Single Mode Bluetooth Low Energy

Bluetooth Low Energy Getting Started with Bluetooth Low Energy Intro to Bluetooth Low Energy **Inside Bluetooth Low Energy Building Bluetooth Low Energy Systems IoT Projects with Bluetooth Low Energy Bluetooth Low Energy in Arduino 101** *Building Bluetooth Low Energy (BLE) Systems* Bluetooth Low Energy in iOS Swift Analytics for the Internet of Things (IoT) *Bluetooth Low Energy in Android Java Make: Bluetooth Essentials of Short-Range Wireless Hacking Internet of Things* Unraveling Bluetooth LE Audio *Bluetooth Tutorial* **Bluetooth Low Energy in C++ with nRF Microcontrollers** 13th EAI International Conference on Body Area Networks **Protocols and Applications for the Industrial Internet of Things** Getting Started with Bluetooth Low Energy **Guide to Bluetooth Security** *Encyclopedia of Wireless Networks Beacon Technologies Inside Bluetooth Low Energy, Second Edition* **IoT Development for ESP32 and ESP8266 with JavaScript Bluetooth Low Energy** *Bluetooth Essentials for Programmers Computational Intelligence, Communications, and Business Analytics* Beginning Arduino Nano 33 IoT **Getting Started with Bluetooth Low Energy Digital Cities Future Data and Security Engineering The Impact of Digital Technologies on Public Health in Developed and Developing Countries Advances in Cyber Security IoT Projects with Arduino Nano 33 BLE Sense Software Engineering at Google IoT Projects with Bluetooth Low Energy Advances in Electrical and Computer Technologies Google Leaks Earth Day**

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Analytics for the Internet of Things (IoT) Jan 26 2022 Break through the hype and learn how to extract actionable intelligence from the flood of IoT data About This Book Make better business decisions and acquire greater control of your IoT infrastructure Learn techniques to solve unique problems associated with IoT and examine and analyze data from your IoT devices Uncover the business potential generated by data from IoT devices and bring down business costs Who This Book Is For This book targets developers, IoT professionals, and those in the field of data science who are trying to solve business problems through IoT devices and would like to analyze IoT data. IoT enthusiasts, managers, and entrepreneurs who would like to make the most of IoT will find this

equally useful. A prior knowledge of IoT would be helpful but is not necessary. Some prior programming experience would be useful What You Will Learn Overcome the challenges IoT data brings to analytics Understand the variety of transmission protocols for IoT along with their strengths and weaknesses Learn how data flows from the IoT device to the final data set Develop techniques to wring value from IoT data Apply geospatial analytics to IoT data Use machine learning as a predictive method on IoT data Implement best strategies to get the most from IoT analytics Master the economics of IoT analytics in order to optimize business value In Detail We start with the perplexing task of extracting value from huge amounts of barely intelligible data. The data takes a convoluted route just to be on the servers for analysis, but insights can emerge through visualization and statistical modeling techniques. You will learn to extract value from IoT big data using multiple analytic techniques. Next we review how IoT devices generate data and how the information travels over networks. You'll get to know strategies to collect and store the data to optimize the potential for analytics, and strategies to handle data quality concerns. Cloud resources are a great match for IoT analytics, so Amazon Web Services, Microsoft Azure, and PTC ThingWorx are reviewed in detail next. Geospatial analytics is then introduced as a way to leverage location information. Combining IoT data with environmental data is also discussed as a way to enhance predictive capability. We'll also review the economics of IoT analytics and you'll discover ways to optimize business value. By the end of the book, you'll know how to handle scale for both data storage and analytics, how Apache Spark can be leveraged to handle scalability, and how R and Python can be used for analytic modeling. Style and approach This book follows a step-by-step, practical approach to combine the power of analytics and IoT and help you get results quickly

Intro to Bluetooth Low Energy Sep 02 2022 Bluetooth Low Energy (BLE) is an exciting new

technology that was introduced in 2010. It targets applications in the Internet of Things (IoT) space. With the recent release of Bluetooth 5 in late 2016 and Bluetooth mesh in mid-2017 (which builds on top of BLE), Bluetooth is now more capable than ever of becoming the standard wireless protocol used in many IoT applications including: smart homes, smart cities, medical devices, wearables, and sensor connectivity. Learning a new technology is always challenging and usually comes with a learning curve. Some technologies are easier to learn than others. Unfortunately, Bluetooth Low Energy (BLE) can be one of those hard ones. The lack of good resources including blogs, tutorials, and up-to-date books that help a beginner to learn BLE, makes the task even more difficult. That is, in fact, the primary goal of this book: to provide you with a complete understanding of the basics and core concepts of BLE that you can learn in a single weekend. Here's a tiny list of the benefits this book will help you achieve: Understand what Bluetooth Low Energy is and how it compares to Bluetooth Classic. Become better informed about the use cases where BLE makes the most sense. Learn all about Bluetooth 5 and the new features it brought us. Understand how two BLE devices discover and connect with each other. Understand how BLE devices exchange and transfer data between each other. Fully grasp concepts such as Peripherals, Centrals, Advertising, Connections, GATT, GAP, and many others. Learn about the newly released Bluetooth mesh standard. What readers are saying "I bought your BLE book and I love it. I am an iOS developer and your material helped me understand some of the finer points of BLE" -Alex Carrizo, Senior iOS Developer, iOS SME at Mobile Apps Company Topics include: The basics of Bluetooth Low Energy & Bluetooth 5.0. The difference between BLE and Bluetooth Classic (the one used for streaming audio and connecting headsets). The benefits and limitations of using BLE and which use cases make the most sense for BLE. The difference between a BLE Central and a BLE Peripheral. All about GATT (Generic Attribute

Profile) and GAP (Generic Access Profile). How Bluetooth 5 achieves double the speed, four times the range, and eight times the advertising capacity.- How BLE devices advertise and discover each other. How two BLE devices connect to each other. How BLE devices exchange and transfer data between each other. Profiles, Services, and Characteristics. How secure BLE is, and how BLE devices secure the communication channel between them. The different connection and advertising parameters and what each of them means. An introduction to Bluetooth mesh. About the Author Mohammad Afaneh has been an embedded engineer for over 10 years. Since 2014, he has focused solely on learning and developing Bluetooth Low Energy applications. He even spent days and weeks reading through the 2,800+ page Bluetooth specification document looking for answers to questions he couldn't find answers to in other books and resources. He shares everything he knows about development for BLE technology at his website www.novelbits.io, and via training classes around the world.

