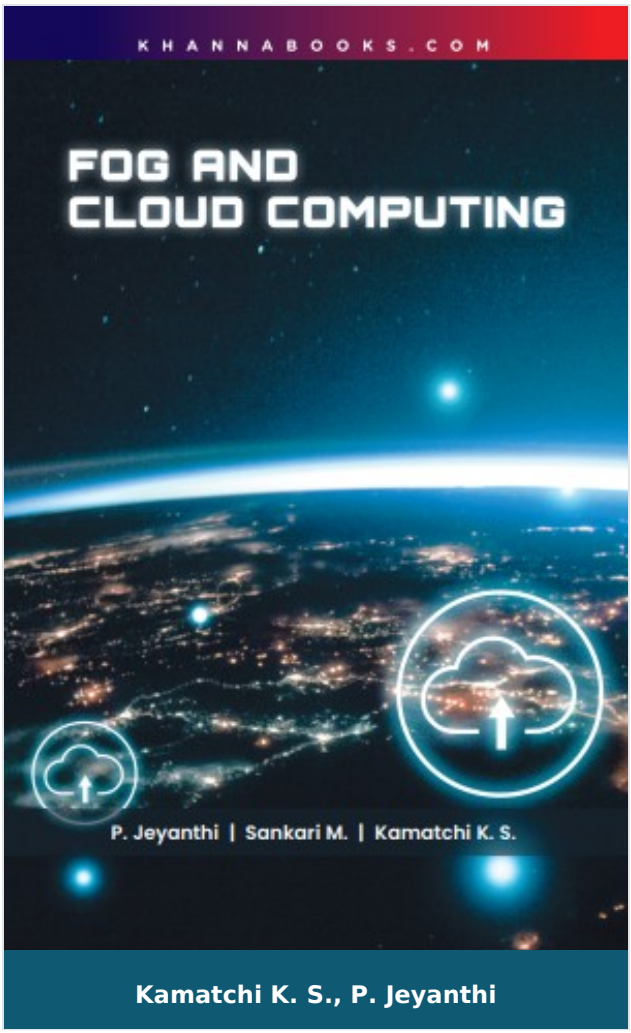


Kamatchi K. S., P. Jeyanthi

Fog and Cloud Computing

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Product Description

Fog and Cloud Computing

This book serves as a comprehensive and essential guide to mastering the modern landscape of cloud and fog computing, two fundamental technologies reshaping the digital era. The core purpose of this text is to provide a robust understanding of Cloud Computing, exploring its history, characteristics, architectural framework, and the key benefits of virtualization. It thoroughly details the major service models—Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS)—and analyzes the deployment models (Public, Private, and Hybrid Cloud) used by global players like Amazon, Microsoft, and IBM.

Crucially, the book extends this foundation into the emerging field of Fog Computing. Fog computing is presented as an indispensable, decentralized architectural layer that addresses the challenges of high latency and network congestion caused by the massive scale of Internet of Things (IoT) devices on traditional, centralized cloud systems. By covering cloud management, security strategies, and the transition to the edge network, this resource aims to bridge the gap between theoretical concepts and their practical, real-world applications. The target audience includes students, IT professionals, researchers, and technology enthusiasts seeking to leverage cloud infrastructure for innovation, digital transformation, and professional growth.

Salient Features:

- **Core Architectural Framework**: Provides a clear overview of cloud computing history, fundamental characteristics (e.g., scalability, multi-sharing), and the architectural components that enable robust cloud services.
- **Essential Service Models:** Dedicated coverage of the foundational service paradigms: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and

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Software as a Service (SaaS), explaining their structure and real-world utility.

- **In-Depth Virtualization**: Details the need for and types of virtualization (hardware, OS), including deep dives into essential hypervisors like Xen, KVM, and Hyper V, and open-source cloud platforms like Eucalyptus.
- **Cloud Security & Governance**: Addresses critical challenges of cloud data management, data center tiers, and essential security protocols like multi-factor authentication, data privacy, and strategies for avoiding vendor lock-in.
- **Industry Landscape Analysis**: Analyzes the competitive landscape by profiling major cloud players (e.g., AWS, Microsoft, IBM) and detailing the advantages and disadvantages of Public, Private, and Hybrid Cloud deployment models.
- **Fog & Edge Integration**: Introduces Fog Computing as an extension of the cloud, detailing its unique architecture, benefits (low latency), and comparing it structurally and functionally to the traditional cloud model.
- **Real-World Fog Applications**: Focuses on the practical utility of Fog Computing in critical modern fields like Smart Cities, Smart Grids, and enabling real-time analytics for high-volume data from Self-driven Cars.
- **Simulation & Testing Tools**: Features an introduction to the role and architecture of Cloud Simulator (CloudSim) for evaluating a nd testing cloud applications before real-world deployment.

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- Cloud Deployment Models and Virtualization
- Management in Cloud Computing and Security
- Fog Computing

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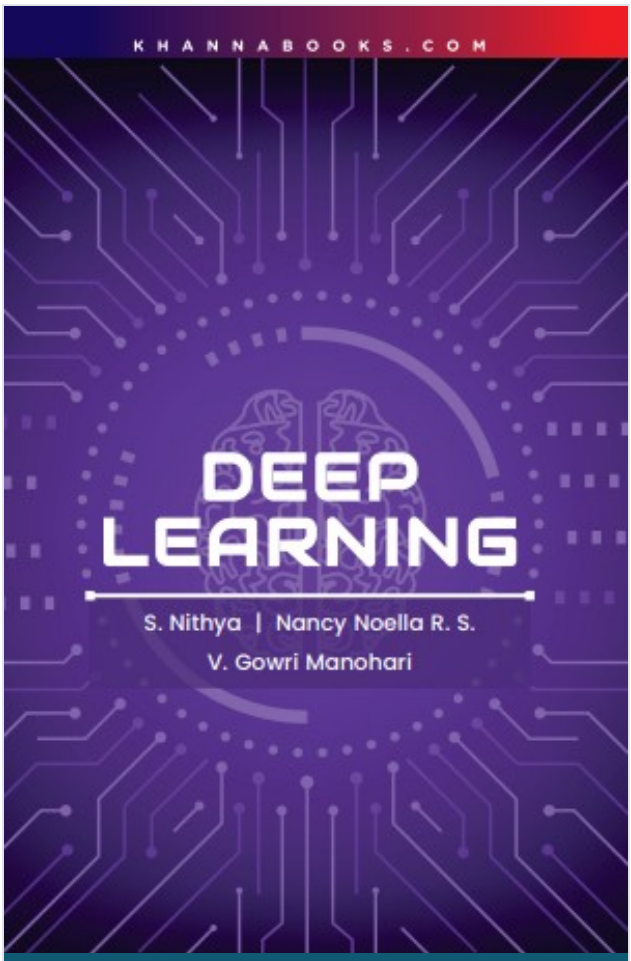
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S. Nithya, Nancy Noella R. S., V. Gowri Manohari

Deep Learning

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Product Description

Deep Learning

This textbook, Deep Learning, serves as a comprehensive and structured introduction to the transformative field of Artificial Intelligence, focusing specifically on modern Deep Learning (DL) methodologies. It is explicitly designed to meet the academic needs of students enrolled in computer science programs, covering the Sathyabama University Syllabus, while simultaneously acting as an invaluable resource for researchers and practitioners seeking to deepen their technical knowledge.

