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The Microsoft .NET Micro Framework is a small and efficient .NET runtime environment used to run managed code on devices that are too small and resource constrained for Windows CE and the Compact Framework. Expert .NET Micro Framework will teach you everything you need to know to use the .NET Micro Framework to create effective embedded applications. It begins

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with the basics of accessing hardware and networking before delving deep into the less-known areas such as cryptography and globalization, and how to use technologies such as wireless communication that are not directly supported by the .NET Micro Framework. This book is a must if you want to get as much as possible out of the .NET Micro Framework to write powerful embedded applications. Expert .NET Micro Framework also describes how to use resources and write

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globalized and multilingual embedded applications. You will learn how to effectively use binary serialization to store data permanently in flash memory or exchange data with a PDA or PC. Topics like cryptography and encrypted data exchange with a .NET or Compact Framework application are covered. Take a practioner's approach in analyzing the Internet of Things (IoT) devices and the security issues facing an IoT architecture. You'll review the architecture's

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central components, from hardware communication interfaces, such as UART and SPI, to radio protocols, such as BLE or ZigBee. You'll also learn to assess a device physically by opening it, looking at the PCB, and identifying the chipsets and interfaces. You'll then use that information to gain entry to the device or to perform other actions, such as dumping encryption keys and firmware. As the IoT rises to one of the most popular tech trends, manufactures need to take necessary

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steps to secure devices and protect them from attackers. The IoT Hacker's Handbook breaks down the Internet of Things, exploits it, and reveals how these devices can be built securely.

What You'll Learn

- Perform a threat model of a real-world IoT device and locate all possible attacker entry points
- Use reverse engineering of firmware binaries to identify security issues
- Analyze, assess, and identify security issues in exploited ARM and MIPS based binaries
- Sniff,

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capture, and exploit radio communication protocols, such as Bluetooth Low Energy (BLE), and ZigBee

Who This Book is For Those interested in learning about IoT security, such as pentesters working in different domains, embedded device developers, or IT people wanting to move to an Internet of Things security role.

This book constitutes the refereed proceedings of six workshops collocated with the 13th International Conference on Ad-Hoc Networks and

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Wireless, ADHOC-NOW Workshops 2014, held in Benidorm, Spain, in June 2014. The 25 revised full papers presented were carefully reviewed and selected from 59 submissions. The papers address the following topics: emerging technologies for smart devices; marine sensors and systems; multimedia wireless ad hoc networks; security in ad hoc networks; smart sensor protocols and algorithms; wireless sensor, actuator and robot networks. For the first time in a

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single reference, this book provides the beginner with a coherent and logical introduction to the hardware and software of the PIC32, bringing together key material from the PIC32 Reference Manual, Data Sheets, XC32 C Compiler User's Guide, Assembler and Linker Guide, MIPS32 CPU manuals, and Harmony documentation. This book also trains you to use the Microchip documentation, allowing better life-long learning of the PIC32. The philosophy is to get you started quickly, but to

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emphasize fundamentals and to eliminate "magic steps" that prevent a deep understanding of how the software you write connects to the hardware. Applications focus on mechatronics: microcontroller-controlled electromechanical systems incorporating sensors and actuators. To support a learn-by-doing approach, you can follow the examples throughout the book using the sample code and your PIC32 development board. The exercises at the end of each chapter help you put your new

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skills to practice.

Coverage includes: A practical introduction to the C programming language Getting up and running quickly with the PIC32 An exploration of the hardware architecture of the PIC32 and differences among PIC32 families Fundamentals of embedded computing with the PIC32, including the build process, time- and memory-efficient programming, and interrupts A peripheral reference, with extensive sample code covering digital input and output, counter/timers, PWM,

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analog input, input capture, watchdog timer, and communication by the parallel master port, SPI, I2C, CAN, USB, and UART An introduction to the Microchip Harmony programming framework Essential topics in mechatronics, including interfacing sensors to the PIC32, digital signal processing, theory of operation and control of brushed DC motors, motor sizing and gearing, and other actuators such as stepper motors, RC servos, and brushless DC motors For more information on

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the book, and to download free sample code, please visit <http://www.nu32.org> Extensive, freely downloadable sample code for the NU32 development board incorporating the PIC32MX795F512H microcontroller Free online instructional videos to support many of the chapters

5G and Beyond
Mid-Size Firms
Expert .NET Micro Framework
Distributed Network Data
Arduino Robotics
From Hardware to Data to Visualization

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Beginning Sensor Networks with Arduino and Raspberry Pi teaches you how to build sensor networks with Arduino, Raspberry Pi, and XBee radio modules, and even shows you how to turn your Raspberry Pi into a MySQL database server to store your sensor data! First you'll learn about the different types of sensors and sensor networks, including how to build a simple XBee network. Then you'll walk through building an Arduino-based temperature sensor and data collector, followed by building a Raspberry Pi-based sensor node. Next you'll learn different ways to store sensor data, including

