Getting Started With Beaglebone Linux Powered Electronic Projects With Python And Javascript Matt Richardson

Getting Started with BeagleBoneLinux-Powered Electronic Projects With Python and JavaScriptMaker Media, Inc.

In-depth instruction and practical techniques for building with the BeagleBone embedded Linux platform Exploring BeagleBone is a hands-on guide to bringing gadgets, gizmos, and robots to life using the popular BeagleBone embedded Linux platform. Comprehensive content and deep detail provide more than just a BeagleBone instruction manual-you'll also learn the underlying engineering techniques that will allow you to create your own projects. The book begins with a foundational primer on essential skills, and then gradually moves into communication, control, and advanced applications using C/C++, allowing you to learn at your own pace. In addition, the book's companion website features instructional videos, source code, discussion forums, and more, to ensure that you have everything you need. The BeagleBone's small size, high performance, low cost, and extreme adaptability have made it a favorite development platform, and the Linux software base allows for complex yet flexible functionality. The BeagleBone has applications in smart buildings, robot control,

environmental sensing, to name a few; and, expansion boards and peripherals dramatically increase the possibilities. Exploring BeagleBone provides a reader-friendly guide to the device, including a crash course in computer engineering. While following step by step, you can: Get up to speed on embedded Linux, electronics, and programming Master interfacing electronic circuits, buses and modules, with practical examples Explore the Internet-connected BeagleBone and the BeagleBone with a display Apply the BeagleBone to sensing applications, including video and sound Explore the BeagleBone's Programmable Real-Time Controllers Updated to cover the latest Beagle boards, Linux kernel versions, and Linux software releases. Includes new content on Linux kernel development, the Linux Remote Processor Framework, CAN bus, IoT frameworks, and much more! Hands-on learning helps ensure that your new skills stay with you, allowing you to design with electronics, modules, or peripherals even beyond the BeagleBone. Insightful guidance and online peer support help you transition from beginner to expert as you master the techniques presented in Exploring BeagleBone, the practical handbook for the popular computing platform.

With Bluetooth Low Energy (BLE), smart devices are about to become even smarter. This practical guide demonstrates how this exciting wireless technology helps developers build mobile apps that share data with external hardware, and how hardware engineers can gain easy and reliable access to mobile operating systems. This book provides a solid, high-level overview of how devices use BLE to

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

Exciting new capabilities to enable even easier DIY robotics with BeagleBone Blue About This Book Build powerful robots with the all new BeagleBone Blue Communicate with your robot and teach it to detect and respond to its environment Control walking, rolling, swimming, and flying robots with your iOS and Android mobile devices Who This Book Is For This book is for anyone who is curious about using new, low-cost hardware to create robotic projects and 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. What You Will Learn Power on and configure the BeagleBone Blue Get to know Simple

programming techniques to enable the unique hardware capabilities of the BeagleBone Blue. Connect standard hardware to enable your projects to see, speak, hear, and move Build advanced capabilities into your projects, such as GPS and sonar sensors Build complex projects that can fly, or go under or on the water In Detail BeagleBone Blue is effectively a small, light, cheap computer in a similar vein to Raspberry Pi and Arduino. It has all of the extensibility of today's desktop machines, but without the bulk, expense, or noise. This project guide provides step-by-step instructions that enable anyone to use this new, low-cost platform in some fascinating robotics projects. By the time you are finished, your projects will be able to see, speak, listen, detect their surroundings, and move in a variety of amazing ways. The book begins with unpacking and powering up the components. This includes guidance on what to purchase and how to connect it all successfully, and a primer on programming the BeagleBone Blue. You will add additional software functionality available from the open source community, including making the system see using a webcam, hear using a microphone, and speak using a speaker. You will then learn to use the new hardware capability of the BeagleBone Blue to make your robots move, as well as discover how to add sonar sensors to avoid or find objects. Later, you will learn to remotely control your robot through iOS and Android devices. At the end of this book, you will see how to integrate all of these functionalities to work together, before developing the most impressive robotics projects: Drone and Submarine. Style and approach Develop

practical example 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 Blue.

JavaScript ist die beliebteste Programmiersprache der Welt und der Standard für Webcoder. Elektronikbastler steuern jedoch ihre Geräte im Internet der Dinge meist mit anderen Sprachen. Warum also nicht diese beiden kreativen Welten zusammenführen? Dieses ansprechend illustrierte und praxisorientierte Buch bringt Ihnen bei, wie Sie mit JavaScript auf Plattformen wie Arduino, Tessel 2 und Raspberry Pi Wetterstationen, motorisierte Geländefahrzeuge, Bluetooth-Türklingeln und vieles mehr konstruieren können. Schließen Sie einfach alles an, von Motoren über Touchscreens bis hin zu Bodenfeuchtesensoren, und schon geht's los! Mit dem node.js-Framework Johnny-Five sind Sie in der Lage, Arbeitsabläufe für die Entwicklung zu nutzen, die Ihnen als WebentwicklerIn vertraut sind. So macht Hardware-Prototyping Spaß und funktioniert intuitiv und schnell. Die Kapselung des Verhaltens in Komponentenklassen, die Johnny-Five bietet, ist leicht zugänglich und der resultierende Code ist meist viel sauberer und leichter handzuhaben als viele Arduino-Bibliotheken. Außerdem können Sie über den Package-Manager npm das nahezu unerschöpfliche Angebot der weltweiten Node.js-Community nutzen und Module importieren. Sie erhalten einen intensiven Crash-Kurs in Grundlagen-Elektronik – Vorkenntnisse werden nicht erwartet. Schritt für Schritt erweitert das Buch Ihr Wissen. Bald erschaffen Sie Ihre eigenen Konstruktionen, die

aufleuchten, Geräusche erzeugen, Daten austauschen, sich bewegen oder ihre Umgebung wahrnehmen können. Verwenden Sie JavaScript, um das Internet der Dinge zum Leben zu erwecken!