Inside Bluetooth Low Energy, Second Edition Nov 11 2020 This updated and expanded second edition of the Artech House bestseller, Inside Bluetooth Low Energy, presents the recent developments within the Bluetooth Core Specifications 4.1 and 4.2. This new edition explores both Internet of Things (IoT) and Bluetooth Low Energy (LE) in one single flow and demonstrates how this technology is very well suited for IoT implementations. The book covers all the advances within the new specifications including Bluetooth LE enhanced power efficiency, faster connections, and enhanced privacy and security. Developed for ultra-low power devices, such as heart rate monitors, thermometers, and sensors, Bluetooth LE is one of the latest, most exciting enhancements to Bluetooth technology. This cutting-edge book presents an easy-to-understand, broad-based explanation of Bluetooth LE, its building blocks and how they all come together. Packed with

examples and practical scenarios, the book helps readers rapidly gain a clear, solid understanding of Bluetooth LE in order to work more effectively with its specification. This book explores the architecture of the Bluetooth LE stack and functionality of its layers and includes a broad view of the technology, identifies the various building blocks, and explains how they come together. Readers will also find discussions on Bluetooth basics, providing the background information needed to master Bluetooth LE.

IoT Projects with Arduino Nano 33 BLE Sense Dec 01 2019 Get started with the extremely versatile and powerful Arduino Nano 33 BLE Sense, a smart device based on the nRF52840 from Nordic semiconductors. This book introduces you to developing with the device. You'll learn how to access Arduino I/O such as analog and digital I/O, serial communication, SPI and I2C. The book also covers how to access sensor devices on Arduino Nano 33 BLE Sense, how to interact with other external devices over BLE, and build embedded Artificial Intelligence applications. Arduino Nano 33 BLE Sense consists of multiple built-in sensors such as 9-axis inertial, humidity, temperature, barometric, microphone, gesture, proximity, light color and light intensity sensors. With this book, you'll see how this board supports the Bluetooth Low Energy (BLE) network, enabling interactions with other devices over the network. What You'll Learn Prepare and set up Arduino Nano 33 BLE Sense board Operate Arduino Nano 33 BLE Sense board hardware and software Develop programs to access Arduino Nano 33 BLE Sense board I/O Build IoT programs with Arduino Nano 33 BLE Sense board Who This Book Is For Makers, developers, students, and professionals at any level interested in developing with the Arduino Nano 33 BLE Sense board.

Bluetooth Essentials for Programmers Aug 09 2020 This book provides an introduction to Bluetooth programming, with a specific focus on developing real code. The authors discuss the major concepts

and techniques involved in Bluetooth programming, with special emphasis on how they relate to other networking technologies. They provide specific descriptions and examples for creating applications in a number of programming languages and environments including Python, C, Java, GNU/Linux, Windows XP, Symbian Series 60, and Mac OS X. No previous experience with Bluetooth is assumed, and the material is suitable for anyone with some programming background. The authors place special emphasis on the essential concepts and techniques of Bluetooth programming, starting simply and allowing the reader to quickly master the basic concepts before addressing advanced features.

IoT Projects with Bluetooth Low Energy Sep 29 2019 Use the power of BLE to create exciting IoT applicationsAbout This Book* Build hands-on IoT projects using Bluetooth Low Energy and learn about Bluetooth 5 and its features.* Build a health tracking system, and indoor navigation and warehouse weather monitoring projects using smart devices.* Build on a theoretical foundation and create a practice-based understanding of Bluetooth Low Energy.Who This Book Is ForIf you're an application developer, a hardware enthusiast, or just curious about the Internet of Things and how to convert it into hands-on projects, then this book is for you. Having some knowledge of writing mobile applications will be advantageous.What You Will Learn* Learn about the architecture and IoT uses of BLE, and in which domains it is being used the most* Set up and learn about various development platforms (Android, iOS, Firebase, Raspberry Pi, Beacons, and GitHub)* Create an Explorer App (Android/iOS) to diagnose a Fitness Tracker* Design a Beacon with the Raspberry Pi and write an app to detect the Beacon* Write a mobile app to periodically poll the BLE tracking sensor* Compose an app to read data periodically from temperature and humidity sensors* Explore more applications of BLE with IoT* Design projects for both Android and iOS mobile platformsIn

DetailBluetooth Low Energy, or Bluetooth Smart, is Wireless Personal Area networking aimed at smart devices and IoT applications. BLE has been increasingly adopted by application developers and IoT enthusiasts to establish connections between smart devices.This book initially covers all the required aspects of BLE, before you start working on IoT projects. In the initial stages of the book, you will learn about the basic aspects of Bluetooth Low Energy--such as discovering devices, services, and characteristics--that will be helpful for advanced-level projects. This book will guide you through building hands-on projects using BLE and IoT. These projects include tracking health data, using a mobile App, and making this data available for health practitioners; Indoor navigation; creating beacons using the Raspberry Pi; and warehouse weather Monitoring. This book also covers aspects of Bluetooth 5 (the latest release) and its effect on each of these projects.By the end of this book, you will have hands-on experience of using Bluetooth Low Energy to integrate with smart devices and IoT projects.Style and approachA practical guide that will help you promote yourself into an expert by building and exploring practical applications of Bluetooth Low Energy.