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writing to an SD card, sending data to the cloud, and setting up a Raspberry Pi MySQL server to host your data. You even learn how to connect to and interact with a MySQL database server directly from an Arduino! Finally you'll learn how to put it all together by connecting your Arduino sensor node to your new Raspberry Pi database server. If you want to see how well Arduino and Raspberry Pi can get along, especially to create a sensor network, then Beginning Sensor Networks with Arduino and Raspberry Pi is just the book you need. This book is a printed edition of the Special Issue "Sensors and

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Actuators in Smart Cities" that was published in JSAN Up-to-the-Minute, Complete Guidance for Developing Embedded Solutions with Linux Linux has emerged as today's #1 operating system for embedded products. Christopher Hallinan's Embedded Linux Primer has proven itself as the definitive real-world guide to building efficient, high-value, embedded systems with Linux. Now, Hallinan has thoroughly updated this highly praised book for the newest Linux kernels, capabilities, tools, and hardware support, including advanced multicore processors. Drawing on more than a decade of embedded Linux experience,

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Hallinan helps you rapidly climb the learning curve, whether you're moving from legacy environments or you're new to embedded programming. Hallinan addresses today's most important development challenges and demonstrates how to solve the problems you're most likely to encounter. You'll learn how to build a modern, efficient embedded Linux development environment, and then utilize it as productively as possible. Hallinan offers up-to-date guidance on everything from kernel configuration and initialization to bootloaders, device drivers to file systems, and BusyBox utilities to real-time

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configuration and system analysis. This edition adds entirely new chapters on UDEV, USB, and open source build systems. Tour the typical embedded system and development environment and understand its concepts and components. Understand the Linux kernel and userspace initialization processes. Preview bootloaders, with specific emphasis on U-Boot. Configure the Memory Technology Devices (MTD) subsystem to interface with flash (and other) memory devices. Make the most of BusyBox and latest open source development tools. Learn from expanded and updated coverage

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of kernel debugging. Build and analyze real-time systems with Linux. Learn to configure device files and driver loading with UDEV. Walk through detailed coverage of the USB subsystem. Introduces the latest open source embedded Linux build systems. Reference appendices include U-Boot and BusyBox commands.

DFRobot Romeo V2 is development board based Arduino Leonardo and designed for Robot development. This book helps you to get started with DFRobot Romeo V2 development. The following is a list of highlight topics: *
Preparing Development

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***Environment * Setting Up
DFRobot Romeo V2 * Writing and
Reading Digital Data * Serial
Communication (UART) * PWM
and Analog Input * Working with
I2C * Working with SPI *
Accessing EEPROM * Wireless
Network with XBee IEEE 802.15.4
* Controlling DC Motor
Trends in Welding Research
2012: Proceedings of the 9th
International Conference
The IoT Hacker's Handbook
Zigbee Wireless Networking
Fundamentals and Standards***

***Embedded Computing and
Mechatronics with the PIC32
Microcontroller***

The bestselling beginner Arduino guide,

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updated with new projects! Exploring Arduino makes electrical engineering and embedded software accessible. Learn step by step everything you need to know about electrical engineering, programming, and human-computer interaction through a series of increasingly complex projects. Arduino guru Jeremy Blum walks you through each build, providing code snippets and schematics that will remain useful for future projects. Projects are accompanied by downloadable source code, tips and tricks, and video tutorials to help you master Arduino. You'll gain the skills you need to develop your own microcontroller projects! This new 2nd edition has been updated to cover the rapidly-expanding Arduino ecosystem, and includes new full-color graphics for easier reference. Servo motors and stepper motors are covered in richer detail, and you'll find more excerpts

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about technical details behind the topics covered in the book. Wireless connectivity and the Internet-of-Things are now more prominently featured in the advanced projects to reflect Arduino's growing capabilities. You'll learn how Arduino compares to its competition, and how to determine which board is right for your project. If you're ready to start creating, this book is your ultimate guide! Get up to date on the evolving Arduino hardware, software, and capabilities Build projects that interface with other devices—wirelessly! Learn the basics of electrical engineering and programming Access downloadable materials and source code for every project Whether you're a first-timer just starting out in electronics, or a pro looking to mock-up more complex builds, Arduino is a fantastic tool for building a variety of devices. This book offers a comprehensive tour of the

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hardware itself, plus in-depth introduction to the various peripherals, tools, and techniques used to turn your little Arduino device into something useful, artistic, and educational. Exploring Arduino is your roadmap to adventure—start your journey today!

