

Pololu High Power Motor Driver 18v15 Egru

Arduino Adventures: Escape from Gemini Station provides a fun introduction to the Arduino microcontroller by putting you (the reader) into the action of a science fiction adventure story. You'll find yourself following along as Cade and Elle explore Gemini Station—an orbiting museum dedicated to preserving and sharing technology throughout the centuries. Trouble ensues. The station is evacuated, including Cade and Elle's class that was visiting the station on a field trip. Cade and Elle don't make it aboard their shuttle and are trapped on the station along with a friendly artificial intelligence named Andrew who wants to help them get off the damaged station. Using some old hardware, a laptop, and some toolboxes full of electronics parts, you will follow along and build eight gizmos with Cade and Elle that will help them escape from Gemini Station. The hardware is Arduino. Each new challenge opens a new area of Arduino and basic electronics knowledge. You'll be taken incrementally from a simple task such as turning on a light through to a complex combination of microcontroller, electronic components, and software programming. By the end of the book you'll be well on your way towards being able to create and implement any sort of electronically controlled device you can imagine, using the stunningly popular Arduino microcontroller. Provides eight challenges, each challenge increasing in complexity Builds around a fictional storyline that keeps the learning fun Leaves you on a solid foundation of electronic skills and knowledge

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.

Desktop or DIY 3D printers are devices you can either buy preassembled as a kit, or build from a collection of parts to design and print physical objects including replacement household parts, custom toys, and even art, science, or engineering projects. Maybe you have one, or maybe you're thinking about buying or building one. Practical 3D Printers takes you beyond how to build a 3D printer, to calibrating, customizing, and creating amazing models, including 3D printed text, a warship model, a robot platform, windup toys, and arcade-inspired alien invaders. You'll learn about the different types of personal 3D printers and how they work; from the MakerBot to the RepRap printers like the Huxley and Mendel, as well as the whiteAnt CNC featured in the Apress book Printing in Plastic. You'll discover how easy it is to find and design 3D models using web-based 3D modeling, and even how to create a 3D model from a 2D image. After learning the basics, this book will walk you through building multi-part models with a steampunk warship project, working with meshes to build your own action heroes, and creating an autonomous robot chassis. Finally, you'll find even more bonus projects to build, including wind-up walkers, faceted vases for the home, and a handful of useful upgrades to modify and improve your 3D printer.

Ready to create rich interactive experiences with your artwork, designs, or prototypes? This is the ideal place to start. With this hands-on guide, you'll explore several themes in interactive art and design—including 3D graphics, sound, physical interaction, computer vision, and geolocation—and learn the basic programming and electronics concepts you need to implement them. No previous experience is necessary. You'll get a complete introduction to three free tools created specifically for artists and designers: the Processing programming language, the Arduino microcontroller, and the openFrameworks toolkit. You'll also find working code samples you can use right away, along with the background and technical information you need to design, program, and build your own projects. Learn cutting-edge techniques for interaction design from leading artists and designers Let users provide input through buttons, dials, and other physical controls Produce graphics and animation, including 3D images with OpenGL Use sounds to interact with users by providing feedback, input, or an element they can control Work with motors, servos, and appliances to provide physical feedback Turn a user's gestures and movements into meaningful input, using Open CV

If you already have some experience with LabVIEW and want to apply your skills to control physical objects and make measurements using the Arduino sensor, this book is for you. Prior knowledge of Arduino and LabVIEW is essential to fully understand the projects detailed in this book.

This book is the first resource to provide in-depth coverage on topical areas of assistive, rehabilitative, and health-related applications for haptic (touch-based) technologies.