The book's core theme revolves around mastering the application of Artificial Neural Networks (ANNs) to extract complex patterns from massive datasets. Its primary objective is to effectively bridge the crucial gap between fundamental theoretical concepts and their practical utility in real-world scenarios. The content guides the reader progressively, starting from foundational Machine Learning concepts—including linear models like SVM and Perceptrons—to the intricate architectures of modern deep networks.

Key topics covered include the inner mechanics of neural networks, advanced training processes like backpropagation, various optimization techniques (e.g., SGD, Adam), and advanced models such as Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), and Generative Adversarial Networks (GANs). To ensure practical mastery, each chapter is reinforced with hands-on exercises, code implementations, and case studies. By emphasizing both theoretical rigor and practical implementation, this text equips readers with the skills needed to apply DL to revolutionary areas such as natural language processing, image recognition, and healthcare.

Salient Features:

- **Foundational Concepts**: Structured coverage of Machine Learning fundamentals, including Linear Models, Support Vector Machines (SVM), and Perceptron, before diving into deep network architectures.
- **Core Network Mechanics**: Detailed explanations of Neural Network training processes, focusing on Loss Functions, Backpropagation, and Stochastic Gradient Descent principles.
- **Advanced Architectures**: Dedicated analysis of state-of-the-art models like Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), and the latest Transformers and Generative Adversarial Networks (GANs).
- **Practical Optimization**: Thorough discussion on Hyperparameter Optimization, Batch Normalization, and various Stochastic Optimization algorithms (e.g., AdaGrad, Adam) to maximize model performance and training efficiency.
- **Dimensionality Reduction**: Explores essential techniques like Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), Manifold Learning, and Autoencoders for effective data preprocessing.
- **Sequence Modeling**: In-depth coverage of sequential data processing using Recurrent Neural Networks and advanced long-term dependency handling via Long Short-Term Memory (LSTM) units.
- **Real-World Case Studies**: Dedicated unit featuring practical applications and industry benchmarks like ImageNet, Audio Wavenet, Word2Vec for NLP, and Deep Reinforcement Learning (DRL).
- **Modern Applications**: Focus on emerging fields such as Bioinformatics, Face Recognition, and Scene Understanding to demonstrate the revolutionary scope of deep learning in critical real-world systems.

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- Case Study and Applications

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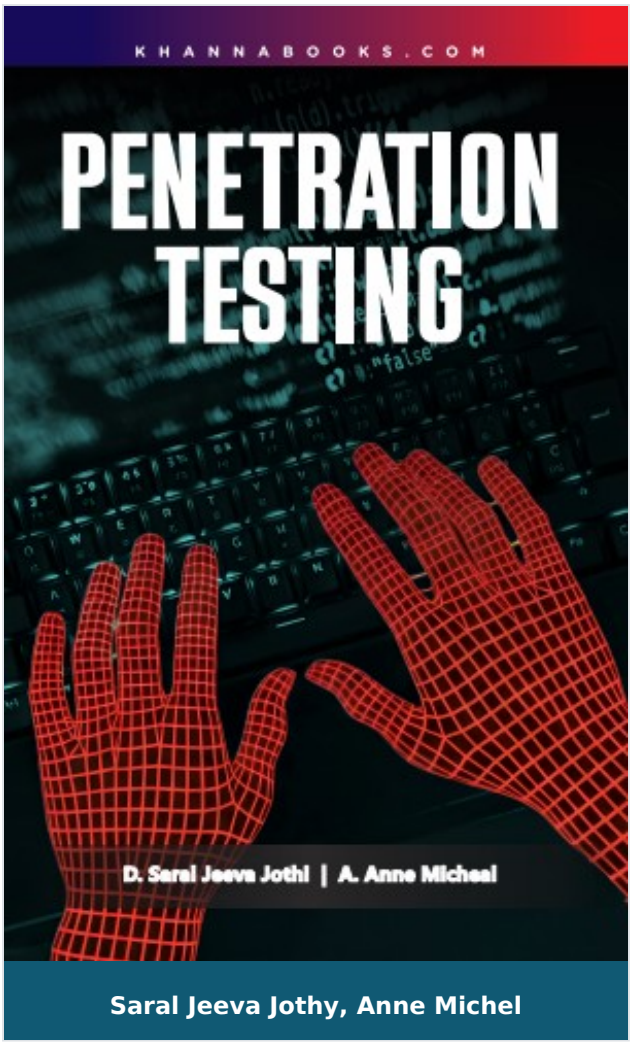
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Saral Jeeva Jothy, Anne Michel

Penetration Testing

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Product Description

Penetration Testing

In today's digital age, where cyber threats are constantly evolving, Penetration Testing—often referred to as ethical hacking—is the most crucial practice for identifying and addressing security vulnerabilities.

Penetration Testing is designed to provide a comprehensive understanding of the field and its methodologies. This book offers a systematic approach to simulating cyberattacks on systems to uncover weaknesses before malicious hackers can exploit them. Readers will gain the theoretical knowledge and hands-on experience necessary to conduct effective security assessments in a controlled, ethical, and legal manner.

You will master the entire pen testing lifecycle: from initial reconnaissance and exploitation to post-exploitation and delivering a detailed, actionable report. By emphasizing practical skills and real-world tools, this resource prepares students and professionals alike to confidently secure systems and ensure compliance with critical industry regulations like PCI DSS, GDPR, and HIPAA.

Salient Features:

- **Foundational Knowledge**: Introduction to the basic principles of Cryptography, including detailed coverage of algorithms like AES, DES, RSA, and SHA.
- **Methodology Mastery**: In-depth discussion of the three major penetration testing approaches: Black Box, White Box, and Grey Box, and when to choose each method.
- **Five-Phase Process**: Step-by-step guidance through the entire pen testing procedure, covering Planning & Reconnaissance, Scanning, Gaining Access, Post-Exploitation, and Reporting.
- **OS & Network Exploitation**: Hands-on experience with Windows and Linux password hashes, exploitation in Internetworks, and testing Wireless Networks.