So, you've created a few projects with Arduino, and now it's time to kick it up a notch. Where do you go next? With Pro Arduino, you'll learn about new tools, techniques, and frameworks to make even more ground-breaking, eye-popping projects. You'll discover how to make Arduino-based gadgets and robots interact with your mobile phone. You'll learn all about the changes in Arduino 1.0, you'll create amazing output with openFrameworks, and you'll learn how to make games with the Gameduino. You'll also learn advanced topics, such as modifying the Arduino to work with non-

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standard Atmel chips and Microchip's PIC32. Rick Anderson, an experienced Arduino developer and instructor, and Dan Cervo, an experienced Arduino gadgeteer, will give you a guided tour of advanced Arduino capabilities. If it can be done with an Arduino, you'll learn about it here.

This volume presents the proceedings of the First Euro-China Conference on Intelligent Data Analysis and Applications (ECC 2014), which was hosted by Shenzhen Graduate School of Harbin Institute of Technology and was held in Shenzhen City on June 13-15, 2014. ECC 2014 was technically co-sponsored by Shenzhen Municipal People's Government, IEEE Signal Processing Society, Machine Intelligence Research Labs, VSB-Technical University of Ostrava (Czech Republic), National Kaohsiung University of Applied Sciences (Taiwan), and Secure E-commerce

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Transactions (Shenzhen) Engineering Laboratory of Shenzhen Institute of Standards and Technology.

Intelligent information and database systems are two closely related subfields of modern computer science which have been known for over thirty years. They focus on the integration of artificial intelligence and classic database technologies to create the class of next generation information systems. The book focuses on new trends in intelligent information and database systems and discusses topics addressed to the foundations and principles of data, information, and knowledge models, methodologies for intelligent information and database systems analysis, design, and implementation, their validation, maintenance and evolution. They cover a broad spectrum of research topics discussed both from the practical and

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theoretical points of view such as: intelligent information retrieval, natural language processing, semantic web, social networks, machine learning, knowledge discovery, data mining, uncertainty management and reasoning under uncertainty, intelligent optimization techniques in information systems, security in databases systems, and multimedia data analysis. Intelligent information systems and their applications in business, medicine and industry, database systems applications, and intelligent internet systems are also presented and discussed in the book. The book consists of 38 chapters based on original works presented during the 7th Asian Conference on Intelligent Information and Database Systems (ACIIDS 2015) held on 23–25 March 2015 in Bali, Indonesia. The book is divided into six parts related to Advanced Machine

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Learning and Data Mining, Intelligent Computational Methods in Information Systems, Semantic Web, Social Networks and Recommendation Systems, Cloud Computing and Intelligent Internet Systems, Knowledge and Language Processing, and Intelligent Information and Database Systems: Applications.

Intelligent Data analysis and its Applications, Volume II

Pro Arduino

ADHOC-NOW 2014 International Workshops, ETSD, MARSS, MWaoN, SecAN, SSPA, and WiSARN, Benidorm, Spain, June 22--27, 2014, Revised

Selected Papers

Concepts, Methodologies, Tools, and Applications

Exploring Arduino

Intelligent IoT Projects in 7 Days

ZigBee is a standard based on the IEEE 802.15.4 standard for wireless

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personal networks. This standard allows for the creation of very low cost and low power networks - 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, industrial, and security sensors. Hundreds of companies are creating applications including Mitsubishi, Motorola, Freescale, and Siemens. This book is written for engineers 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 facts but explains what ZigBee can do through detailed code examples.

**Details how to plan and develop*

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*applications and networks *Zigbee sensors have many applications including industrial automation, medical sensing, remote controls, and security *Hot topic for today's electrical engineer because it is low cost and low power*

Open-source electronics are becoming very popular, and are integrated with our daily educational and developmental activities. At present, the use open-source electronics for teaching science, technology, engineering, and mathematics (STEM) has become a global trend. Off-the-shelf embedded electronics such as Arduino- and Raspberry-compatible modules have been widely used for various applications, from do-it-yourself (DIY) to industrial projects. In addition to the growth of open-source software

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platforms, open-source electronics play an important role in narrowing the gap between prototyping and product development. Indeed, the technological and social impacts of open-source electronics in teaching, research, and innovation have been widely recognized.