Application topics are grouped into thematic areas spanning haptic devices for sensory impairments, health and well-being, and physical impairments which are illustrated in this book. A diverse group of experts in the field were invited to contribute different chapters to provide complementary and multidisciplinary perspectives. Unlike other books on haptics, which focus on human haptic perception, specific modalities of haptics (e.g., realistic haptic rendering), or broadly cover the subfields of haptics, this book takes an application-oriented approach to present a tour of how the field of haptics has been advanced with respect to important, impactful thematic focuses. Under Theme 1 “Sensory Impairments”, haptics technologies to support individuals with sensory impairments is presented which includes: Spatial awareness in sensory impairments through touch; Haptically-assisted interfaces for persons with visual impairments; and Enabling learning experiences for visually impaired children by interaction design. Under Theme 2 “Haptics for Health and Well-Being”, haptics technologies aimed at supporting exercise and healthy aging will be covered including: Haptics in rehabilitation, exergames and health; Therapeutic haptics for mental health and well-being; and Applications of haptics in medicine. Under Theme 3 “Haptics for Physical Impairments”, haptics technologies for enhancing the quality of life for individuals with weakened/impaired limbs or neurological diseases impacting movement is targeted including: Assistive soft exoskeletons with pneumatic artificial muscles; Haptics for accessibility in rehabilitative hardware; and intelligent robotics and immersive displays for enhancing haptic interaction in physical rehabilitation environments. Engineers, scientists, and researchers working in the areas of haptics, multimedia, virtual/augmented/mixed-reality, human-computer interaction, assistive technologies, rehabilitative technologies, healthcare technologies, and/or actuator design will want to purchase this book. Advanced level students and hobbyists interested in haptics will also be interested in this book.

Beginning Arduino Programming allows you to quickly and intuitively develop your programming skills through sketching in code. This clear introduction provides you with an understanding of the basic framework for developing Arduino code, including the structure, syntax, functions, and libraries needed to create future projects. You will also learn how to program your Arduino interface board to sense the physical world, to control light, movement, and sound, and to create objects with interesting behavior. With Beginning Arduino Programming, you'll get the knowledge you need to master the fundamental aspects of writing code on the Arduino platform, even if you have never before written code. It will have you ready to take the next step: to explore new project ideas, new kinds of hardware, contribute back to the open source community, and even take on more programming languages.

Expand Raspberry Pi capabilities with fundamental engineering principles Exploring Raspberry Pi is the innovators guide to bringing Raspberry Pi to life. This book favors engineering principles over a 'recipe' approach to give you the skills you need to design and build your own projects. You'll understand the fundamental principles in a way that transfers to any type of electronics, electronic modules, or external peripherals, using a "learning by doing" approach that caters to both beginners and experts. The book begins with basic Linux and programming skills, and helps you stock your inventory with common parts and supplies. Next, you'll learn how to make parts work together to achieve the goals of your project, no matter what type of components you use. The companion website provides a full repository that structures all of the code and scripts, along with links to video tutorials and supplementary content that takes you deeper into your project. The Raspberry Pi's most famous feature is its adaptability. It can be used for thousands of electronic applications, and using the Linux OS expands the functionality even more. This book helps you get the most from your Raspberry Pi, but it also gives you the fundamental engineering skills you need to incorporate any electronics into any project. Develop the Linux and programming skills you need to build basic applications Build your inventory of parts so you can always "make it work" Understand interfacing, controlling, and communicating with almost any component Explore advanced applications with video, audio, real-world interactions, and more Be free to adapt and create with Exploring Raspberry Pi.

In Practical AVR Microcontrollers, you'll learn how to use the AVR microcontroller to make your own nifty projects and gadgets. You'll start off with the basics in part one: setting up your development environment and learning how the "naked" AVR differs from the Arduino. Then you'll gain experience by building a few simple gizmos and learning how everything can be interconnected. In part two, we really get into the goodies: projects! Each project will show you exactly what software and hardware you need, and will provide enough detail that you can adapt it to your own needs and parts availability. Some of the projects you'll make: An illuminated secret panel A hallway lighting system with a waterfall effect A crazy lightshow Visual effects gizmos like a Moire wheel and shadow puppets In addition, you'll design and implement some home automation projects, including working with wired and wireless setups. Along the way, you'll design a useable home automation protocol and look at a variety of hardware setups. Whether you're new to electronics, or you just want to see what you can do with an AVR outside of an Arduino, Practical AVR Microcontrollers is the book for you.

