

Designing Embedded Hardware

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In the five years since the first edition of this classic book was published, Internet use has exploded. The commercial world has rushed headlong into doing business on the Web, often without integrating sound security technologies and policies into their products and methods. The security risks--and the need to protect both business and personal data--have never been greater. We've updated Building Internet Firewalls to address these newer risks. What kinds of security threats does the Internet pose? Some, like password attacks and the exploiting of known security holes, have been around since the early days of networking. And others, like the distributed denial of service attacks that crippled Yahoo, E-Bay, and other major e-commerce sites in early 2000, are in current headlines. Firewalls, critical components of today's computer networks, effectively protect a system from most Internet security threats. They keep damage on one part of the network--such as eavesdropping, a worm program, or file damage--from spreading to the rest of the network. Without firewalls, network security problems can rage out of control, dragging more and more systems down. Like the bestselling and highly respected first edition, Building Internet

Firewalls, 2nd Edition, is a practical and detailed step-by-step guide to designing and installing firewalls and configuring Internet services to work with a firewall. Much expanded to include Linux and Windows coverage, the second edition describes:

- Firewall technologies: packet filtering, proxying, network address translation, virtual private networks
- Architectures such as screening routers, dual-homed hosts, screened hosts, screened subnets, perimeter networks, internal firewalls
- Issues involved in a variety of new Internet services and protocols through a firewall
- Email and News
- Web services and scripting languages (e.g., HTTP, Java, JavaScript, ActiveX, RealAudio, RealVideo)
- File transfer and sharing services such as NFS, Samba
- Remote access services such as Telnet, the BSD "r" commands, SSH, BackOrifice
- 2000 Real-time conferencing services such as ICQ and talk
- Naming and directory services (e.g., DNS, NetBT, the Windows Browser)
- Authentication and auditing services (e.g., PAM, Kerberos, RADIUS);
- Administrative services (e.g., syslog, SNMP, SMS, RIP and other routing protocols, and ping and other network diagnostics)
- Intermediary protocols (e.g., RPC, SMB, CORBA, IIOP)
- Database protocols (e.g., ODBC, JDBC, and protocols for Oracle, Sybase, and Microsoft SQL Server)

The book's complete list of resources includes the location of many publicly available firewall construction tools.

Until the late 1980s, information processing was associated with large mainframe computers and huge tape drives. During the 1990s, this trend shifted toward information processing with personal computers, or PCs. The trend toward miniaturization continues and in the future the majority of information processing systems will be small mobile computers, many of which will be embedded into larger products and interfaced to the physical environment. Hence, these kinds of systems are called embedded systems. Embedded systems together with their physical environment are called cyber-physical systems. Examples include systems such as transportation and fabrication equipment. It is expected that the total market volume of embedded systems will be significantly larger than that of traditional information processing systems such as PCs and mainframes. Embedded systems share a number of common characteristics. For example, they must be dependable, efficient, meet real-time constraints and require customized user interfaces (instead of generic keyboard and mouse interfaces). Therefore, it makes sense to consider common principles of embedded system design. Embedded System Design starts with an introduction into the area and a survey of specification models and languages for embedded and cyber-physical systems. It provides a brief overview of hardware devices used for such systems and presents the

essentials of system software for embedded systems, like real-time operating systems. The book also discusses evaluation and validation techniques for embedded systems. Furthermore, the book presents an overview of techniques for mapping applications to execution platforms. Due to the importance of resource efficiency, the book also contains a selected set of optimization techniques for embedded systems, including special compilation techniques. The book closes with a brief survey on testing. Embedded System Design can be used as a text book for courses on embedded systems and as a source which provides pointers to relevant material in the area for PhD students and teachers. It assumes a basic knowledge of information processing hardware and software. Courseware related to this book is available at

<http://ls12-www.cs.tu-dortmund.de/~marwedel>.