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- **Industry-Standard Tools**: Practical application of essential tools and frameworks, including Nmap for scanning, the Metasploit Exploitation Framework, and Netcat for pivoting and remote connections.
- **Compliance and Ethics:** Comprehensive coverage of the Ethical and Legal Considerations required to conduct penetration tests responsibly, ensuring tests adhere to governance frameworks.
- **Actionable Reporting**: Detailed structure and components of a professional Penetration Testing Report, including the Executive Summary, Risk Assessment, and clear, prioritized Recommendations for remediation.

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- Penetration Testing with Internet Works
- Penetration Testing in Linux, Window

Author

Saral Jeeva Jothy

Saral Jeeva Jothy

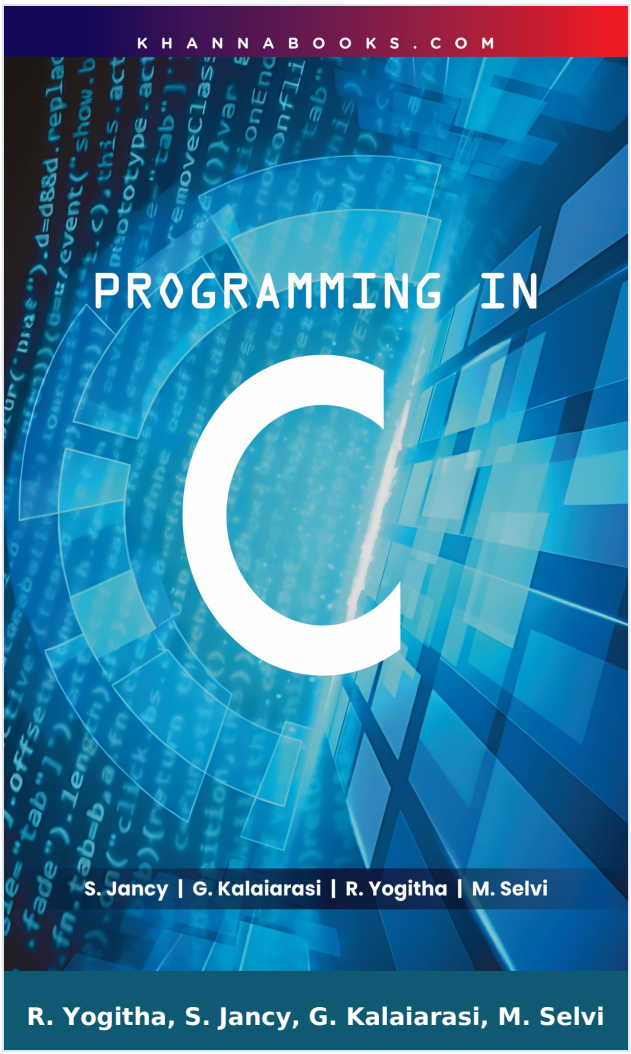
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Programming in C

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Product Description

This book, PROGRAMMING IN C, serves as an essential, comprehensive resource for mastering the C programming language, grounded in the foundational principles of computer science. The core theme is the seamless synergy between algorithmic problem-solving and practical, efficient C implementation. It begins by establishing a robust understanding of computational fundamentals, detailing the evolution of programming languages, and exploring key system components like Hardware, Software, Processor, and Memory.

The book's purpose is to mold readers into effective computational thinkers. It meticulously guides users through the art of problem-solving using structured techniques like Algorithms, Flowcharts, and Pseudocode. Crucially, it dedicates significant attention to measuring program performance through Time and Space Complexity (Big O Notation), enabling students to write code that is not only correct but also scalable and optimized.

Readers will gain mastery over the C program structure, fundamental data types, operators, and advanced concepts such as Modular Programming with Functions (including recursion and call-by-reference). Key data structures like Arrays, Strings, Pointers, and Structures are covered in depth. The target audience includes undergraduate students, aspiring software developers, and researchers who require a robust, hands-on, and efficiency-focused guide to system-level programming and computational logic.

Salient Features:

• Fundamental Computing Overview: The book starts with the basics of computer systems, covering Hardware, Software, Processor, and Memory, establishing a strong foundation before diving into coding.

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• Algorithmic Mastery: Teaches problem-solving using Algorithms, Flowcharts, and Pseudocode, acting as a blueprint for translating logical steps into clean, efficient code.

• Efficiency Analysis: Dedicated coverage of Time and Space Complexity (Big O Notation) ensures students learn to analyze algorithm efficiency and optimize programs for scalability and speed.

• Modular Programming: Master code organization using Functions (user-defined and library), covering concepts like parameter passing (Pass by Value/Reference) and advanced techniques like Recursion.

• Control Flow Logic: Clear explanations and examples of Decision-Making (if-else, switch) and Looping (for, while, do-while) statements, enabling the creation of dynamic and interactive programs.

• Essential Data Structures: Comprehensive units on managing data using Arrays (1D and Multi-dimensional), Strings, Pointers, and powerful heterogeneous containers like Structures and Unions.

• Hands-On Learning: Features multiple fully-coded Case Studies and Exercises on practical applications, including sorting, searching, calculating prime numbers, and building a scientific calculator.

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B. Ankayarkanni, D. Usha Nandini, A. Mary Posonia, V. Ulagamuthalvi

Compiler Design

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Product Description

Compiler Design offers a comprehensive and organized introduction to the foundational principles, techniques, and practical tools necessary for constructing a compiler. Serving as an essential bridge between human-readable high-level programming languages and machine instructions, this book aims to unravel the complexity of the translation process and demystify compiler construction for both students and academics.

The book systematically guides readers through the entire compiler lifecycle, detailing each major phase: Lexical Analysis, Syntax Parsing, Semantic Analysis, Intermediate Code Generation, Code Optimization, and Final Code Generation. It adopts an approachable, academic tone, striving to simplify both fundamental ideas and advanced concepts by integrating theoretical foundations with practical implementations. For enhanced comprehension, the material is reinforced with a combination of theoretical discussions and numerous solved numerical problems. Furthermore, a strong emphasis is placed on practical skill development, featuring dedicated coverage of industry-standard tools like LEX and YACC, ensuring the target audience—computer science students and professors—gains hands-on experience in building real-world compilers. This indispensable resource provides a clear pathway to mastering the art and science of transforming source code into efficient, executable programs.

Salient Features:

• Systematic Phase Coverage: Presents the compiler's structure through distinct, organized units, detailing the functionality of the analysis-synthesis model from scanning to code generation.

• Practical Tool Integration: Provides detailed sections on using LEX and YACC (Yet Another Compiler Compiler), giving students hands-on experience in generating practical Lexical Analyzers and Parsers.

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• Comprehensive Parsing Methods: Explores a full range of parsing techniques, including Top-Down (LL(1)) and sophisticated Bottom-Up (LR, SLR) parsing, complete with error handling and recovery strategies.

• Intermediate Code Representation: Dedicated unit focusing on Syntax-Directed Translation (SDT), implementing three-address code, and handling complex programming constructs like procedure calls and switch-case statements.

