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Low Energy The
Bluetooth
Developers
Handbook
Low Energy
The
Developers
Handbook

The papers in this proceeding discuss current and future trends in wearable communications and

Download File PDF Bluetooth Low Energy The personal health Developers Handbook

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-

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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

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Low Energy The

more effective. The
Developers
papers were presented

at the 13th EAI

International

Conference on Body

Area Networks

(BODYNETS 2018),

Oulu, Finland, 02-03

October 2018.

This book comprises

select proceedings of

the International

Conference on

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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

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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

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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,

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optical networks and
wireless

Handbook

communication. The
volume can be useful
for students and
researchers working in
the different
overlapping areas of
electrical, electronics
and communication
engineering.

This book is a practical
guide to programming

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Handbook

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

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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

Download File PDF Bluetooth Low Energy The Developers Handbook

data This book is excellent for anyone who has basic or advanced knowledge of iOS programming in SWIFT.

This book provides an introduction to Bluetooth programming, with a specific focus on developing real code. The authors discuss the

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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

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Low Energy The
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

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Low Energy The
Developers
Handbook

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

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Low Energy The
features.
Developers
Handbook

Taking you to the limit
in Concurrency, OOP,
and the most advanced
capabilities of C
Technologies,
Experiences, and
Future Perspectives
Computational
Intelligence,
Communications, and
Business Analytics
Make: Bluetooth

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Developers
Pi

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Beacon Technologies

About the Authors C

Bala Kumar is a

Distinguished

Member of the

Technical Staff at

Motorola. He chaired

the industry expert

group that defined

the Java APIs for

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Bluetooth wireless technology. He currently leads the systems software team for wireless platforms in Motorola's Semiconductor Products Sector. Paul J. Kline is a Distinguished Member of the Technical Staff at Motorola and the

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*maintenance lead for
the JABWT*

specification. He

currently works on the

System Software

Architecture team in

Motorola's

Semiconductor

Products Sector.

Timothy J. Thompson

is a Senior Software

Engineer on the

System Software

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***Architecture team in
Motorola's
Semiconductor
Products Sector. He
was the OBEX
architect on the
JABWT specification
team at Motorola.-
The First Complete
Guide to Bluetooth
Low Energy: How It
Works, What It Can
Do, and How to Apply***

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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

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*Low Energy The
Developers
Handbook*

*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*

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Low Energy The

*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

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*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*

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*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

Download File
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Low Energy The
guide is an
Developers
Handbook

*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.*

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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

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Low Energy The

*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:

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Low Energy The

*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

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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

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Handbook

*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*

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*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*

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beat other people's security, and how to make your hardware secure.

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

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Handbook

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

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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

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*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

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product.

*Technologies for
Security, Privacy and
Identity Management
Web, Artificial
Intelligence and
Network Applications
Cyber-Physical, IoT,
and Autonomous
Systems in Industry
4.0
Inside Bluetooth Low
Energy*

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***Intelligent and
Efficient Electrical
Systems***

***Select Proceedings of
ICAECT 2020***

This book is for those who want to learn how to build exciting Arduino projects by interfacing it with Android. You will need to

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HubBook

have some basic experience in electronics and programming. However, you don't need to have any previous experience with the Arduino or Android platforms.

"Bluetooth (enabled

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Handbook

devices) will
ship in the
billions of
units once it
gains momentum."

- Martin
Reynolds,
Gartner Group
Bluetooth is the
most exciting
development in
wireless
computing this
decade!

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Low Energy The
Bluetooth
enabled devices
can include
everything from
network servers,
laptop computers
and PDAs, to
stereos and home
security
systems. Most
Bluetooth
products to hit
the market in
2001 will be PC

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cards for laptop computers and access points, which allow up to seven Bluetooth devices to connect to a network. Reports indicate that by the end of 2003 there will be over 2 billion Bluetooth-enabled

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devices. Bluetooth-enabled devices communicate with each other through embedded software applications. Bluetooth Developer's Guide to Embedded Applications will provide

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applications
developers with
advanced
tutorials and
code listings
written to the
latest

Bluetooth's
latest
specification,
version 1.1.

