

Chapter 14 On Digital Fundamentals 10th Edition

The revised edition of Modern Digital Electronics focuses on rigorous coverage of design and analysis of complex digital circuits and systems through enhanced elucidation of Sequential Logic Design, PLDs, Memories and VHDL implementation codes. Begins with the fundamental concepts of digital electronics, it covers digital design using VHDL supported by plethora of examples.

Now available in a three-volume set, this updated and expanded edition of the bestselling The Digital Signal Processing Handbook continues to provide the engineering community with authoritative coverage of the fundamental and specialized aspects of information-bearing signals in digital form. Encompassing essential background material, technical details, standards, and software, the second edition reflects cutting-edge information on signal processing algorithms and protocols related to speech, audio, multimedia, and video processing technology associated with standards ranging from WiMax to MP3 audio, low-power/high-performance DSPs, color image processing, and chips on video. Drawing on the experience of leading engineers, researchers, and scholars, the three-volume set contains 29 new chapters that address multimedia and Internet technologies, tomography, radar systems, architecture, standards, and future applications in speech, acoustics, video, radar, and telecommunications. Emphasizing theoretical concepts, Digital Signal Processing Fundamentals provides comprehensive coverage of the basic foundations of DSP and includes the following parts: Signals and Systems; Signal Representation and Quantization; Fourier Transforms; Digital Filtering; Statistical Signal Processing; Adaptive Filtering; Inverse Problems and Signal Reconstruction; and Time–Frequency and Multirate Signal Processing.

The Industrial Electronics Handbook, Second Edition combines traditional and newer, more specialized knowledge that will help industrial electronics engineers develop practical solutions for the design and implementation of high-power applications. Embracing the broad technological scope of the field, this collection explores fundamental areas, including analog and digital circuits, electronics, electromagnetic machines, signal processing, and industrial control and communications systems. It also facilitates the use of intelligent systems—such as neural networks, fuzzy systems, and evolutionary methods—in terms of a hierarchical structure that makes factory control and supervision more efficient by addressing the needs of all production components. Enhancing its value, this fully updated collection presents research and global trends as published in the IEEE Transactions on Industrial Electronics Journal, one of the largest and most respected publications in the field. Control and Mechatronics presents concepts of control theory in a way that makes them easily understandable and practically useful for engineers or students working with control system applications. Focusing more on practical applications than on mathematics, this book avoids typical theorems and proofs and instead uses plain language and useful examples to: Concentrate on control system analysis and design, comparing various techniques Cover estimation, observation, and identification of the objects to be controlled—to ensure accurate system models before production Explore the various aspects of robotics and mechatronics Other volumes in the set: Fundamentals of Industrial Electronics Power Electronics and Motor Drives Industrial Communication Systems Intelligent Systems

Today's broadcasting students need a well-balanced, hands-on, and relevant guide to the radio industry. Digital Radio Production provides exactly that, and more. Employing a holistic approach, Connelly shares his 20 years of experience and invaluable insights on the production person's role in a radio station. His extensive knowledge of sales, promotion, programming, announcing, and social media is thoughtfully revealed within the structures of both large and small markets. The text also focuses on the latest technologies and trends in combination with core concepts vital to a successful career in radio. Fully updated, the Third Edition enhances students' technical skills and knowledge of digital audio, recording, storage, audio processing, and special effects. Each chapter features suggested activities outside the classroom, key informative websites, and a glossary of industry terms. The text is accompanied by 93 audio examples of virtually every aspect of radio production (from microphone techniques to commercial production samples), an outstanding selection of production music that can be creatively reworked and transformed, and a custom studio-tracking session with suggested activities. Access audio examples, production music, and a custom studio-tracking session here. 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.

