Atmel Avr Springer

With this book, Christopher Kormanyos delivers a highly practical guide to programming real-time embedded microcontroller systems in C++. It is divided into three parts plus several appendices. Part I provides a foundation for real-time C++ by covering language technologies, including object-oriented methods, template programming and optimization. Next, part II presents detailed descriptions of a variety of C++ components that are widely used in microcontroller programming. It details some of C++'s most powerful language elements, such as class types, templates and the STL, to develop components for microcontroller register access, low-level drivers, custom memory management, embedded containers, multitasking, etc. Finally, part III describes mathematical methods and generic utilities that can be employed to solve recurring problems in real-time C++. The appendices include a brief C++ language tutorial, information on the real-time C++ development environment and instructions for building GNU GCC cross-compilers and a microcontroller circuit. For this third edition, the most recent specification of C++17 in ISO/IEC 14882:2017 is used throughout the text. Several sections on new C++17 functionality have been added, and various others reworked to reflect changes in the standard. Also several new sample projects are introduced and existing ones extended, and various user suggestions have been incorporated. To facilitate portability, no libraries other than those specified in the language standard itself are used. Efficiency is always in focus and numerous examples are backed up with real-time performance measurements and size analyses that quantify the true costs of the code down to the very last byte and microsecond. The target audience of this book mainly consists of students and professionals interested in real-time C++. Readers should be familiar with C or another programming language and will benefit most if they have had some previous experience with microcontroller electronics and the performance and size issues prevalent in embedded systems programming.

This book shows how to build a "INFelecPHY GPS Unit" (IEP-GPS) tracking system for fleet management that is based on 3G and GPRS modules. This model should provide reliability since it deals with several protocols: 1) HTTP and HTTPS to navigate, download and upload in real time the information to a web server, 2) FTTP and FTTPS to handle in a non-real time the files to the web application, and 3) SMTP and POP3 to send and receive email directly from the unit in case of any alert. Similar to a mobile device, but without screen for display, it is multifunctional because it links to a GPRS module, a camera, a speaker, headphone, a keypad and screen.

DepCoS – RELCOMEX is an annual series of conferences organized by the Institute of Computer Engineering, Control and Robotics (CECR), Wroc?aw University of Technology, since 2006. Its idea came from the heritage of the other two cycles of events: RELCOMEX Conferences (1977 – 89) and Microcomputer Schools (1985 – 95) which were then organized by the Institute of Engineering Cybernetics, the previous name of CECR. In contrast to those preceding meetings focused on the conventional reliability analysis, the DepCoS mission is to develop a more comprehensive approach to computer system performability, which is now commonly called dependability. Contemporary technical systems are integrated unities of technical, information, organization, software and human resources. Diversity of the processes being realized in the system, their concurrency and their reliance on in-system intelligence significantly impedes construction of strict mathematical models and calls for application of intelligent and soft computing methods. The submissions included in this volume illustrate variety of problems that need to be explored in the dependability analysis: methodologies and practical tools for modeling, design and simulation of the systems, security and confidentiality in information processing, specific issues of heterogeneous, today often wireless,

computer networks, or management of transportation networks.

Artificial intelligence (AI) stands out as a transformational technology of the digital age. Its practical applications are growing very rapidly. One of the chief reasons AI applications are attaining prominence, is in its design to learn continuously, from real-world use and experience, and its capability to improve its performance. It is no wonder that the applications of AI span from complex high-technology equipment manufacturing to personalized exclusive recommendations to end-users. Many deployments of AI software, given its continuous learning need, require computation platforms that are resource intense, and have sustained connectivity and perpetual power through central electrical grid. In order to harvest the benefits of AI revolution to all of humanity, traditional AI software development paradigms must be upgraded to function effectively in environments that have resource constraints, small form factor computational devices with limited power, devices with intermittent or no connectivity and/or powered by non-perpetual source or battery power. The aim this book is to prepare current and future software engineering teams with the skills and tools to fully utilize AI capabilities in resource-constrained devices. The book introduces essential AI concepts from the perspectives of full-scale software development with emphasis on creating niche Blue Ocean small form factored computational environment products.

