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Architecture With Raspberry Pi

Learning Computer Architecture With Raspberry Pi

Expand Raspberry Pi capabilities
with fundamental engineering

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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

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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

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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

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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

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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

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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

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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

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Explore advanced applications with video, audio, real-world interactions, and more Be free to adapt and create with Exploring Raspberry Pi.

The next generation of computer system designers will be less

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concerned about details of processors and memories, and more concerned about the elements of a system tailored to particular applications. These designers will have a fundamental knowledge of

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processors and other elements in the system, but the success of their design will depend on the skills in making system-level tradeoffs that optimize the cost, performance and other attributes to meet application

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requirements. This book provides a new treatment of computer system design, particularly for System-on-Chip (SOC), which addresses the issues mentioned above. It begins with a global introduction,

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from the high-level view to the lowest common denominator (the chip itself), then moves on to the three main building blocks of an SOC (processor, memory, and interconnect). Next is an overview of what makes SOC

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unique (its customization ability and the applications that drive it). The final chapter presents future challenges for system design and SOC possibilities. Through the use of complete program examples, flow

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diagrams, and color codes, Assembly Language Coding in Color helps students and computer enthusiasts start on a solid path to understanding computer architecture. Example programs in ARM and NEON

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assembly language ranging from 5 to over 100 lines of code are described and available for downloading.

The world of single-board computing puts powerful coding tools in the palm of your hand.

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The portable Raspberry Pi computing platform with the power of Linux yields an exciting exploratory tool for beginning scientific computing. Science and Computing with Raspberry Pi takes the enterprising

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researcher, student, or hobbyist through explorations in a variety of computing exercises with the physical sciences. The book has tutorials and exercises for a wide range of scientific computing problems while guiding the user

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through: * Configuring your Raspberry Pi and Linux operating system *

Understanding the software requirements while using the Pi for scientific computing *

Computing exercises in physics,

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astronomy, chaos theory, and machine learning

ARM Edition

Raspberry Pi Projects

Hacking Raspberry Pi

Machine Learning with the Raspberry Pi

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Textbook

Electronic Projects with Python,
Scratch, and Linux

Learn the Raspberry Pi 3 from the experts! Raspberry Pi User Guide, 4th Edition is the "unofficial official" guide to

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everything Raspberry Pi 3. Written by the Pi's creator and a leading Pi guru, this book goes straight to the source to bring you the ultimate Raspberry Pi 3 manual. This new fourth edition has been updated to cover the Raspberry Pi 3 board and

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software, with detailed discussion on its wide array of configurations, languages, and applications. You'll learn how to take full advantage of the mighty Pi's full capabilities, and then expand those capabilities even more with add-on technologies.

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You'll write productivity and multimedia programs, and learn flexible programming languages that allow you to shape your Raspberry Pi into whatever you want it to be. If you're ready to jump right in, this book gets you started with clear, step-by-step

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instruction from software installation to system customization. The Raspberry Pi's tremendous popularity has spawned an entire industry of add-ons, parts, hacks, ideas, and inventions. The movement is growing, and pushing the

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boundaries of possibility along with it—are you ready to be a part of it? This book is your ideal companion for claiming your piece of the Pi. Get all set up with software, and connect to other devices Understand Linux System Admin nomenclature and

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conventions Write your own programs using Python and Scratch Extend the Pi's capabilities with add-ons like Wi-Fi dongles, a touch screen, and more The credit-card sized Raspberry Pi has become a global phenomenon. Created by the

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Raspberry Pi Foundation to get kids interested in programming, this tiny computer kick-started a movement of tinkerers, thinkers, experimenters, and inventors.

Where will your Raspberry Pi 3 take you? The Raspberry Pi User Guide, 3rd Edition is your

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ultimate roadmap to discovery. Start programming quickly with this super-fun guide to Raspberry Pi Adventures in Raspberry Pi, 2nd Edition includes 9 cool projects that show you how to set up and start developing on your Raspberry Pi. Updated for the

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release of the Rev 3 board, this second edition covers all the latest features and tells you everything you need to know. Written specifically for 11-15 year-olds, this book uses the wildly successful, Raspberry Pi to explain the fundamentals of

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computing. You'll have a blast learning basic programming and system administration skills, beginning with the very basics of how to plug in the board and turn it on. Each project includes an instructional video so you can jump right in and start going

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through the lessons on your own. This hands-on book gets you up and running fast, with fun projects that let you explore. Learn how to "talk to" your Raspberry Pi Create games and stories with Scratch Program with Turtle Graphics and Python

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Code music and create a Raspberry Pi jukebox If you want to get started programming today, Adventures in Raspberry Pi is the ultimate hands-on guide. Om hvordan mikroprocessorer fungerer, med undersøgelse af de nyeste mikroprocessorer fra

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Intel, IBM og Motorola.