• Advanced Optimization Techniques: Covers crucial optimization strategies like Data Flow Analysis, Loop Optimization, and the use of Directed Acyclic Graphs (DAGs) for efficient, high-speed target code generation.

• Efficient Code Generation: Discusses critical implementation issues such as managing Run-Time Storage, optimal Register Allocation and Assignment, and the final conversion of assembly code to machine code.

• Formal Language Foundation: Clearly explains the role of Formal Languages, covering Regular Expressions and both Deterministic and Non-Deterministic Finite Automata (DFA/NFA) conversions in lexical design.

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D. Usha Nandini

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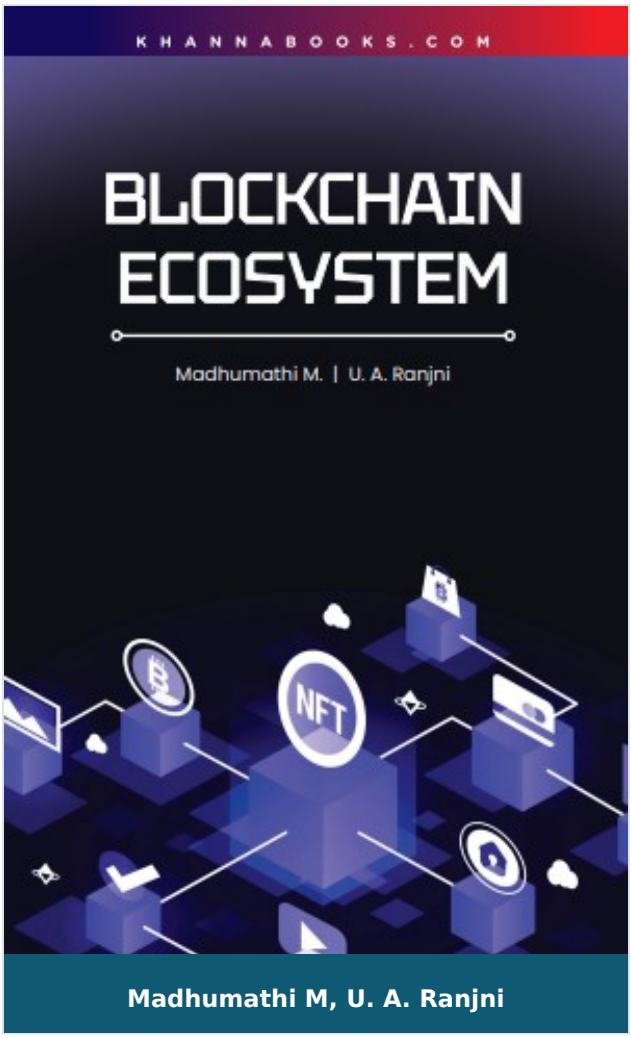
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Madhumathi M, U. A. Ranjni

Blockchain Ecosystem

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Product Description

Blockchain Ecosystem

BLOCKCHAIN ECOSYSTEM is a comprehensive and essential guide to the transformative technology underpinning the decentralized digital future. This book explores blockchain not just as a technology for secure, transparent, and immutable record-keeping, but as a foundational innovation reshaping entire industries, from finance and supply chains to healthcare and governance. It introduces readers to a new paradigm of trust and value exchange that operates without reliance on central authorities or intermediaries.

Authored with clarity and academic rigor, the text systematically breaks down the intricate and interconnected nature of the blockchain ecosystem. It begins by establishing the fundamental network architecture, contrasting it with conventional distributed databases, and delves into the mechanics of key consensus algorithms like Proof-of-Work (PoW) and Proof-of-Stake (PoS). The book then traces the evolution of the technology across Blockchain 1.0, 2.0, and 3.0, illustrating the shift from basic digital currency to complex decentralized applications (dApps) and enterprise-grade scalability solutions.

Crucially, this guide provides practical, hands-on knowledge, including a deep dive into Smart Contracts using Solidity, detailing their lifecycle, creation, and deployment, alongside frontend connection methods. It also critically examines the significant security risks (e.g., Reentrancy, 51% attacks) and performance challenges (e.g., scalability, interoperability) inherent in blockchain deployment.

Whether you are a student seeking foundational knowledge, an entrepreneur building the next decentralized application, a developer aiming for secure Solidity implementation, or a policymaker navigating regulatory complexities, this book is an indispensable resource for understanding the complexities, opportunities, and future directions of the blockchain revolution.

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Salient Features:

- **Core Network Fundamentals:** Presents a detailed comparison of blockchain with conventional distributed databases, explaining fundamental principles like decentralization, immutability, security, and cryptographic hashing.
- **Mechanism Comparison**: In-depth coverage of various consensus models, detailing the trade-offs between energy-intensive Proof-of-Work (PoW) and the more sustainable Proof-of-Stake (PoS) and BFT protocols.
- **Blockchain Generation Study**: Systematically analyzes the evolution from Blockchain 1.0 (Digital Currency) to 2.0 (Smart Contracts/dApps), concluding with 3.0 (Scalability/Interoperability) and enterprise-grade solutions.
- **Practical Smart Contracts**: Provides step-by-step guidance on writing, deploying, and connecting decentralized applications (Dapps) to a frontend using Solidity, Hardhat, and Next.js.
- **Security Risks Analysis**: Dedicated chapters dissect major security issues, including the 51% Attack, smart contract vulnerabilities (like Reentrancy), Sybil attacks, and common EVM bytecode flaws.
- **Solidity Code Vulnerabilities**: Highlights programming pitfalls specific to the Ethereum development language Solidity, such as gas optimization issues, access control flaws, and the challenges of contract upgradability.
- **Advanced Scalability Solutions**: Explores techniques to overcome network performance limitations like low TPS and high fees, focusing on Sharding, Sidechains, Off-Chain State Channels, and concurrent transaction processing.
- I**ndustry 4.0 Applications**: Details the promising real-world application of blockchain in Industry 4.0 (M2M communication) and Health 4.0, discussing both opportunities and inherent integration challenges.