MATLAB provides APIs to access BeagleBone Black board. This book helps you to get started with BeagleBone Black Programming using Matlab. The following the highlight: * Preparing Development Environment * Setting up BeagleBone Black Development for MATLAB * Working with GPIO * Working with PWM and ADC * Working with I2C * Working with SPI * Working with Serial Port * Working with Web Camera * Working with BeagleBone Black Linux Command * Measuring and Plotting Sensor Data in Real-Time

Master BeagleBone programming by doing simple electronics and Internet of Things projects About This Book Quickly develop electronics projects that interact with Internet applications using JavaScript and Python Learn about electronics components such as sensors and motors, and how to communicate with them by writing programs A step-by-step guide to explore the exciting world of BeagleBone—from connecting BeagleBone to doing electronics projects and creating IoT applications Who This Book Is For If you want to learn programming on embedded systems with BeagleBone by doing simple electronics projects, this book is for you. This book is also helpful to BeagleBone owners who want to quickly implement small-scale home automation solutions. It is assumed that you have familiarity with C and Python programming. Some familiarity with electronics is helpful but not essential. What You Will Learn Connect your

BeagleBone to a computer in different ways and get the Cloud9 IDE running to quick-start programming on the BeagleBone Get to know about BeagleBone extension pins such as GPIO and how to connect various electronics components with BeagleBone Read and write to various electronics components such as LED, Push-button, sensors, and motors Grasp in-depth theory on Analog, PWM, and BUS programming and the electronics components used in programs Handle data to and from various BUS supporting modules such as UART, I2C, and SPI using the Adafruit BBIO Python library Write real-life IoT applications in JavaScript and Python such as shooting an e-mail on overheat and controlling a servo motor remotely Make use of online free cloud services to store and analyze sensor data collected on the BeagleBone Discover what else can be done using the BeagleBone Get to grips with embedded system BUS communication In Detail The whole world is moving from desktop computers to smartphones and embedded systems. We are moving towards utilizing Internet of Things (IoT). An exponential rise in the demand for embedded systems and programming in the last few years is driving programmers to use embedded development boards such as Beaglebone. BeagleBone is an ultra-small, cost-effective computer that comes with a powerful hardware. It runs a full-fledged Debian Linux OS and provides numerous electronics solutions. BeagleBone is open source and comes with an Ethernet port, which allows you to deploy IoT projects without any additions to the board. It provides plenty of GPIO, Anlaog pins, and UART, I2C, SPI pins which

makes it the right choice to perform electronics projects. This gives you all the benefits of Linux kernel such as multitasking, multiusers, and extensive device driver support. This allows you to do programming in many languages including high-level languages such as JavaScript and Python. This book aims to exploit the hardware and software capabilities of BeagleBone to create real-life electronics and IoT applications quickly. It is divided into two parts. The first part covers JavaScript programs. The second part provides electronics projects and IoT applications in Python. First, you will learn to use BeagleBone as tool to write useful applications on embedded systems. Starting with the basics needed to set up BeagleBone and the Cloud9 IDE, this book covers interfacing with various electronics components via simple programs. The electronics theory related to these components is then explained in depth before you use them in a program. Finally, the book helps you create some real-life IoT applications. Style and approach An easy-to-follow guide full of real-world electronics programs and quick troubleshooting tips using BeagleBone. All the required electronics concepts are explained in detail before using them in a program and all programs are explained in depth. Most of the theory is covered in the first part; while the second part gives you some quick programs.

How can we build bridges from the digital world of the Internet to the analog world that surrounds us? By bringing accessibility to embedded components such as sensors and microcontrollers, JavaScript and Node.js might shape the world of physical computing

as they did for web browsers. This practical guide shows hardware and software engineers, makers, and web developers how to talk in JavaScript with a variety of hardware platforms. Authors Patrick Mulder and Kelsey Breseman also delve into the basics of microcontrollers, single-board computers, and other hardware components. Use JavaScript to program microcontrollers with Arduino and Espruino Prototype IoT devices with the Tessel 2 development platform Learn about electronic input and output components, including sensors Connect microcontrollers to the Internet with the Particle Photon toolchain Run Node.js on single-board computers such as Raspberry Pi and Intel Edison Talk to embedded devices with Node.js libraries such as Johnny-Five, and remotely control the devices with Bluetooth Use MQTT as a message broker to connect devices across networks Explore ways to use robots as building blocks for shared experiences

Build and program projects that tap into the Internet of Things (IoT) using Arduino, Raspberry Pi, and BeagleBone Black! This innovative guide gets you started right away working with the most popular processing platforms, wireless communication technologies, the Cloud, and a variety of sensors. You'll learn how to take advantage of the utility and versatility of the IoT and connect devices and systems to the Internet using sensors. Each project features a list of the tools and components, how-to explanations with photos and illustrations, and complete programming code. All projects can be modified and expanded, so you can build on your skills. The Internet of Things: DIY Projects with Arduino, Raspberry Pi, and BeagleBone Black