Bluetooth Low Energy Sep 09 2020

Unraveling Bluetooth LE Audio Aug 21 2021 Explore how Bluetooth Low Energy (LE) has transformed the audio landscape, from music streaming to voice recognition applications. This book describes the rationale behind moving to LE audio, the potential power savings, and how various specifications need to be linked together to develop a final end product. LE Audio is a natural development of the Bluetooth audio standard. The standard is spread across more than a dozen different specifications, from application profiles, down to the core transports in both Host part and Controller part. You'll see how this new architecture of the Bluetooth audio stack defines a LE Audio stack from the Core Controller to the Host Protocols, and Profiles. You'll also learn how to free

yourself from wires and charging. LE Audio introduces a new audio compression codec called LC3 (Low Complexity Communication Codec), which covers sampling rates for the full range of voice and media application at high fidelity, low complexity and low bit-rate and is ideal for new applications – such as voice assistance and gaming. Unraveling Bluetooth Low Energy Audio provides full context to anyone who is curious to learn about the new LE Audio technology. What You'll Learn Understand the advantages of LE audio over current standards Describe the overall Bluetooth LE audio stack and its various blocks Enable LE audio with the Core Controller specification See how an end-to-end application works its through the LE audio ecosystem Examine how LE Audio addresses current and future trends in interoperable wireless audio Who This Book Is For The target audience for this book are developers, manufacturers, students, lecturers, teachers, technology geeks, platform integrators, and entrepreneurs.

Protocols and Applications for the Industrial Internet of Things Apr 16 2021 The Internet of Things (IoT) has become a major influence on the development of new technologies and innovations. When utilized properly, these applications can enhance business functions and make them easier to perform. Protocols and Applications for the Industrial Internet of Things discusses and addresses the difficulties, challenges, and applications of IoT in industrial processes and production and work life. Featuring coverage on a broad range of topics such as industrial process control, machine learning, and data mining, this book is geared toward academicians, computer engineers, students, researchers, and professionals seeking current and relevant research on applications of the IoT. *Beacon Technologies* Dec 13 2020 Learn the key standards—iBeacon, Eddystone, Bluetooth 4.0, and AltBeacon—and how they work with other proximity technologies. Then build your understanding of the proximity framework and how to identify and deploy the best solutions for your own business,

institutional, or consulting needs. Proximity technology—in particular, Bluetooth beacons—is a major source of business opportunity, and this book provides everything you need to know to architect a solution to capitalize on that opportunity. What You'll Learn Understand the disruptive implications of digital–physical convergence and the new applications it makes possible Review the key standards that solutions developers need to understand to capitalize on the business opportunity of proximity technology Discover the new phenomenon of beacon networks, which will be hugely significant in driving strategic decisions and creating wealth See other technologies in the proximity ecosystem catalyzed by and complementary to Bluetooth beacons, including visual light communication, magnetic resonance, and RFID Examine the Beacosystem framework for analyzing the proximity ecosystem Who This Book Is For Solutions architects of all types—venture capitalists, founders, CEOs, strategists, product managers, CTOs, business developers, and programmers Stephen Statler is a writer, public speaker, and consultant working in the beacon ecosystem. He trains and advises retailers, venue owners, VCs, as well as makers of beacon software and hardware, and is a thought leader in the beacosystem community. Previously he was the Senior Director for Strategy and Solutions Management at Qualcomm's Retail Solutions Division, helping to incubate Gimbal, one of the leading Bluetooth beacons in the market. He is also the CEO of Cause Based Solutions, creators of Give the Change, democratizing philanthropy, enabling non-profit supporters to donate the change from charity branded debit cards, and developer of The Good Traveler program. Contributors: Anke Audenaert, CEO, Favrit John Coombs, CEO, Rover Labs Theresa Mary Gordon, Co-Founder, tapGOconnect Phil Hendrix, Director, immr Kris Kolodziej, President, IndoorLBS Patrick Leddy, CEO, Pulsate Ben Parker, VP Business Development, AccelerateIT Mario Proietti, CEO, Location Smart Ray Rotolo, SVP OOH, Gimbal Kjartan Slette, COO, Unacast Jarno Vanto,

Partner, Borenius Attorneys LLP David Young, Chief Engineer, Radius Networks Foreword by Asif Khan, President LBMA

Building Bluetooth Low Energy (BLE) Systems Mar 28 2022 Discover and reshape the limitless possibilities of networking and small-distance communication with BLEAbout This Book* Build exciting wireless tech projects that make your web or mobile apps smarter in terms of networking and communications* Leverage the best of IoT by combining with BLE in some of the most popular and emerging tech areas such as wearable tech and health monitors* Acquire key skills to harness the power of BLE to enhance security and build more aware apps for Android and iOSWho This Book Is ForThe book is for developers and enthusiasts who are passionate about learning new technologies and want to add BLE features and services to their new or existing products. They should be familiar with programming languages such as Swift, Java, and JavaScript. A knowledge of debugging skills would be an advantage.What you will learn* Implement Bluetooth Low Energy Communication (Central and Peripheral) using Android* Understand BLE Beacons with various examples implemented over EddyStone and iBeacons* Build indoor navigation applications using Bluetooth beacons* Implement Internet gateways to control BLE devices on a Wi-Fi network* Understand BLE security mechanisms with a special focus on Bluetooth pairing, bonding, and key exchange to cover encryption, privacy, and user data integrity* Write Android BLE applications from the server and client sidesIn DetailBluetooth Low Energy (BLE) is a wireless personal area network technology aimed at novel applications for smart devices. High-precision BLE information and services are being increasingly used by application developers and hardware enthusiasts to allow devices to interact with the surrounding world.This book will focus on a technical introduction to BLE and how it is reshaping small-distance communication. We will start with IoT, where many

technologies such as BLE, Zigbee, and IEEE 802.15.4 Mesh will be introduced. You will get to know BLE from an engineering perspective where the protocol stack, architecture, and layers are discussed in detail. Further, the book explains the various cryptographic techniques and security models used by BLE. In the later part of the book, you will learn to implement BLE on Android and iOS. Finally, you will learn about the future of IoT and which technologies will be the center of attention going forward.