Perform fast interactive analytics against different data sources using the Trino high-performance distributed SQL query engine. With this practical guide, you'll learn how to conduct analytics on data where it lives, whether it's Hive, Cassandra, a relational database, or a proprietary data store. Analysts, software engineers, and production engineers will learn how to manage, use, and even develop with Trino. Initially developed by Facebook, open source Trino is now used by Netflix, Airbnb, LinkedIn, Twitter, Uber, and many other companies.

Matt Fuller, Manfred Moser, and Martin Traverso show you how a single Trino query can combine data from multiple sources to allow for analytics across your entire organization. Get started: Explore Trino's use cases and learn about tools that will help you connect to Trino and query data Go deeper: Learn Trino's internal workings, including how to connect to and query data sources with support for SQL statements, operators, functions, and more Put Trino in production: Secure Trino, monitor workloads, tune queries, and connect more applications; learn how other organizations apply Trino

Embedded Systems Design with Platform FPGAs introduces professional engineers and students alike to system development using Platform FPGAs. The focus is on embedded systems but it also serves as a general guide to building custom computing systems. The text describes the fundamental technology in terms of hardware, software, and a set of principles to guide the development of Platform FPGA systems. The goal is to show how to systematically and creatively apply these principles to the construction of application-specific embedded system architectures. There is a strong focus on using free and open source software to increase productivity. Each chapter is organized into two parts. The white pages describe concepts, principles, and general knowledge. The gray pages

provide a technical rendition of the main issues of the chapter and show the concepts applied in practice. This includes step-by-step details for a specific development board and tool chain so that the reader can carry out the same steps on their own. Rather than try to demonstrate the concepts on a broad set of tools and boards, the text uses a single set of tools (Xilinx Platform Studio, Linux, and GNU) throughout and uses a single developer board (Xilinx ML-510) for the examples. Explains how to use the Platform FPGA to meet complex design requirements and improve product performance Presents both fundamental concepts together with pragmatic, step-by-step instructions for building a system on a Platform FPGA Includes detailed case studies, extended real-world examples, and lab exercises

Intelligent readers who want to build their own embedded computer systems-- installed in everything from cell phones to cars to handheld organizers to refrigerators-- will find this book to be the most in-depth, practical, and up-to-date guide on the market. Designing Embedded Hardware carefully steers between the practical and philosophical aspects, so developers can both create their own devices and gadgets and customize and extend off-the-shelf systems. There are hundreds of books to choose from if you need to learn programming, but only a few are available if you want to learn to create

hardware. Designing Embedded Hardware provides software and hardware engineers with no prior experience in embedded systems with the necessary conceptual and design building blocks to understand the architectures of embedded systems. Written to provide the depth of coverage and real-world examples developers need, Designing Embedded Hardware also provides a road-map to the pitfalls and traps to avoid in designing embedded systems. Designing Embedded Hardware covers such essential topics as: The principles of developing computer hardware Core hardware designs Assembly language concepts Parallel I/O Analog-digital conversion Timers (internal and external) UART Serial Peripheral Interface Inter-Integrated Circuit Bus Controller Area Network (CAN) Data Converter Interface (DCI) Low-power operation This invaluable and eminently useful book gives you the practical tools and skills to develop, build, and program your own application-specific computers. Every other day we hear about new ways to put deep learning to good use: improved medical imaging, accurate credit card fraud detection, long range weather forecasting, and more. PyTorch puts these superpowers in your hands, providing a comfortable Python experience that gets you started quickly and then grows with you as you—and your deep learning skills—become more sophisticated. Deep Learning with PyTorch will make that journey

engaging and fun. Summary Every other day we hear about new ways to put deep learning to good use: improved medical imaging, accurate credit card fraud detection, long range weather forecasting, and more. PyTorch puts these superpowers in your hands, providing a comfortable Python experience that gets you started quickly and then grows with you as you—and your deep learning skills—become more sophisticated. Deep Learning with PyTorch will make that journey engaging and fun. Foreword by Soumith Chintala, Cocreator of PyTorch. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Although many deep learning tools use Python, the PyTorch library is truly Pythonic. Instantly familiar to anyone who knows PyData tools like NumPy and scikit-learn, PyTorch simplifies deep learning without sacrificing advanced features. It's excellent for building quick models, and it scales smoothly from laptop to enterprise. Because companies like Apple, Facebook, and JPMorgan Chase rely on PyTorch, it's a great skill to have as you expand your career options. It's easy to get started with PyTorch. It minimizes cognitive overhead without sacrificing the access to advanced features, meaning you can focus on what matters the most - building and training the latest and greatest deep learning models and contribute to making a dent in the world. PyTorch is also a snap to