Covers the basics of Java, C#, Python, JavaScript, and other programming languages used in

the projects Shows you how to use IBM’s Net Beans IDE and the Eclipse IDE Explains how to set up small-scale networks to connect the projects to the Internet Includes essential tips for setting up and using a MySQL database. The fun, DIY projects in the book include: Raspberry Pi home temperature measurements Raspberry Pi surveillance webcams Raspberry Pi home weather station Arduino garage door controller Arduino irrigation controller Arduino outdoor lighting controller Beaglebone message panel Beaglebone remote control SDR Machine-to-machine demonstration project

BeagleBone is a barebone computer that can be configured and customized for different applications and is almost half the price of a standard computer. This book will cover the basics of how BeagleBone Black's hardware interface subsystems work, and can be controlled using two popular Python libraries for BeagleBone Black. You will be introduced to BeagleBone Black's GPIO, PWM, ADC, UART, SPI, I2C, and eQEP subsystems. We will then dive deep into more complex built-in peripherals, demonstrating different ways to receive input from a user including buttons, potentiometers, and rotary encoders with the eQEP module. We will also learn about interfacing with external devices; this will be demonstrated using the serial modules to interface with external devices such as temperature sensors and accelerometers. Towards the end of the book, we will present a couple of real-world problems and demonstrate how to solve them with the skills you've acquired.

The definitive, easy-to-use guide to the popular BeagleBone board BeagleBone For Dummies is the definitive beginner's guide to using the popular BeagleBone board to learn electronics and programming. Unlike other books that require previous knowledge of electronics, Linux, and Python, this one assumes you know nothing at all, and guides you step-by-step throughout

the process of getting acquainted with your BeagleBone Original or BeagleBone Black. You'll learn how to get set up, use the software, build the hardware, and code your projects, with plenty of examples to walk you through the process. You'll move carefully through your first BeagleBone project, then get ideas for branching out from there to create even better, more advanced programs. The BeagleBone is a tiny computer board – about the size of a credit card – that has all the capability of a desktop. Its affordability and ease of use has made it popular among hobbyists, hardware enthusiasts, and programmers alike, and it's time for you to join their ranks as you officially dive into the world of microcomputers. This book removes the guesswork from using the popular BeagleBone board and shows you how to get up and running in no time. Download the operating system and connect your BeagleBone Learn to navigate the desktop environment Start programming with Python and Bonescript Build your first project, and find plans for many more To learn BeagleBone, you could spend hours on the Internet and still never find the information you need, or you can get everything you need here. This book appeals to all new and inexperienced hobbyists, tinkerers, electronics gurus, hackers, budding programmers, engineers, and hardware geeks who want to learn how to get the most out of their powerful BeagleBone.

Summary JavaScript on Things is your first step into the exciting and downright entertaining world of programming for small electronics. If you know enough JavaScript to hack a website together, you'll be making things go bleep, blink, and spin faster than you can say "nodebot." Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Are you ready to make things move? If you can build a web app, you can create robots, weather stations, and other funky gadgets! In this

incredibly fun, project-based guide, JavaScript hardware hacker Lyza Danger Gardner takes you on an incredible journey from your first flashing LED through atmospheric sensors, motorized rovers, Bluetooth doorbells, and more. With JavaScript, some easy-to-get hardware, and a bit of creativity, you'll be beeping, spinning, and glowing in no time. About the Book JavaScript on Things introduces the exciting world of programming small electronics! You'll start building things immediately, beginning with basic blinking on Arduino. This fully illustrated, hands-on book surveys JavaScript toolkits like Johnny-Five along with platforms including Raspberry Pi, Tessel, and BeagleBone. As you build project after interesting project, you'll learn to wire in sensors, hook up motors, transmit data, and handle user input. So be warned: once you start, you won't want to stop. What's Inside Controlling hardware with JavaScripti Designing and assembling robots and gadgets A crash course in electronics Over a dozen hands-on projects! About the Reader Written for readers with intermediate JavaScript and Node.js skills. No experience with electronics required. About the Author Lyza Danger Gardner has been a web developer for over 20 years. She's part of the NodeBots community and a contributor to the Johnny-Five Node.js library. Table of Contents PART 1 - A JAVASCRIPTER'S INTRODUCTION TO HARDWARE Bringing JavaScript and hardware together Embarking on hardware with Arduino How to build circuits PART 2 - PROJECT BASICS: INPUT AND OUTPUT WITH JOHNNY-FIVE Sensors and input Output: making things happen Output: making things move PART 3 - MORE SOPHISTICATED PROJECTS Serial communication Projects without wires Building your own thing PART 4 - USING JAVASCRIPT WITH HARDWARE IN OTHER ENVIRONMENTS JavaScript and constrained hardware Building with Node.js and tiny computers In the cloud, in the browser, and beyond

Learn how to build physical computing systems using BeagleBone Black and Python About This Book Get to grips with the fundamentals of BeagleBone Leverage Python scripts to program BeagleBone for your requirements Build four exciting projects, from home automation to a tele-controlled robot Who This Book Is For This book is intended for hobbyists and consumers who wish to create impressive projects using BeagleBone. You must be familiar with Python programming. What You Will Learn Program on BeagleBone Black using Python Interface sensors and actuators to BeagleBone Black Build your own real-time physical computing systems Connect physical computing systems to cloud servers Build your own home automation and home security system Build your own tele-controlled robot with real-time video streaming In Detail BeagleBone is a low cost, community-supported development platform to develop a variety of electronic projects. This book will introduce you to BeagleBone and get you building fun, cool, and innovative projects with it. Start with the specifications of BeagleBone Black and its operating systems, then get to grips with the GPIOs available in BeagleBone Black. Work through four types of exciting projects: building real-time physical computing systems, home automation, image processing for a security system, and building your own tele-controlled robot and learn the fundamentals of a variety of projects in a single book. By the end of this book, you will be able to write code for BeagleBone in order to operate hardware and impart decision-making capabilities with the help of efficient coding in Python. Style and approach This book is a step by step guide that will walk you through the fundamentals of building different projects using BeagleBone Black.