Written by
Bluetooth

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Low Energy The
pioneers from
market leaders
in Bluetooth
software
development,
Extended Systems
and Cambridge
Silicon Radio,
this is the
first advanced
level Bluetooth
developer title
on the market.
White Hot Topic

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While other books introduce readers to the possibilities of Bluetooth, this is the first comprehensive, advanced level programming book written specifically for embedded application developers

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Authors are responsible for SDK, the market-leading development tool for Bluetooth Comes with Syngress' revolutionary Credit Card CD containing a printable HTML version of the book, all of the

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source code and
sample
applications
from Extended
Systems and
Cambridge
Silicon Radio
Bluetooth Low
Energy (BLE) is
an exciting new
technology that
was introduced
in 2010. It
targets

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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

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becoming the standard wireless protocol used in many IoT applications including: smart homes, smart cities, medical devices, wearables, and sensor connectivity.

Learning a new

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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

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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

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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

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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.

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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,

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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

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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

Download File PDF Bluetooth Low Energy The Energy & Developers 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

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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

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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

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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

Download File PDF Bluetooth Low Energy The 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

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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

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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

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the world.
ZigBee is a
standard based
on the IEEE
802.15.4
standard for
wireless
personal
networks. This
standard allows
for the creation
of very lost
cost and low
power networks -

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these applications run for years rather than months.

These networks are created from sensors and actuators and can wireless control many electrical products such as remote controls, medical,

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Industrial, and
Security
Sensors
Handbook

Hundreds of companies are creating applications including Mitsubishi, Motorola, Freescale, and Siemens. This book is written for engineers

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who plan to develop ZigBee applications and networks, to understand how they work, and to evaluate this technology to see if it is appropriate to a particular project. This book does not simply state

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facts but
explains what
ZigBee can do
through detailed
code examples.

*Details how to
plan and develop
applications and
networks *Zigbee
sensors have
many
applications
including
industrial

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automation,
Developers
medical sensing,
remote controls,
and security

*Hot topic for
today's
electrical
engineer because
it is low cost
and low power
Essentials of
Short-Range
Wireless
Automate your

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home or business
Developers
with inexpensive
Wi-Fi devices
Recommendations
of the National
Institute of
Standards and
Technology
Proceedings of
the Twelfth
International
Conference on
Genetic and
Evolutionary

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Computing, The
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December 14-17,
Changzhou,

Jiangsu, China

Guide to

Bluetooth

Security

Bluetooth

Essentials for

Programmers

***Use the power of BLE
to create exciting IoT
applications About***

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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

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*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

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projects, then this
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Handbook

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

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*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*

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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

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*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*

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*enthusiasts to
Developers
Handbook*
*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*

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*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

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*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)

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*Low Energy The
Developers
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*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*

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Low Energy The
*expert by building
and exploring
practical applications*

*of Bluetooth Low
Energy.*

*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*

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*and its features.**

Build a health

tracking system, and

indoor navigation

and warehouse

weather monitoring

projects using smart

devices. Build on a*

theoretical

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a practice-based

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Bluetooth Low

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***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***

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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,

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*iOS, Firebase,
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Raspberry Pi,
Handbook*

*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*

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*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

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DetailBluetooth Low

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Energy, or Bluetooth

Smart, is Wireless

Personal Area

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smart devices and IoT

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application

developers and IoT

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establish connections

between smart

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*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*

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*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

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*available for health
practitioners; Indoor*

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beacons using the

Raspberry Pi; and

warehouse weather

Monitoring. This

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(the latest release)

and its effect on each

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*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

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*of Bluetooth Low
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Energy.
Handbook*

*Master the technique
of using ESP32 as an
edge device in any
IoT application where
wireless
communication can
make life easier Key
FeaturesGain
practical experience
in working with
ESP32Learn to*

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*interface various
electronic devices
such as sensors,*