This book constitutes revised selected papers from the 20th International Conference on Information Security and Cryptology, ICISC 2017, held in Seoul, South Korea, in November/December 2017. The total of 20 papers presented in this volume were carefully reviewed and selected from 70 submissions. The papers were organized in topical sections named: symmetric key encryption; homomorphic encryption; side channel analysis and implementation; broadcast encryption; elliptic curve; signature and protocol; and network and system security.

The book, gathering the proceedings of the Future of Information and Communication Conference (FICC) 2018, is a remarkable collection of chapters covering a wide range of topics in areas of information and communication technologies and their applications to the real world. It includes 104 papers and posters by pioneering academic researchers, scientists, industrial engineers, and students from all around the world, which contribute to our understanding of relevant trends of current research on communication, data science, ambient intelligence, networking, computing, security and Internet of Things. This book collects state of the art chapters on all aspects of information science and communication technologies, from classical to intelligent, and covers both theory and applications of the latest technologies and methodologies. Presenting state-of-the-art intelligent methods and techniques for solving real-world problems along with a vision of the future research, this book is an interesting and useful resource. The chapter "Emergency Departments" is available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

Johannes Buchmann is internationally recognized as one of the leading figures in areas of computational number theory, cryptography and information security. He has published numerous scientific papers and books spanning a very wide spectrum of interests; besides R&D he also fulfilled lots of administrative tasks for instance building up and directing his research group CDC at Darmstadt, but he also served as the Dean of the Department of Computer Science at TU Darmstadt and then went on to become Vice President of the university for six years (2001-2007). This festschrift, published in honor of Johannes Buchmann on the occasion of his 60th birthday, contains contributions by some of his colleagues, former students and friends. The papers give an overview of Johannes Buchmann's research interests, ranging from computational number theory and the hardness of cryptographic assumptions to more application-oriented topics such as privacy and hardware security. With this book we celebrate Johannes Buchmann's vision and achievements.

In recent years, the role of information and communications technologies in the development of agriculture and environmental issues has

received significant attention in different types of international forums. With new technologies constantly developing, there is a need for research dedicated to technological progress. Innovations and Trends in Environmental and Agricultural Informatics provides emerging research on the design, development, and implementation of complex agricultural and environmental information systems, addressing the integration of several scientific domains including agronomy, mathematics, economics, and computer science. While highlighting topics such as image quality assessment, environmental policy, and supervised classification, this publication explores the applications and progress of various technologies within agricultural and environmental professions. This book is an important resource for researchers, professionals, academics, students, and scientists seeking current research on the rapidly evolving field of technology integration in agricultural production and environmental issues.

This book constitutes the refereed proceedings of the 5th International Conference on the Theory and Application of Cryptographic Techniques in Africa, AFRICACRYPT 2011, held in Ifrane, Morocco, in July 2012. The 24 papers presented together with abstracts of 2 invited talks were carefully reviewed and selected from 56 submissions. They are organized in topical sections on signature schemes, stream ciphers, applications of information theory, block ciphers, network security protocols, public-key cryptography, cryptanalysis of hash functions, hash functions: design and implementation, algorithms for public-key cryptography, and cryptographic protocols.

This book constitutes the refereed proceedings of the 7th International Conference on Evolvable Systems, ICES 2007, held in Wuhan, China, in September 2007. The 41 revised full papers collected in this volume are organized in topical sections on digital hardware evolution, analog hardware evolution, bio-inspired systems, mechanical hardware evolution, evolutionary design, evolutionary algorithms in hardware design, and hardware implementation of evolutionary algorithms.

Wireless sensor networks (WSNs) are envisioned to enable a variety of applications including environmental monitoring, building and plant automation, homeland se- rity and healthcare. It has been argued that one of the key characteristics of sensor networks is that they are tightly coupled with the applications running on top of them. Although WSNs have been an active area of research for over a decade, real world sensor network deployments have not yet found their way to widespread adoption. The experience gained and lessons learned during the initial attempts to deploy WSNs and implement various sensor network applications are very valuable for the - vancement of this technology. Recognizing the need of a conference dedicated to practical aspects of WSN p- taining to their employment in a plethora of applications, ICST launched SENSAPPEAL as a yearly event whose first edition took place in September 2009 at the Athens Information Technology campus in the outskirts of Athens, Greece.

This book examines the evolution of self-organised multicellular structures, and the remarkable transition from unicellular to multicellular life. It shows the way forward in developing new robotic entities that are versatile, cooperative and self-configuring.