This is an introductory course textbook in electronics, programming, and microprocessing. It explains how to connect and control various electronic components, how to wire and read common types of sensors, and how to amplify, filter, and smooth sensor readings. This will allow the learner to start designing and building their own equipment for research projects. The course starts at a beginner level, assuming no prior knowledge in these areas. Programming and microprocessing are taught using the Arduino IDE. This book can serve as a stand-alone crash course for a self-motivated learner. It can also be directly adopted as a course textbook for an elective in a college, university, or high school context. Sections include various fun lab activities that increase in difficulty, and enough theory and practical advice to help complement the activities with understanding. Resources are provided to the instructor to organize the lectures, activities, and individual student design projects. These tools will help any reader turn their electronic project ideas into functional prototypes.

This book provides a comprehensive coverage on robot fish including design, modeling and optimization, control, autonomous control and applications. It gathers contributions by the leading researchers in the area. Readers will find the book very useful for designing and building robot fish, not only in theory but also in practice. Moreover, the book discusses various important issues for future research and development, including design methodology, control methodology, and autonomous control strategy. This book is intended for researchers and graduate students in the fields of robotics, ocean engineering and related areas.

The First Maker-Friendly Guide to Electric Motors! Makers can do amazing things with motors. Yes, they're more complicated than some other circuit elements, but with this book, you can completely master them. Once you do, incredible new projects become possible. Unlike other books, *Motors for Makers* is 100% focused on what you can do. Not theory. Making. First, Matthew Scarpino explains how electric motors work and what you need to know about each major type: stepper, servo, induction, and linear motors. Next, he presents detailed instructions and working code for interfacing with and controlling servomotors with Arduino Mega, Raspberry Pi, and BeagleBone Black. All source code and design files are available for you to download from motorsformakers.com. From start to finish, you'll learn through practical examples, crystal-clear explanations, and photos. If you've ever dreamed of what you could do with electric motors, stop dreaming...and start making! Understand why electric motors are so versatile and how they work Choose the right motor for any project Build the circuits needed to control each type of motor Program motor control with Arduino Mega, Raspberry Pi, or BeagleBone Black Use gearmotors to get the right amount of torque Use linear motors to improve speed and precision Design a fully functional electronic speed control (ESC) circuit Design your own quadcopter Discover how electric motors work in modern electric vehicles--with a fascinating inside look at Tesla's patents for motor design and control! Includes index.

In *Learn Robotics with Raspberry Pi*, you'll learn how to build and code your own robot projects with just the Raspberry Pi microcomputer and a few easy-to-get components - no prior experience necessary! *Learn Robotics with Raspberry Pi* will take you from inexperienced maker to robot builder. You'll start off building a two-wheeled robot powered by a Raspberry Pi minicomputer and then program it using Python, the world's most popular programming language. Gradually, you'll improve your robot by adding increasingly advanced functionality until it can follow lines, avoid obstacles, and even recognize objects of a certain size and color using computer vision. Learn how to: - Control your robot remotely using only a Wii remote - Teach your robot to use sensors to avoid obstacles - Program your robot to follow a line autonomously - Customize your robot with LEDs and speakers to make it light up and play sounds - See what your robot sees with a Pi Camera As you work through the book, you'll learn fundamental electronics skills like how to wire up parts, use resistors and regulators, and determine how much power your robot needs. By the end, you'll have learned the basics of coding in Python and know enough about working with hardware like LEDs, motors, and sensors to expand your creations beyond simple robots.