Leverage .NET and Sketch in your Arduino development implementation and integrate it into your .NET program. There are many Arduino models and compatible shields that can be used in Arduino boards. Integrating between an Arduino platform and .NET technology or Sketch can produce more advantages. Arduino Programming using .NET and Sketch shows readers how to do so with practical Arduino projects, such as preparing a development environment,

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performing sensing and actuating with external devices, implementing Windows Remote Arduino and building a simple IoT program. Use this quick reference to learn the basics of the Arduino platform for multiple models and start your Arduino programming in .NET and Sketch today. What You'll Learn: Learn the basics of the Arduino platform Prepare and set up an Arduino development environment Develop an Arduino program using .NET and Sketch Implement Windows Remote Arduino Build a simple IoT program Who This Book Is For: .NET and Sketch developers who want to learn Arduino programming. Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any

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online entitlements included with the product. Gain the skills needed to create a hi-tech home—affordably and easily This hands-on guide shows, step by step, how to use the powerful Raspberry Pi for home automation. Written in an easy-to-follow style, the book features DIY projects for Amazon Echo, Google Home, smart lightbulbs and thermostats, and more. Home Automation with Raspberry Pi: Projects Using Google Home, Amazon Echo, and Other Intelligent Personal Assistants lays out essential skills for hobbyists and makers of all ages and experience levels. You will discover how to build gadgets that can work in conjunction with—or in some cases replace—commercially available smart home products. Inside, you'll learn how to:

- Design and build

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custom home automation devices

- *Interface a Google Home device to your Raspberry Pi*
 - *Connect Google Voice Assistant to RasPi*
 - *Incorporate GPIO control using the Amazon Echo*
 - *Navigate home automation operating systems*
 - *Use Z-Wave in your RasPi HA projects*
 - *Apply fuzzy logic techniques to your projects*
 - *Work with sensors and develop home security systems*
 - *Utilize two open-source AI applications, Mycroft and Picroft*
 - *Tie your projects together to create an integrated home automation system*
- BeagleBone Robotic Projects*
- Plunkett's Companion to the Almanac of American Employers 2009*
- Northern African Wireless Communications*
- Nine Simple Projects with Lights, Sounds, and More!*

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*Electronic Design
Computer Networks*

If you want a simple guide to building complex robots, then this book is for you. You'll need some programming knowledge and experience working with mechanical systems.

This book constitutes the thoroughly refereed proceedings of the 23rd International Conference on Computer Networks, CN 2016, held in Brunów, Poland, in June 2016. The 32 full papers and the 4 short papers presented were carefully reviewed and selected from 72 submissions. They are organized in topical sections on computer networks architectures and

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protocols, teleinformatics and telecommunications, new technologies, queueing theory, and innovative applications. Get the practical knowledge you need to set up and deploy XBee modules with this hands-on, step-by-step series of experiments The only book to cover XBee in practical fashion; enables you to get up and running quickly with step-by-step tutorials. Provides insight into the product data sheets, saving you time and helping you get straight to the information you need. Includes troubleshooting and testing information, plus downloadable configuration files and fully-documented source code to

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illustrate and explain operations. The Hands-on XBee Lab Manual takes the reader through a range of experiments, using a hands-on approach. Each section demonstrates module set up and configuration, explores module functions and capabilities, and, where applicable, introduces the necessary microcontrollers and software to control and communicate with the modules. Experiments cover simple setup of modules, establishing a network of modules, identifying modules in the network, and some sensor-interface designs. This book explains, in practical terms, the basic capabilities and potential uses of XBee modules, and gives

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engineers the know-how that they need to apply the technology to their networks and embedded systems. The only book to cover XBee in practical fashion; enables you to get up and running quickly with step-by-step tutorials. • Provides insight into the product data sheets, saving you time and helping you get straight to the information you need. • Includes troubleshooting and testing information, plus downloadable configuration files and fully-documented source code to illustrate and explain operations. This monograph provides comprehensive guidelines on the current and future trends of innovative simulation systems. In

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particular, their important components, such as augmented reality and unmanned vehicles are presented. The book consists of three parts. Each part presents good practices, new methods, concepts of systems and new algorithms. Presented challenges and solutions are the results of research and conducted by the contributing authors. The book describes and evaluates the current state of knowledge in the field of innovative simulation systems. Throughout the chapters there are presented current issues and concepts of systems, technology, equipment, tools, research challenges and current, past and future applications of

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simulation systems. The book is addressed to a wide audience: academic staff, representatives of research institutions, employees of companies and government agencies as well as students and graduates of technical universities in the country and abroad. The book can be a valuable source of information for constructors and developers of innovative simulation systems and their components. Scientists and researchers involved in mechanics, control algorithms, image processing, computer vision or data fusion can find many valuable suggestions and solutions.