scale and extend, and it partners well with other Python tooling. PyTorch has been adopted by hundreds of deep learning practitioners and several first-class players like FAIR, OpenAI, FastAI and Purdue. About the book Deep Learning with PyTorch teaches you to create neural networks and deep learning systems with PyTorch. This practical book quickly gets you to work building a real-world example from scratch: a tumor image classifier. Along the way, it covers best practices for the entire DL pipeline, including the PyTorch Tensor API, loading data in Python, monitoring training, and visualizing results. After covering the basics, the book will take you on a journey through larger projects. The centerpiece of the book is a neural network designed for cancer detection. You'll discover ways for training networks with limited inputs and start processing data to get some results. You'll sift through the unreliable initial results and focus on how to diagnose and fix the problems in your neural network. Finally, you'll look at ways to improve your results by training with augmented data, make improvements to the model architecture, and perform other fine tuning. What's inside Training deep neural networks Implementing modules and loss functions Utilizing pretrained models from PyTorch Hub Exploring code samples in Jupyter Notebooks About the reader For Python programmers with an interest in machine learning.

About the author Eli Stevens had roles from software engineer to CTO, and is currently working on machine learning in the self-driving-car industry.

Luca Antiga is cofounder of an AI engineering company and an AI tech startup, as well as a former PyTorch contributor. Thomas Viehmann is a

PyTorch core developer and machine learning trainer and consultant. consultant based in Munich, Germany and a PyTorch core developer.

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DEPLOYMENT 15 Deploying to production

Data is at the center of many challenges in system design today. Difficult issues need to be figured out, such as scalability, consistency, reliability, efficiency, and maintainability. In addition, we have an

overwhelming variety of tools, including relational databases, NoSQL datastores, stream or batch processors, and message brokers. What are the right choices for your application? How do you make sense of all these buzzwords? In this practical and comprehensive guide, author Martin Kleppmann helps you navigate this diverse landscape by examining the pros and cons of various technologies for processing and storing data. Software keeps changing, but the fundamental principles remain the same. With this book, software engineers and architects will learn how to apply those ideas in practice, and how to make full use of data in modern applications. Peer under the hood of the systems you already use, and learn how to use and operate them more effectively. Make informed decisions by identifying the strengths and weaknesses of different tools. Navigate the trade-offs around consistency, scalability, fault tolerance, and complexity. Understand the distributed systems research upon which modern databases are built. Peek behind the scenes of major online services, and learn from their architectures.

Today, software engineers need to know not only how to program effectively but also how to develop proper engineering practices to make their codebase sustainable and healthy. This book emphasizes this difference between programming and software engineering. How can software engineers manage a

living codebase that evolves and responds to changing requirements and demands over the length of its life? Based on their experience at Google, software engineers Titus Winters and Hyrum Wright, along with technical writer Tom Manshreck, present a candid and insightful look at how some of the world's leading practitioners construct and maintain software. This book covers Google's unique engineering culture, processes, and tools and how these aspects contribute to the effectiveness of an engineering organization. You'll explore three fundamental principles that software organizations should keep in mind when designing, architecting, writing, and maintaining code: How time affects the sustainability of software and how to make your code resilient over time How scale affects the viability of software practices within an engineering organization What trade-offs a typical engineer needs to make when evaluating design and development decisions

This book offers a highly accessible introduction to natural language processing, the field that supports a variety of language technologies, from predictive text and email filtering to automatic summarization and translation. With it, you'll learn how to write Python programs that work with large collections of unstructured text. You'll access richly annotated datasets using a comprehensive range of linguistic data structures, and you'll understand the main algorithms for analyzing the content and structure of written communication. Packed with examples and exercises, Natural Language