13th EAI International Conference on Body Area Networks May 18 2021 The papers in this proceeding discuss current and future trends in wearable communications and personal health management through the use of wireless body area networks (WBAN). The authors posit new technologies that can provide trustworthy communications mechanisms from the user to medical health databases. The authors discuss not only on-body devices, but also technologies providing information in-body. Also discussed are dependable communications combined with accurate localization and behavior analysis, which will benefit WBAN technology and make the healthcare processes more effective. The papers were presented at the 13th EAI International Conference on Body Area Networks (BODYNETS 2018), Oulu, Finland, 02-03 October 2018.

Advances in Electrical and Computer Technologies Aug 28 2019 This book comprises select proceedings of the International Conference on Advances in Electrical and Computer Technologies 2020 (ICAECT 2020). The papers presented in this book are peer-reviewed and cover latest research in electrical, electronics, communication and computer engineering. Topics covered include smart grids, soft computing techniques in power systems, smart energy management systems, power electronics, feedback control systems, biomedical engineering, geo informative systems, grid computing, data mining, image and signal processing, video processing, computer vision, pattern

recognition, cloud computing, pervasive computing, intelligent systems, artificial intelligence, neural network and fuzzy logic, broad band communication, mobile and optical communication, network security, VLSI, embedded systems, optical networks and wireless communication. The volume can be useful for students and researchers working in the different overlapping areas of electrical, electronics and communication engineering.

IoT Projects with Bluetooth Low Energy May 30 2022 Use the power of BLE to create exciting IoT applications About This Book Build hands-on IoT projects using Bluetooth Low Energy and learn about Bluetooth 5 and its features. Build a health tracking system, and indoor navigation and warehouse weather monitoring projects using smart devices. Build on a theoretical foundation and create a practice-based understanding of Bluetooth Low Energy. Who This Book Is For If you're an application developer, a hardware enthusiast, or just curious about the Internet of Things and how to convert it into hands-on projects, then this book is for you. Having some knowledge of writing mobile applications will be advantageous. What You Will Learn Learn about the architecture and IoT uses of BLE, and in which domains it is being used the most Set up and learn about various development platforms (Android, iOS, Firebase, Raspberry Pi, Beacons, and GitHub) Create an Explorer App (Android/iOS) to diagnose a Fitness Tracker Design a Beacon with the Raspberry Pi and write an app to detect the Beacon Write a mobile app to periodically poll the BLE tracking sensor Compose an app to read data periodically from temperature and humidity sensors Explore more applications of BLE with IoT Design projects for both Android and iOS mobile platforms In Detail Bluetooth Low Energy, or Bluetooth Smart, is Wireless Personal Area networking aimed at smart devices and IoT applications. BLE has been increasingly adopted by application developers and IoT enthusiasts to establish connections between smart devices. This book initially covers all the

required aspects of BLE, before you start working on IoT projects. In the initial stages of the book, you will learn about the basic aspects of Bluetooth Low Energy—such as discovering devices, services, and characteristics—that will be helpful for advanced-level projects. This book will guide you through building hands-on projects using BLE and IoT. These projects include tracking health data, using a mobile App, and making this data available for health practitioners; Indoor navigation; creating beacons using the Raspberry Pi; and warehouse weather Monitoring. This book also covers aspects of Bluetooth 5 (the latest release) and its effect on each of these projects. By the end of this book, you will have hands-on experience of using Bluetooth Low Energy to integrate with smart devices and IoT projects. Style and Approach A practical guide that will help you promote yourself into an expert by building and exploring practical applications of Bluetooth Low Energy.

Digital Cities Apr 04 2020 On the way towards the Information Society, global networks such as the Internet, together with mobile computing, have made wide-area computing over virtual communities a reality. Digital city projects, with the goal of building platforms to support community networking, are going on worldwide. This is the first book devoted to digital cities. It is based on an international symposium held in Kyoto, Japan, in September 1999. The 34 revised full papers presented were carefully selected for inclusion in the book; they reflect the state of the art in this exciting new field of interdisciplinary research and development. The book is divided into parts on design and analysis, digital city experiments, community network experiments, applications, visualization technologies, mobile technologies, and social interaction and communityware.

Bluetooth Tutorial Jul 20 2021 'Bluetooth Tutorial: Design, Protocol and Specifications for BLE - Bluetooth Low Energy 4.0 and Bluetooth 5' starts from the ground up for a new user and does a gradual progression into the technical details around Bluetooth technology. The latest update adds

information about Bluetooth 4.0 also known as Bluetooth Low Energy(BLE) and Bluetooth 5.0. Introduction Bluetooth is the name given to a new technology standard using short-range radio links, intended to replace the cables) connecting portable and/or fixed electronic devices. The standard defines a uniform structure for a wide range of devices to communicate with each other, with minimal user effort. Bluetooth key features are robustness, low complexity, low power and low cost. The technology also offers wireless access to LANs, PSTN, the mobile phone network and the Internet for a host of home appliances and portable handheld interfaces. The immediate need for Bluetooth came from the desire to connect peripherals and devices without cables. The available technology-IrDA OBEX (Infrared Data Association Object Exchange Protocol) is based in infrared links that are limited to line of sight connections. Bluetooth is further fueled by the demand for mobile and wireless access to LANs, Internet over mobile and other existing networks, where the backbone is wired but the interface is free to move. This not only makes the network easier to use but also extends its reach. What is inside Overview on Wireless Technologies, Usage Scenarios and related Taxonomy Bluetooth Architecture: Protocol Stack, Baseband, Link Manager Protocol, Logical Link Control and Adaptation, Service Discovery, Cable Replacement, Telephony Bluetooth Adopted Protocols: PPP, TCP/UDP/IP, OBEX, Content Formats, WAP Bluetooth Usage Models: File Transfer, Synchronization, Three-in-One Phone, Ultimate Headset Bluetooth Specifications: Bluetooth 1.0 and 1.0B, Bluetooth 1.1, Bluetooth 1.2, Bluetooth 2.0 + EDR, Bluetooth 2.1 + EDR, Bluetooth 3.0 + HS, Bluetooth 4.0 + LE (Bluetooth Low Energy), Bluetooth 4.1, Bluetooth 4.2, Bluetooth 5 Bluetooth Connection Establishment, Bluetooth Security Zigbee: Architecture, Zigbee Device Types, Zigbee Network Model

Make: Bluetooth Nov 23 2021 This book is where your adventures with Bluetooth LE begin. You'll

start your journey by getting familiar with your hardware options: Arduino, BLE modules, computers (including Raspberry Pi!), and mobile phones. From there, you'll write code and wire circuits to connect off-the-shelf sensors, and even go all the way to writing your own Bluetooth Services. Along the way you'll look at lightbulbs, locks, and Apple's iBeacon technology, as well as get an understanding of Bluetooth security-- both how to beat other people's security, and how to make your hardware secure.