Learn the foundational concepts of vector graphics and raster imaging, including what new media formats are best for use with Android Studio, Java and JavaFX, iOS, Kindle and HTML5, as well as key factors regarding the data footprint optimization work process, and why data footprint optimization is important. Digital Painting Techniques covers concepts central to digital painting using the Inkscape 0.91 open source software package as well as the Corel Painter 2016 professional digital painting software package. You'll learn: The terminology of digital painting What comprises a digital painting 2D modeling and rendering pipeline Concepts and principles behind digital painting content production How to install and utilize 64-bit Inkscape 0.91 and Corel Painter 2016 Concepts behind curves, strokes, fills, patterns, rendering and physics Digital painting data formats and data footprint optimization Who This Book is For: Digital Artists, Illustrators, Painters, User Interface Designers, Digital Signage Content Developers, e-Learning Content Creators, eBook Cover

Artists, Album Cover Artists Secondary: Android Developers, iOS Developers, Website Developers, Flash Developers, Multimedia Producers, Rich Internet Application (RIA) Programmers, Game Designers, Teachers, Educators.

In addition to its thorough coverage of DSP design and programming techniques, Smith also covers the operation and usage of DSP chips. He uses Analog Devices' popular DSP chip family as design examples. Covers all major DSP topics Full of insider information and shortcuts Basic techniques and algorithms explained without complex numbers

A must for working network and security professionals as well as anyone in IS seeking to build competence in the increasingly important field of security Written by three high-profile experts, including Eric Cole, an ex-CIA security guru who appears regularly on CNN and elsewhere in the media, and Ronald Krutz, a security pioneer who cowrote The CISSP Prep Guide and other security bestsellers Covers everything from basic security principles and practices to the latest security threats and responses, including proven methods for diagnosing network vulnerabilities and insider secrets for boosting security effectiveness

Image processing is a hands-on discipline, and the best way to learn is by doing. This text takes its motivation from medical applications and uses real medical images and situations to illustrate and clarify concepts and to build intuition, insight and understanding. Designed for advanced undergraduates and graduate students who will become end-users of digital image processing, it covers the basics of the major clinical imaging modalities, explaining how the images are produced and acquired. It then presents the standard image processing operations, focusing on practical issues and problem solving. Crucially, the book explains when and why particular operations are done, and practical computer-based activities show how these operations affect real images. All images, links to the public-domain software ImageJ and custom plug-ins, and selected solutions are available from www.cambridge.org/books/dougherty.

Gain concepts central to digital video using the affordable Corel Video Studio Ultimate X9 software package as well as open source digital video editing package EditShare Lightworks 12. This compact visual guide builds on the essential concepts of digital imaging, audio, illustration, and painting, and gets more advanced as chapters progress, covering what digital video new media formats are best for use with Android Studio, Java and JavaFX, iOS, and HTML5. Furthermore, Digital Video Editing Fundamentals covers the key factors of the data footprint optimization work process, streaming versus captive assets, and why these are important. What You'll Learn Create a digital video editing and effects pipeline Gain knowledge of the concepts behind digital video editing Work with resolution, aspect ratio, bit rate, and color depth Use pixel editing, color correction, layers, and compression Optimize data footprints Who This Book Is For Website developers, musicians, digital signage, e-learning content creators, Android developers, and iOS developers.

In today's interconnected society, media, including news, entertainment, and social networking, has increasingly shifted to an online, ubiquitous format. Artists and audiences will achieve the greatest successes by utilizing these new digital tools. Digital Arts and Entertainment: Concepts, Methodologies, Tools, and Applications examines the latest research and findings in electronic media, evaluating the staying power of this increasingly popular paradigm along with best practices for those engaged in the field. With chapters on topics ranging from an introduction to online entertainment to the latest advances in digital media, this impressive three-volume reference source will be important to researchers, practitioners, developers, and students of the digital arts.