*integrated circuits
(ICs), and*

*displaysApply your
knowledge to build
real-world
automation*

projectsBook

Description

Developing IoT

Projects with ESP32

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provides end-to-end

coverage of secure

data communication

techniques from

sensors to cloud

platforms that will

help you to develop

production-grade IoT

solutions by using the

ESP32 SoC. You'll

learn how to employ

ESP32 in your IoT

projects by

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interfacing with

different sensors and

actuators using

different types of

serial protocols. This

book will show you

how some projects

require immediate

output for end-users,

and cover different

display technologies

as well as examples of

driving different types

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of displays. The book features a dedicated chapter on cybersecurity packed with hands-on examples. As you progress, you'll get to grips with BLE technologies and BLE mesh networking and work on a complete smart home project where

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*all nodes
communicate over a
BLE mesh. Later
chapters will show
you how IoT requires
cloud connectivity
most of the time and
remote access to
smart devices. You'll
also see how cloud
platforms and third-
party integrations
enable endless*

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*possibilities for your
end-users, such as
insights with big data
analytics and
predictive
maintenance to
minimize costs. By
the end of this book,
you'll have developed
the skills you need to
start using ESP32 in
your next wireless
IoT project and meet*

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the project's
requirements by
building effective,
efficient, and secure
solutions. What you
will learn Explore
advanced use cases
like UART
communication,
sound and camera
features, low-energy
scenarios, and
scheduling with an

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RTOS Add different types of displays in your projects where immediate output to users is required Connect to Wi-Fi and Bluetooth for local network communication Connect cloud platforms through different IoT messaging protocols Integrate

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ESP32 with third-party services such as voice assistants and IFTTT Discover best practices for implementing IoT security features in a production-grade solution Who this book is for If you are an embedded software developer, an IoT software

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*architect or
developer, a
technologist, or
anyone who wants to
learn how to use
ESP32 and its
applications, this
book is for you. A
basic understanding
of embedded systems,
programming,
networking, and
cloud computing*

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*concepts is necessary
to get started with the
book.*

*Discover and reshape
the limitless
possibilities of
networking and small-
distance
communication with
BLE About This
Book* Build exciting
wireless tech projects
that make your web*

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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

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*BLE to enhance
security and build
more aware apps for
Android and iOS Who
This Book Is For*
The
*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*

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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*

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*Communication
(Central and
Peripheral) using
Android* Understand
BLE Beacons with
various examples
implemented over
EddyStone and
iBeacons* Build
indoor navigation
applications using
Bluetooth beacons**

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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

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Low Energy The

*Android BLE
applications from the
server and client*

sides

Detail Bluetooth Low

Energy (BLE) is a

wireless personal

area network

technology aimed at

novel applications for

smart devices. High-

precision BLE

information and

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*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-*

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distance
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Handbook
*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,*

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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

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about the future of

IoT and which

technologies will be

the center of attention

going forward.

Unraveling Bluetooth

LE Audio

Building the Web of

Things

Digital Cities

Genetic and

Evolutionary

Computing

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*Bluetooth Low
Energy in Android
Java*

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the refereed
proceedings of
the 18th
International
Conference on*

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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

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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

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activity

monitoring; and
wellbeing
technology.

**This conference
was held
virtually due to
the COVID-19
pandemic.*

*Learn the key st
andards—iBeacon,
Eddystone,
Bluetooth 4.0,
and*

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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,

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*institutional,
or consulting*

needs. Proximity

technology—in

particular,

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beacons—is a

major source of

business

opportunity, and

this book

provides

everything you

need to know to

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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

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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

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*hugely
significant in
driving
strategic
decisions and
creating wealth
See other
technologies in
the proximity
ecosystem
catalyzed by and
complementary to
Bluetooth
beacons,*

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communication,
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RFID Examine the
Beacosystem

framework for
analyzing the
proximity

ecosystem Who

This Book Is For
Solutions

architects of

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*all
types—venture
capitalists,
founders, CEOs,
strategists,
product
managers, CTOs,
business
developers, and
programmers
Stephen Statler
is a writer,
public speaker,
and consultant*

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working in the
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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

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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

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also the CEO of
Cause Based
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creators of Give
the Change,
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philanthropy,
enabling non-
profit
supporters to
donate the*

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debit cards, and

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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

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or Peripheral
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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*

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*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*

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*for handling
data Skill Level*

This book is

excellent for

anyone who has

basic or

advanced

knowledge of

Java programming

on Android.