This book presents how to program Single Board Computers (SBCs) for Internet of Things (IoT) rapid prototyping with popular tools such as Raspberry Pi, Arduino, Beagle Bone, and NXP boards. The book provides

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novel programs to solve new technological real-time problems. The author addresses programming, PCB design and Mechanical Cad design all in single volume, easing learners into incorporating their ideas as prototype. The aim of the book is

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to provide programming, sensors interfacing, PCB design, and Mechanical Cad design to and create rapid prototyping. The author presents the methodologies of rapid prototyping with KiCAD design and Catia software, used to

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create ready to mount solutions. The book covers scripting- based and drag/drop- based programming for different problems and data gathering approach.

Interfacing to the Real World with Embedded Linux

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Getting Started with Raspberry Pi

Teach Yourself VISUALLY Raspberry Pi

Beginning Artificial Intelligence with the Raspberry Pi

Experiments with Data and Computer Vision

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Raspberry Pi For Dummies

The objective of this book is to make it possible (and even easy) for students to master both assembly language and the fundamentals of computer architecture in a single semester. Integrating coverage of

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software and hardware throughout, the book uses H1--a simple, horizontally microprogrammed computer--as a unifying theme. Like all simple models, H1 has flaws, but this book puts these flaws to good use. In particular, in addition to

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showing students how H1 works and what is wrong with it, the book shows students how to fix it (which they then proceed to do). Students learn best by doing, and this book supplies much to do with various examples and projects to facilitate

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learning. For example, students not only use assemblers and linkers, they also write their own. Students not only study and use the provided instruction set but implement new, improved ones. The result is a book that is easy to read, engaging, and

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substantial. The software package for the book supports Windows, Mac OS X, Linux, and Raspbian.

This book thoroughly explains how computers work. It starts by fully examining a NAND gate, then goes on to build every piece and part of a

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small, fully operational computer. The necessity and use of codes is presented in parallel with the appropriate pieces of hardware. The book can be easily understood by anyone whether they have a technical background or not. It

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could be used as a textbook.

The world of Raspberry Pi is evolving quickly, with many new interface boards and software libraries becoming available all the time. In this cookbook, prolific hacker and author Simon Monk

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provides more than 200 practical recipes for running this tiny low-cost computer with Linux, programming it with Python, and hooking up sensors, motors, and other hardware—including Arduino. You'll also learn basic principles to

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help you use new technologies with Raspberry Pi as its ecosystem develops. Python and other code examples from the book are available on GitHub. This cookbook is ideal for programmers and hobbyists familiar with the Pi

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through resources such as Getting Started with Raspberry Pi (O'Reilly). Set up and manage your Raspberry Pi Connect the Pi to a network Work with its Linux-based operating system Use the Pi's ready-made software Program Raspberry

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Pi with Python Control hardware through the GPIO connector Use Raspberry Pi to run different types of motors Work with switches, keypads, and other digital inputs Hook up sensors for taking various measurements Attach different

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*displays, such as an LED matrix
Create dynamic projects with
Raspberry Pi and Arduino Make
sure to check out 10 of the over 60
video recipes for this book at:
<http://razzpisampler.oreilly.com/>
You can purchase all recipes at:*

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In this book, we explore Raspberry Pi 2's hardware through a number of projects in a variety of programming languages. We will start by exploring the various hardware components in detail, which will provide a base for the

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programming projects and guide you through setting up the tools for Assembler, C/C++, and Python. We will then learn how to write multi-threaded applications and Raspberry Pi 2's multi-core processor. Moving on, you'll get

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hands on by expanding the storage options of the Raspberry Pi beyond the SD card and interacting with the graphics hardware. Furthermore, you will be introduced to the basics of sound programming while expanding upon your knowledge of

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Python to build a web server.