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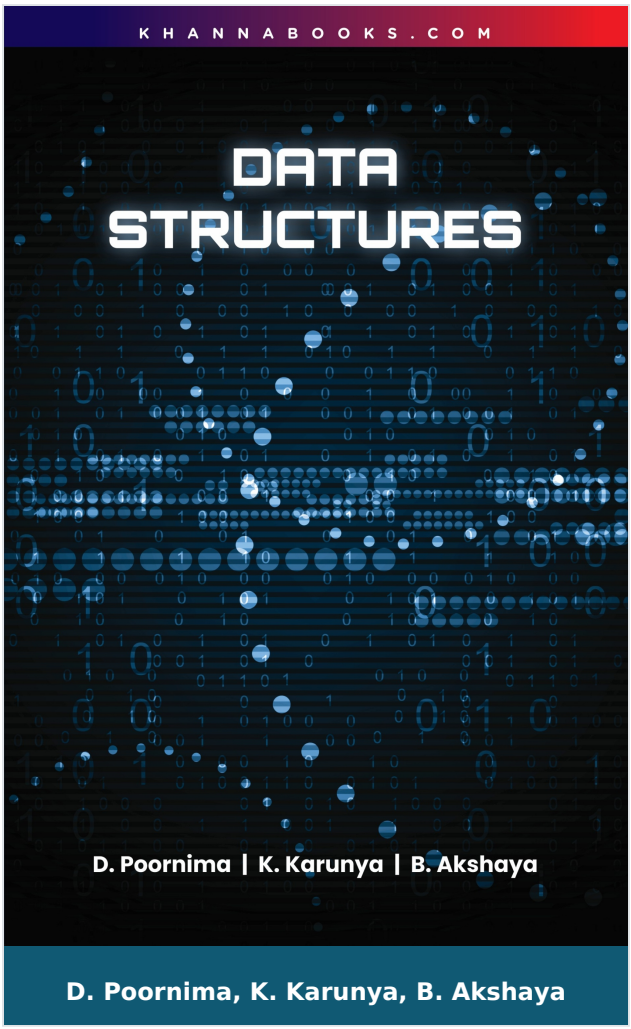
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Data Structures

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Product Description

This comprehensive textbook offers an indispensable foundation in data structures, the core discipline for efficient computing and algorithm design. It is explicitly designed to empower students, software developers, and computer science professionals with the ability to organize, manage, and process data optimally, thereby reducing computational overhead and enhancing application performance.

The book systematically guides readers through fundamental concepts, beginning with linear structures like Arrays, Linked Lists, Stacks, and Queues, and progresses to complex, non-linear structures such as Trees and Graphs. A strong emphasis is placed on the dual goals of reducing time complexity and optimizing memory storage, which are vital for developing modern, scalable software. Readers will gain practical proficiency through units dedicated to Search and Sorting Techniques and critical graph algorithms like Dijkstra's and Minimum Spanning Trees. By blending academic rigor with extensive real-world Case Studies and practical programming examples in C, this text ensures that learners not only understand how these structures work, but also why they are the backbone of modern applications in areas like databases, AI, and network optimization.

Salient Features:

• Fundamental Concepts: Provides a clear introduction to data structures, covering classifications (linear vs. non-linear) and the core need for optimizing both time and space complexity.

• Advanced Structures: Thoroughly covers complex, non-linear structures like Binary Trees, BSTs (Binary Search Trees), and even AVL Trees, detailing their implementation and use in storage and retrieval.

• Graph Theory: Explores Graphs with depth, covering representation using Adjacency Matrix and List, and essential traversals like Breadth-First Search (BFS) and Depth-First

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Search (DFS).

• Pathfinding Algorithms: Dedicated focus on practical solutions with algorithms for Minimum Spanning Trees (Kruskal's/Prim's) and Shortest Paths (Dijkstra's, Bellman-Ford, Floyd-Warshall).

• Algorithm Analysis: Offers a comprehensive unit on Search and Sorting Techniques (Quick Sort, Merge Sort, Heap Sort), with detailed analysis comparing the efficiency of various algorithms.

• Practical Coding: Includes numerous Solved Problems and C programming code examples for all major operations (insertion, deletion, traversal), enabling hands-on implementation skills.

• Real-World Applications: Features focused Case Studies throughout, illustrating how structures like Queues and Trees are utilized in practical scenarios such as hospital queue optimization and network routing.

• ICT Integration: Recommends specific digital tools, including online visualizers (like VisuAlgo) and competitive programming platforms (like LeetCode), to enhance interactive and application-based learning.

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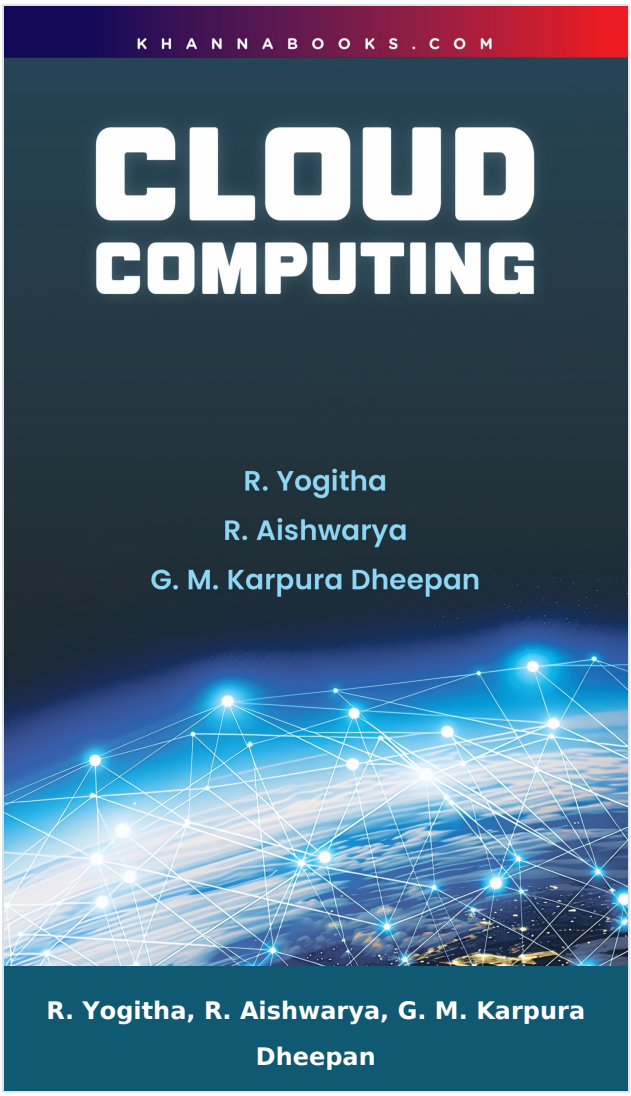
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Cloud Computing

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Product Description

Cloud Computing

This comprehensive textbook provides a structured and authoritative introduction to Cloud Computing. guiding readers from foundational principles to advanced real-world applications. It serves as an essential resource urce for students, IT professionals, and researchers seeking to master the technologies that power modem digital infrastructure The book clearly outlines the origins and essential characteristics of cloud environments, such as Rapid Elasticity, Broad Network Access, and Measured Service, setting the stage for deep dives into implementation. It thoroughly examines the cloud infrastructure, covering foundational technologies like data center components, power efficiency metrics (PUE), and the multi-level implementation ofvirtualization across CPU, Memory, and I/O. A significant portion is dedicated to cloud architecture, detailing the fundamental service models (SaaS, PaaS, laaS) and various deployment models (Public, Private, Hybrid). Finally, a major focus is placed on cloud security, detailing the CIA Triad, Zero Trust principles, and modem DevSecOps practices crucial for designing and deploying secure cloud software. By covering these core concepts and modern storage systems (Object. NoSQL Databases), this book delivers both the academic knowledge and the practical value needed to confidently design, manage, and secure scalable cloud solutions.