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Processing with Python will help you: Extract information from unstructured text, either to guess the topic or identify "named entities" Analyze linguistic structure in text, including parsing and semantic analysis Access popular linguistic databases, including WordNet and treebanks Integrate techniques drawn from fields as diverse as linguistics and artificial intelligence This book will help you gain practical skills in natural language processing using the Python programming language and the Natural Language Toolkit (NLTK) open source library. If you're interested in developing web applications, analyzing multilingual news sources, or documenting endangered languages -- or if you're simply curious to have a programmer's perspective on how human language works -- you'll find Natural Language Processing with Python both fascinating and immensely useful.

Designing Embedded Hardware"O'Reilly Media, Inc."
Explores J2ME, covering topics including graphical user interfaces for small devices, designing applications for wireless environments, and the Mobile Information Device Profile.

Provides information on writing a driver in Linux, covering such topics as character devices, network interfaces, driver debugging, concurrency, and interrupts.

Annotation Over the past 10 years, distributed systems have become more fine-grained. From the large multi-million line long monolithic applications, we are now seeing the benefits of smaller self-contained services. Rather than heavy-weight, hard to change Service Oriented Architectures, we are now seeing systems consisting of collaborating microservices. Easier to change, deploy, and if required retire, organizations which are in the right position to take advantage of them are yielding significant benefits. This book takes an holistic view of the things you need to be cognizant of in order to pull this off. It covers just enough understanding of technology,

architecture, operations and organization to show you how to move towards finer-grained systems.

Learn to design and develop safe and reliable embedded systems

Key Features

- Identify and overcome challenges in embedded environments
- Understand the steps required to increase the security of IoT solutions
- Build safety-critical and memory-safe parallel and distributed embedded systems

Book Description

Embedded systems are self-contained devices with a dedicated purpose. We come across a variety of fields of applications for embedded systems in industries such as automotive, telecommunications, healthcare and consumer electronics, just to name a few. Embedded Systems Architecture begins with a bird's eye view of embedded development and how it differs from the other systems that you may be familiar with. You will first be guided to set up an optimal development environment, then move on to software tools and methodologies to improve the work flow. You will explore the boot-up mechanisms and the memory management strategies typical of a real-time embedded system. Through the analysis of the programming interface of the reference microcontroller, you'll look at the implementation of the features and the device drivers. Next, you'll learn about the techniques used to reduce power consumption. Then you will be introduced to the technologies, protocols and security aspects related to integrating the system into IoT solutions. By the end of the book, you will have explored various aspects of embedded architecture, including task synchronization in a multi-threading environment, and the safety models adopted by modern real-time operating systems. What you will learn

- Participate in the design and definition phase of an embedded product
- Get to grips with writing code for ARM Cortex-M microcontrollers
- Build an embedded development lab and optimize the workflow
- Write memory-safe code
- Understand the

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architecture behind the communication interfaces Understand the design and development patterns for connected and distributed devices in the IoT Master multitask parallel execution patterns and real-time operating systems Who this book is for If you're a software developer or designer wanting to learn about embedded programming, this is the book for you. You'll also find this book useful if you're a less experienced embedded programmer willing to expand your knowledge.

This title gives students an integrated and rigorous picture of applied computer science, as it comes to play in the construction of a simple yet powerful computer system. An understanding of psychology—specifically the psychology behind how users behave and interact with digital interfaces—is perhaps the single most valuable nondesign skill a designer can have. The most elegant design can fail if it forces users to conform to the design rather than working within the "blueprint" of how humans perceive and process the world around them. This practical guide explains how you can apply key principles in psychology to build products and experiences that are more intuitive and human-centered. Author Jon Yablonski deconstructs familiar apps and experiences to provide clear examples of how UX designers can build experiences that adapt to how users perceive and process digital interfaces. You'll learn: How aesthetically pleasing design creates positive responses The principles from psychology most useful for designers How these psychology principles relate to UX heuristics Predictive models including Fitts's law, Jakob's law, and Hick's law Ethical implications of using psychology in design A framework for applying these principles

Designing Embedded Hardware steers a course between those books dedicated to writing code for particular

microprocessors, and those that stress the philosophy of embedded system design without providing any practical information. Having designed 40 embedded computer systems of his own, author John Catsoulis brings a wealth of real-world experience to show readers how to design and create entirely new embedded devices and computerized gadgets, as well as how to customize and extend off-the-shelf systems.