Finally, you will learn to interact with the third-party microcontrollers.

Learning ROS robot programming with Raspberry Pi

ARM Processor Coding

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MPI4PY, NumPy, and SciPy for Enthusiasts

Role of Single Board Computers (SBCs) in rapid IoT Prototyping
Practical Raspberry Pi

Programming with 64-Bit ARM Assembly Language

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Jump right into the pro-level guts of the Raspberry Pi with complete schematics and detailed hardware explanations as your guide. You'll tinker with runlevels, reporting voltages and temperatures, and work on a variety of project examples that

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you can tune for your own project ideas.. This book is fully updated for the latest Pi boards with three chapters dedicated to GPIO to help you master key aspects of the Raspberry Pi. You'll work with Linux driver information and explore the different Raspberry Pi

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models, including the Pi Zero, Pi Zero W, Pi 2, Pi3 B and Pi3 B+. You'll also review a variety of project examples that you can tune for your own project ideas. Other topics covered include the 1-Wire driver interface, how to configure a serial Linux console,

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and cross-compile code, including the Linux kernel. You'll find yourself turning to Advanced Raspberry Pi over and over again for both inspiration and reference. Whether you're an electronics professional, an entrepreneurial maker, or just looking for more

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detailed information on the Raspberry Pi, this is exactly the book for you. What You'll Learn Master I2C and SPI communications from Raspbian Linux in C Program USB peripherals, such as a 5-inch LCD panel with touch control and the

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Pi camera Study GPIO hardware, the sysfs driver interface and direct access from C programs Use and program the UART serial device. Who This Book Is For Advanced Raspberry Pi users who have experience doing basic projects and want to take their

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projects further.

Explore Raspberry Pi's architecture through innovative and fun projects About This Book Explore Raspberry Pi 2's hardware through the Assembly, C/C++, and Python programming languages Experiment with

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connecting electronics up to your Raspberry Pi 2 and interacting with them through software Learn about the Raspberry Pi 2 architecture and Raspbian operating system through innovative projects Who This Book Is For Raspberry Pi

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Computer Architecture Essentials is for those who are new and those who are familiar with the Raspberry Pi. Each topic builds upon earlier ones to provide you with a guide to Raspberry Pi's architecture. From the novice to the expert, there is something for

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everyone. A basic knowledge of programming and Linux would be helpful but is not required. What You Will Learn Set up your Raspberry Pi 2 and learn about its hardware Write basic programs in Assembly Language to learn about the ARM architecture Use C

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and C++ to interact with electronic components Find out about the Python language and how to use it to build web applications Interact with third-party microcontrollers Experiment with graphics and audio programming Expand Raspberry

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Pi 2's storage mechanism by using external devices Discover Raspberry Pi 2's GPIO pins and how to interact with them In Detail With the release of the Raspberry Pi 2, a new series of the popular compact computer is available for you to build cheap,

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exciting projects and learn about programming. In this book, we explore Raspberry Pi 2's hardware through a number of projects in a variety of programming languages. We will start by exploring the various hardware components in detail, which will

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provide a base for the programming projects and guide you through setting up the tools for Assembler, C/C++, and Python. We will then learn how to write multi-threaded applications and Raspberry Pi 2's multi-core processor. Moving on, you'll get

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hands on by expanding the storage options of the Raspberry Pi beyond the SD card and interacting with the graphics hardware. Furthermore, you will be introduced to the basics of sound programming while expanding upon your knowledge

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of Python to build a web server. Finally, you will learn to interact with the third-party microcontrollers. From writing your first Assembly Language application to programming graphics, this title guides you through the essentials. Style and

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approach This book takes a step-by-step approach to exploring Raspberry Pi's architecture through projects that build upon each other. Each project provides you with new information on how to interact with an aspect of the Raspberry Pi and Raspbian

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operating system, providing a well-rounded guide.

