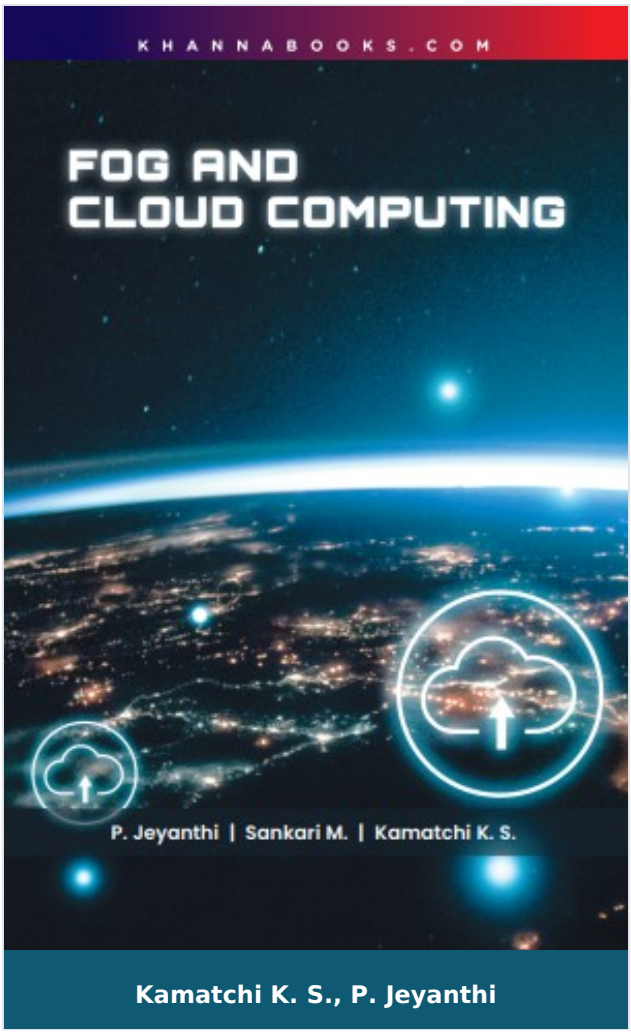

Kamatchi K. S., P. Jeyanthi

Fog and Cloud Computing

Author :	Kamatchi K. S., P. Jeyanthi
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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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Author

Kamatchi K. S.

P. Jeyanthi, Sankari M., Kamatchi K. S.

P. Jeyanthi

P. Jeyanthi, Sankari M., Kamatchi K. S.

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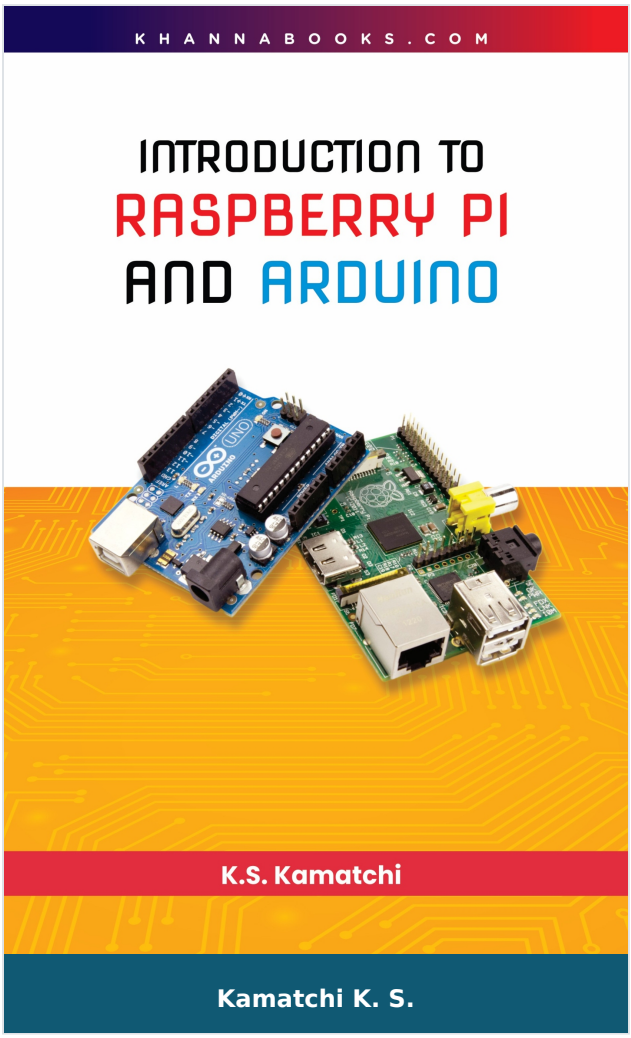

Introduction to Raspberry Pi and Arduino

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Product Description

"Introduction to Raspberry Pi and Arduino" is a comprehensive, practical guide designed to launch aspiring engineers, students, and hobbyists into the dynamic world of the Internet of Things (IoT), embedded systems, and electronics. Recognizing that modern IoT innovation rests upon versatile prototyping tools, this book provides focused, hands-on instruction for the two most popular platforms: Arduino and Raspberry Pi.