This book constitutes the thoroughly refereed post-conference proceedings of the 20th International Workshop on Fast Software Encryption, held in Singapore, March 11-13, 2013. The 30 revised full papers presented were carefully reviewed and selected from 97 initial submissions. The papers are organized in topical sections on block ciphers, lightweight block ciphers, tweakable block ciphers, stream ciphers, hash functions, message authentication codes, provable security, implementation aspects, lightweight

authenticated encryption, automated cryptanalysis, Boolean functions.

This book constitutes the thoroughly refereed post-conference proceedings of the 10th International Workshop on Information Security Applications, WISA 2009, held in Busan, Korea, during August 25-27, 2009. The 27 revised full papers presented were carefully reviewed and selected from a total of 79 submissions. The papers are organized in topical sections on mutlimedia security, device security, HW implementation security, applied cryptography, side channel attacks, cryptograptanalysis, anonymity/authentication/access controll, and network security.

This book reports on an outstanding research devoted to modeling and control of dynamic systems using fractional-order calculus. It describes the development of model-based control design methods for systems described by fractional dynamic models. More than 300 years had passed since Newton and Leibniz developed a set of mathematical tools we now know as calculus. Ever since then the idea of non-integer derivatives and integrals, universally referred to as fractional calculus, has been of interest to many researchers. However, due to various issues, the usage of fractional-order models in real-life applications was limited. Advances in modern computer science made it possible to apply efficient numerical methods to the computation of fractional derivatives and integrals. This book describes novel methods developed by the author for fractional modeling and control, together with their successful application in real-world process control scenarios.

Cryptographic Hardware and Embedded Systems -- CHES 201214th International Workshop, Leuven, Belgium, September 9-12, 2012, ProceedingsSpringer

This book constitutes the thoroughly refereed post-conference proceedings of the 17th International Conference on Information and Communications Security, ICISC 2015, held in Beijing, China, in December 2015. The 24 revised full papers and 19 short papers presented were carefully selected from 148 submissions. The papers provide the latest results in research and development in the field of information security and applied cryptology.

This book constitutes the thoroughly refereed post-proceedings of the Second European Workshop on Security and Privacy in Ad hoc and Sensor Networks, ESAS 2005, held in Visegrad, Hungary in July 2005, in conjunction with the First International Conference on Wireless Internet (WICON). The 17 revised full papers were carefully reviewed and selected from a total of 51 submissions. The papers address current topics in network security, cryptography, and wireless networking communities and present original research on all aspects of security and privacy in wireless ad hoc and sensor networks.

The book covers a wide range of topics in Computer Science and Information Technology including swarm intelligence, artificial intelligence, evolutionary algorithms, and bio-inspired algorithms. It is a collection of papers presented at the First International Conference on Intelligent Computing and Communication (ICIC2) 2016. The prime areas of the conference are Intelligent Computing, Intelligent Communication, Bio-informatics, Geo-informatics, Algorithm, Graphics and Image

Processing, Graph Labeling, Web Security, Privacy and e-Commerce, Computational Geometry, Service Orient Architecture, and Data Engineering.

This book constitutes the proceedings of the 20th International Conference on Selected Areas in Cryptography, SAC 2013, held in Burnaby, Canada, in August 2013. The 26 papers presented in this volume were carefully reviewed and selected from 98 submissions. They are organized in topical sections named: lattices; discrete logarithms; stream ciphers and authenticated encryption; post-quantum (hash-based and system solving); white box crypto; block ciphers; elliptic curves, pairings and RSA; hash functions and MACs; and side-channel attacks. The book also contains 3 full-length invited talks.

This book constitutes the refereed proceedings of the 13th International Conference on Detection of Intrusions and Malware, and Vulnerability Assessment, DIMVA 2016, held in San Sebastián, Spain, in July 2016. The 19 revised full papers and 2 extended abstracts presented were carefully reviewed and selected from 66 submissions. They present the state of the art in intrusion detection, malware analysis, and vulnerability assessment, dealing with novel ideas, techniques, and applications in important areas of computer security including vulnerability detection, attack prevention, web security, malware detection and classification, authentication, data leakage prevention, and countering evasive techniques such as obfuscation.