Build an inexpensive cluster of multiple Raspberry Pi computers and install all the required libraries to write parallel and scientific programs in Python 3. This book covers setting up your

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Raspberry Pis, installing the necessary software, and making a cluster of multiple Pis. Once the cluster is built, its power has to be exploited by means of programs to run on it. So, Raspberry Pi Supercomputing and Scientific Programming teaches

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you to code the cluster with the MPI4PY library of Python 3. Along the way, you will learn the concepts of the Message Passing Interface (MPI) standards and will explore the fundamentals of parallel programming on your inexpensive cluster. This will

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make this book a great starting point for supercomputing enthusiasts who want to get started with parallel programming. The book finishes with details of symbolic mathematics and scientific and numerical programming in

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Python, using SymPi, SciPy, NumPy, and Matplotlib. You'll see how to process signals and images, carry out calculations using linear algebra, and visualize your results, all using Python code. With the power of a Raspberry Pi supercomputer at

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your fingertips, data-intensive scientific programming becomes a reality at home. What You Will Learn Discover the essentials of supercomputing Build a low-cost cluster of Raspberry Pis at home Harness the power of parallel programming and the Message

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Passing Interface (MPI) Use your Raspberry Pi for symbolic, numerical, and scientific programming Who This Book Is For Python 3 developers who seek the knowledge of parallel programming, Raspberry Pi enthusiasts, researchers, and the

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scientific Python community. The inclusion of experts in communicability in the software industry has allowed timeframes to speed up in the commercialization of new technological products worldwide. However, this constant evolution

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of software in the face of the hardware revolution opens up a host of new horizons to maintain and increase the quality of the interactive systems following a set of standardized norms and rules for the production of interactive software. Currently,

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we see some efforts towards this goal, but they are still partial solutions, incomplete, and flawed from the theoretical as well as practical points of view. If the quality of the interactive design is analyzed, it is left to professionals to generate systems that are

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efficient, reliable, user-friendly, and cutting-edge. The Handbook of Research on Software Quality Innovation in Interactive Systems analyzes the quality of the software applied to the interactive systems and considers the constant advances in the

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software industry. This book reviews the past and present of information and communication technologies with a projection towards the future, along with analyses of software, software design, phrases to use, and the purposes for software

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applications in interactive systems. This book is ideal for students, professors, researchers, programmers, analysts of systems, computer engineers, interactive designers, managers of software quality, and evaluators of interactive systems.

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Raspberry Pi Assembly Language Programming

Raspberry Pi Operating System Assembly Language

Arm and Neon

An Illustrated Introduction to Microprocessors and Computer Architecture

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Handbook of Research on
Software Quality Innovation in
Interactive Systems
Digital Design and Computer
Architecture
Practical Raspberry Pi
takes you quickly through
the hardware and software

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basics of the Raspberry Pi. Author Brendan Horan then gets you started on a series of fun and practical projects, including a simple temperature sensor, a

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media center, a real-time clock, and even a security monitoring device, all of which require minimal programming experience. Along with these projects, you'll learn all about the

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Raspberry Pi hardware, including how it can be so powerful and still so small and inexpensive, why it's so suitable as a video player, and how you can customize it for

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different tasks, including running different operating systems on it, including Android and RISC OS. The Raspberry Pi is an inexpensive but relatively powerful little computer.

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It was designed to get kids interested in computing and programming, but it's also a great platform for hardware hackery. The projects in this book will get you

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deep into the hardware to show you what the Raspberry Pi can really do.

Gain all the skills required to dive into the fundamentals of the

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Raspberry Pi hardware architecture and how data is stored in the Pi's memory. This book provides you with working starting points for your own projects while you develop

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a working knowledge of Assembly language programming on the Raspberry Pi. You'll learn how to interface to the Pi's hardware including accessing the GPIO ports.

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The book will cover the basics of code optimization as well as how to inter-operate with C and Python code, so you'll develop enough background to use the

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official ARM reference documentation for further projects. With Raspberry Pi Assembly Language Programming as your guide you'll study how to read and reverse engineer

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machine code and then then apply those new skills to study code examples and take control of your Pi's hardware and software both. What You'll Learn Program basic ARM 32-Bit

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Assembly Language

Interface with the various hardware devices on the Raspberry Pi Comprehend code containing Assembly language Use the official ARM reference

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documentation Who This Book Is For Coders who have already learned to program in a higher-level language like Python, Java, C#, or C and now wish to learn Assembly

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programming.