This book

introduces a new

approach to

embedded

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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

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Usebook

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.

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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

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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

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native SDK.

Building user
interfaces and
communicating
over the network
are two areas
where JavaScript
really shines.
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for ESP32 and
ESP8266 with
JavaScript shows
you how to build
responsive touch

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screen user
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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

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*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*

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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

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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

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ESP8266 Using
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modern

JavaScript for
all aspects of
embedded
development with
the Moddable SDK
Developing IoT
products with
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touch input,
networking, BLE,
sensors,

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actuator, and
more Who This

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embedded

developers who

want the speed,

flexibility, and

power of web

development in

their embedded

software work

Makers who want

a faster, easier

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A Practical

Guide to XS and

the Moddable SDK

With Bluetooth Low

Energy (BLE),

smart devices are

about to become

even smarter. This

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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

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a solid, high-level overview of how devices use BLE to communicate with each other.

You will learn useful low-cost tools for developing and testing BLE-enabled mobile apps and embedded firmware and get examples using various

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Development platfor
ms{u2014}includin
g 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

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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

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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. This definitive handbook

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networking
technologies and
protocols and
explores their
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in a unique real-
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protocol stack and
security. Build
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that make your web
or mobile apps
smarter in terms of
networking and
communications.

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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

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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

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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

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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

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devices to interact
with the

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Handbook

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

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IEEE 802.15.4
Developers
Handbook
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

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Peripheral/Central
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Bluetooth
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.

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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

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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.

Explore how
Bluetooth Low
Energy (LE) has

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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

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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

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Controller part.

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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

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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

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with the Core
Controller
specification See
how an end-to-end
application works
its through the LE
audio ecosystem

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Blueprints
Design, Protocol
and Specifications

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The Handbook of
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18th International
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2020, Hammamet,
Tunisia, June
24-26, 2020,
Proceedings

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Push the limits
of what C – and
you – can do,
with this high-
intensity guide
to the most
advanced
capabilities of
C Key

Features Make the
most of C's low-
level control,
flexibility, and
high

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more to C than

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language syntax.

The industry

looks for
developers with
a rigorous,
scientific
understanding of
the principles
and practices.

Extreme C will
teach you to use
C's advanced low-
level power to

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systems. This
intensive,
practical guide
will help you
become an expert
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Building on your
existing C
knowledge, you
will master
preprocessor
directives,

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macros,
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compilation,
pointers, and
much more. You
will gain new
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algorithm
design,
functions, and
structures. You
will discover
how C helps you
squeeze maximum

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still plays a
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21st-century
programming,
remaining the
core language
for precision
engineering,
aviations, space

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research, and more. This book shows how C works with Unix, how to implement OO principles in C, and fully covers multi-processing. In Extreme C, Amini encourages you to think, question, apply, and experiment

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for yourself.
The book is
essential for
anybody who
wants to take
their C to the
next level. What
you will
learnBuild
advanced C
knowledge on
strong
foundations,
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principles of
Developers
and memory

structures and
compilation

pipeline and how
they work, and
how to make most
out of them Apply
object-oriented
design

principles to
your procedural
C code Write low-
level code

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that's close to
the hardware and
squeezes maximum
performance out
of a computer
systemMaster
concurrency,
multithreading,
multi-
processing, and
integration with
other
languagesUnit
Testing and

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will help you

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book is to
provide latest
research
findings,
innovative
research
results, methods
and development
techniques from

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both theoretical
and practical

perspectives
related to the
emerging areas
of Web

Computing,
Intelligent
Systems and
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Computing. As
the Web has
become a major
source of

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information,
techniques and
methodologies
that extract
quality
information are
of paramount
importance for
many Web and
Internet
applications.
Data mining and
knowledge
discovery play

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key roles in many of today's prominent Web applications such as e-commerce and computer security.