Prototyping and user testing is the best way to create successful products, but many designers skip this important step and use gut instinct instead. By explaining the goals and methodologies behind prototyping—and demonstrating how to prototype for both physical and digital products—this practical guide helps beginning and intermediate designers become more comfortable with creating and testing prototypes early and often in the process. Author Kathryn McElroy explains various prototyping methods, from fast and dirty to high fidelity and refined, and reveals ways to test your prototypes with users. You'll gain valuable insights for improving your product, whether it's a smartphone app or a new electronic gadget. Learn similarities and differences between prototyping for physical and digital products Know what fidelity level is needed for different prototypes Get best practices for prototyping in a variety of mediums, and choose which prototyping software or components to use Learn electronics prototyping basics and resources for getting started Write basic pseudocode and translate it into usable code for Arduino Conduct user tests to gain insights from prototypes

- * Augment system performance
- * Optimize protocol

implementation * Increase code maintainability Create network communications software with a thorough understanding of the essential system-level design and implementation choices and how they affect the p

If you want to learn how to build efficient user interfaces with React, this is your book. Authors Alex Banks and Eve Porcello show you how to create UIs with this small JavaScript library that can deftly display data changes on large-scale, data-driven websites without page reloads. Along the way, you'll learn how to work with functional programming and the latest ECMAScript features. Developed by Facebook, and used by companies including Netflix, Walmart, and The New York Times for large parts of their web interfaces, React is quickly growing in use. By learning how to build React components with this hands-on guide, you'll fully understand how useful React can be in your organization. Learn key functional programming concepts with JavaScript Peek under the hood to understand how React runs in the browser Create application presentation layers by mounting and composing React components Use component trees to manage data and reduce the time you spend debugging applications Explore React's component lifecycle and use it to load data and improve UI performance Use a routing solution for browser history, bookmarks, and other features of single-page applications Learn how to structure React applications with servers in mind Microservices can have a positive impact on your enterprise—just ask Amazon and Netflix—but you can fall into many traps if you don't approach them in the right

way. This practical guide covers the entire microservices landscape, including the principles, technologies, and methodologies of this unique, modular style of system building. You'll learn about the experiences of organizations around the globe that have successfully adopted microservices. In three parts, this book explains how these services work and what it means to build an application the Microservices Way. You'll explore a design-based approach to microservice architecture with guidance for implementing various elements. And you'll get a set of recipes and practices for meeting practical, organizational, and cultural challenges to microservice adoption. Learn how microservices can help you drive business objectives

Examine the principles, practices, and culture that define microservice architectures

Explore a model for creating complex systems and a design process for building a microservice architecture

Learn the fundamental design concepts for individual microservices

Delve into the operational elements of a microservices architecture, including containers and service discovery

Discover how to handle the challenges of introducing microservice architecture in your organization

Develop the software and hardware you never think about. We're talking about the nitty-gritty behind the buttons on your microwave, inside your thermostat, inside the keyboard used to type this description, and even running the monitor on which you are reading it now. Such stuff is termed embedded systems, and this book shows how to design and develop embedded systems at a professional level. Because yes, many

people quietly make a successful career doing just that. Building embedded systems can be both fun and intimidating. Putting together an embedded system requires skill sets from multiple engineering disciplines, from software and hardware in particular. Building Embedded Systems is a book about helping you do things in the right way from the beginning of your first project: Programmers who know software will learn what they need to know about hardware. Engineers with hardware knowledge likewise will learn about the software side. Whatever your background is, Building Embedded Systems is the perfect book to fill in any knowledge gaps and get you started in a career programming for everyday devices. Author Changyi Gu brings more than fifteen years of experience in working his way up the ladder in the field of embedded systems. He brings knowledge of numerous approaches to embedded systems design, including the System on Programmable Chips (SOPC) approach that is currently growing to dominate the field. His knowledge and experience make Building Embedded Systems an excellent book for anyone wanting to enter the field, or even just to do some embedded programming as a side project.