Program your own BeagleBone Black projects! Build creative BeagleBone Black devices--no prior programming or electronics experience required. In Programming the BeagleBone Black,

electronics guru Simon Monk explains essential application development methods through straightforward directions and cool downloadable examples. Discover how to navigate the board, write and debug code, use expansion capes, and control external hardware. Easy-to-follow plans show you how to wire up and program a Web-controlled roving robot and an e-mail notifier that lights an incandescent lamp. Set up the BeagleBone Black and explore its features Connect to your computer via USB or Ethernet Use the BeagleBone Black as a stand-alone PC Write and execute BoneScript code Use JavaScript functions and timers Perform analog and digital I/O Work with expansion capes and modules Design Web interfaces that control electronics Assemble and program a robot and an e-mail notifier

littleBits are electronic building blocks with over 60 modules and trillions of combinations. With littleBits, anyone can harness the power of electronics, microcontrollers, and the cloud--regardless of age, gender, technical ability, or educational background. You can combine these simple, snap-together, magnetic bricks to make simple electronic circuits, or build robots and devices that combine sensors, microcontrollers, and cloud connectivity. This book, co-authored by littleBits founder Ayah Bdeir, along with top-selling author Matt Richardson (Getting Started with Raspberry Pi), teaches you just enough electronics to start making things with littleBits and takes you on up through connecting littleBits to the cloud and programming with its Arduino-compatible module.

In-depth instruction and practical techniques for building with the BeagleBone embedded Linux platform Exploring BeagleBone is a hands-on guide to bringing gadgets, gizmos, and robots to life using the popular BeagleBone embedded Linux platform. Comprehensive content and deep detail provide more than just a BeagleBone instruction manual—you'll also learn the

underlying engineering techniques that will allow you to create your own projects. The book begins with a foundational primer on essential skills, and then gradually moves into communication, control, and advanced applications using C/C++, allowing you to learn at your own pace. In addition, the book's companion website features instructional videos, source code, discussion forums, and more, to ensure that you have everything you need. The BeagleBone's small size, high performance, low cost, and extreme adaptability have made it a favorite development platform, and the Linux software base allows for complex yet flexible functionality. The BeagleBone has applications in smart buildings, robot control, environmental sensing, to name a few; and, expansion boards and peripherals dramatically increase the possibilities. Exploring BeagleBone provides a reader-friendly guide to the device, including a crash course in computer engineering. While following step by step, you can: Get up to speed on embedded Linux, electronics, and programming Master interfacing electronic circuits, buses and modules, with practical examples Explore the Internet-connected BeagleBone and the BeagleBone with a display Apply the BeagleBone to sensing applications, including video and sound Explore the BeagleBone's Programmable Real-Time Controllers Hands-on learning helps ensure that your new skills stay with you, allowing you to design with electronics, modules, or peripherals even beyond the BeagleBone. Insightful guidance and online peer support help you transition from beginner to expert as you master the techniques presented in Exploring BeagleBone, the practical handbook for the popular computing platform.

The Raspberry Pi is a credit card-sized computer that plugs into your TV and a keyboard. It is a capable little computer which can be used in electronics

projects, and for many of the things that your desktop PC does, like spreadsheets, word processing, browsing the internet, and playing games. It also plays high-definition video. This book takes you step-by-step through many fun and educational possibilities. Take advantage of several preloaded programming languages. Use the Raspberry Pi with Arduino. Create Internet-connected projects. Play with multimedia. With Raspberry Pi, you can do all of this and more.

BeagleBone Black is a low-cost, community-supported development platform for developers and hobbyists. This book helps you to get started with BeagleBone Black development using Python and Node.js with Debian Linux platform. Several demo samples are be provided to accelerate your learning. The following is highlight topics in this book: * Preparing Development Environment * Basic Configuration * Serial Debugging * BeagleBone Black Programming Language * BeagleBone Black I/O Programming: GPIO, Analog I/O (PWM), UART, SPI, I2C/TWI * Arduino Development * Working with XBee IEEE 802.15.4 * OpenCV Development

An annotated guide to program and develop GNU/Linux Embedded systems quickly About This Book Rapidly design and build powerful prototypes for GNU/Linux Embedded systems Become familiar with the workings of GNU/Linux

Embedded systems and how to manage its peripherals Write, monitor, and configure applications quickly and effectively, manage an external micro-controller, and use it as co-processor for real-time tasks Who This Book Is For This book targets Embedded System developers and GNU/Linux programmers who would like to program Embedded Systems and perform Embedded development. The book focuses on quick and efficient prototype building. Some experience with hardware and Embedded Systems is assumed, as is having done some previous work on GNU/Linux systems. Knowledge of scripting on GNU/Linux is expected as well. What You Will Learn Use embedded systems to implement your projects Access and manage peripherals for embedded systems Program embedded systems using languages such as C, Python, Bash, and PHP Use a complete distribution, such as Debian or Ubuntu, or an embedded one, such as OpenWrt or Yocto Harness device driver capabilities to optimize device communications Access data through several kinds of devices such as GPIO's, serial ports, PWM, ADC, Ethernet, WiFi, audio, video, I2C, SPI, One Wire, USB and CAN Practical example usage of several devices such as RFID readers, Smart card readers, barcode readers, z-Wave devices, GSM/GPRS modems Usage of several sensors such as light, pressure, moisture, temperature, infrared, power, motion In Detail Embedded computers have