This undergraduate textbook first introduces basic electronic circuitry before explaining more advanced elements such as the Arithmetic Logic Unit,

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sequential circuits, and finally microprocessors. In keeping with this integrated and graduated approach, the authors then explain the relationship to first assembly

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programming, then higher-level languages, and finally computer organisation. Authors use the Raspberry Pi and ARM microprocessors for their explanations The material

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has been extensively class tested at TU Eindhoven by an experienced team of lecturers and researchers. This is a modern, holistic treatment of well-established topics,

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valuable for undergraduate students of computer science and electronics engineering and for self-study. The authors use the Raspberry Pi and ARM microprocessors for their

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explanations.

Make the most out of the world's first truly compact computer. It's the size of a credit card, it can be charged like a smartphone, it runs on

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open-source Linux, and it holds the promise of bringing programming and playing to millions at low cost. And now you can learn how to use this amazing computer from its

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co-creator, Eben Upton, in Raspberry Pi User Guide. Cowritten with Gareth Halfacree, this guide gets you up and running on Raspberry Pi, whether you're an educator,

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hacker, hobbyist, or kid. Learn how to connect your Pi to other hardware, install software, write basic programs, and set it up to run robots, multimedia centers, and

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more. Gets you up and running on Raspberry Pi, a high-tech computer the size of a credit card
Helps educators teach students how to program
Covers connecting

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Raspberry Pi to other hardware, such as monitors and keyboards, how to install software, and how to configure Raspberry Pi Shows you how to set up Raspberry Pi as a simple

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productivity computer,
write basic programs in
Python, connect to servos
and sensors, and drive a
robot or multimedia center
Adults, kids, and devoted
hardware hackers, now that

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you've got a Raspberry Pi, get the very most out of it with Raspberry Pi User Guide.

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System-on-Chip
Computer System Design

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Software and Hardware
Problems and Solutions
But how Do it Know?
Raspbian Linux and GPIO
Integration

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to the basics of sound**

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programming while expanding upon your knowledge of Python to build a web server. Finally, you will learn to interact with the third-party microcontrollers. In this book, we explore Raspberry Pi 2's hardware through a number of projects in a variety of programming languages.

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We will start by exploring the various hardware components in detail, which will provide a base for the programming projects and guide you through setting up the tools for Assembler, C/C++, and Python. We will then learn how to write multi-threaded applications

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and Raspberry Pi 2's multi-core processor. Moving on, you'll get hands on by expanding the storage options of the Raspberry Pi beyond the SD card and interacting with the graphics hardware.

Use your Raspberry Pi to get smart about computing fundamentals In

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the 1980s, the tech revolution was kickstarted by a flood of relatively inexpensive, highly programmable computers like the Commodore. Now, a second revolution in computing is beginning with the Raspberry Pi. Learning Computer Architecture with the Raspberry Pi

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is the premier guide to understanding the components of the most exciting tech product available. Thanks to this book, every Raspberry Pi owner can understand how the computer works and how to access all of its hardware and software capabilities.

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Now, students, hackers, and casual users alike can discover how computers work with Learning Computer Architecture with the Raspberry Pi. This book explains what each and every hardware component does, how they relate to one another, and how they

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correspond to the components of other computing systems. You'll also learn how programming works and how the operating system relates to the Raspberry Pi's physical components. Co-authored by Eben Upton, one of the creators of the Raspberry Pi, this is a

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**companion volume to the
Raspberry Pi User Guide An
affordable solution for learning
about computer system design
considerations and experimenting
with low-level programming
Understandable descriptions of the
functions of memory storage,**

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Ethernet, cameras, processors, and more Gain knowledge of computer design and operation in general by exploring the basic structure of the Raspberry Pi The Raspberry Pi was created to bring forth a new generation of computer scientists, developers, and architects who

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understand the inner workings of the computers that have become essential to our daily lives. Learning Computer Architecture with the Raspberry Pi is your gateway to the world of computer system design. With millions of new users and several new models, the Raspberry

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Pi ecosystem continues to expand—along with a lot of new questions about the Pi's capabilities. The second edition of this popular cookbook provides more than 240 hands-on recipes for running this tiny low-cost computer with Linux, programming it with

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Python, and hooking up sensors, motors, and other hardware—including Arduino and the Internet of Things. Prolific hacker and author Simon Monk also teaches basic principles to help you use new technologies with Raspberry Pi as its ecosystem

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continues to develop. This cookbook is ideal for programmers and hobbyists familiar with the Pi through resources, including Getting Started with Raspberry Pi (O'Reilly). Python and other code examples from the book are available on GitHub. Set up your