What You Will Learn

- Program embedded systems at the hardware level
- Learn current industry practices in firmware development
- Develop practical knowledge of embedded hardware options
- Create tight integration between software and hardware
- Practice a work flow leading to successful outcomes
- Build from transistor level to the system level
- Make sound choices between performance and cost

Who This Book Is For

Embedded-system engineers and intermediate electronics enthusiasts who are seeking tighter integration between software and hardware. Those who favor the System on a Programmable Chip (SOPC) approach will in particular benefit from this book.

Students in both Electrical Engineering and Computer Science can also benefit from this book and the real-life industry practice it provides.

Provides information on creating a variety of gadgets and controllers using Arduino.

Linux® is being adopted by an increasing number of embedded systems developers, who have been won over by its sophisticated scheduling and networking, its cost-free license, its open development model, and the support offered by rich and powerful programming tools. While there is a great deal of hype surrounding the use of Linux in embedded systems, there is not a lot of practical information. Building Embedded Linux Systems is the first in-depth, hard-core guide to putting together an embedded system based on the Linux kernel. This indispensable book features arcane and previously undocumented procedures for:

- Building your own GNU development toolchain
- Using an efficient embedded development framework
- Selecting, configuring, building, and installing a target-specific kernel
- Creating a complete target root filesystem
- Setting up, manipulating, and using solid-state storage devices
- Installing and configuring a bootloader for the target
- Cross-compiling a slew of utilities and packages
- Debugging your embedded system using a plethora of tools and techniques

Details are provided for various target architectures and

hardware configurations, including a thorough review of Linux's support for embedded hardware. All explanations rely on the use of open source and free software packages. By presenting how to build the operating system components from pristine sources and how to find more documentation or help, this book greatly simplifies the task of keeping complete control over one's embedded operating system, whether it be for technical or sound financial reasons. Author Karim Yaghmour, a well-known designer and speaker who is responsible for the Linux Trace Toolkit, starts by discussing the strengths and weaknesses of Linux as an embedded operating system. Licensing issues are included, followed by a discussion of the basics of building embedded Linux systems. The configuration, setup, and use of over forty different open source and free software packages commonly used in embedded Linux systems are also covered. uClibc, BusyBox, U-Boot, OpenSSH, tftpd, tftp, strace, and gdb are among the packages discussed.

New generations of IT users are increasingly abstracted from the underlying devices and platforms that provide and safeguard their services. As a result they may have little awareness that they are critically dependent on the embedded security devices that are becoming pervasive in daily modern life. *Secure Smart Embedded Devices, Platforms and Applications* provides a broad overview of the many security and practical issues of embedded devices, tokens, and their operation systems, platforms and main applications. It also addresses a diverse range of industry/government initiatives and considerations,

while focusing strongly on technical and practical security issues. The benefits and pitfalls of developing and deploying applications that rely on embedded systems and their security functionality are presented. A sufficient level of technical detail to support embedded systems is provided throughout the text, although the book is quite readable for those seeking awareness through an initial overview of the topics. This edited volume benefits from the contributions of industry and academic experts and helps provide a cross-discipline overview of the security and practical issues for embedded systems, tokens, and platforms. It is an ideal complement to the earlier work, *Smart Cards Tokens, Security and Applications* from the same editors.