Breakthroughs in Research and

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Practice

*4th International Conference,
SIMPAN 2014, Bergamo, Italy,
October 20-23, 2014. Proceedings*

Tools and Techniques for

Engineering Wizardry

*Sensing the World with Python
and MicroPython*

*DFRobot Romeo V2 Development
Workshop*

A Beginner's Guide to Circuits

***Arduino is an open-source
platform that makes DIY
electronics projects easier
than ever. Gone are the days
when you had to learn
electronics theory and
arcane programming languages
before you could even get an
LED to blink. Now, with this
new edition of the***

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bestselling Arduino: A Quick-Start Guide, readers with no electronics experience can create their first gadgets quickly. This book is up-to-date for the new Arduino Zero board, with step-by-step instructions for building a universal remote, a motion-sensing game controller, and many other fun, useful projects. This Quick-Start Guide is packed with fun, useful devices to create, with step-by-step instructions and photos throughout. You'll learn how to connect your Arduino to the Internet and program both client and server applications. You'll build projects such as your own

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motion-sensing game controller with a three-axis accelerometer, create a universal remote with an Arduino and a few cheap parts, build your own burglar alarm that emails you whenever someone's moving in your living room, build binary dice, and learn how to solder. In one of several new projects in this edition, you'll create your own video game console that you can connect to your TV set. This book is completely updated for the new Arduino Zero board and the latest advances in supporting software and tools for the Arduino. Sidebars throughout the book point you to

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exciting real-world projects using the Arduino, exercises extend your skills, and "What If It Doesn't Work" sections help you troubleshoot common problems. With this book, beginners can quickly join the worldwide community of hobbyists and professionals who use the Arduino to prototype and develop fun, useful inventions. What You Need: This is the full list of all parts you'd need for all projects in the book; some of these are provided as part of various kits that are available on the web, or you can purchase individually. Sources include adafruit.com,

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*makershed.com,
radioshack.com,
sparkfun.com, and
mouser.com. Please note we
do not support or endorse
any of these vendors, but we
list them here as
aconvenience for you.*

*Arduino Zero (or Uno or
Duemilanove or Diecimila)
board USB cable Half-size
breadboard Pack of LEDs (at
least 3, 10 or more is a
good idea) Pack of 100 ohm,
10k ohm, and 1k ohm
resistors Four pushbuttons
Breadboard jumper wire /
connector wire Parallax
Ping))) sensor Passive
Infrared sensor An infrared
LED A 5V servo motor Analog
Devices TMP36 temperature*

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*sensor ADXL335 accelerometer
breakout board 6 pin 0.1"
standard header (might be
included with the ADXL335)
Nintendo Nunchuk Controller
Arduino Ethernet shield
Arduino Proto shield and a
tiny breadboard (optional
but recommended) Piezo
speaker/buzzer (optional)
Tilt sensor (optional) A
25-30 Watts soldering iron
with a tip (preferably
1/16") A soldering stand and
a sponge A standard 60/40
solder (rosin-core) spool
for electronics work
This book will show you how
to use your Arduino to
control a variety of
different robots, while
providing step-by-step*

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instructions on the entire robot building process. You'll learn Arduino basics as well as the characteristics of different types of motors used in robotics. You also discover controller methods and failsafe methods, and learn how to apply them to your project. The book starts with basic robots and moves into more complex projects, including a GPS-enabled robot, a robotic lawn mower, a fighting bot, and even a DIY Segway-clone.

Introduction to the Arduino and other components needed for robotics

Learn how to build motor controllers

Build bots from simple line-

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following and bump-sensor bots to more complex robots that can mow your lawn, do battle, or even take you for a ride Please note: the print version of this title is black & white; the eBook is full color.

Ongoing advancements in modern technology have led to significant developments with smart technologies. With the numerous applications available, it becomes imperative to conduct research and make further progress in this field. Smart Technologies: Breakthroughs in Research and Practice provides comprehensive and interdisciplinary research

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on the most emerging areas of information science and technology. Including innovative studies on image and speech recognition, human-computer interface, and wireless technologies, this multi-volume book is an ideal source for researchers, academicians, practitioners, and students interested in advanced technological applications and developments.

This book is divided into projects that are explained in a step-by-step format, with practical instructions that are easy to follow. If you want to build your own home automation systems wirelessly using the Arduino

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platform, this is the book for you. You will need to have some basic experience in Arduino and general programming languages, such as C and C++ to understand the projects in this book.

*Advanced Microsystems for Automotive Applications 2020
Mastering BeagleBone*

Robotics

Proceeding of the First Euro-China Conference on Intelligent Data Analysis and Applications, June

13-15, 2014, Shenzhen, China

New York Stock Exchange,

American Stock Exchange,

Nasdaq Stock Market and

regional exchanges

23rd International

Conference, CN 2016, Brunów,

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***Poland, June 14–17, 2016,
Proceedings
Simulation, Modeling, and
Programming for Autonomous
Robots***

This book constitutes the refereed proceedings of the 4th International Conference on Simulation, Modeling, and Programming for Autonomous Robots, SIMPAR 2014, held in Bergamo, Italy, in October 2014. The 49 revised full papers presented were carefully reviewed and selected from 62 submissions. The papers are organized in topical sections on simulation, modeling, programming, architectures, methods and

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tools, and systems and applications.