Digital geometry is about deriving geometric information from digital pictures. The field emerged from its mathematical roots some forty-years ago through work in computer-based imaging, and it is used today in many fields, such as digital image processing and analysis (with applications in medical imaging, pattern recognition, and robotics) and of course computer graphics. Digital Geometry is the first book to detail the concepts, algorithms, and practices of the discipline. This comprehensive text and reference provides an introduction to the mathematical foundations of digital geometry, some of which date back to ancient times, and also discusses the key processes involved, such as geometric algorithms as well as operations on pictures. *A comprehensive text and reference written by pioneers in digital geometry, image processing and analysis, and computer vision *Provides a collection of state-of-the-art algorithms for a wide variety of geometrical picture analysis tasks, including extracting data from digital images and making geometric measurements on the data *Includes exercises, examples, and references to related or more advanced work

Signals and Systems Primer with MATLAB® equally emphasizes the fundamentals of both analog and digital signals and systems. To ensure insight into the basic concepts and methods, the text presents a variety of examples that illustrate a wide range of applications, from microelectromechanical to worldwide communication systems. It also provides MATLAB functions and procedures for practice and verification of these concepts. Taking a pedagogical approach, the author builds a solid foundation in signal processing as well as analog and digital systems. The book first introduces orthogonal signals, linear and time-invariant continuous-time systems, discrete-type systems, periodic signals represented by Fourier series, Gibbs's phenomenon, and the sampling theorem. After chapters on various transforms, the book discusses analog filter design, both finite and infinite impulse response digital filters, and the fundamentals of random digital signal processing, including the nonparametric spectral estimation. The final chapter presents different types of filtering and their uses for random digital signal processing, specifically, the use of Wiener filtering and least mean squares filtering. Balancing the study of signals with system modeling and interactions, this text will help readers accurately develop mathematical representations of systems.

Analysis, design, and realization of digital filters have experienced major developments since the 1970s, and have now become an integral part of the theory and practice in the field of contemporary digital signal processing. Digital Filter Design and Realization is written to present an up-to-date and comprehensive account of the analysis, design, and realization of digital filters. It is intended to be used as a text for graduate students as well as a reference book for practitioners in the field. Prerequisites for this book include basic knowledge of calculus, linear algebra, signal analysis, and linear system theory. Technical topics discussed in the book include: Discrete-Time Systems and z-Transformation Stability and Coefficient Sensitivity State-Space Models FIR Digital Filter Design Frequency-Domain Digital Filter Design Time-Domain Digital Filter Design Interpolated and Frequency-Response-Masking FIR Digital Filter Design Composite Digital Filter Design Finite Word Length Effects Coefficient Sensitivity Analysis and Minimization Error Spectrum Shaping Roundoff Noise Analysis and Minimization Generalized Transposed Direct-Form II Block-State Realization

This fun, concise, full color book introduces the fundamentals of digital illustration, and covers how to develop and optimize these types of scalable vector graphics (SVG) using Inkscape 0.91 or later. It also covers concepts central to digital painting using the Corel Painter 2016 professional digital painting and illustration paid software package, which also has a free trial version, and a discount for purchasers of this book. The book builds upon the foundational concepts of vector graphics and the SVG format, and gets more advanced as chapters progress, covering what vector new media formats, and SVG commands and SVG filters, are best for use with Android Studio, Java 8, JavaFX, iOS, Kindle Fire and HTML5. The book covers key factors regarding the data footprint optimization work process, and why data footprint optimization is important, and covers programming languages used for digital illustration, and publishing platforms which support digital illustration, and how to assimilate these into your digital illustration and digital painting content production pipelines and workflow. You will learn: The terminology of vector imaging and digital illustration What comprises a digital illustration 2D modeling and rendering pipeline Concepts and principles behind digital illustration content production How to install and utilize 64-bit Inkscape 0.91 for Windows, Mac OSX and Linux Concepts behind spline curves, strokes, fills, patterns and rendering Digital illustration data formats and data footprint optimization

Audience Primary: Artists, Illustrators, Website Developers, Flash Developers, User Interface Designers, Digital Signage Content Developers, e-Learning Content Creators, eBook Authors. Secondary: Android Developers, iOS Developers, Multimedia Producers, Rich Internet Application (RIA) Programmers, Game Designers, Teachers, Educators. div

Reinforce your understanding of diagnostic imaging and sharpen your radiographic skills! Corresponding to the chapters in Bushong's Radiologic Science for Technologists, 12th Edition, this workbook helps you review key concepts and gain the technical knowledge needed to become an informed and confident radiographer. More than 100 worksheets include engaging exercises allowing you to assess your comprehension and apply your knowledge to imaging practice. More than 100 worksheets make it easy to review specific topics from the text, and are numbered according to textbook chapter. In-depth coverage of the textbook's topics lets you review medical imaging concepts and apply them to practice. Penguin icons highlight important information from the textbook, making it easier to understand concepts and complete the worksheet exercises. NEW! Closer correlation of worksheets to the textbook simplifies your review of radiologic physics, which can be a difficult subject to understand. NEW! New worksheets on digital radiographic technique and the digital image display correspond to the new content covered in the textbook.