Eager to develop embedded systems? These systems don't tolerate inefficiency, so you may need a more disciplined approach to programming. This easy-to-read book helps you cultivate a host of good development practices, based on classic software design patterns as well as new patterns unique to embedded programming. You not only learn system architecture, but also specific techniques for dealing with system constraints and manufacturing requirements. Written by an expert who's created embedded systems ranging from urban surveillance and DNA scanners to children's toys, *Making Embedded Systems* is ideal for intermediate and experienced programmers, no matter what platform you use. Develop an architecture that makes your software robust and maintainable Understand how to make your code smaller, your processor seem faster, and your system use less power Learn how to explore sensors,

motors, communications, and other I/O devices Explore tasks that are complicated on embedded systems, such as updating the software and using fixed point math to implement complex algorithms

Kubernetes radically changes the way applications are built and deployed in the cloud. Since its introduction in 2014, this container orchestrator has become one of the largest and most popular open source projects in the world. The updated edition of this practical book shows developers and ops personnel how Kubernetes and container technology can help you achieve new levels of velocity, agility, reliability, and efficiency. Kelsey Hightower, Brendan Burns, and Joe Beda—who've worked on Kubernetes at Google and beyond—explain how this system fits into the lifecycle of a distributed application. You'll learn how to use tools and APIs to automate scalable distributed systems, whether it's for online services, machine learning applications, or a cluster of Raspberry Pi computers. Create a simple cluster to learn how Kubernetes works Dive into the details of deploying an application using Kubernetes Learn specialized objects in Kubernetes, such as DaemonSets, jobs, ConfigMaps, and secrets Explore deployments that tie together the lifecycle of a complete application Get practical examples of how to develop and deploy real-world applications in Kubernetes Provides information on designing easy-to-use interfaces.

As the embedded world expands, developers must have a strong grasp of many complex topics in order to make faster, more efficient and more powerful microprocessors

to meet the public's growing demand. Embedded Software: The Works covers all the key subjects embedded engineers need to understand in order to succeed, including Design and Development, Programming, Languages including C/C++, and UML, Real Time Operating Systems Considerations, Networking, and much more. New material on Linux, Android, and multi-core gives engineers the up-to-date practical know-how they need in order to succeed. Colin Walls draws upon his experience and insights from working in the industry, and covers the complete cycle of embedded software development: its design, development, management, debugging procedures, licensing, and reuse. For those new to the field, or for experienced engineers looking to expand their skills, Walls provides the reader with detailed tips and techniques, and rigorous explanations of technologies. Key features include: New chapters on Linux, Android, and multi-core - the cutting edge of embedded software development! Introductory roadmap guides readers through the book, providing a route through the separate chapters and showing how they are linked About the Author Colin Walls has over twenty-five years experience in the electronics industry, largely dedicated to embedded software. A frequent presenter at conferences and seminars and author of numerous technical articles and two books on embedded software, he is a member of the marketing team of the Mentor Graphics Embedded Software Division. He writes a regular blog on the Mentor website (blogs.mentor.com/colinwalls). New chapters on Linux, Android, and multi-core - the cutting edge of

embedded software development! Introductory roadmap guides readers through the book, providing a route through the separate chapters and showing how they are linked

Thoroughly rewritten for today's web environment, this bestselling book offers a fresh look at a fundamental topic of web site development: navigation design. Amid all the changes to the Web in the past decade, and all the hype about Web 2.0 and various "rich" interactive technologies, the basic problems of creating a good web navigation system remain. Designing Web Navigation demonstrates that good navigation is not about technology-it's about the ways people find information, and how you guide them. Ideal for beginning to intermediate web designers, managers, other non-designers, and web development pros looking for another perspective, Designing Web Navigation offers basic design principles, development techniques and practical advice, with real-world examples and essential concepts seamlessly folded in. How does your web site serve your business objectives? How does it meet a user's needs? You'll learn that navigation design touches most other aspects of web site development. This book:

- Provides the foundations of web navigation and offers a framework for navigation design
- Paints a broad picture of web navigation and basic human information behavior
- Demonstrates how navigation reflects brand and affects site credibility
- Helps you understand the problem you're trying to solve before you set out to design
- Thoroughly reviews the mechanisms and different types of navigation
- Explores "information scent" and "information

shape" Explains "persuasive" architecture and other design concepts Covers special contexts, such as navigation design for web applications Includes an entire chapter on tagging While Designing Web Navigation focuses on creating navigation systems for large, information-rich sites serving a business purpose, the principles and techniques in the book also apply to small sites. Well researched and cited, this book serves as an excellent reference on the topic, as well as a superb teaching guide. Each chapter ends with suggested reading and a set of questions that offer exercises for experiencing the concepts in action.