become very complex in the last few years and developers need to easily manage them by focusing on how to solve a problem without wasting time in finding supported peripherals or learning how to manage them. The main challenge with experienced embedded programmers and engineers is really how long it takes to turn an idea into reality, and we show you exactly how to do it. This book shows how to interact with external environments through specific peripherals used in the industry. We will use the latest Linux kernel release 4.4.x and Debian/Ubuntu distributions (with embedded distributions like OpenWrt and Yocto). The book will present popular boards in the industry that are user-friendly to base the rest of the projects on - BeagleBone Black, SAMA5D3 Xplained, Wandboard and system-on-chip manufacturers. Readers will be able to take their first steps in programming the embedded platforms, using C, Bash, and Python/PHP languages in order to get access to the external peripherals. More about using and programming device driver and accessing the peripherals will be covered to lay a strong foundation. The readers will learn how to read/write data from/to the external environment by using both C programs or a scripting language (Bash/PHP/Python) and how to configure a device driver for a specific hardware. After finishing this book, the readers will be able to gain a good knowledge level and understanding of writing, configuring, and managing drivers,

controlling and monitoring applications with the help of efficient/quick programming and will be able to apply these skills into real-world projects. Style and approach This practical tutorial will get you quickly prototyping embedded systems on GNU/Linux. This book uses a variety of hardware to program the peripherals and build simple prototypes.

BeagleBone is an inexpensive web server, Linux desktop, and electronics hub that includes all the tools you need to create your own projects—whether it's robotics, gaming, drones, or software-defined radio. If you're new to BeagleBone Black, or want to explore more of its capabilities, this cookbook provides scores of recipes for connecting and talking to the physical world with this credit-card-sized computer. All you need is minimal familiarity with computer programming and electronics. Each recipe includes clear and simple wiring diagrams and example code to get you started. If you don't know what BeagleBone Black is, you might decide to get one after scanning these recipes. Learn how to use BeagleBone to interact with the physical world Connect force, light, and distance sensors Spin servo motors, stepper motors, and DC motors Flash single LEDs, strings of LEDs, and matrices of LEDs Manage real-time input/output (I/O) Work at the Linux I/O level with shell commands, Python, and C Compile and install Linux kernels Work at a high level with JavaScript and the BoneScript library

Expand BeagleBone’s functionality by adding capes Explore the Internet of Things

Many people think of Linux as a computer operating system, running on users' desktops and powering servers. But Linux can also be found inside many consumer electronics devices. Whether they're the brains of a cell phone, cable box, or exercise bike, embedded Linux systems blur the distinction between computer and device. Many makers love microcontroller platforms such as Arduino, but as the complexity increases in their projects, they need more power for applications, such as computer vision. The BeagleBone is an embedded Linux board for makers. It's got built-in networking, many inputs and outputs, and a fast processor to handle demanding tasks. This book introduces you to both the original BeagleBone and the new BeagleBone Black and gets you started with projects that take advantage of the board's processing power and its ability to interface with the outside world.

The Photon is an open source, inexpensive, programmable, WiFi-enabled module for building connected projects and prototypes. Powered by an ARM Cortex-M3 microcontroller and a Broadcom WiFi chip, the Photon is just as happy plugged into a hobbyist's breadboard as it is into a product rolling off of an assembly line. While the Photon--and its accompanying cloud platform--is

designed as a ready-to-go foundation for product developers and manufacturers, it's great for Maker projects, as you'll see in this book. You'll learn how to get started with the free development tools, deploy your sketches over WiFi, and build electronic projects that take advantage of the Photon's processing power, cloud platform, and input/output pins. What's more, the Photon is backward-compatible with its predecessor, the Spark Core.

This book is for new BeagleBone owners who are looking to quickly get their microboard up and running. It would be helpful to have an understanding of embedded concepts or Linux but neither is essential.

This book introduces the problems facing Internet of Things developers and explores current technologies and techniques to help you manage, mine, and make sense of the data being collected through the use of the world’s most popular database on the Internet - MySQL. The IoT is poised to change how we interact with and perceive the world around us, and the possibilities are nearly boundless. As more and more connected devices generate data, we will need to solve the problem of how to collect, store, and make sense of IoT data by leveraging the power of database systems. The book begins with an introduction of the MySQL database system and storage of sensor data. Detailed instructions and examples are provided to show how to add database nodes to IoT solutions

including how to leverage MySQL high availability, including examples of how to protect data from node outages using advanced features of MySQL. The book closes with a comparison of raw and transformed data showing how transformed data can improve understandability and help you cut through a clutter of superfluous data toward the goal of mining nuggets of useful knowledge. In this book, you'll learn to: Understand the crisis of vast volumes of data from connected devices Transform data to improve reporting and reduce storage volume Store and aggregate your IoT data across multiple database servers Build localized, low-cost MySQL database servers using small and inexpensive computers Connect Arduino boards and other devices directly to MySQL database servers Build high availability MySQL solutions among low-power computing devices

Mit dem Arduino-Kochbuch, das auf der Version Arduino 1.0 basiert, erhalten Sie ein Füllhorn an Ideen und praktischen Beispielen, was alles mit dem Mikrocontroller gezaubert werden kann. Sie lernen alles über die Arduino-Softwareumgebung, digitale und analoge In- und Outputs, Peripheriegeräte, Motorensteuerung und fortgeschrittenes Arduino-Coding. Egal ob es ein Spielzeug, ein Detektor, ein Roboter oder ein interaktives Kleidungsstück werden soll: Elektronikbegeisterte finden über 200 Rezepte, Projekte und Techniken, um

mit dem Arduino zu starten oder bestehende Arduino-Projekt mit neuen Features aufzupimpen.