A Beginner's Guide to Circuits is the perfect first step for anyone ready to jump into the world of electronics and circuit design. After finishing the book's nine graded projects, readers will understand core electronics concepts which they can use to make their own electrifying creations! First, you'll learn to read circuit diagrams and use a breadboard, which allows you to connect electrical components without using a hot soldering iron! Next, you'll build nine simple projects using just a handful of readily

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available components, like resistors, transistors, capacitors, and other parts. As you build, you'll learn what each component does, how it works, and how to combine components to achieve new and interesting effects. By the end of the book, you'll be able to build your own electronic creations. With easy-to-follow directions, anyone can become an inventor with the help of *A Beginner's Guide to Circuits!*

Build These 9 Simple Circuits! □
Steady-Hand Game: Test your nerves using a wire and a buzzer to create an Operation-style game! □ Touch-Enabled Light: Turn on a light with your

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finger! □ Cookie Jar Alarm: Catch cookie thieves red-handed with this contraption. □ Night-Light: Automatically turn on a light when it gets dark. □ Blinking LED: This classic circuit blinks an LED. □ Railroad Crossing Light: Danger! Don't cross the tracks if this circuit's pair of lights is flashing. □ Party Lights: Throw a party with these charming string lights. □ Digital Piano: Play a tune with this simple synthesizer and learn how speakers work. □ LED Marquee: Put on a light show and impress your friends with this flashy finale.

Leverage the powerful Arduino and XBee platforms to monitor

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and control your surroundings
About This Book Build your own
low-power, wireless network
using ready-made Arduino and
XBee hardware Create a
complex project using the
Arduino prototyping platform A
guide that explains the
concepts and builds upon them
with the help of examples to
form projects Who This Book Is
For This book is targeted at
embedded system developers
and hobbyists who have some
working knowledge of Arduino
and who wish to extend their
projects using wireless
connectivity. What You Will
Learn Interact with XBee
boards using the XCTU

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program on Windows, OS X, or Linux Make your Arduino boards communicate wirelessly, using XBee modules in the advanced API mode Centrally collect and store measured sensor data, in the cloud or your own database Connect the coordinator Arduino to the Internet and send data to web services Control your environment automatically, based on sensor input from your network Interact with off-the-shelf ZigBee Home Automation devices Make your devices battery-powered and let them sleep to get months or even years of battery life In Detail

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Arduino has been established as the de facto standard microcontroller programming platform, being used for one-off do-it-yourself projects as well as prototypes for actual products. By providing a myriad of libraries, the Arduino community has made it very easy to interact with pretty much any piece of hardware out there. XBee offers a great range of low-power wireless solutions that are easy to work with, by taking all of the complexity of wireless (mesh) networking out of your hands and letting you focus on what to send without worrying about the how. Building wireless

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sensor networks is cost-effective as well as efficient as it will be done with Arduino support. The book starts with a brief introduction to various wireless protocols, concepts, and the XBee hardware that enables their use. Then the book expands to explain the Arduino boards to you, letting them read and send sensor data, collect that data centrally, and then even control your home from the Internet. Moving further more advanced topics such as interacting through the standard Zigbee Home Automation protocol, or making your application power-

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efficient are covered. By the end of the book, you will have all the tools needed to build complete, real-world solutions. Style and approach A hands-on guide, featuring a single home automation project that can be built as described or with endless variations. Every step is illustrated with complete examples and screenshots, allowing you to build the examples swiftly.

Plunkett's Companion to the Almanac of American Employers is the perfect complement to the highly-regarded main volume of The Almanac of American Employers. This mid-size firms

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companion book covers employers of all types from 100 to 2,500 employees in size (while the main volume covers companies of 2,500 or more employees). No other source provides this book's easy-to-understand comparisons of growth, corporate culture, salaries, benefits, pension plans and profit sharing at mid-size corporations. The book contains profiles of highly successful companies that are of vital importance to job-seekers of all types. It also enables readers to readily compare the growth potential and benefit plans of large employers. You'll see the

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financial record of each firm, along with the impact of earnings, sales and growth plans on each company's potential to provide a lucrative and lasting employment opportunity. Nearly five hundred of the most successful mid-size corporate employers in America are analyzed in this book. Tens of thousands of pieces of information, gathered from a wide variety of sources, have been researched for each corporation and are presented here in a unique form that can be easily understood by job seekers of all types. Purchasers of either the book or PDF version can receive a free copy

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of the company profiles database on CD-ROM, enabling export of company names, human resources contacts, and addresses for mail merge and other uses.

Arduino Programming with .NET and Sketch

Beginning Sensor Networks with XBee, Raspberry Pi, and Arduino

Embedded Linux Primer

Beginning Sensor Networks with Arduino and Raspberry Pi

Open-Source Electronics Platforms

A Practical Guide to Hacking the Internet of Things

As more and more devices become interconnected

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through the Internet of Things (IoT), there is an even greater need for this book, which explains the technology, the internetworking, and applications that are making IoT an everyday reality. The book begins with a discussion of IoT "ecosystems" and the technology that enables them, which includes: Wireless Infrastructure and Service Discovery Protocols Integration Technologies and Tools Application and Analytics Enablement Platforms A chapter on next-generation cloud infrastructure explains hosting IoT platforms and applications.