In recent years, Moore's law has fostered the steady growth of the field of digital image processing, though the computational complexity remains a problem for most of the digital image processing applications. In parallel, the research domain of optical image processing has matured, potentially bypassing the problems digital approaches were suffering and bringing new applications. The advancement of technology calls for applications and knowledge at the intersection of both areas but there is a clear knowledge gap between the digital signal processing and the optical processing communities. This book covers the fundamental basis of the optical and image processing techniques by integrating contributions from both optical and digital research communities to solve current application bottlenecks, and give rise to new applications and solutions. Besides focusing on joint research, it also aims at disseminating the knowledge existing in both domains. Applications covered include image restoration, medical imaging, surveillance, holography, etc... "a very good book that deserves to be on the bookshelf of a serious student or scientist working in these areas." Source: Optics and Photonics News

For the student and general reader, a tour of the digital universe that offers critical observations and new perspectives on human communication and intelligence. Traces the development and diffusion of digital information and communication technologies, providing an analysis of trans-cultural effects among developed and developing nations Provides a balanced analysis of the pros and cons of the adoption and diffusion of digital technologies Explores privacy, censorship, the digital divide, online games, and virtual and augmented realities Follows a thematic structure, allowing readers to access the text at any point, based on their interests Accompanying resources provide a wealth of related online content Selected by Choice as a 2013 Outstanding Academic Title

The Newnes Know It All Series takes the best of what our authors have written to create hard-working desk references that will be an engineer's first port of call for key information, design techniques and rules of thumb. Guaranteed not to gather dust on a shelf! Audio engineers need to master a wide area of topics in order to excel. The Audio Engineering Know It All covers every angle, including digital signal processing, power supply design, microphone and loudspeaker technology as well as audio compression. A 360-degree view from our best-selling authors Includes such topics as fundamentals, compression, and test and measurement The ultimate hard-working desk reference; all the essential information, techniques and tricks of the trade in one volume

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.

This book provides comprehensive coverage of the modern methods for geometric problems in the computing sciences. It also covers concurrent topics in data sciences including geometric processing, manifold learning, Google search, cloud data, and R-tree for wireless networks and BigData. The author investigates digital geometry and its related constructive methods in discrete geometry, offering detailed methods and algorithms. The book is divided into five sections: basic geometry; digital curves, surfaces and manifolds; discretely represented objects; geometric computation and processing; and advanced topics. Chapters especially focus on the applications of these methods to other types of geometry, algebraic topology, image processing, computer vision and computer graphics. Digital and Discrete Geometry: Theory and Algorithms targets researchers and professionals working in digital image processing analysis, medical imaging (such as CT and MRI) and informatics, computer graphics, computer vision, biometrics, and information theory. Advanced-level students in electrical engineering, mathematics, and computer science will also find this book useful as a secondary text book or reference. Praise for this book: This book does present a large collection of important concepts, of mathematical, geometrical, or algorithmical nature, that are frequently used in computer graphics and image processing. These concepts range from graphs through manifolds to homology. Of particular value are the sections dealing with discrete versions of classic continuous notions. The reader finds compact definitions and concise explanations that often appeal to intuition, avoiding finer, but then necessarily more complicated, arguments... As a first introduction, or as a reference for professionals working in computer graphics or image processing, this book should be

of considerable value." - Prof. Dr. Rolf Klein, University of Bonn.

In the recent years there has been rapid advances in the field of Digital Electronics and Microprocessor. This book is intended to help students to keep pace with these latest developments. The Present book is revised version of earlier book 'Introduction to Digital Computers' by the same author. Now this book is written in a lucid and simple language, which gives clear explanation of basics of Digital Electronics, Computers and microprocessors.