Moreover, the outcome of Web services delivers a new platform for enabling service-

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oriented systems. The emergence of large scale distributed computing paradigms, such as Cloud Computing and Mobile Computing Systems, has opened many opportunities for

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collaboration
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services, which
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are at the core
of any
Information
System.
Artificial
Intelligence
(AI) is an area
of computer
science that
build
intelligent
systems and

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algorithms that
work and react

like humans. The

AI techniques

and

computational

intelligence are

powerful tools

for learning,

adaptation,

reasoning and

planning. They

have the

potential to

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become enabling
technologies for
the future
intelligent
networks. Recent
research in the
field of
intelligent
systems,
robotics,
neuroscience,
artificial
intelligence and
cognitive

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sciences are very important for the future development and innovation of Web and Internet applications.

The book presents novel research in the areas of social identity and security when using mobile

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platforms. The topics cover a broad range of applications related to securing social identity as well as the latest advances in the field, including the presentation of novel research methods that are in the

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service of all
citizens using
mobile devices.

More

specifically,
academic,
industry-related
and government
(law
enforcement,
intelligence and
defence)
organizations,
will benefit

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from the
research topics
of this book
that cover the
concept of
identity
management and
security using
mobile platforms
from various
perspectives,
i.e. whether a
user navigates
to social media,

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accesses their
own phone
devices, access
their bank
accounts, uses
online shopping
service
providers,
accesses their
personal
documents or
accounts with
valuable
information,

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surfs the internet, or even becomes a victim of cyberattacks. In all of the aforementioned cases, there is a need for mobile related technologies that protect the users' social identity and

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well-being in the digital world, including the use of biometrics, cybersecurity software and tools, active authentication and identity anti-spoofing algorithms and more.

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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,

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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-

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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

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book explains
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the architecture
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of Bluetooth LE
stack and the
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provided by each
of the layers.
You find expert
guidance in
setting up your
own system in a
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easily available
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sample programs
to help you get
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feel for how the

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works.

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Building

Bluetooth Low
Energy Systems

**With Bluetooth
Low Energy
(BLE), smart
devices are
about to
become even**

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smarter. This

practical

guide

demonstrates

how this

exciting

wireless

technology

helps

developers

build mobile

apps that

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share data
with external
hardware, and

how hardware
engineers can
gain easy and

reliable
access to

mobile
operating

systems. This
book provides

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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

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ing iOS and

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product
designers and
hardware

engineers.

Understand how
data is

organized and
transferred by

BLE devices

Explore BLE's
concepts, key
limitations,

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and network

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topology Dig

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to grasp how

and why BLE

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devices

discover each

other and

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hundred
companies, the
new ZigBee
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only simple,
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networking,
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this book

thoroughly

explains the

entire ZigBee

protocol stack

and covers

issues ranging

from routing

to security.

It also

presents

detailed,

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practical
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coverage of
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features for
home
automation,
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MANs,
Bluetooth, and
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includes
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bands, data
rate,
channels, data
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power, and
receiver
sensitivity •
MAC layer: dat

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a/management
services, MAC
layer

information

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methods, and

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data entities,

NIB, device

configuration,

starting

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network,
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discovery,
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scanning, and
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practical

guide to

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s. In this
book, you will
learn the

basics of how
to program an
nRF microcontr
oller to
communicate

with any
Central device
over Bluetooth
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Each chapter
of the book
builds on the
previous one,
culminating in
three

projects: - An
iBeacon - An
Echo Server -
A Remote
Controlled
Device Through

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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

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handling data
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excellent for
anyone who has
basic or
advanced
knowledge of
nRFx, microcon
troller
programming,

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or C++.
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and 1031
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the refereed
proceedings of
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Intelligence,

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; microelectro
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and
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networks; data
science &
advanced data
analytics;
intelligent

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data mining &

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warehousing;

and

computational

forensics

(privacy and

security).