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A chapter on data analytics throws light on IoT data collection, storage, translation, real-time processing, mining, and analysis, all of which can yield actionable insights from the data collected by IoT applications. There is also a chapter on edge/fog computing. The second half of the book presents various IoT ecosystem use cases. One chapter discusses smart airports and highlights the role of IoT integration. It explains how mobile devices, mobile technology, wearables, RFID sensors, and beacons work together as the core

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technologies of a smart airport. Integrating these components into the airport ecosystem is examined in detail, and use cases and real-life examples illustrate this IoT ecosystem in operation. Another in-depth look is on envisioning smart healthcare systems in a connected world. This chapter focuses on the requirements, promising applications, and roles of cloud computing and data analytics. The book also examines smart homes, smart cities, and smart governments. The book concludes with a chapter on IoT security and privacy. This chapter examines

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the emerging security and privacy requirements of IoT environments. The security issues and an assortment of surmounting techniques and best practices are also discussed in this chapter.

Build sensor networks with Python and MicroPython using XBee radio modules, Raspberry Pi, and Arduino boards. This revised and updated edition will put all of these together to form a sensor network, and show you how to turn your Raspberry Pi into a MySQL database server to store your sensor data! You'll review the different types of sensors and sensor networks,

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along with new technology, including how to build a simple XBee network. You'll then walk through building an sensor nodes on the XBee, Raspberry Pi, and Arduino, and also learn how to collect data from multiple sensor nodes. The book also explores different ways to store sensor data, including writing to an SD card, sending data to the cloud, and setting up a Raspberry Pi MySQL server to host your data. You'll even learn how to connect to and interact with a MySQL database server directly from an Arduino! Finally you'll see how to put it all together by connecting your

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sensor nodes to your new Raspberry Pi database server. If you want to see how well XBee, Raspberry Pi, and Arduino can get along, especially to create a sensor network, then *Beginning Sensor Networks with XBee, Raspberry Pi, and Arduino* is just the book you need. What You'll Learn

- Code your sensor nodes with Python and MicroPython
- Work with new XBee 3 modules
- Host your data on Raspberry Pi
- Get started with MySQL
- Create sophisticated sensor networks

Who This Book Is For

Those interested in building or experimenting with sensor networks and IoT

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solutions, including those with little or no programming experience. A secondary target includes readers interested in using XBee modules with Raspberry Pi and Arduino, those interested in controlling XBee modules with MicroPython.

Intelligent Data analysis and its Applications, Volume II
Proceeding of the First Euro-China Conference on Intelligent Data Analysis and Applications, June 13-15, 2014, Shenzhen, China
Springer

This book gathers papers from the 23rd International Forum on Advanced Microsystems for Automotive Applications (AMAA

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2020) held online from Berlin, Germany, on May 26-27, 2020. Focusing on intelligent system solutions for auto mobility and beyond, it discusses in detail innovations and technologies enabling electrification, automation and diversification, as well as strategies for a better integration of vehicles into the networks of traffic, data and power. Further, the book addresses other relevant topics, including the role of human factors and safety issues in automated driving, solutions for shared mobility, as well as automated bus transport in rural areas. Implications of

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current circumstances, such as those generated by climate change, on the future development of auto mobility, are also analysed, providing researchers, practitioners and policy makers with an authoritative snapshot of the state-of-the-art, and a source of inspiration for future developments and collaborations.

Robotic Systems: Concepts, Methodologies, Tools, and Applications

Intelligent System Solutions for Auto Mobility and Beyond
Sensors and Actuators in Smart Cities

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Standard & Poor's Stock Reports
New Trends in Intelligent
Information and Database
Systems

A Practical Real-World Approach

Through expanded intelligence, the use of robotics has fundamentally transformed a variety of fields, including manufacturing, aerospace, medicine, social services, and agriculture. Continued research on robotic design is critical to solving various dynamic obstacles individuals, enterprises, and humanity at large face on a daily basis. Robotic Systems: Concepts, Methodologies, Tools, and Applications is a

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vital reference source that delves into the current issues, methodologies, and trends relating to advanced robotic technology in the modern world. Highlighting a range of topics such as mechatronics, cybernetics, and human-computer interaction, this multi-volume book is ideally designed for robotics engineers, mechanical engineers, robotics technicians, operators, software engineers, designers, programmers, industry professionals, researchers, students, academicians, and computer practitioners seeking current research on developing innovative ideas for

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intelligent and autonomous robotics systems.