Bluetooth Low Energy in iOS Swift Feb 24 2022 This book is a practical guide to programming Bluetooth Low Energy in iPhones and iPads. In this book, you will learn the basics of how to program an iOS device to communicate with any Central or Peripheral device over Bluetooth Low Energy. Each chapter of the book builds on the previous one, culminating in three projects: - A Beacon and Scanner - A Echo Server and Client - A Remote Controlled Device Through the course of the book you will learn important concepts that relate to: - How Bluetooth Low Energy works - How data is sent and received - Common paradigms for handling data This book is excellent for anyone who has basic or advanced knowledge of iOS programming in SWIFT.

Advances in Cyber Security Jan 02 2020 This book presents refereed proceedings of the First International Conference on Advances in Cyber Security, ACeS 2019, held in Penang, Malaysia, in July-August 2019. The 25 full papers and 1 short paper were carefully reviewed and selected from 87 submissions. The papers are organized in topical sections on internet of things, industry and blockchain, and cryptology; digital forensics and surveillance, botnet and malware, and DDoS and intrusion detection/prevention; ambient cloud and edge computing, wireless and cellular communication.

Essentials of Short-Range Wireless Oct 23 2021 For engineers, product designers, and technical

marketers who need to design a cost-effective, easy-to-use, short-range wireless product that works, this practical guide is a must-have. It explains and compares the major wireless standards - Bluetooth, Wi-Fi, 802.11abgn, ZigBee, and 802.15.4 - enabling you to choose the best standard for your product. Packed with practical insights based on the author's 10 years of design experience, and highlighting pitfalls and trade-offs in performance and cost, this book will ensure you get the most out of your chosen standard by teaching you how to tailor it for your specific implementation. With information on intellectual property rights and licensing, production test, and regulatory approvals, as well as analysis of the market for wireless products, this resource truly provides everything you need to design and implement a successful short-range wireless product.

Bluetooth Low Energy in C++ with nRF Microcontrollers Jun 18 2021 This book is a practical guide to programming Bluetooth Low Energy for nRFx Bluetooth-enabled programmable microcontrollers. In this book, you will learn the basics of how to program an nRF microcontroller to communicate with any Central device over Bluetooth Low Energy. Each chapter of the book builds on the previous one, culminating in three projects: - An iBeacon - An Echo Server - A Remote Controlled Device Through the course of the book you will learn important concepts that relate to: - How Bluetooth Low Energy works - How data is sent and received - Common paradigms for handling data Skill Level This book is excellent for anyone who has basic or advanced knowledge of nRFx, microcontroller programming, or C++.

Earth Day Jun 26 2019 Earth Day celebrates our beautiful planet and calls us to act on its behalf. Some people spend the day planting flowers or trees. Others organize neighborhood clean-ups, go on nature walks, or make recycled crafts. Readers will discover how a shared holiday can have multiple traditions and be celebrated in all sorts of ways.

Getting Started with Bluetooth Low Energy May 06 2020 With Bluetooth Low Energy (BLE), smart devices are about to become even smarter. This practical guide demonstrates how this exciting wireless technology helps developers build mobile apps that share data with external hardware, and how hardware engineers can gain easy and reliable access to mobile operating systems. This book provides a solid, high-level overview of how devices use BLE to communicate with each other. You'll learn useful low-cost tools for developing and testing BLE-enabled mobile apps and embedded firmware and get examples using various development platforms—including iOS and Android for app developers and embedded platforms for product designers and hardware engineers. Understand how data is organized and transferred by BLE devices Explore BLE's concepts, key limitations, and network topology Dig into the protocol stack to grasp how and why BLE operates Learn how BLE devices discover each other and establish secure connections Set up the tools and infrastructure for BLE application development Get examples for connecting BLE to iPhones, iPads, Android devices, and sensors Develop code for a simple device that transmits heart rate data to a mobile device

Beginning Arduino Nano 33 IoT Jun 06 2020 Develop Internet of Things projects with Sketch to build your Arduino programs. This book is a quick reference guide to getting started with Nano 33 IoT, Arduino's popular IoT board. You'll learn how to access the Arduino I/O, understand the WiFi and BLE networks, and optimize your board by connecting it to the Arduino IoT Cloud. Arduino Nano 33 IoT is designed to build IoT solutions with supported WiFi and BLE networks. This board can be easily extend through I/O pins, sensors and actuators. Beginning Arduino Nano 33 IoT is the perfect solution for those interested in learning how to use the latest technology and project samples through a practical and content-driven approach. What You'll Learn Prepare and set up Arduino

Nano 33 IoT board Operate Arduino Nano 33 IoT board hardware and software Develop programs to access Arduino Nano 33 IoT board I/O Build IoT programs with Arduino Nano 33 IoT board Who This Book Is For Makers, developers, students, and professional of all levels.

Bluetooth Low Energy in Android Java Dec 25 2021 This book is a practical guide to programming Bluetooth Low Energy for Android phones and Tablets In this book, you will learn the basics of how to program an Android device to communicate with any Central or Peripheral device over Bluetooth Low Energy. Each chapter of the book builds on the previous one, culminating in three projects: - A Beacon and Scanner - An Echo Server and Client - A Remote Controlled Device Through the course of the book you will learn important concepts that relate to: - How Bluetooth Low Energy works - How data is sent and received - Common paradigms for handling data Skill Level This book is excellent for anyone who has basic or advanced knowledge of Java programming on Android.