The AVR microcontroller from Atmel (now Microchip) is one of the most widely used 8-bit microcontrollers. Arduino Uno is based on AVR microcontroller. It is inexpensive and widely available around the world. This book combines the two. In this book, the authors use a step-by-step and systematic approach to show the programming of the AVR chip. Examples in both Assembly language and C show how to program many of the AVR features, such as timers, serial communication, ADC, SPI, I2C, and PWM. The text is organized into two parts: 1) The first 6 chapters use Assembly language programming to examine the internal architecture of the AVR. 2) Chapters 7-18 uses both Assembly and C to show the AVR peripherals and I/O interfacing to real-world devices such as LCD, motor, and sensor. The first edition of this book published by Pearson used ATmega32. It is still available for purchase from Amazon. This new edition is based on Atmega328 and the Arduino Uno board. The appendices, source codes, tutorials and support materials for both books are available on the following websites: http: //www.NicerLand.com/ and http: //www.MicroDigitalEd.com/AVR/AVR_books.htm

This volume contains the workshopproceedings of the accompanying workshops of the 14th Financial Cryptograpy and Data Security International Conference 2010, held on Tenerife, Canary Islands, Spain, January 25-28, 2010. FinancialCryptographyandData Securityis a majorinternationalforumfor research, advanced development, education,

exploration, and debate regarding information assurance, with a speci?c focus on commercial contexts. The c- ference covers all aspects of securing transactions and systems and especially encourages original work focusing on both fundamental and applied real-world deployments on all aspects surrounding commerce security. Three workshops were co-located with FC 2010: the Workshop on Real-Life CryptographicProtocolsandStandardization(RLCPS),theWorkshoponEthics in Computer Security Research (WECSR), and the Workshop on Lightweight Cryptography for Resource-Constrained Devices (WLC). Intimate and colorful by tradition, the high-quality program was not the only attraction of FC. In the past, FC conferences have been held in highly research-synergistic locations such as Tobago, Anguilla, Dominica, Key West, Guadelupe, Bermuda, the Grand Cayman, and Cozumel Mexico. 2010 was the ?rst year that the conference was held on European soil, in the Spanish Canary Islands, in Atlantic waters, a few miles across Morocco. Over 100 researchers from more than 20 countries were in attendance.

This volume includes extended and revised versions of a set of selected papers from the 2011 2nd International Conference on Education and Educational Technology (EET 2011) held in Chengdu, China, October 1-2, 2011. The mission of EET 2011 Volume 2 is to provide a forum for researchers, educators, engineers, and government officials involved in the general areas of education management, education theory and education application to disseminate their latest research results and exchange views on the future research directions of these fields. 133 related topic papers were selected into this volume. All the papers were reviewed by 2 program committee members and selected by the volume editor Prof. Yuanzhi Wang, from Intelligent Information Technology Application Research Association, Hong Kong. The conference will bring together leading researchers, engineers and scientists in the domain of interest. We hope every participant can have a good opportunity to exchange their research ideas and results and to discuss the state of the art in the areas of the education management, education theory and education application.

ThisvolumecontainstheproceedingsofFM2003,the12thInternationalFormal Methods Europe Symposium which was held in Pisa, Italy on September 8–14, 2003. Formal Methods Europe (FME, www. fmeurope. org) is an independent - sociation which aims to stimulate the use of and research on formal methods for system development. FME conferences began with a VDM Europe symposium in 1987. Since then, the meetings have grown and have been held about once - ery 18 months. Throughout the years the symposia have been notably successful in bringing together researchers, tool developers, vendors, and users, both from academia and from industry. Unlike previous symposia in the series, FM 2003 was not given a speci?c theme. Rather, its main goal could be synthesized as "widening the scope. " Indeed, the organizers aimed at enlarging the audience and impact of the symposium along several directions. Dropping the su?x 'E' from the title of the conference re?ects the wish to welcome participation and contribution from every country; also,contributionsfromoutsidethetraditionalFormalMethodscommunitywere solicited. The recent innovation of including an Industrial Day as an

important part of the symposium shows the strong commitment to involve industrial p- ple more and more within the Formal Methods community. Even the traditional and rather fuzzy borderline between "software engineering formal methods" and methods and formalisms exploited in di?erent ?elds of engineering was so- what challenged.