The core purpose of this text is to bridge the gap between theoretical electronic concepts and the tangible creation of smart devices. The journey begins by laying the groundwork, introducing the essential components of any IoT ecosystem, such as sensors and actuators. The book then systematically separates the platforms: Arduino is utilized for building interactive and rapid-prototyping applications, while the more powerful Raspberry Pi is leveraged for creating complex, networked, and web-connected projects. Readers will learn to integrate Wi-Fi supported modules like the ESP 8266, manage cloud communication (e.g., Thing Speak, Blynk), and design full-scale home automation systems that combine both microcontrollers.

With its academic yet friendly tone and chapters structured around hands-on examples, this resource guarantees that by the end, you will be equipped with the necessary knowledge and practical skills to create your own innovative IoT solutions, moving from the simplest to the most sophisticated systems. This book is your essential gateway to becoming a builder in the digital age.

Salient Features:

• Dual Platform Focus: Dedicated, practical coverage of both Arduino (for interactive prototyping) and Raspberry Pi (for complex, networked systems), providing versatile skills for any DIY electronics project.

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• Core IoT Components: Detailed introduction to sensors and actuators and their roles in IoT systems, with practical guidance on interfacing various types of sensors (LDRs, DHT-22, etc.) for crucial data collection.

• Hands-on Projects: Every chapter provides hands-on examples and step-by-step guides, enabling readers to follow along, experiment, and immediately build their own IoT applications for real-world problem-solving.

• Cloud Communication: Comprehensive coverage of IoT integration and cloud connectivity, including using the ESP 8266 Wi-Fi module and platforms like ThingSpeak and Blynk for remote data monitoring.

• Web-Connected Control: Teaches how to leverage the Raspberry Pi's potential for web-connected projects, covering key concepts like setting up a LAMP Web-server and controlling GPIO pins over a web browser.

• Visual Programming: Includes exploration of the Node-RED Visual Editor, which simplifies home automation and IoT design using a flow-based programming model to connect hardware, APIs, and online services.

• Integrated Automation: Explains the design and implementation of home automation systems that leverage both platforms, covering communication protocols like MQTT and providing blueprints for smart devices and solutions.

• Code Practicality: Provides executable code and programming guidance in both C/C++ (for Arduino sketches) and Python (for Raspberry Pi GPIO and networking), preparing the reader for full-stack embedded development.

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Author

Kamatchi K. S.

P. Jeyanthi, Sankari M., Kamatchi K. S.

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Kamatchi K. S., Sundaravelrani

Open Source Software

Author :	Kamatchi K. S., Sundaravelrani
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Product Description

Open Source Software

Open-Source Software (OSS) has fundamentally transformed the modern technological landscape, becoming the backbone of computing by driving innovation, collaboration, and democratizing access to powerful tools.

Open Source Software is a comprehensive guide designed to equip both seasoned developers and newcomers with the theoretical and practical knowledge needed to thrive in the open-source ecosystem. The book starts with an in-depth exploration of the legal landscape, clarifying complex topics such as copyright, patents, and licensing (including GPL, MIT, and Apache) to ensure legal compliance in open-source projects.

The technical journey delves into the foundational tools, including the indispensable GNU/Linux operating system and its core utilities, compilers, and linkers. It masters open-source programming techniques such as version control (Git), code reviews, and effective development toolchains. Ultimately, this text empowers you to contribute to and leverage OSS systems, transforming you from a user into a vital participant in the global open collaboration movement.

Salient Features:

- **Legal and Licensing Mastery**: Comprehensive coverage of Intellectual Property (IP) Rights and the core concepts of Free Software (the four freedoms). Detailed analysis of copyleft licenses (GPL, AGPL) versus permissive licenses (MIT, Apache, BSD).
- **GNU/Linux System Essentials**: Installation and configuration of GNU/Linux distributions, including mastering basic shell commands for file/directory management.

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- **Server Configuration**: Practical instruction on setting up and managing open-source Email (Postfix), Web (Apache), File (NFS), and Proxy Services.
- **Programming and Debugging Tools**: Deep understanding of GNU LIBC Libraries, Compilers, and Linkers, along with powerful tools for Memory Debugging/Profiling (Mpatrol and Valgrind).
- **Scripting and Automation**: Hands-on introduction to Bash, SED, and AWK scripting for system automation and data manipulation.
- **GUI Application Development**: Introduction to cross-platform GUI Programming using open-source frameworks like Qt and GTK+, including techniques for Localization.
- **FOSS Philosophy and Trends**: Examination of the FOSS philosophy and trends, including its global and Indian adoption and potential.

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- Understanding GNU LIBC Libraries, compilers and linker
- Open-source Programming Techniques
- Exercise

Author

Kamatchi K. S.

P. Jeyanthi, Sankari M., Kamatchi K. S.

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