PhD Dissertation The availability and capabilities of present-day technology suggest that legged robots should be able to physically outperform their biological counterparts. This thesis revolves around the philosophy that the observed opposite is caused by over-complexity in legged robot design, which is believed to substantially suppress design for high-performance. In this dissertation a design philosophy is elaborated with a focus on simple but high performance design. This philosophy is governed by various key points, including holistic design, technology-inspired design, machine and behaviour co-design and design at the performance envelope. This design philosophy also focuses on improving progress in robot design, which is inevitably complicated by the aspire for high performance. It includes an approach of iterative design by trial-and-error, which is believed to accelerate robot design through experience. This thesis mainly focuses on the case study of Skippy, a fully autonomous monopedal balancing and hopping robot. Skippy is maximally simple in having only two actuators, which is the minimum number of actuators required to control a robot in 3D. Despite its simplicity, it is challenged with a versatile set of high-performance activities, ranging from balancing to reaching record jump heights, to surviving crashes from several meters and getting up unaided after a crash, while being built from off-the-shelf technology. This thesis has contributed to the detailed mechanical design of Skippy and its optimisations that abide the design philosophy, and has resulted in a robust and realistic design that is able to reach a record jump height of 3.8m. Skippy is also an example of iterative design through trial-and-error, which has lead to the successful design and creation of the balancing-only precursor Tippy. High-performance balancing has been successfully demonstrated on Tippy, using a recently developed balancing algorithm that combines the objective of tracking a desired position command with balancing, as required for preparing hopping motions. This thesis has furthermore contributed to several ideas and theories on Skippy's road of completion, which are also useful for designing other high-performance robots. These contributions include (1) the introduction of an actuator design criterion to maximize the physical balance recovery of a simple balancing machine, (2) a generalization of the centre of percussion for placement of components that are sensitive to shock and (3) algebraic modelling of a non-linear high-gravimetric energy density compression spring with a regressive stress-strain profile. The activities performed and the results achieved have been proven to be valuable, however they have also delayed the actual creation of Skippy itself. A possible explanation for this happening is that Skippy's requirements and objectives were too ambitious, for which many complications were encountered in the decision-making progress of the iterative design strategy, involving trade-offs between exercising trial-and-error, elaborate simulation studies and the development of above-mentioned new theories. Nevertheless, from (1) the resulting realistic design of Skippy, (2) the successful creation and demonstrations of Tippy and (3) the contributed theories for high-performance robot design, it can be concluded that the adopted design philosophy has been generally successful. Through the case study design project of the hopping and balancing robot Skippy, it is shown that proper design for high physical performance (1) can indeed lead to a robot design that is capable of physically outperforming humans and animals and (2) is already very challenging for a robot that is intended to be very simple.

Design, simulate, and program interactive robots Key Features Design, simulate, build, and program an interactive autonomous mobile robot Leverage the power of ROS, Gazebo, and Python to enhance your robotic skills A hands-on guide to creating an autonomous mobile robot with the help of ROS and Python Book Description Robot Operating System (ROS) is one of the most popular robotics software frameworks in research and industry. It has various features for implementing different capabilities in a robot without implementing them from scratch. This book starts by showing you the fundamentals of ROS so you understand the basics of differential robots. Then, you'll learn about robot modeling and how to design and simulate it using ROS. Moving on, we'll design robot hardware and interfacing actuators. Then, you'll learn to configure and program depth sensors and LIDARs using ROS. Finally, you'll create a GUI for your robot using the Qt framework. By the end of this tutorial, you'll have a clear idea of how to integrate and assemble everything into a robot and how to bundle the software package. What you will learn Design a differential robot from scratch Model a differential robot using ROS and URDF Simulate a differential robot using ROS and Gazebo Design robot hardware electronics Interface robot actuators with embedded boards Explore the interfacing of different 3D depth cameras in ROS Implement autonomous navigation in ChefBot Create a GUI for robot control Who this book is for This book is for those who are conducting research in mobile robotics and autonomous navigation. As well as the robotics research domain, this book is also for the robot hobbyist community. You're expected to have a basic understanding of Linux commands and Python.

This two-volume set (CCIS 915 and CCIS 916) constitutes the refereed proceedings of the 5th Workshop on Engineering Applications, WEA 2018, held in Medellín, Colombia, in October 2018. The 41 revised full papers presented in this volume were carefully reviewed and selected from 101 submissions. The papers are organized in topical sections such as green logistics and optimization, Internet of Things (IoT), digital signal processing (DSP), network applications, miscellaneous applications.