This book constitutes the refereed proceedings of the 6th International Conference on the Theory and Application of Cryptographic Techniques in Africa, AFRICACRYPT 2013, held in Cairo, Egypt, in June 2013. The 26 papers presented were carefully reviewed and selected from 77 submissions. They cover the following topics: secret-key and public-key cryptography and cryptanalysis, efficient implementation, cryptographic protocols, design of cryptographic schemes, security proofs, foundations and complexity theory, information theory, multi-party computation, elliptic curves, and lattices.

The two-volume set, LNCS 10492 and LNCS 10493 constitutes the refereed proceedings of the 22nd European Symposium on Research in Computer Security, ESORICS 2017, held in Oslo, Norway, in September 2017. The 54 revised full papers presented were carefully reviewed and selected from 338 submissions. The papers address issues such as data protection; security protocols; systems; web and network security; privacy; threat modeling and detection; information flow; and security in emerging applications such as cryptocurrencies, the Internet of Things and automotive.

This volume constitutes the refereed proceedings of the 7th International Conference on Smart Card Research and Advanced Applications, CARDIS 2006, held in Tarragona, Spain, in April 2006. The 25 revised full papers presented were carefully reviewed and updated for inclusion in this book. The papers are organized in topical sections on smart card applications, side channel attacks, smart card networking, cryptographic protocols, RFID security, and formal methods.

This book focuses on prototyping aspects of concurrent control systems and their further implementation and partial reconfiguration in programmable devices. Further, it lays out a full prototyping flow for concurrent control systems. Based on a given primary specification, a system is described with an interpreted Petri net, which naturally reflects the concurrent and sequential relationships of the design. The book shows that, apart from the traditional option of static configuration of the entire system, the latest programmable devices (especially FPGAs) offer far more sophistication. Partial reconfiguration allows selected parts of the system to be replaced without having to reprogram the entire structure of the device. Approaches to dynamic and static partial reconfiguration of concurrent control systems are presented and described in detail."/p> The theoretical work is illustrated by examples drawn from various applications, with a milling machine and a traffic-light controller highlighted as representative interpreted Petri nets. Given the ubiquity of concurrent control systems in a huge variety of technological areas including transportation, medicine, artificial intelligence, manufacturing, security and safety and planetary exploration, the innovative software and hardware design methods described here will be of considerable interest to control engineers and systems and circuits researchers in many areas of industry and academia.

This book constitutes the thoroughly refereed proceedings of the 11th International Conference on Security for Information Technology and Communications, SecITC 2018, held in Bucharest, Romania, in November 2018. The 35 revised full papers presented together with 3 invited talks were carefully reviewed and selected from 70 submissions. The papers present advances in the theory, design, implementation, analysis, verification, or evaluation of secure systems and algorithms.

Embedded Software Development With C offers both an effectual reference for professionals and researchers, and a valuable learning tool for students by laying the groundwork for a solid foundation in the hardware and software aspects of embedded systems development. Key

features include a resource for the fundamentals of embedded systems design and development with an emphasis on software, an exploration of the 8051 microcontroller as it pertains to embedded systems, comprehensive tutorial materials for instructors to provide students with labs of varying lengths and levels of difficulty, and supporting website including all sample codes, software tools and links to additional online references.

"This book addresses the development of reconfigurable embedded control systems and describes various problems in this important research area, which include static and dynamic (manual or automatic) reconfigurations, multi-agent architectures, modeling and verification, component-based approaches, architecture description languages, distributed reconfigurable architectures, real-time and low power scheduling, execution models, and the implementation of such systems"--

This textbook serves as an introduction to the subject of embedded systems design, using microcontrollers as core components. It develops concepts from the ground up, covering the development of embedded systems technology, architectural and organizational aspects of controllers and systems, processor models, and peripheral devices. Since microprocessor-based embedded systems tightly blend hardware and software components in a single application, the book also introduces the subjects of data representation formats, data operations, and programming styles. The practical component of the book is tailored around the architecture of a widely used Texas Instrument's microcontroller, the MSP430 and a companion web site offers for download an experimenter's kit and lab manual, along with Powerpoint slides and solutions for instructors.

This book constitutes the thoroughly refereed post-conference proceedings of the 6th International Workshop, COSADE 2015, held in Berlin, Germany, in April 2015. The 17 revised full papers presented were carefully selected from 48 submissions. the focus of this workshop was on following topics: side-channel attacks, FPGA countermeasures, timing attacks and countermeasures, fault attacks, countermeasures, and Hands-on Side-channel analysis.