Getting Started with Bluetooth Low Energy Mar 16 2021

Bluetooth Low Energy Nov 04 2022 The First Complete Guide to Bluetooth Low Energy: How It Works, What It Can Do, and How to Apply It A radical departure from conventional Bluetooth technology, Bluetooth low energy (BLE) enables breakthrough wireless applications in industries ranging from healthcare to transportation. Running on a coin-sized battery, BLE can operate reliably for years, connecting and extending everything from personal area network devices to next-generation sensors. Now, one of the standard's leading developers has written the first comprehensive, accessible introduction to BLE for every system developer, designer, and engineer. Robin Heydon, a member of the Bluetooth SIG Hall of Fame, has brought together essential information previously scattered through multiple standards documents, sharing the context and expert insights needed to implement high-performance working systems. He first reviews BLE's

design goals, explaining how they drove key architectural decisions, and introduces BLE's innovative usage models. Next, he thoroughly covers how the two main parts of BLE, the controller and host, work together, and then addresses key issues from security and profiles through testing and qualification. This knowledge has enabled the creation of Bluetooth Smart and Bluetooth Smart Ready devices. This guide is an indispensable companion to the official BLE standards documents and is for every technical professional and decision-maker considering BLE, planning BLE products, or transforming plans into working systems. Topics Include BLE device types, design goals, terminology, and core concepts Architecture: controller, host, applications, and stack splits Usage models: presence detection, data broadcasting, connectionless models, and gateways Physical Layer: modulation, frequency band, radio channels, power, tolerance, and range Direct Test Mode: transceiver testing, hardware interfaces, and HCI Link Layer: state machine, packets, channels, broadcasting, encryption, and optimization HCI: physical/logical interfaces, controller setup, and connection management L2CAP: channels and packet structure, and LE signaling channels Attributes: grouping, services, characteristics, and protocols Security: pairing, bonding, and data signing Generic Access Profiles: roles, modes, procedures, security modes, data advertising, and services Applications, devices, services, profiles, and peripherals Testing/qualification: starting projects, selecting features, planning, testing, compliance, and more

Google Leaks Jul 28 2019 A Story of Big Tech Censorship and Bias and the Fight to Save Our Country The madness of Google's attempt to mold our reality into a version dictated by their corporate values has never been portrayed better than in this chilling account by Google whistleblower, Zach Vorhies. As a senior engineer at Zach watched in horror from the inside as the 2016 election of Donald Trump drove Google into a frenzy of censorship and political manipulation.

The American ideal of an honest, hard-fought battle of ideas—when the contest is over, shaking hands and working together to solve problems—was replaced by a different, darker ethic alien to this country's history as wave after of censorship destroyed free speech and entire market sectors. Working with New York Times bestselling author Kent Heckenlively (Plague of Corruption), Vorhies and Heckenlively weave a tale of a tech industry once beloved by its central figure for its innovation and original thinking, turned into a terrifying "woke-church" of censorship and political intolerance. For Zach, an intuitive counter-thinker, brought up on the dystopian futures of George Orwell, Aldous Huxley, and Ray Bradbury, it was clear that Google was attempting nothing less than a seamless rewriting of the operating code of reality in which many would not be allowed to participate. Using Google's own internal search engine, Zach discovered their real "AI-Censorship" system called "Machine Learning Fairness," which he claims is a merging of critical race theory and AI that was secretly released on their users of search, news and YouTube. He collected and released 950 pages of these documents to the Department of Justice and to the public in the summer of 2019 through Project Veritas with James O'Keefe, which quickly became their most popular whistleblower story, which started a trend of big whistleblowing. From Google re-writing their news algorithms to target Trump to using human tragedy emergencies to inject permanent blacklists, Zach and Kent provide a "you are there" perspective on how Google turned to the dark side to seize power. They finish by laying out a solution to fight censorship. Read this book if you care to know how Google tries to manipulate, censor, and downrank the voice of its users.

Getting Started with Bluetooth Low Energy Oct 03 2022 With Bluetooth Low Energy (BLE), smart devices are about to become even smarter. This practical guide demonstrates how this exciting wireless technology helps developers build mobile apps that share data with external hardware, and

how hardware engineers can gain easy and reliable access to mobile operating systems. This book provides a solid, high-level overview of how devices use BLE to communicate with each other. You'll learn useful low-cost tools for developing and testing BLE-enabled mobile apps and embedded firmware and get examples using various development platforms—including iOS and Android for app developers and embedded platforms for product designers and hardware engineers. Understand how data is organized and transferred by BLE devices Explore BLE's concepts, key limitations, and network topology Dig into the protocol stack to grasp how and why BLE operates Learn how BLE devices discover each other and establish secure connections Set up the tools and infrastructure for BLE application development Get examples for connecting BLE to iPhones, iPads, Android devices, and sensors Develop code for a simple device that transmits heart rate data to a mobile device

Software Engineering at Google Oct 30 2019 Today, software engineers need to know not only how to program effectively but also how to develop proper engineering practices to make their codebase sustainable and healthy. This book emphasizes this difference between programming and software engineering. How can software engineers manage a living codebase that evolves and responds to changing requirements and demands over the length of its life? Based on their experience at Google, software engineers Titus Winters and Hyrum Wright, along with technical writer Tom Manshreck, present a candid and insightful look at how some of the world's leading practitioners construct and maintain software. This book covers Google's unique engineering culture, processes, and tools and how these aspects contribute to the effectiveness of an engineering organization. You'll explore three fundamental principles that software organizations should keep in mind when designing, architecting, writing, and maintaining code: How time affects the sustainability of software and how to make your code resilient over time How scale affects the

viability of software practices within an engineering organization What trade-offs a typical engineer needs to make when evaluating design and development decisions

Bluetooth Low Energy in Arduino 101 Apr 28 2022 This book is a practical guide to programming Bluetooth Low Energy for Arduino 101. In this book, you will learn the basics of how to program an Arduino 101 to communicate with any Central or Peripheral device over Bluetooth Low Energy. Each chapter of the book builds on the previous one, culminating in three projects: - A Beacon and Scanner - An Echo Server and Client - A Remote Controlled Device Through the course of the book you will learn important concepts that relate to: - How Bluetooth Low Energy works - How data is sent and received - Common paradigms for handling data This book is excellent for anyone who has basic or advanced knowledge of Arduino programming or C++.