The fourth edition of Embedded Systems takes a big leap from the fundamentals of hardware to Edge Computing, Embedded IoT & Embedded AI. The book discusses next generation embedded systems topics, such as embedded SoC, Exascale computing systems and embedded systems' tensor processing units. This thoroughly updated edition serves as a textbook for engineering students and reference book for students of software-training institutions and embedded-systems-design professionals. Salient Features: 1. New chapters on IoT system architecture and design & Embedded AI 2. Case studies, such as, of Automatic Chocolate Vending Machine and Automobile Cruise Control 3. Bloom's Taxonomy-based chapter structure 4. Rich Pedagogy o 1000+ Self-assessment questions o 150+ MCQs o 220+ Review questions o 200+ Practice exercises

Editörün Önsözü Bir insan? di?erlerinden farkl? k?lan nedir? Bir odada 10 ki?i varken neden aralar?ndan tek ki?i topluluktan s?yr?l?p daha ba?ar?l? olabilir? Ya da tak?mlar? birbirinden farkl? k?lan nedir? Nas?l var olduklar?ndan daha fazla ve anlaml? olurlar? Bunun tek cevab? ki?inin kendi biricikli?ini fark etmi? olup, kendi farkl?l???n? do?all?k içinde ortaya koymas?d?r. Asl?nda do?am?z gere?i farkl?l???m?z, kendi üretkenli?imizin de bir göstergesidir. ??te o yüzden de

herkes asl?nda maker do?ar ama yaln?zca baz?lar? ya?amlar? boyunca maker kalmay? beceririler... Maker hareketi, özellikle 20. yüzy?l?n sonlar?nda pasif olarak gerçekle?tirilen e?itim ?ekline bir alternatif olarak, geçmi?te de görülen zanaatç?lar?n ya?am ?eklinin 21. yüzy?l?n dinamikleri çerçevesinde yeniden uygulanmas? ?eklinde önemli bir ihtiyaç olarak ortaya ç?km??t?r. Standartla?an ve standart testlerle bunu ölçmeye çal??an yukar?dan bir yakla??ma kar??l?k olarak Maker Hareketi a?a??dan, kendi do?all???nda ortaya ç?km?? bir interaktif ya?am biçimidir. Yenili?in oldu?u yerde heyecan, sevgi , sayg? ve en önemlisi durmak bilmeyen geli?im vard?r. Ayr?ca tak?m çal??mas? içinde fikirler payla??ld?kça daha da büyümekte ve yay?lmakta... Buradaki as?l mesele ki?inin kendini tan?mas?... Herkes birbirinden farkl? do?ar ve dü?ünme dinamikleri farkl? araçlar ile ?ekillenir. Birisi tasar?m yetene?i ile parlarken, di?eri de muhte?em bir mühendis olacak özelliklere sahiptir. Bu tamamen yeti?tirildi?imiz ortamlar ve dinamikler ile olu?ur. Yolu çizmeden yolda yürüyemezsin! Üretme eylemi ise bu anlamda yap?lan ilk ve tek ?ey. ?ster ba?ka insanlarla ister kendi dü?üncelerinizle çal???n, ileriye dönük yenilikleri üretmek ve devam ettirmek her zaman ba?lang?ç noktas?. S?radan bir insanla üreten insan aras?ndaki en büyük fark ise ki?inin kendisini tan?mas?d?r. Kendini tan?ma ve ba?kalar?n?n üretme iste?ini de tetikleyebilme özellikleri onu topluluktan ay?rmakla beraber ba?ar? için

sürdürebilir motivasyonu güçlendirir. Böylece gerçek bir maker olu?ur ve güçlenir. Maker Hareketi'nin en ilham verici kitaplar?ndan biri olan S?f?rdan Maker Olmaya'y? çevirirken ve basarken bu kitab?n gelece?in giri?imcilerine ve gençlerine ???k tutmas?n? diledik. Her fikir de?erlidir ve fikri olmayan insanlar kaybetmeyi ba?tan kabullenir. Birçok gencimiz ve insan?m?z?n dinlemeye de?er fikirleri var. Ancak engelleri nas?l ortadan kald?rabileceklerini bilmiyorlar. Her gün çevrelerinde de?i?tirebilecekleri bir dünya oldu?unun fark?na varmalar? ve vard?klar? noktada onlara bir yol gösterici olmak en büyük iste?imiz. Bu nedenlerden dolay? bu kitab? mutlaka okuman?z? ve sevdiklerinizle payla?man?z? istiyoruz. Art?k tak?m olmak birey olmaktan daha önemli. Hepinizin iyi oldu?u noktalar var fakat; ba?kalar? olmadan tam olamay?z. Maker olmak da s?rf kendin için de?il çevren için de üretmek anlam?na geliyor. S?f?rdan Maker Olmaya kitab? bu anlamda yeni ve sürdürebilir de?erler yarat?yor. Bu kitab?n Türkçe'ye çevriliyor olmas? bizi çok mutlu ediyor. Maker Hareketi'nin önemli bir sosyal inovasyon oldu?unu dü?ünerek burada kâr amac? gütmeyen bir yol izleyerek pek çok makera ve onlar?n çevresinde yer alan ailelere ve e?iticilere küçük de olsa bir kaynak olu?turmak istedik. S?f?rdan Maker Olmaya kitab? yeni de?erler yaratacak ve geli?tirecek bir kaynak. Bu kitab?n kitlesi olan makerlar?n gelece?in liderleri olmas? bizleri heyecanland?r?yor. Özellikle bu kitab?n