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Energy in iOS

Swift

Developing IoT

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Projects with
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ESP32

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Papers, Part I

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of the 33rd
International
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Advanced

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Handbook
Applications
(WAINA-2019)

*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.*

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How to build

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

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*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*

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experiments,
Developers
applications,
visualization

*technologies, mobile
technologies, and
social interaction and
communityware.*

*'Bluetooth Tutorial:
Design, Protocol and
Specifications for BLE
- Bluetooth Low
Energy 4.0 and
Bluetooth 5' starts
from the ground up for*

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Introduction

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

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Low Energy The

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.

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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

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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

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*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*

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*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

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Formats, WAP
Developers
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,

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*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

Summary A hands-on

guide that will teach

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how to design and implement scalable, flexible, and open IoT solutions using web technologies. This book focuses on providing the right balance of theory, code samples, and practical examples to enable you to successfully connect all sorts of devices to the web and to

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*expose their services
and data over REST*

*APIs. Purchase of the
print book includes a*

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*Publications. About
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*Because the Internet
of Things is still new,
there is no universal
application protocol.*

Fortunately, the IoT

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can take advantage of the web, where IoT protocols connect applications thanks to universal and open APIs. About the Book Building the Web of Things is a guide to using cutting-edge web technologies to build the IoT. This step-by-step book teaches you how to use web protocols to

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*connect real-world
devices to the web,*

including the

Semantic and Social

Webs. Along the way

you'll gain vital

concepts as you

follow instructions for

making Web of Things

devices. By the end,

you'll have the

practical skills you

need to implement

your own web-

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*connected products
and services. What's*

Inside Introduction to

IoT protocols and

devices Connect

electronic actuators

and sensors (GPIO) to

a Raspberry Pi

Implement standard

REST and Pub/Sub

APIs with Node.js on

embedded systems

Learn about IoT

protocols like MQTT

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*and CoAP and
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integrate them to the
Web of Things Use
the Semantic Web
(JSON-LD, RDFa,
etc.) to discover and
find Web Things
Share Things via
Social Networks to
create the Social Web
of Things Build a web-
based smart home
with HTTP and
WebSocket Compose*

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physical mashups with
EVERYTHING, Node-
RED, and IFTTT*

*About the Reader For
both seasoned
programmers and
those with only basic
programming skills.*

*About the Authors
Dominique Guinard
and Vlad Trifa
pioneered the Web of
Things and cofounded
EVERYTHING, a large-*

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scale IoT cloud

powering billions of

Web Things. Table of

Contents PART 1

BASICS OF THE IOT

AND THE WOT From

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to the Web of Things

Hello, World Wide

Web of Things

Node.js for the Web of

Things Getting started

with embedded

systems Building

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PART 2 BUILDING
THE WOT Access:
Web APIs for Things
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and discover Web
Things Share:
Securing and sharing
Web Things
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selected papers from
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both industry and
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focuses on energy
efficiency in electrical
systems and covers
en trende topics such
as control of
renewable energy
systems. The*

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for Low-Power

Networking

This book

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addresses topics
related to the
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machine
learning, cyber-
physical
systems, cloud
computing, and
autonomous
vehicles in
Industry 4.0. It
investigates
challenges

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across multiple
sectors and
industries and
considers
Industry 4.0 for
operations
research and
supply chain
management.
Cyber-Physical,
IoT, and
Autonomous
Systems in
Industry 4.0

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encourages
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develop novel
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enrich their
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changing nature
of the wireless
security
industry and the
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vulnerabilities
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technologies,

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this book, you

will learn the

basics of how to

program an

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communicate with

any Central or

Peripheral

device over

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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

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the course of
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important
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relate to: - How
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Energy works -
How data is sent
and received -
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for handling
data This book

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is excellent for
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basic or

advanced

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C++.

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**papers presented
at the 12th**

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professionals in
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