(Book). This up-to-date book comprehensively covers all aspects of speech and music sound reinforcement. It is roughly divided into four sections: Section 1 provides the tutorial fundamentals that all audio engineers will need, discussing subjects such as fundamentals of acoustics, psychoacoustics, basic electrical theory and digital processing. Section 2 deals with the fundamental classes of hardware that the modern engineer will use, such as loudspeaker systems and components, microphones, mixers, amplifiers and signal processors. Special attention is given to digital techniques for system control and to audio signal analysis. Section 3 deals with the basics of system design, from concept to final realization. It covers topics such as basic system type and speech intelligibility, site survey, user needs analysis and project management. Section 4 discusses individual design areas, such as sports facilities, large-scale tour sound systems, high-level music playback, systems for the theater, religious facilities, and other meeting spaces. The book is written in an accessible style, but does not lack for ample amounts of technical information. It is truly a book for the 21st century! The Senior Director of Product Development and Application for JBL Professional, John Eargle is the author of The Handbook of Recording Engineering, The Microphone Book, Handbook of Sound System Design, Electroacoustical Reference Data, Music, Sound and Technology and The Loudspeaker Handbook . A 2000 Grammy Award-winner for Best Classical Engineering, Mr. Eargle is an honorary member and past national president of the Audio Engineering Society, a faculty-member of the Aspen Audio Recording Institute, and a member of the National Academy of Recording Arts and Sciences and the Academy of Motion Picture Arts and Sciences.

Most introductory texts provide a technology-based survey of methods and techniques that leaves the reader without a clear understanding of the interrelationships between methods and techniques. By providing a strategy-based introduction, the reader is given a clear understanding of how to provide overlapping defenses for critical information. This understanding provides a basis for engineering and risk-management decisions in the defense of information. Information security is a rapidly growing field, with a projected need for thousands of professionals within the next decade in the government sector alone. It is also a field that has changed in the last decade from a largely theory-based discipline to an experience-based discipline. This shift in the field has left several of the classic texts with a strongly dated feel. Provides a broad introduction to the methods and techniques in the field of information security Offers a strategy-based view of these tools and techniques, facilitating selection of overlapping methods for in-depth defense of information Provides very current view of the emerging standards of practice in information security

The construction industry is amidst a digital transformation that is focused on addressing well-documented issues and calls for significant improvements and changes through increased productivity, whole-life value, client focus, reduction of waste, and being more sustainable. The key aspect to driving change and transformation is the education and upskilling of the required workforce towards developing the required capacities. Various approaches can be taken to embed digital construction within education and through collaborative efforts in order to drive change and facilitate improvements. The Handbook of Research on Driving Transformational Change in the Digital Built Environment focuses on current developments in practice and education towards facilitating transformation in the built environment. This book provides insight, from a practice perspective, in relation to the client's understanding, digitally enabled collaboration, interoperability and open standards, and maturity/capability. Covering topics that include digital transformation and construction, digitally enabled infrastructure, building information modelling, collaborative digital education, and the digital built environment, this book is an ideal reference source for engineers, professionals, and researchers in the field of digital transformation as well as doctoral scholars, doctoral researchers, professionals, and academicians.

This outstanding textbook provides an introduction to electronic materials and device concepts for the major areas of current and future information technology. On about 1,000 pages, it collects the fundamental concepts and key technologies related to advanced electronic materials and devices. The obvious strength of the book is its encyclopedic character, providing adequate background material instead of just reviewing current trends. It focuses on the underlying principles which are illustrated by contemporary examples. The third edition now holds 47 chapters grouped into eight sections. The first two sections are devoted to principles, materials processing and characterization methods. Following sections hold contributions to relevant materials and various devices, computational concepts, storage systems, data transmission, imaging systems and displays. Each subject area is opened by a tutorial introduction, written by the editor and giving a rich list of references. The following chapters provide a concise yet in-depth description in a given topic. Primarily aimed at graduate students of physics, electrical engineering and information technology as well as material science, this book is equally of interest to professionals looking for a broader overview. Experts might appreciate the book for having quick access to principles as well as a source for getting insight into related fields.