gerçekle?tirilmesinde çok büyük emekleri geçen Özgür Emir, Serra ?spahani, Esra Y?ld?r?m, Ece Sahuto?ullar?, Fatik Bayrakç?l, Zeynep H?rca ve tüm ABA InnoLab ile ABA E?itim ekibine te?ekkür etmek isterim. Maker hareketinde önemli de?erler olu?turan Sina Dumlu, Defne Sönmez, Simay Yaz?c?o?lu, Timur Gordon, Ba?ak Tuzcu, Ege Küçükçolak, Ertu?rul Uçar, Cem Özbek, Mert Barutçuo?lu ve Mustafa Gazio?lu'na destekleri için ayr?ca çok müte?ekkirim. Fark yaratmak için yola ç?kan bu gençleri kutlamak gerek. S?f?rdan maker olman?n inceliklerini anlatan bu kitab? okurken sizin de keyif al?p yeni fikirler bulman?z? ve bu kitab? sizinle payla??rken hissetti?im mutlulu?u sizin de ya?aman?z? temenni ederim. Genç ya?ta cesaret ile yola ç?kan tüm makerlar?n yolunun aç?k olmas? dile?iyle... Gamze Sart

If you are an Android app developer who wants to experiment with the hardware capabilities of the BeagleBone Black platform, then this book is ideal for you. You are expected to have basic knowledge of developing Android apps but no prior hardware experience is required.

Linux continues to grow as an operating system of choice in many embedded systems such as networking, wireless, and base stations. In this chapter we look at possible uses of Linux in embedded systems. The chapter covers getting a Linux kernel set up, getting started with creating your Linux baseline, and the

initial steps of getting an application running on the platform. If you haven't used Linux for an embedded system before, this chapter will cover all of the basic steps to get you going!

BeagleBone Black is a low-cost, open hardware computer uniquely suited to interact with sensors and actuators directly and over the Web. Introduced in April 2013 by BeagleBoard.org, a community of developers first established in early 2008, BeagleBone Black is used frequently to build vision-enabled robots, home automation systems, artistic lighting systems, and countless other do-it-yourself and professional projects. BeagleBone variants include the original BeagleBone and the newer BeagleBone Black, both hosting a powerful 32-bit, super-scalar ARM Cortex A8 processor capable of running numerous mobile and desktop-capable operating systems, typically variants of Linux including Debian, Android, and Ubuntu. Yet, BeagleBone is small enough to fit in a small mint tin box. The "Bone" may be used in a wide variety of projects from middle school science fair projects to senior design projects to first prototypes of very complex systems. Novice users may access the power of the Bone through the user-friendly BoneScript software, experienced through a Web browser in most major operating systems, including Microsoft Windows, Apple Mac OS X, or the Linux operating systems. Seasoned users may take full advantage of the Bone's power

using the underlying Linux-based operating system, a host of feature extension boards (Capes) and a wide variety of Linux community open source libraries. This book provides an introduction to this powerful computer and has been designed for a wide variety of users including the first time novice through the seasoned embedded system design professional. The book contains background theory on system operation coupled with many well-documented, illustrative examples. Examples for novice users are centered on motivational, fun robot projects while advanced projects follow the theme of assistive technology and image-processing applications.

Over 60 recipes and solutions for inventors, makers, and budding engineers to create projects using the BeagleBone Black About This Book Learn how to develop applications with the BeagleBone Black and open source Linux software Sharpen your expertise in making sophisticated electronic devices Explore the BeagleBone Black with this easy-to-succeed recipe format Who This Book Is For If you are a hardware, Linux, and/or microcomputing novice, or someone who wants more power and possibilities with product prototypes, electronic art projects, or embedded computing experiments, then this book is for you. It is for Internet of Things enthusiasts who want to use more sophisticated hardware than the Raspberry Pi or the Arduino can provide. Whether you are an engineering

student, a DIYer, an inventor, or a budding electronics enthusiast, this book delivers accessible, easy-to-succeed instructions for using an advanced microcomputing platform. What You Will Learn Set up and run the BeagleBone Black for the first time Learn the basics of microcomputing and Linux using the command line and easy kernel mods Make introductory projects with Python, JavaScript, BoneScript, and Node.js Explore physical computing and simple circuits using buttons, LEDs, sensors, and motors Discover the unique features of the BeagleBone Black and its real-time computing functions Build intermediate level audio and video applications Assemble and add ingredients for creating Internet of Things prototypes In Detail There are many single-board controllers and computers such as Arduino, Udoo, or Raspberry Pi, which can be used to create electronic prototypes on circuit boards. However, when it comes to creating more advanced projects, BeagleBone Black provides a sophisticated alternative. Mastering the BeagleBone Black enables you to combine it with sensors and LEDs, add buttons, and marry it to a variety of add-on boards. You can transform this tiny device into the brain for an embedded application or an endless variety of electronic inventions and prototypes. With dozens of how-tos, this book kicks off with the basic steps for setting up and running the BeagleBone Black for the first time, from connecting the necessary hardware and using the

command line with Linux commands to installing new software and controlling your system remotely. Following these recipes, more advanced examples take you through scripting, debugging, and working with software source files, eventually working with the Linux kernel. Subsequently, you will learn how to exploit the board's real-time functions. We will then discover exciting methods for using sound and video with the system before marching forward into an exploration of recipes for building Internet of Things projects. Finally, the book finishes with a dramatic arc upward into outer space, when you explore ways to build projects for tracking and monitoring satellites. Style and approach This comprehensive recipe book deconstructs a complex, often confusing piece of technology, and transforms it to become accessible and fun with snappy, unintimidating prose, and extensive easy-to-succeed instructions.