The Trends conference attracts the world's leading welding researchers. Topics covered in this volume include friction stir welding, sensing, control and automation, microstructure and properties, welding processes, procedures and consumables, weldability, modeling, phase transformations, residual stress and distortion, physical processes in welding, and properties and structural integrity of weldments. Build your own distributed sensor network to collect, analyze, and visualize real-time data about our human

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environment—including noise level, temperature, and people flow. With this hands-on book, you'll learn how to turn your project idea into working hardware, using the easy-to-learn Arduino microcontroller and off-the-shelf sensors. Authors Alasdair Allan and Kipp Bradford walk you through the entire process, from prototyping a simple sensor node to performing real-time analysis on data captured by a deployed multi-sensor network. Demonstrated at recent O'Reilly Strata Conferences, the future of distributed data is already here. If you have programming experience, you

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can get started immediately. Wire up a circuit on a breadboard, and use the Arduino to read values from a sensor Add a microphone and infrared motion detector to your circuit Move from breadboard to prototype with Fritzing, a program that converts your circuit design into a graphical representation Simplify your design: learn use cases and limitations for using Arduino pins for power and grounding Build wireless networks with XBee radios and request data from multiple sensor platforms Visualize data from your sensor network with Processing or LabVIEW Develop practical example

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projects with detailed explanations; combine the projects in a vast number of ways to create different robot designs, or work through them in sequence to discover the full capability of the BeagleBone Black. This book is for anyone who is curious about using new, low-cost hardware to create robotic projects that have previously been the domain of research labs, major universities or Defence departments. Some programming experience would be useful, but if you know how to use a personal computer, you can use this book to construct far more complex systems than you would have thought possible.

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**Arduino: A Quick-Start Guide
Innovative Simulation
Systems**

**Experiments that Teach You
XBEE Wireless
Communications**

**Home Automation with
Raspberry Pi: Projects Using
Google Home, Amazon Echo,
and Other Intelligent Personal
Assistants**

**The Internet of Things
Smart Technologies:
Breakthroughs in Research
and Practice**

**This book provides an
accessible and comprehensive
tutorial on the key enabling
technologies for 5G and
beyond, covering both the
fundamentals and the state-of-
the-art 5G standards. The**

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book begins with a historical overview of the evolution of cellular technologies and addresses the questions on why 5G and what is 5G. Following this, six tutorial chapters describe the fundamental technology components for 5G and beyond. These include modern advancements in channel coding, multiple access, massive multiple-input and multiple-output (MIMO), network densification, unmanned aerial vehicle enabled cellular networks, and 6G wireless systems. The second part of this book consists of five chapters that introduce the basics of 5G New Radio (NR) standards

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developed by 3GPP. These include 5G architecture, protocols, and physical layer aspects. The third part of this book provides an overview of the key 5G NR evolution directions. These directions include ultra-reliable low-latency communication (URLLC) enhancements, operation in unlicensed spectrum, positioning, integrated access and backhaul, air-to-ground communication, and non-terrestrial networks with satellite communication. Discover how to build your own Intelligent Internet of Things projects and bring a new degree of interconnectivity to your

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world. About This Book Build intelligent and unusual IoT projects in just 7 days, Create home automation, smart home, and robotic projects and allow your devices to do smart work Build IoT skills through enticing projects and leverage revolutionary computing hardware through the RPi and Arduino. Who This Book Is For If you're a developer, IoT enthusiast, or just someone curious about Internet of Things, then this book is for you. A basic understanding of electronic hardware, networking, and basic programming skills would do wonders. What You Will Learn Learn how to get started with intelligent IoT

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projects Explore various pattern recognition and machine learning algorithms to make IoT projects smarter. Make decisions on which devices to use based on the kind of project to build. Create a simple machine learning application and implement decision system concepts Build a smart parking system using Arduino and Raspberry Pi Learn how to work with Amazon Echo and to build your own smart speaker machine Build multi-robot cooperation using swarm intelligence. In Detail Intelligent IoT Projects in 7 days is about creating smart IoT projects in just 7 days. This book will help you to

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overcome the challenge of analyzing data from physical devices. This book aims to help you put together some of the most exciting IoT projects in a short span of time. You'll be able to use these in achieving or automating everyday tasks—one project per day. We will start with a simple smart gardening system and move on to a smart parking system, and then we will make our own vending machine, a smart digital advertising dashboard, a smart speaker machine, an autonomous fire fighter robot, and finally look at a multi-robot cooperation using swarm intelligence

Style and approach A clear step-by-step

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**instruction guide to
completing fully-fledged
projects in just 7 days
Ad-hoc Networks and Wireless
The Hands-on XBEE Lab
Manual
Arduino Home Automation
Projects
Building Wireless Sensor
Networks Using Arduino
Enabling Technologies,
Platforms, and Use Cases**