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Raspberry Pi and connect to a network Work with its Linux-based operating system Program Raspberry Pi with Python Give your Pi "eyes" with computer vision Control hardware through the GPIO connector Use Raspberry Pi to run different types of motors Work with

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switches, keypads, and other digital inputs Use sensors to measure temperature, light, and distance Connect to IoT devices in various ways Create dynamic projects with Arduino

Mastering ARM hardware architecture opens a world of

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programming for nearly all phones and tablets including the iPhone/iPad and most Android phones. It's also the heart of many single board computers like the Raspberry Pi. Gain the skills required to dive into the fundamentals of the ARM hardware

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architecture with this book and start your own projects while you develop a working knowledge of assembly language for the ARM 64-bit processor. You'll review assembly language programming for the ARM Processor in 64-bit mode and write programs for a

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number of single board computers, including the Nvidia Jetson Nano and the Raspberry Pi (running 64-bit Linux). The book also discusses how to target assembly language programs for Apple iPhones and iPads along with 64-Bit ARM based Android phones and

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tablets. It covers all the tools you require, the basics of the ARM hardware architecture, all the groups of ARM 64-Bit Assembly instructions, and how data is stored in the computer's memory. In addition, interface apps to hardware such as the Raspberry Pi's GPIO

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ports. The book covers code optimization, as well as how to inter-operate with C and Python code. Readers will develop enough background to use the official ARM reference documentation for their own projects. With Programming with 64-Bit ARM Assembly

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Language as your guide you'll study how to read, reverse engineer and hack machine code, then be able to apply these new skills to study code examples and take control of both your ARM devices' hardware and software. What You'll Learn
Make operating system calls

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from assembly language and include other software libraries in your projects Interface apps to hardware devices such as the Raspberry Pi GPIO ports Reverse engineer and hack code Use the official ARM reference documentation for your own

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**projects Who This Book Is For
Software developers who have
already learned to program in a
higher-level language like Python,
Java, C#, or even C and now wish to
learn Assembly programming.
Science and Computing with
Raspberry Pi**

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**Assembly Language and Computer
Architecture Using C++ and Java
A Hands-On Guide to the Inner
Workings of the Machine
The Basic Principles of Computers
for Everyone
Raspberry Pi Supercomputing and
Scientific Programming**

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Advanced Raspberry Pi

Gain a gentle introduction to the world of Artificial Intelligence (AI) using the Raspberry Pi as the computing platform. Most of the major AI topics will be explored, including expert

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systems, machine learning both shallow and deep, fuzzy logic control, and more! AI in action will be demonstrated using the Python language on the Raspberry Pi. The Prolog language will also be

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introduced and used to demonstrate fundamental AI concepts. In addition, the Wolfram language will be used as part of the deep machine learning demonstrations. A series of projects will walk you

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through how to implement AI concepts with the Raspberry Pi. Minimal expense is needed for the projects as only a few sensors and actuators will be required. Beginners and hobbyists can jump right in to creating AI

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projects with the Raspberry PI using this book. What You'll Learn What AI is and—as importantly—what it is not Inference and expert systems Machine learning both shallow and deep Fuzzy logic and how to apply to an

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actual control system When
AI might be appropriate to
include in a system
Constraints and limitations
of the Raspberry Pi AI
implementation Who This Book
Is For Hobbyists, makers,
engineers involved in

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designing autonomous systems and wanting to gain an education in fundamental AI concepts, and non-technical readers who want to understand what AI is and how it might affect their lives.

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approachable. Machine learning, also commonly referred to as deep learning (DL), is currently being integrated into a multitude of commercial products as well as widely being used in industrial, medical, and

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military applications. It is hard to find any modern human activity, which has not been "touched" by artificial intelligence (AI) applications. Building on the concepts first presented in Beginning Artificial

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Intelligence with the Raspberry Pi, you'll go beyond simply understanding the concepts of AI into working with real machine learning experiments and applying practical deep learning concepts to

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hobbyist or commercial projects. What You'll Learn
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Apply AI and ML tools and techniques to your own work

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projects and studies Who This Book Is For Engineers and scientists but also experienced makers and hobbyists. Motivated high school students who desire to learn about ML can benefit from this material

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The book also covers advanced topics of parallelism, pipelining, power and energy, and performance. A hands-on lab is also included. The second edition contains three new chapters as well as changes and updates throughout.