This book explains how to get started with BeagleBone Black Wireless development using Python and Node.js with step-by-step approach. The following is a list of the topic: * Preparing Development Environment * Basic Configuration * Administering Linux on BeagleBone Black Wireless * Serial Debugging * BeagleBone Black Wireless Programming Language * BeagleBone Black Wireless I/O Programming using Python * BeagleBone Black Wireless I/O Programming using Node.js * Arduino Development * Working with XBee

802.15.4 * OpenCV Development

Linux for Embedded and Real-Time Applications, Fourth Edition, provides a practical introduction to the basics, covering the latest developments in this rapidly evolving technology. Ideal for those new to the use of Linux in an embedded environment, the book takes a hands-on approach that covers key concepts of building applications in a cross-development environment. Hands-on exercises focus on the popular open source BeagleBone Black board. New content includes graphical programming with QT as well as expanded and updated material on projects such as Eclipse, BusyBox – configuring and building, the U-Boot bootloader – what it is, how it works, configuring and building, and new coverage of the Root file system and the latest updates on the Linux kernel.. Provides a hands-on introduction for engineers and software developers who need to get up to speed quickly on embedded Linux, its operation and capabilities Covers the popular open source target boards, the BeagleBone and BeagleBone Black Includes new and updated material that focuses on BusyBox, U-Boot bootloader and graphical programming with QT

Learn to build amazing robotic projects using the powerful BeagleBone Black. About This Book Push your creativity to the limit through complex, diverse, and fascinating projects Develop applications with the BeagleBone Black and open source Linux software Sharpen your expertise in making sophisticated electronic devices Who This Book Is For This Learning Path is aimed at hobbyists who want to do creative projects that make their life easier and also push the boundaries of what can be done with the BeagleBone Black. This Learning Path's projects are for the aspiring maker, casual programmer, and budding engineer or tinkerer. You'll need some programming knowledge, and experience of working with mechanical systems to get the

complete experience from this Learning Path. What You Will Learn Set up and run the BeagleBone Black for the first time Get to know the basics of microcomputing and Linux using the command line and easy kernel mods Develop a simple web interface with a LAMP platform Prepare complex web interfaces in JavaScript and get to know how to stream video data from a webcam Find out how to use a GPS to determine where your sailboat is, and then get the bearing and distance to a new waypoint Use a wind sensor to sail your boat effectively both with and against the wind Build an underwater ROV to explore the underwater world See how to build an autonomous Quadcopter In Detail BeagleBone is a microboard PC that runs Linux. It can connect to the Internet and run OSes such as Android and Ubuntu. You can transform this tiny device into a brain for an embedded application or an endless variety of electronic inventions and prototypes. This Learning Path starts off by teaching you how to program the BeagleBone. You will create introductory projects to get yourselves acquainted with all the nitty gritty. Then we'll focus on a series of projects that are aimed at hobbyists like you and encompass the areas of home automation and robotics. With each project, we'll teach you how to connect several sensors and an actuator to the BeagleBone Black. We'll also create robots for land, sea, and water. Yes, really! The books used in this Learning Path are: BeagleBone Black Cookbook BeagleBone Home Automation Blueprints Mastering BeagleBone Robotics Style and approach This practical guide transforms complex and confusing pieces of technology to become accessible with easy- to-succeed instructions. Through clear, concise examples, you will quickly get to grips with the core concepts needed to develop home automation applications with the BeagleBone Black.

Jump into the world of Near Field Communications (NFC), the fast-growing technology that lets

devices in close proximity exchange data, using radio signals. With lots of examples, sample code, exercises, and step-by-step projects, this hands-on guide shows you how to build NFC applications for Android, the Arduino microcontroller, and embedded Linux devices. You'll learn how to write apps using the NFC Data Exchange Format (NDEF) in PhoneGap, Arduino, and node.js that help devices read messages from passive NFC tags and exchange data with other NFC-enabled devices. If you know HTML and JavaScript, you're ready to start with NFC. Dig into NFC's architecture, and learn how it's related to RFID Write sample apps for Android with PhoneGap and its NFC plugin Dive into NDEF: examine existing tag-writer apps and build your own Listen for and filter NDEF messages, using PhoneGap event listeners Build a full Android app to control lights and music in your home Create a hotel registration app with Arduino, from check-in to door lock Write peer-to-peer NFC messages between two Android devices Explore embedded Linux applications, using examples on Raspberry Pi and BeagleBone

Viele lieben Mikrocontroller-Plattformen wie die Arduino- oder die Raspberry Pi-Plattform, aber wenn die Ansprüche an die verwendete Elektronik steigen, dann stoßen diese Mikrocontroller schnell an ihre Grenzen. Der BeagleBone-Mikrocontroller von Texas Instruments ist mit 2 GB On-Board-Speicher für die vorinstallierte Linux-Software ausgestattet und verfügt mit seinen USB-, 10/100-Mbit-Ethernet- und HDMI-Schnittstellen über vielfältige Anschlussmöglichkeiten. Das Buch führt in das Opensource-Hard- und Softwareprojekt BeagleBone ein und stellt reizvolle Elektronikprojekte vor, die mit Python und JavaScript realisiert werden.