Python is a powerful programming language that's easy to learn and fun to play with. But once you've gotten a handle on the basics, what do you do next? *Python Playground* is a collection of imaginative programming projects that will inspire you to use Python to make art and music, build simulations of real-world phenomena, and interact with hardware

like the Arduino and Raspberry Pi. You'll learn to use common Python tools and libraries like numpy, matplotlib, and pygame to do things like: –Generate Spirograph-like patterns using parametric equations and the turtle module –Create music on your computer by simulating frequency overtones –Translate graphical images into ASCII art –Write an autostereogram program that produces 3D images hidden beneath random patterns –Make realistic animations with OpenGL shaders by exploring particle systems, transparency, and billboard techniques –Construct 3D visualizations using data from CT and MRI scans –Build a laser show that responds to music by hooking up your computer to an Arduino Programming shouldn't be a chore. Have some solid, geeky fun with Python Playground. The projects in this book are compatible with both Python 2 and 3.

This book is targeted towards beginners and intermediate designers of mechatronic systems and embedded system design. Some familiarity with the Raspberry Pi and Python programming is preferred but not required.

For the first time in a 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 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 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, 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 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

If you are an engineer, a researcher, or a hobbyist, and you are interested in robotics and want to build your own robot, this book is for you. Readers are assumed to be new to robotics but should have experience with Python.

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 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.

This book will show you how to use your Arduino to control a variety of different robots, while providing step-by-step 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-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.

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.

Become a master of Python programming using the small yet powerful Raspberry Pi Zero About This Book This is the first book on the market that teaches Python programming with Raspberry Pi Zero Develop exciting applications such as a mobile robot and home automation controller using Python This step-by-step guide helps you make the most out of Raspberry Pi Zero using Python programming Who This Book Is For This book is aimed at hobbyists and programmers who want to learn Python programming and develop applications using the Pi Zero. They should have basic familiarity with electronics. What You Will Learn Configure Raspberry Pi using Python Control loops to blink an LED using simple arithmetic operations Understand how interface sensors, actuators, and LED displays work Get to grips with every aspect of Python programming using practical examples Explore machine vision, data visualization, and scientific computations Build a mobile robot using the Raspberry Pi as the controller Build a voice-activated home automation controller In Detail Raspberry Pi Zero is a super-small and super-affordable product from Raspberry Pi that is packed with a plethora of features and has grabbed the notice of programmers, especially those who use Python. This step-by-step guide will get you developing practical applications in Python using a Raspberry Pi Zero. It will become a valuable resource as you learn the essential details of interfacing sensors and actuators to a Raspberry Pi, as well as acquiring and displaying data. You will get started by writing a Python program that blinks an LED at 1-second intervals. Then you will learn to write simple logic to

execute tasks based upon sensor data (for example, to control a motor) and retrieve data from the web (such as to check e-mails to provide a visual alert). Finally, you will learn to build a home automation system with Python where different appliances are controlled using the Raspberry Pi. The examples discussed in each chapter of this book culminate in a project that help improve the quality of people's lives. Style and approach This will be a learning, step-by-step guide to teach Python programming using the famous Raspberry Pi Zero. The book is packed with practical examples at every step along with tips and tricks for the Raspberry Pi fans

This book presents recent advances and developments in control, automation, robotics, and measuring techniques. It presents contributions of top experts in the fields, focused on both theory and industrial practice. The particular chapters present a deep analysis of a specific technical problem which is in general followed by a numerical analysis and simulation, and results of an implementation for the solution of a real world problem. The presented theoretical results, practical solutions and guidelines will be useful for both researchers working in the area of engineering sciences and for practitioners solving industrial problems.

Robotics is undergoing a major transformation in scope and dimension. From a largely dominant industrial focus, robotics is rapidly expanding into human environments and vigorously engaged in its new challenges. Interacting with, assisting, serving, and exploring with humans, the emerging robots will increasingly touch people and their lives. Beyond its impact on physical robots, the body of knowledge robotics has produced is revealing a much wider range of applications reaching across diverse research areas and scientific disciplines, such as: biomechanics, haptics, neurosciences, virtual simulation, animation, surgery, and sensor networks among others. In return, the challenges of the new emerging areas are proving an abundant source of stimulation and insights for the field of robotics. It is indeed at the intersection of disciplines that the most striking advances happen. The Springer Tracts in Advanced Robotics (STAR) is devoted to bringing to the research community the latest advances in the robotics field on the basis of their significance and quality. Through a wide and timely dissemination of critical research developments in robotics, our objective with this series is to promote more exchanges and collaborations among the researchers in the community and contribute to further advancements in this rapidly growing field.