The effects of climate change, rapid urbanization, and aging infrastructure challenge water policymakers to confront a radical paradigm shift in water resources utilization. Recent advances in sensing, networking, processing, and control have provided the means for sustainable solutions in water management, and their implementation in water infrastructures is collectively referred to as "smart water grids." Smart water grids depend upon cyber-physical system principles to effectively respond to issues regarding the scalability and reliability of dynamic and inaccessible environments. As such, unique smart water grid issues associated with front-end signal processing, communication, control, and data analysis must be jointly addressed, while sophisticated techniques for data analytics must be introduced into cyber-physical systems research. This book provides a thorough description of the best practices for designing and implementing cyber-physical systems that are tailored to different aspects of smart water grids. It is organized into three distinct, yet complementary areas, namely: the theory behind water-oriented cyber-physical systems with an emphasis on front-end sensing and processing, communication technologies, and learning techniques over water data; the applications and emerging topics of cyber-physical systems for water urban infrastructures, including real-life deployments, modern control tools, and economic aspects for smart water grids; and the applications and emerging topics across natural environments, emphasizing the evolution of fresh water resources. The structured discussion yields a rich, comprehensive body of

knowledge on this emerging topic of research and engineering. As water issues intensify on a global scale, this book offers an algorithmic and practical toolkit for intermediate and advanced readers as well as professionals and researchers who are active in, or interested in, learning more about smart water grids. Key Features: Emphasizes the multidisciplinary nature of this emerging topic, covering both theoretical and practical aspects of this area while providing insights on existing deployments, which can serve as design examples for new applications. Explores how modern signal processing and machine learning techniques can contribute and enrich the potential of smart water grids, well beyond conventional closed-loop control techniques. Highlights complementary aspects that will help shape the future of smart water grids, such as consumption awareness, economic aspects, and control tools in industrial water treatment as well as the impact of climate change on fresh water resources. Enables the reader to better understand this emerging topic, investing in current state-of-the-art and future technological roadmaps for smart water grids.

This 2nd edition textbook has been expanded to include of 175 additional pages of additional content, created in response to readers feedback, as well as to new hardware and software releases. The book presents foundational robotics concepts using the ROBOTIS BIOLOID and OpenCM-904 robotic systems, and is suitable as a curriculum for a first course in robotics for undergraduate students or a self-learner. It covers wheel-based robots, as well as walking robots. Although it uses the standard "Sense, Think, Act" approach, communications (bot-to-bot and PC-to-bot) programming concepts are treated in more depth (wired and wireless ZigBee/BlueTooth). Algorithms are developed and described via ROBOTIS' proprietary RoboPlus IDE, as well as the more open Arduino-based Embedded C environments. Additionally, a vast array of web-based multimedia materials are used for illustrating robotics concepts, code implementations and videos of actual resulting robot behaviors. Advanced sensor interfacing for gyroscope, inertial measuring unit, foot pressure sensor and color camera are also demonstrated.

This book constitutes the refereed proceedings of the 5th International Conference on Security, Privacy, and Applied Cryptography Engineering, SPACE 2015, held in Jaipur, India, in October 2015. The 17 full papers presented in this volume were carefully reviewed and selected from 57 submissions. The book also contains 4 invited talks in full-paper length. The papers are devoted to various aspects of security, privacy, applied cryptography, and cryptographic engineering.

This book constitutes the proceedings of the 14th International Workshop on Cryptographic Hardware and Embedded Systems, CHES 2012, held in Leuven, Belgium, in September 2012. The 32 papers presented together with 1 invited talk were carefully reviewed and selected from 120 submissions. The papers are organized in the following topical sections: intrusive attacks and countermeasures; masking; improved fault attacks and side channel analysis; leakage resiliency and security analysis; physically unclonable functions; efficient implementations; lightweight cryptography; we still love RSA; and hardware implementations.

This book addresses researchers and graduate students at the forefront of study/research on the Internet of Things (IoT) by presenting state-of-the-art research together with the current and future challenges in building new smart applications (e.g., Smart Cities, Smart Buildings, and Industrial IoT) in an efficient, scalable, and sustainable way. It covers the main pillars of the IoT world (Connectivity, Interoperability, Discoverability, and Security/Privacy), providing a comprehensive look at the current technologies,

procedures, and architectures.