Digital Illustration Fundamentals Vector, Raster, WaveForm, NewMedia with DICF, DAEF and ASNMF Apress

This second edition, extensively revised and updated, continues to offer sound, practically-oriented, modularized coverage of the full spectrum of fundamental topics in each of the several major areas of electrical and electronics engineering. Circuit Theory Electrical Measurements and Measuring Instruments Electric Machines Electric Power Systems Control Systems Signals and Systems Analog and Digital Electronics including introduction to microcomputers The book conforms to the syllabi of Basic Electrical and Electronic Sciences prescribed for the first-year engineering students. It is also an ideal text for students pursuing diploma programmes in Electrical Engineering. Written in a straightforward style with a strong emphasis on primary principles, the main objective of the book is to bring an understanding of the subject within the reach of all engineering students. What is New to This Edition : Fundamentals of Control Systems (Chapter 24) Fundamentals of Signals and Systems (Chapter 25) Introduction to Microcomputers (Chapter 32) Substantial revisions to chapters on Transformer, Semiconductor Diodes and Transistors, and Field Effect Transistors Laplace Transform (Appendix B) Applications of Laplace Transform (Appendix C) PSpice (Appendix E) key Features : Numerous solved examples for sound conceptual understanding End-of-chapter review questions and numerical

problems for rigorous practice by students
Answers to all end-of-chapter numerical problems
An objective type Questions Bank with answers to hone the technical skills of students for viva voce and preparation for competitive examinations.

Any device or system with imaging functionality requires a digital video processing solution as part of its embedded system design. Engineers need a practical guide to technology basics and design fundamentals that enables them to deliver the video component of complex projects. This book introduces core video processing concepts and standards, and delivers practical how-to guidance for engineers embarking on digital video processing designs using FPGAs. It covers the basic topics of video processing in a pictorial, intuitive manner with minimal use of mathematics. Key outcomes and benefits of this book for users include:

understanding the concepts and challenges of modern video systems; architect video systems at a system level; reference design examples to implement your own high definition video processing chain; understand implementation trade-offs in video system designs. Video processing is a must-have skill for engineers working on products and solutions for rapidly growing markets such as video surveillance, video conferencing, medical imaging, military imaging, digital broadcast equipment, displays and countless consumer electronics applications This book is for engineers who need to develop video systems in their designs but who do not have video processing experience. It introduces the fundamental video processing concepts and skills in enough detail to get the job done, supported by reference designs, step-by-step FPGA- examples, core standards and systems architecture maps Written by lead engineers at Altera Corp, a top-three global developer of digital video chip (FPGA) technology

Adapted from Floyd's best-selling Digital Fundamentals—widely recognized as the authority in digital electronics—this book also applies basic VHDL concepts to the description of logic circuits. It introduces digital logic concepts and functions in the same way as the original book, but with an emphasis on PLDs rather than fixed-function logic devices. Reflects the trend away from fixed-function logic devices with an emphasis on CPLDs and FPGAs, while offering coverage of fixed-function logic for reference.

Presents VHDL as a tool for implementing the digital logic in programmable logic devices. Offers complete, up-to-date coverage, from the basic digital logic concepts to the latest in digital signal processing. Emphasizes applications and troubleshooting.

Provides Digital System Applications in most chapters, illustrating how basic logic functions can be applied in real-world situations; many use VHDL to implement a system. Provides many examples with related problems. Includes ample illustrations throughout. A solid introduction to digital systems and programming in VHDL for design engineers or software engineers.