Inside Bluetooth Low Energy Aug 01 2022 Bluetooth Low Energy (LE) is one of the latest enhancement to Bluetooth technology and, as the name suggests, it is aimed at ultra low power devices, such as heart rate monitors, thermometers, and laboratory sensors. Due to very low power consumption, devices compliant with this standard can operate for months or even years on coin cell batteries without the need for recharging. This cutting-edge book helps you understand the whats, whys, and hows of Bluetooth LE. It includes a broad view of the technology, identifies the various building blocks and explains how they come together. The book explains the architecture of Bluetooth LE stack and the functionality provided by each of the layers. You find expert guidance in setting up your own system in a quick and efficient manner with inexpensive, easily available hardware and just a couple of PCs running Linux. Additionally, this practical volume features exercises and sample programs to help you get a first-hand feel for how the technology works.

Guide to Bluetooth Security Feb 12 2021 This document provides info. to organizations on the

security capabilities of Bluetooth and provide recommendations to organizations employing Bluetooth technologies on securing them effectively. It discusses Bluetooth technologies and security capabilities in technical detail. This document assumes that the readers have at least some operating system, wireless networking, and security knowledge. Because of the constantly changing nature of the wireless security industry and the threats and vulnerabilities to the technologies, readers are strongly encouraged to take advantage of other resources (including those listed in this document) for more current and detailed information. Illustrations.

IoT Development for ESP32 and ESP8266 with JavaScript Oct 11 2020 This book introduces a new approach to embedded development, grounded in modern, industry-standard JavaScript. Using the same language that powers web browsers and Node.js, the Moddable SDK empowers IoT developers to apply many of the same tools and techniques used to build sophisticated websites and mobile apps. The Moddable SDK enables you to unlock the full potential of inexpensive microcontrollers like the ESP32 and ESP8266. Coding for these microcontrollers in C or C++ with the ESP-IDF and Arduino SDKs works for building basic products but doesn't scale to handle the increasingly complex IoT products that customers expect. The Moddable SDK adds the lightweight XS JavaScript engine to those traditional environments, accelerating development with JavaScript while keeping the performance benefits of a native SDK. Building user interfaces and communicating over the network are two areas where JavaScript really shines. IoT Development for ESP32 and ESP8266 with JavaScript shows you how to build responsive touch screen user interfaces using the Piu framework. You'll learn how easy it is to securely send and receive JSON data over Wi-Fi with elegant JavaScript APIs for common IoT protocols, including HTTP/HTTPS, WebSocket, MQTT, and mDNS. You'll also learn how to integrate common sensors and actuators, Bluetooth Low

Energy (BLE), file systems, and more into your projects, and you'll see firsthand how JavaScript makes it easier to combine these diverse technologies. If you're an embedded C or C++ developer who has never worked in JavaScript, don't worry. This book includes an introduction to the JavaScript language just for embedded developers experienced with C or C++. What You'll Learn Building, installing, and debugging JavaScript projects on the ESP32 and ESP8266 Using modern JavaScript for all aspects of embedded development with the Moddable SDK Developing IoT products with animated user interfaces, touch input, networking, BLE, sensors, actuators, and more Who This Book Is For Professional embedded developers who want the speed, flexibility, and power of web development in their embedded software work Makers who want a faster, easier way to build their hobby projects Web developers working in JavaScript who want to extend their skills to hardware products

Encyclopedia of Wireless Networks Jan 14 2021 Wireless networking technologies are witnessed to become the integral part of industry, business, entertainment and daily life. Encyclopedia of Wireless Networks is expected to provide comprehensive references to key concepts of wireless networks, including research results of historical significance, areas of current interests, and growing directions in the future wireless networks. It can serve as a valuable and authoritative literature for students, researchers, engineers, and practitioners who need a quick reference to the subjects of wireless network technology and its relevant applications. Areas covered: 5G Network | Editors: Rahim Tafazolli, Rose Hu Ad hoc Network | Editor: Cheng Li Big Data for Networking | Editor: Song Guo Cellular Network, 2G/3G Network, 4G/LTE Network | Editor: Hsiao-hwa Chen Cognitive Radio Network | Editor: Ning Zhang Cooperative Communications | Editor: Kaoru Ota Cyber Physical Systems | Editor: Shiyan Hu Data Center Network | Editor: Lei Lei Delay Tolerant

and Opportunistic Network | Editor: Yuanguo Bi Equalization, Synchronization and Channel Estimation | Editor: Yingying Chen Future Network Architecture | Editor: Wei Quan Game Theory in Wireless Network | Editor: Dusit Niyato Interference Characterization and Mitigation | Editor: Lin Cai Internet of Things | Editors: Xiuzhen Cheng, Wei Cheng Internet of Things and its Applications | Editor: Phone Lin Interworking Heterogeneous Wireless Network | Editor: Ping Wang Medium Access Control | Editors: Hassan Omar, Qiang Ye Millimeter-wave Communications | Editor: Ming Xiao MIMO-based Network | Editor: Prof. Wei Zhang Mobility Management and Models | Editors: Sandra Cespedes, Sangheon Pack Molecular, Biological and Multi-scale Communications | Editor: Adam Noel Network Economics and pricing | Editors: Jianwei Huang, Yuan Luo Network Forensics and surveillance, Fault Tolerance and Reliability | Editor: Hongwei Li Network Measurement and Virtualization | Editor: Yusheng Ji Quality of Service, Quality of Experience and Quality of Protection | Editors: Rui Luis Aguiar, Yu Cheng Resource Allocation and Management | Editors: Junshan Zhang, Nan Cheng Routing and Multi-cast, Router and Switch Design | Editor: Richard Yu Scaling Laws and Fundamental Limits | Editor: Ning Lu Security, Privacy and Trust | Editor: Kui Ren Short Range Communications, RFID and NFC | Editor: Zhiguo Shi Smart Grid Communications | Editor: Vincent W. S. Wong Vehicular Network | Editors: Lian Zhao, Qing Yang Video Streaming | Editor: Zhi Liu Wireless Body Area Network and e-healthcare | Editor: Honggang Wang Wireless Security | Editors: Haojin Zhu, Jian Shen Wireless Sensor Network | Editors: Jiming Chen, Ruilong Deng WLAN and OFDM | Editor: Xianbin Wang