Salient Features:

- **Core Cloud Characteristics**: The book meticulously details the defining aspects of cloud computing, such as Rapid Elasticity, Meaaured Service. and On-demand Seli service, contrasting them with traditional IT models for a clear understanding of cloud value
- **Advanced Infrastructure**: Features an in-depth exploration of data center design, including.crucial topics like calculating Power Usage Effectiveness (PUE) and

implementing robust power redundancy configurations (N+1, 2N forhigh for high reliability

- **Multi-Level Virtualization**: Explains the foundational role of virtualization by detalling the implementation levels across CPU, Memory, and I/D, including hypervisor types and the mechanics of creating virtual machines
- **Cloud Security Focus:** Provides dedicated coverage of Cloud Computing Software Security. focusing on the CIA Triad (Confidentiality, Integrity, Availability), Zero Trust principles, and legal compliance requirements.
- **Secure Development Practices**: Highlights the adoption of modem security methods like DevSecOps and Secure Development Practices to integrate security into the CI/CD pipeline and mitigate risks from the requirements phase onwards.
- **Comprehensive Service Models**: Offers a detailed comparative analysis of the three fundamental service models-laaS, Paas, and Saas complete with their respective features, benefits, and roies within various cloud architecture
- **Modern Cloud Storage**: Delves Inte scalable data management, covering distributod file systems (HDFS, Ceph FS), NoSOL doud databases (MongoDB, Dynamo DB), and industry-leading Object Storage solutions (Amazon 53, Ceph).

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- Cloud Storage

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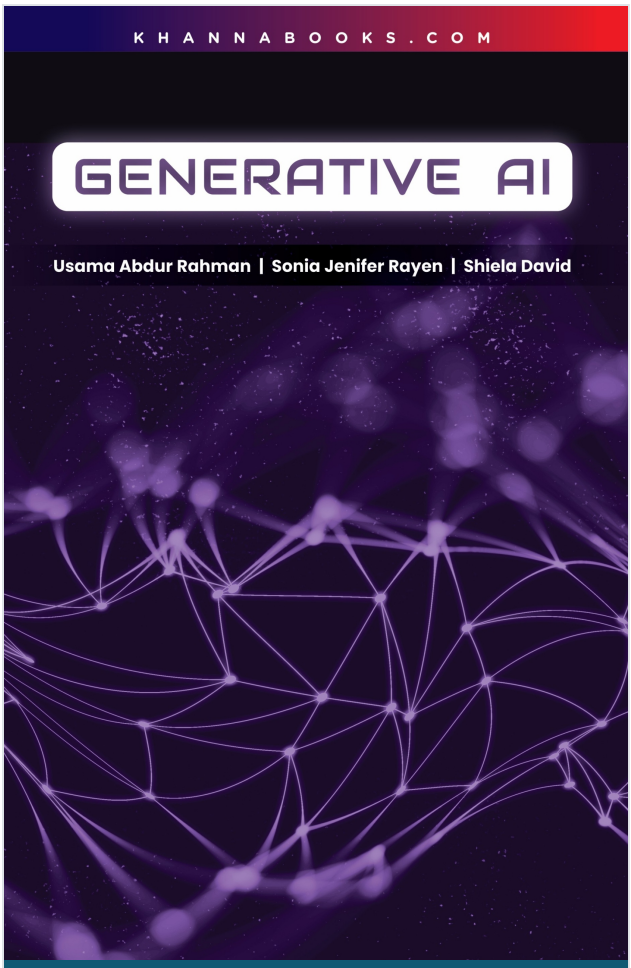
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Sonia Jenifer Rayen, Shiela David, Usama Abdur Rahman

Generative AI

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Product Description

Generative AI (Gen AI) has rapidly evolved from a theoretical concept into a transformative technology capable of simulating human creativity, generating content, producing innovative ideas, and enabling autonomous decision-making. This book serves as a comprehensive and structured guide to understanding the foundations, architectures, applications, and future directions of Generative Artificial Intelligence. Designed for students, researchers, professionals, and technology enthusiasts, it provides both theoretical insights and practical perspectives on one of the most influential fields in modern computing.

The text begins by tracing the historical evolution of Artificial Intelligence, highlighting key milestones that shaped the development of machine learning and intelligent systems. It then builds a strong conceptual foundation by introducing Neural Networks and the revolutionary Transformer Architecture, which forms the backbone of modern generative systems. Special emphasis is placed on the Attention Mechanism, encoder-decoder architectures, and the emergence of Large Language Models (LLMs) that power advanced conversational and content-generation systems.

Beyond foundational concepts, the book explores advanced generative techniques such as Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs), explaining their architectures, workflows, and practical applications. Readers gain insights into how generative models create realistic text, images, and multimedia content, while also understanding the principles behind AI Agents, prompt engineering, and modern AI development frameworks.

The practical relevance of Generative AI is demonstrated through extensive real-world applications across healthcare, finance, manufacturing, software engineering, media, and entertainment. The text also addresses critical contemporary topics including model

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evaluation metrics, ethical considerations, responsible AI development, and emerging innovations such as Quantum AI and Neuromorphic Computing. By combining academic rigor with practical implementation, this book provides a complete roadmap for mastering the rapidly evolving landscape of Generative Artificial Intelligence.

Salient Features:

- Foundational AI Concepts: Provides a detailed overview of the history and evolution of Artificial Intelligence, establishing a strong foundation in neural networks, machine learning, and the development of generative technologies.
- Transformer Architecture Deep Dive: Thoroughly explains Transformer Models, the Attention Mechanism, and the distinctions between encoder-based architectures (such as BERT) and decoder-based Large Language Models.
- Large Language Model Mastery: Covers the principles, architectures, and applications of LLMs, including their use in natural language processing, content generation, summarization, translation, and conversational AI systems.
- Advanced Generative Models: Presents comprehensive coverage of Variational Autoencoders (VAEs) and Generative Adversarial Networks (GANs), detailing their components, workflows, training methodologies, and practical applications.
- Practical AI Agents & Frameworks: Introduces AI Agents and modern development frameworks such as Lang Chain, enabling readers to build scalable and production-ready Generative AI applications.
- Cross-Industry Applications: Demonstrates the transformative impact of Generative AI across multiple sectors, including healthcare, manufacturing, finance, software development, and digital media.
- Model Evaluation Techniques: Explains important evaluation metrics such as Perplexity, BLEU Score, and ROUGE Score, helping readers assess and benchmark the performance of generative and language models.