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Second Edition

Operating Systems Foundations with
Linux on the Raspberry Pi

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for Raspberry Pi and Mobile Devices

An approachable, hands-on guide to understanding how computers work, from low-level circuits to high-level code. How Computers Really Work is a hands-on guide to the computing ecosystem:

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everything from circuits to memory and clock signals, machine code, programming languages, operating systems, and the internet. But you won't just read about these concepts, you'll test your knowledge with exercises, and

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- **Think like a software engineer as you use data to describe a real world concept**
- **Use Ohm's and Kirchhoff's laws to analyze an electrical circuit**
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execute a program in your mind, step-by-step The book's projects will have you translate your learning into action, as you:

- Learn how to use a multimeter to measure resistance, current, and voltage
- Build a half adder to

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see how logical operations in hardware can be combined to perform useful functions •
Write a program in assembly language, then examine the resulting machine code •
Learn to use a debugger, disassemble code, and hack a

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program to change its behavior without changing the source code

- **Use a port scanner to see which internet ports your computer has open**
- **Run your own server and get a solid crash course on how the web works**

And since a

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picture is worth a thousand bytes, chapters are filled with detailed diagrams and illustrations to help clarify technical complexities.

Requirements: The projects require a variety of hardware - electronics projects need a

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breadboard, power supply, and various circuit components; software projects are performed on a Raspberry Pi. Appendix B contains a complete list. Even if you skip the projects, the book's major concepts are clearly presented

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in the main text.

The aim of this book is to provide a practical introduction to the foundations of modern operating systems, with a particular focus on GNU/Linux and the Arm platform. The

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unique perspective of the authors is that they explain operating systems theory and concepts but also ground them in practical use through illustrative examples.

Digital Design and Computer Architecture: ARM Edition

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covers the fundamentals of digital logic design and reinforces logic concepts through the design of an ARM microprocessor. Combining an engaging and humorous writing style with an updated and hands-on approach to

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digital design, this book takes the reader from the fundamentals of digital logic to the actual design of an ARM processor. By the end of this book, readers will be able to build their own microprocessor and will have

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a top-to-bottom understanding of how it works. Beginning with digital logic gates and progressing to the design of combinational and sequential circuits, this book uses these fundamental building blocks as the basis

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for designing an ARM processor. SystemVerilog and VHDL are integrated throughout the text in examples illustrating the methods and techniques for CAD-based circuit design. The companion website includes a

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chapter on I/O systems with practical examples that show how to use the Raspberry Pi computer to communicate with peripheral devices such as LCDs, Bluetooth radios, and motors. This book will be a valuable resource for

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students taking a course that combines digital logic and computer architecture or students taking a two-quarter sequence in digital logic and computer organization/architecture. Covers the fundamentals of

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digital logic design and reinforces logic concepts through the design of an ARM microprocessor. Features side-by-side examples of the two most prominent Hardware Description Languages (HDLs)—SystemVerilog and

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VHDL—which illustrate and compare the ways each can be used in the design of digital systems. Includes examples throughout the text that enhance the reader's understanding and retention of key concepts and

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techniques. The Companion website includes a chapter on I/O systems with practical examples that show how to use the Raspberry Pi computer to communicate with peripheral devices such as LCDs, Bluetooth radios,

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and motors. The Companion website also includes appendices covering practical digital design issues and C programming as well as links to CAD tools, lecture slides, laboratory projects, and solutions to exercises.

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Raspberry Pi Operating System Assembly Language is a fully revised and updated guide to learning to program ARM machine code on your Raspberry Pi. With nothing other than the Raspberry Pi Operating System installed on

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your Raspberry Pi, this book shows you how to access all the tools that you'll need to create your own machine code programs using assembly language. Ideal for the novice, this book starts from first principles and leads you

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comfortably on your way to become an accomplished programmer. Providing lucid descriptions, award winning author Bruce Smith keeps things simple and includes plenty of program examples you can try for yourself. Ideas

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and concepts are introduced in the order required so you should never be left wondering. This book is compatible with all Raspberry PI models including the RPi 4, 400 and 3.

Raspberry Pi Computer

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Architecture Essentials
How Computers Really Work
Adventures in Raspberry Pi
Logic Gates, Circuits,
Processors, Compilers and
Computers