The Impact of Digital Technologies on Public Health in Developed and Developing Countries Feb 01 2020 This open access book constitutes the refereed proceedings of the 18th International Conference on String Processing and Information Retrieval, ICOST 2020, held in

Hammamet, Tunisia, in June 2020.* The 17 full papers and 23 short papers presented in this volume were carefully reviewed and selected from 49 submissions. They cover topics such as: IoT and AI solutions for e-health; biomedical and health informatics; behavior and activity monitoring; behavior and activity monitoring; and wellbeing technology. *This conference was held virtually due to the COVID-19 pandemic.

Future Data and Security Engineering Mar 04 2020 This book constitutes the proceedings of the 7th International Conference on Future Data and Security Engineering, FDSE 2020, which was supposed to be held in Quy Nhon, Vietnam, in November 2020, but the conference was held virtually due to the COVID-19 pandemic. The 24 full papers (of 53 accepted full papers) presented together with 2 invited keynotes were carefully reviewed and selected from 161 submissions. The other 29 accepted full and 8 short papers are included in CCIS 1306. The selected papers are organized into the following topical headings: security issues in big data; big data analytics and distributed systems; advances in big data query processing and optimization; blockchain and applications; industry 4.0 and smart city: data analytics and security; advanced studies in machine learning for security; and emerging data management systems and applications.

Computational Intelligence, Communications, and Business Analytics Jul 08 2020 The two volume set CCIS 1030 and 1031 constitutes the refereed proceedings of the Second International Conference on Computational Intelligence, Communications, and Business Analytics, CICBA 2018, held in Kalyani, India, in July 2018. The 76 revised full papers presented in the two volumes were carefully reviewed and selected from 240 submissions. The papers are organized in topical sections on computational intelligence; signal processing and communications; microelectronics, sensors, and intelligent networks; data science & advanced data analytics; intelligent data mining & data

warehousing; and computational forensics (privacy and security).

Hacking Internet of Things Sep 21 2021 According to IHS Markit, the number of IoT (Internet of Things) devices will grow to 30.7 billion in 2020, and to 75.4 billion by 2025! IDC Forecasts Worldwide spending on the IoT to reach $772 Billion in 2018! Whether it is connected automobiles, fitness watches, smart coffee machines, smart locks or even medical equipment such as insulin pumps, IoT is becoming all-pervasive. In the future, there will hardly be any aspect of our lives that IoT will not touch one way or the other. Bluetooth Low Energy (BLE) is one of the popular radio protocols used by many IoT devices. As the footprint of IoT devices has increased, so have the attacks on these devices by cyber criminals. Given our increasing dependency on IoT and the increasing number of cyber attacks on these devices, it's intuitive that their security will have a huge implication on safety and security of the digital society that we are a part of! If you wish to acquire hands-on (BLE) IoT penetration testing and securing skills and be a white hat cyber security superstar, this book is for you!

Building Bluetooth Low Energy Systems Jun 30 2022 Discover and implement a system of your choice using Bluetooth Low Energy. About This Book Learn the basics of Bluetooth Low Energy with its exciting new protocol stack and security. Build customized Bluetooth Low Energy projects that make your web or mobile apps smarter in terms of networking and communications. Using Android, iOS, and the Web, acquire key skills to harness the power of Bluetooth Low Energy in your IoT applications. Who This Book Is For The book is for developers and enthusiasts who are passionate about learning Bluetooth Low Energy technologies and want to add new features and services to their new or existing products. They should be familiar with programming languages such as Swift, Java, and JavaScript. Knowledge of debugging skills would be an advantage. What You Will Learn

Bluetooth Low Energy in theory. Bluetooth Low Energy Hardware and Software Development Kits. Implement Bluetooth low energy communication (central and peripheral) using Android. Master BLE Beacons with examples implemented over Eddystone and iBeacons. Implement indoor navigation using Estimote Beacons on iOS. Implement Internet gateways to control BLE devices on a Wi-Fi network. Understand BLE security mechanisms with a special focus on Bluetooth pairing, bonding, and key exchange to cover encryption, privacy, and user data integrity. Implement Bluetooth Mesh using CSRMesh Technology. In Detail Bluetooth Low Energy (BLE) is a Wireless Personal Area network technology aimed at novel applications for smart devices. High-tech BLE profiles and services are being increasingly used by application developers and hardware enthusiasts to allow devices to interact with the surrounding world. This book will focus on a technical introduction to BLE and how it is reshaping small-distance communication. We will start with IoT, where many technologies such as BLE, Zigbee, and IEEE 802.15.4 Mesh will be introduced. The book will present BLE from an engineering perspective, from which the protocol stack, architecture, and layers are discussed. You will learn to implement customized projects for Peripheral/Central communication, BLE Beacons, indoor navigation using triangulation, and the Internet gateway for Bluetooth Low Energy Personal Network, all using various code samples and APIs on Android, iOS, and the Web. Finally, the book will conclude with a glimpse into future technologies destined to be prominent in years to come. Style and approach The book is a practical tutorial that will help you understand the background and technicalities of BLE and offers a friendly environment to build and create robust BLE projects. This hands-on approach will give you a clear vision of Bluetooth Low Energy and how it can be used in IoT.