step by step through digital theory focusing on number representation systems and codes for representing information in digital systems use of logic gates in building digital circuits basic postulates and theorems of boolean algebra karnaugh map method for simplifying boolean functions arithmetic circuits such as adders and subtractors combinational circuit building blocks such as multiplexers decoders and encoders sequential circuit building blocks such as flip flops counters and registers operation of memory elements such as ram dram magnetic disk magnetic bubble optical disk etc 1 number systems and codes 2 logic gates and circuits 3 boolean algebra 4 combinational logic circuits 5 sequential logic circuits 6 counters and shift registers 7 memory elements

an advantage of digital circuits when compared to analog circuits is that signals represented digitally can be transmitted without degradation caused by noise while this requires more digital circuits to process the signals each digit is handled by the same kind of hardware resulting in an easily scalable system this book is meant to

provide the readers to know of how to analyze and implement combinational circuits and sequential circuits based on the requirement we can use either a combinational circuit or sequential circuit or a combination of both after completing this learn digital circuits full you will be able to learn the type of digital circuit which is suitable for a specific application

this book emerged from lecture notes of a course taught in the second year to students of computer science at the federal institute of tech nology zurich the topic of hardware design plays a relatively minor role in compu ter science curricula at many universities most courses concentrate on the various aspects of theory software and of information sys tems students therefore obtain few opportunities to deal with con crete engineering problems and physical devices we consider this as rather unfortunate particularly for technical universities as a result we observe a growing gap between interest in and understanding of design issues involving not only software but also hardware and inter faces this is regrettable at a time when new and advanced solutions to many problems are often crucially influenced by recent hardware de velopments at a time when the engineer needs to be competent in both software and hardware issues in order to fmd an optimally inte grated competitive solution it turns out that the hesitation of many students in computer science to take an active interest in hardware his or her daily tool does not only stem from a preference of clean abstract concepts with a corre sponding distaste for dealing with concrete components construction techniques and the dirty realities inflicted by nature but also stems from the lack of a bridge between the two realms

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Introduction

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