This three volume set LNAI 9244, 9245, and 9246 constitutes the refereed proceedings of the 8th International Conference on Intelligent Robotics and Applications, ICIRA 2015, held in Portsmouth, UK, in August 2015. The 61 papers included in the second volume are organized in topical sections on man-machine interaction; robot design, development and control; navigation and planning; robot motion analysis and planning; medical robot; prototyping; and manufacturing.

This book is a printed edition of the Special Issue "Sensors and Actuators in Smart Cities" that was published in JSAN

Get started with the smallest, cheapest, and highest-utility Pi ever—Raspberry Pi Zero About This Book Get started with Raspberry Pi Zero and put all of its exciting features to use Create fun games and programs with little or no programming experience Learn to use this super-tiny PC to control hardware and software for work, play, and everything else Who This Book Is For This book is for hobbyists and programmers who are taking their first steps toward using Raspberry Pi Zero. No programming experience is required, although some Python programming experience might be useful. What You Will Learn Understand how to initially download the operating system and set up Raspberry Pi Zero Find out how to control the GPIO pins of Raspberry Pi Zero to control LED circuits Get to grips with adding hardware to the GPIO to control more complex hardware such as motors Add USB control hardware to control a complex robot with 12 servos Include speech recognition so that projects can receive commands Enable the robot to communicate with the world around it by adding speech output Control the robot from a distance and see what the robot is seeing by adding wireless communication Discover how to build a Robotic hand and a Quadcopter In Detail Raspberry Pi Zero is half the size of Raspberry Pi A, only with twice the utility. At just three centimeters wide, it packs in every utility required for full-fledged computing tasks. This practical tutorial will help you quickly get up and running with Raspberry Pi Zero to control hardware and software and write simple programs and games. You will learn to build creative programs and exciting games with little or no programming experience. We cover all the features of Raspberry Pi Zero as you discover how to configure software and hardware, and control external devices. You will find out how to navigate your way in Raspbian, write simple Python scripts, and create simple DIY programs. Style and approach This is a practical and fun 'getting started' tutorial that will guide you through everything new that the Raspberry Pi has to offer.

If you want to build programming and electronics projects that interact with the environment, this book will offer you dozens of recipes to guide you through all the major applications of the Arduino platform. It is intended for programming or electronics enthusiasts who want to combine the best of both worlds to build interactive projects.

Long-awaited revision of this best-selling book on the Arduino electronics platform (35,000+ copies sold). Readers gain an in-depth understanding of the Arduino -- beyond just making simple projects. The Arduino is an affordable, flexible, open source microcontroller platform designed to make it easy for hobbyists to use electronics in homemade projects. With an almost unlimited range of input and output add-ons, sensors, indicators, displays, motors, and more, the Arduino offers you countless ways to create devices that interact with the world around you. This second edition of Arduino Workshop has been updated for the latest version of Arduino IDE. It begins with an overview of the Arduino system and then moves on to coverage of various electronic components and concepts, including revised content reflecting advances in displays, touchscreens, sensors, motors, GPS, and wireless technology. You'll learn about new hardware and find updated projects that cover areas like touchscreens and LED displays, robotics, using sensors with wireless data links, and even controlling projects remotely through a cell phone. Brand new chapters include coverage of MAX7219-based LED numeric displays, LED matrix modules, and creating your own Arduino libraries. Throughout the book, hands-on projects reinforce what you've learned and show you how to apply that knowledge. As your understanding grows, the projects increase in complexity and sophistication. Along the way, you'll learn valuable lessons in coding, including how to create your own Arduino libraries to efficiently reuse code across multiple projects. Among the book's 65 projects are useful devices like: • A digital thermometer that charts temperature changes on an LCD • A GPS logger that records data from your travels, which can be displayed on Google Maps • A handy tester that lets you check the voltage of any single-cell battery • A keypad-controlled lock that requires a secret code to open You'll also learn to build Arduino toys and games like: • An electronic version of the classic six-sided die • A binary quiz game that challenges your number conversion skills • A motorized remote control car with collision detection to keep it from crashing Arduino Workshop will teach you

the tricks and design principles of a master craftsman. Whatever your skill level, you'll have fun as you learn to harness the power of the Arduino for your own DIY projects.