High density digital magnetic and magneto-optical storage devices are widely used in audio, video, and data processing information technology, as well as in CAD/CAM computer systems. These widespread uses generate a continually increasing demand for both increased information storage densities and capacities, and for reduced access times. Hence, the materials engineering of high density storage media, with a high signal to noise ratio, and the associated design of sophisticated read and write heads, form the basis of major technological research. This research is especially complex because, ideally, the recorded information should be both erasable and, at the same time, secure and accessible over periods of many decades. As a result, research on these complex problems requires a multidisciplinary approach which utilizes the expertise in such widely differing fields as organic, inorganic, and solid state chemistry, metallurgy, solid state physics, electrical and mechanical engineering, and systems analysis. Often, further research specialization is necessary in each of these different disciplines. For instance, solid state physics and chemistry address the problems of crystallographic structure and phase diagram determination, magnetism, and optics, but more advanced research methods, such as high resolution electron microscopy and electronic band structure calculations, are necessary to understand the microstructure of particulate recording media or the electronic spectra of magneto-optical recording media.

For many applications, circuits that combine analog and digital signals can provide superior solutions to those produced with digital signals alone. Eighteen contributions in four sections--processing technology, circuit techniques and building blocks, design and applications, and CAD and supporting tools--detail and support this new approach. Annotation copyrighted by Book News, Inc., Portland, OR

Digital Image Compositing Fundamentals is an introductory title covering concepts central to digital imagery and digital image compositing using software packages such as Adobe Photoshop or the open source GIMP software, which is used for this book because it is free for commercial use. This book builds on the fundamental concepts of pixels, color depth and layers, and gets more advanced as chapters progress, covering pixel transparency using the alpha channel, pixel blending using Porter-Duff blending and transfer modes, and digital image file formats and key factors regarding a data footprint optimization work process. What You'll Learn: What are the most common memes in digital imaging What comprises a digital image compositing pipeline What are the concepts behind digital imaging How to install and use GIMP 2.8 or 2.9 What are and how to use the concepts behind color depth and image optimization Audience: This book is for those new to image compositing, editing. Ideal for web developers, game developers who need to learn these kinds of fundamentals quickly and effectively.

The previous edition of this book marked the shift in technology from video to digital camera use with microscope use in biological science. This new edition presents some of the optical fundamentals needed to provide a quality image to the digital camera. Specifically, it covers the fundamental geometric optics of finite- and infinity-corrected microscopes, develops the concepts of physical optics and Abbe's theory of image formation, presents the principles of Kohler illumination, and finally reviews the fundamentals of fluorescence and fluorescence microscopy. The second group of chapters deals with digital and video fundamentals: how digital and video cameras work, how to coordinate cameras with microscopes, how to deal with digital data, the fundamentals of image processing, and low light level cameras. The third group of chapters address some specialized areas of microscopy that allow sophisticated measurements of events in living cells that are below the optical limits of resolution. Expands coverage to include discussion of confocal microscopy not found in the previous edition Includes "traps and pitfalls" as well as laboratory exercises to help illustrate methods Reflecting lengthy experience in the engineering industry, this bestseller provides thorough, up-to-date coverage of digital fundamentals—from basic concepts to microprocessors, programmable logic, and digital signal processing. Floyd's acclaimed emphasis on applications using real devices and on troubleshooting gives users the problem-solving experience they'll need in their professional careers. Known for its clear, accurate explanations of theory supported by superior exercises and examples, this book's full-color format is packed with the visual aids today's learners need to

grasp often complex concepts. **KEY TOPICS** The book features a comprehensive review of fundamental topics and a unique introduction to two popular programmable logic software packages (Altera and Xilinx) and boundary scan software. **MARKET:** For electronic technicians, system designers, engineers.

This textbook provides comprehensive, in-depth coverage of the fundamental concepts of electrical engineering. It is written from an engineering perspective, with special emphasis on circuit functionality and applications. Reliance on higher-level mathematics and physics, or theoretical proofs has been intentionally limited in order to prioritize the practical aspects of electrical engineering. This text is therefore suitable for a number of introductory circuit courses for other majors such as mechanical, biomedical, aerospace, civil, architecture, petroleum, and industrial engineering. The authors' primary goal is to teach the aspiring engineering student all fundamental tools needed to understand, analyze and design a wide range of practical circuits and systems. Their secondary goal is to provide a comprehensive reference, for both major and non-major students as well as practicing engineers.

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