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- Future & Ethical Directions: Explores emerging topics including Multimodal AI, prompt optimization techniques (Top-K and Top-P sampling), ethical AI practices, Quantum AI, and Neuromorphic Computing.

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Shiela David

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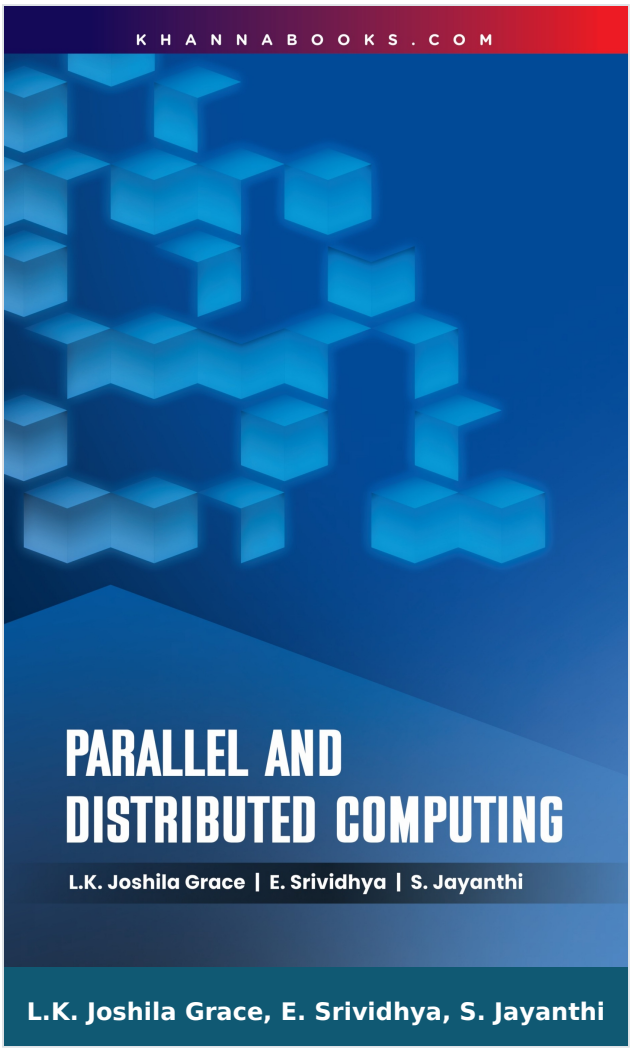
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Parallel and Distributed Computing

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Product Description

The rapid growth in data processing and the increasing complexity of computational problems have made Parallel and Distributed Computing (PDC) an essential field in modern technology. This book serves as a comprehensive and authoritative guide, providing both the theoretical foundations and practical insights required to master this evolving domain. It systematically explores how systems can execute multiple tasks simultaneously, fundamentally improving speed, efficiency, and resource utilization. The core theme is the detailed exposition of PDC principles, architectures, and applications, starting with the motivations for parallelism and modifications to the traditional von Neumann model. It offers a deep dive into parallel hardware like SIMD and MIMD systems, advanced architectures such as CMPs and GPUs, and crucial concepts like cache coherence and OpenCL programming. The book then transitions to distributed computing, covering critical areas like communication models, synchronization, deadlock handling, and distributed file systems and shared memory. With its structured five-unit approach, real-world applications, and problem-solving exercises, this resource is designed to equip a broad target audience—including students, researchers, and professionals—with the necessary knowledge to design and implement efficient, scalable systems. Mastering the concepts presented herein will be instrumental in shaping the future of high-performance computing.

Salient Features:

• Fundamental Architectures: Provides comprehensive coverage of parallel hardware, including Flynn’s taxonomy (SIMD/MIMD), cache coherence, and the evolution of modern architectures like CMPs and GPUs.

• Advanced Programming Models: Detailed exploration of key models of parallelism such as the PRAM and CTA models, alongside an essential introduction to OpenCL for heterogeneous parallel computing.

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• Interconnection Networks: Focuses on the crucial role of interconnection networks in parallel and distributed systems. It discusses both static and dynamic approaches to ensure high-speed and efficient communication among all processors.

• Distributed Communication: Covers essential goals, design issues, and models like the Client-Server Model. Includes in-depth topics such as Remote Procedure Calls (RPC) and Group Communication mechanisms.

• Synchronization & Control: Offers an in-depth analysis of synchronization algorithms, deadlock handling, and distributed scheduling techniques for effective resource and process management in multi-node systems.

• Memory Management Systems: Dedicated units on Distributed File Systems (DFS) design, implementation, and an introduction to shared memory consistency models, including a MACH system case study.

• Performance Optimization: Addresses practical considerations for performance, including floating-point precision, parallel reduction techniques, and managing common caveats like overhead and over-parallelization.

• Real-World Applications: Explores the wide scope of PDC, with applications in scientific simulations, AI, big data analytics, bioinformatics, and commercial systems like web and database services.

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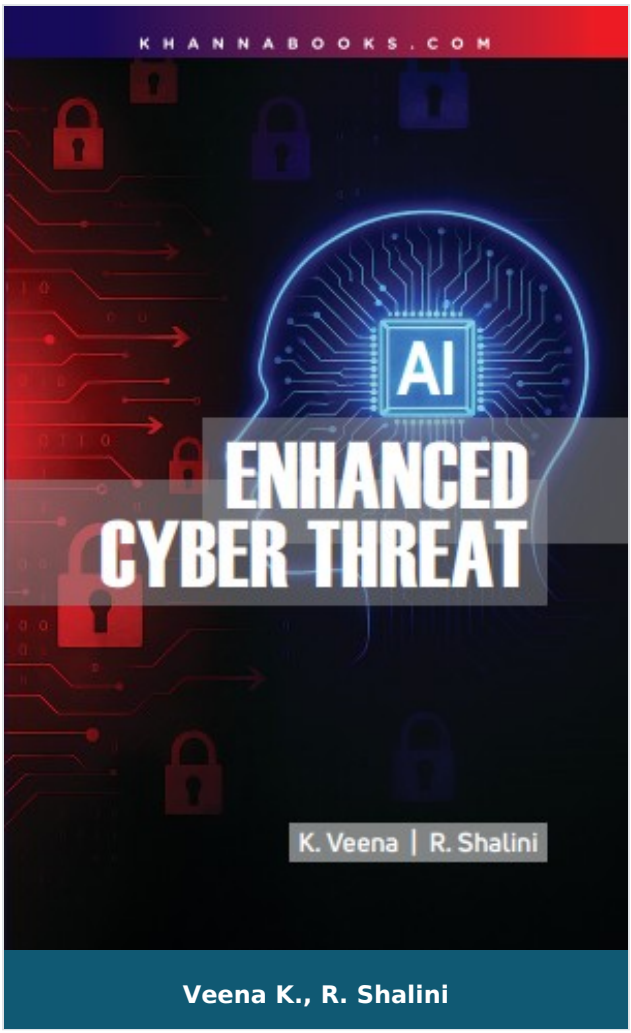
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Veena K., R. Shalini

AI Enhanced Cyber Threat

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Product Description

AI Enhanced Cyber Threat

In the rapidly evolving digital landscape. Artificial intelligence (AI) presents a double – edged sword. While it serves as the foundation for next-generation defense systems. It is simultaneously being weaponized by adversaries to create sophisticated, adaptive, and highly evasive cyber threats.