This book presents nearly 90 carefully selected contributions at the 12th International Conference Mechatronics, which took place in Brno, Czech Republic on 6–8 September 2017. Reflecting the most progressive and constantly changing areas of mechatronics, these proceedings includes papers concerning modeling and simulation, automatic control, robotics, sensors and actuators, electrical machines, and energy harvesting. It not only offers inspiration, but also deepens readers' interdisciplinary and integrated understanding of modern engineering. The book is intended for experts in the integration of electronic, mechanical, control and computer sciences.

This book presents recent progresses in control, automation, robotics and measuring techniques. It includes contributions of top experts in the fields, focused on both theory and industrial practice. The particular chapters present a deep analysis of a specific technical problem which is in general followed by a numerical analysis and simulation and results of an implementation for the solution of a real world problem. The presented theoretical results, practical solutions and guidelines will be useful for both researchers working in the area of engineering sciences and for practitioners solving industrial problems.

This proceedings book gathers the latest achievements and trends in research and development in educational robotics from the 10th International Conference on Robotics in Education (RiE), held in Vienna, Austria, on April 10–12, 2019. It offers valuable methodologies and tools for robotics in education that encourage learning in the fields of science, technology, engineering, arts and mathematics (STEAM) through the design, creation and programming of tangible artifacts for creating personally meaningful objects and addressing real-world societal needs. It also discusses the introduction of technologies ranging from robotics platforms to programming environments and languages and presents extensive evaluations that highlight the impact of robotics on students' interests and competence development. The approaches included cover the entire educative range, from the elementary school to the university level in both formal and informal settings.

Mechatronics: Ideas for Industrial ApplicationsSpringer

Discover the biblical definition of gentleness through scripture, research, and soul-baring personal illustrations in *Gentleness: It's Not What You Think*.

Interest in control of climbing and walking robots has remarkably increased over the years. Novel solutions of complex mechanical systems such as climbing, walking, flying and running robots with different kinds of locomotion and the technologies that support them and their applications are the evidence of significant progress in the area of robotics. Supporting technologies include the means by which robots use to sense, model, and navigate through their environments and, of course, actuation and control technologies. Human interaction including exoskeletons, prostheses and orthoses, as well as service robots, are increasingly active important pertinent areas of research. In addition, legged machines and tracked platforms with software architecture seem to be currently the research idea of most interest to the robotics community. Contents:Plenary PresentationsAssistive RobotsAutonomous RobotsBiologically-Inspired Systems and SolutionsInnovative Design of CLAWARInnovative Sensing and ActuationLocomotionManipulation and GrippingManufacturing, Construction and Underwater RobotsMedical and Rehabilitation RobotsModelling and Simulation of CLAWARPerception, Localisation, Planning and ControlService RobotsRobot Ethics Readership: Systems and control engineers, electrical engineers, mechanical engineers in academic, research and industrial settings. Engineers and practitioners in the public services sectors in health care, manufacturing, supply and delivery services. Key Features:The book will contain extended versions of the conference presentations. Contrary to typical proceedings collections it has an extended form of presentation — particular chapters will contain exhaustive descriptions of the solved problemsIt is intended that the Conference is the forum of technical discussion and interchange of ideas for people both from universities and industry. Because of this it is addressed to a wide group of readers: researchers, PhD students and practitionersProminent professors deliver plenary presentationsKeywords:Assistive Robotics;Autonomous Robots;Biologically Inspired Robotics;CLAWAR;Climbing and Walking Robots;Design of CLAWAR;Hybrid Locomotion;Legged Locomotion;Mobile Robots;Modeling and Simulation;Planning and Control;Robot Standardization;Service Robotics;Wheeled Locomotion

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