AI Enhanced cyber threats offers a vital, comprehensive analysis of this critical intersection. This book meticulously explores the emerging methodologies where Ai and Machine Learning are used to launch automated spear-phishing campaigns, craft polymorphic malware, and bypass conventional security measures. Crucially, it provides IT professionals, security analysis, and researchers with actionable, cutting-edge strategies to counter these advanced threats.

From implementing adversarial training to fortify defense models to establishing secure deployment practices in complex IoT and cloud environments, this text is the definitive guide to building an intelligent, resilient, and adaptive cybersecurity posture in the AI age.

Salient Features:

- **Comprehensive threat analysis:** In-depth exploration of how adversaries utilize AI to automate attacks, enhance phishing efficacy, and deploy adaptive malware.
- **Advanced Mitigation Strategies:** Detailed coverage of AI-powered defense mechanisms, including Adversarial training to improve model resilience against attacks.
- **Real-time security implementation:** Focus on deploying AI-powered anomaly detection systems for continuous, real-time monitoring ongoing compliance in modern infrastructure.

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- **Secure IoT and cloud deployment:** best practices for secure configuration of cloud services, network segmentation, and ensuring ongoing compliance in modern infrastructure.
- **Data security fundamentals:** Insights on establishing effective patch management processes and conduction regular security audits and risk assessments.
- I**deal for:** undergraduate and postgraduate students, researchers, cybersecurity professionals, and network administrators seeking to master the principles of AI-driven security.

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- Cyber threats

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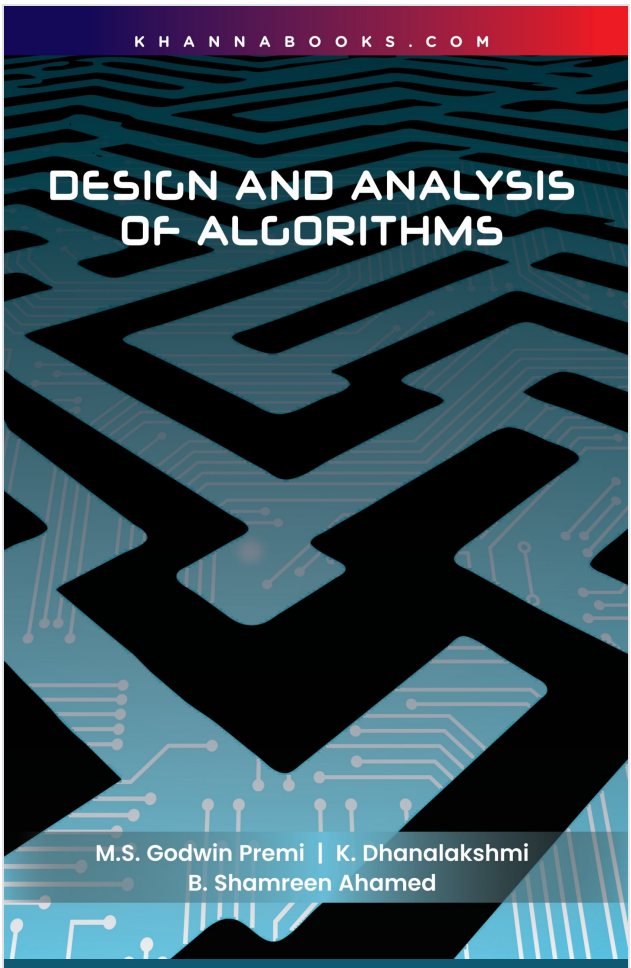
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Design and Analysis of Algorithms

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Product Description

This comprehensive textbook, Design and Analysis of Algorithms, is meticulously structured to provide Computer Science Engineering students with an in-depth and systematic understanding of foundational algorithmic principles. The core theme of the book revolves around the effective approach to computational problem-solving, emphasizing the art of designing efficient algorithms and rigorously analyzing their performance.

The book's purpose is to bridge the gap between theoretical knowledge and practical implementation, ensuring that learners can not only grasp complex concepts but also apply them to real-world computational challenges. It systematically covers essential methodologies across five comprehensive units. Starting with the fundamentals of algorithmic problem-solving, it delves into the critical concepts of Time and Space Complexity, Growth of Functions, and Asymptotic Notations (Big-O, Omega, and Theta).

It moves through major design paradigms, including Brute Force, Divide-and-Conquer, Greedy Approach, Dynamic Programming, and Backtracking and Branch and Bound. Detailed discussions on classic problems—like the Travelling Salesman, Knapsack, Huffman Coding, and Optimal Binary Search Trees—demonstrate the strengths and weaknesses of each approach. Written in a clear, simple, and student-friendly manner while maintaining academic rigor, this book is an indispensable resource. It serves as a comprehensive guide for students, educators, and researchers seeking to build a strong analytical mindset and a deep appreciation for the art and science of algorithm design.

Salient Features:

• Fundamental Analysis: Offers a detailed introduction to Time and Space Complexity, Growth Functions, and Asymptotic Notations (Big-O, Omega, Theta), enabling mastery over performance estimation and efficiency.

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• Recurrence Relation Mastery: Dedicated coverage on solving recurrence equations using methods like Substitution, Recursion Tree, and the Master Method for precise algorithm time analysis.

• Five Major Techniques: Systematically explores all major algorithm design techniques, including Divide-and-Conquer, Greedy Approach, Dynamic Programming, Backtracking, and Branch and Bound.

• Linear Time Sorting: Features in-depth explanations of advanced sorting algorithms that achieve linear time complexity, such as Counting Sort, Radix Sort, and Bucket Sort.

• Practical Applications: Discusses classic problems like Travelling Salesman, Knapsack, Huffman Coding, and the 8-Queens Problem, illustrating the real-world application of theoretical concepts.

• Efficiency Benchmarking: Provides both Theoretical and Empirical Analysis methods for complexity, with program examples to ensure a clear understanding of practical performance measurement.

• Combinatorial Optimization: Focuses on advanced techniques like Backtracking and Branch and Bound, demonstrating their effective use in solving complex combinatorial optimization and NP-Complete problems.

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