Get complete instructions for manipulating, processing, cleaning, and crunching datasets in Python. Updated for Python 3.6, the second edition of this hands-on guide is packed with practical case studies that show you how to solve a broad set of data analysis problems effectively. You'll learn the latest versions of pandas, NumPy, IPython, and Jupyter in the process. Written by Wes McKinney, the creator of the Python pandas project, this book is a practical, modern introduction to data science tools in Python. It's ideal for analysts new to Python and for Python programmers new to data science and scientific computing. Data files and related material are available on GitHub. Use the IPython shell and Jupyter notebook for exploratory computing Learn basic and advanced features in NumPy (Numerical Python) Get started with data analysis tools in the pandas library Use flexible tools to load, clean, transform, merge, and reshape data Create informative visualizations with matplotlib Apply the pandas groupby facility to slice, dice,

and summarize datasets Analyze and manipulate regular and irregular time series data Learn how to solve real-world data analysis problems with thorough, detailed examples

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 Authored by two of the leading authorities in the field, this guide offers readers the knowledge and skills needed to achieve proficiency with embedded software. Interested in developing embedded systems? Since they

don't tolerate inefficiency, these systems require a disciplined approach to programming. This easy-to-read guide helps you cultivate a host of good development practices, based on classic software design patterns and new patterns unique to embedded programming. Learn how to build system architecture for processors, not operating systems, and discover specific techniques for dealing with hardware difficulties and manufacturing requirements. Written by an expert who's created embedded systems ranging from urban surveillance and DNA scanners to children's toys, this book is ideal for intermediate and experienced programmers, no matter what platform you use. Optimize your system to reduce cost and increase performance Develop an architecture that makes your software robust in resource-constrained environments Explore sensors, motors, and other I/O devices Do more with less: reduce RAM consumption, code space, processor cycles, and power consumption Learn how to update embedded code directly in the processor Discover how to implement complex mathematics on small processors Understand what interviewers look for when you apply for an embedded systems job "Making Embedded Systems is the book for a C programmer who wants to enter the fun (and lucrative) world of embedded systems. It's very well written—entertaining, even—and filled with clear illustrations." —Jack Ganssle, author and embedded system expert.

Networked thermostats, fitness monitors, and door locks show that the Internet of Things can (and will) enable new ways for people to interact with the world around

them. But designing connected products for consumers brings new challenges beyond conventional software UI and interaction design. This book provides experienced UX designers and technologists with a clear and practical roadmap for approaching consumer product strategy and design in this novel market. By drawing on the best of current design practice and academic research, *Designing Connected Products* delivers sound advice for working with cross-device interactions and the complex ecosystems inherent in IoT technology.

Embedded computer systems literally surround us: they're in our cell phones, PDAs, cars, TVs, refrigerators, heating systems, and more. In fact, embedded systems are one of the most rapidly growing segments of the computer industry today. Along with the growing list of devices for which embedded computer systems are appropriate, interest is growing among programmers, hobbyists, and engineers of all types in how to design and build devices of their own. Furthermore, the knowledge offered by this book into the fundamentals of these computer systems can benefit anyone who has to evaluate and apply the systems. The second edition of *Designing Embedded Hardware* has been updated to include information on the latest generation of processors and microcontrollers, including the new MAXQ processor. If you're new to this and don't know what a MAXQ is, don't worry--the book spells out the basics of embedded design for beginners while providing material useful for advanced systems designers. *Designing Embedded Hardware* steers a course between those books dedicated to writing code

for particular microprocessors, and those that stress the philosophy of embedded system design without providing any practical information. Having designed 40 embedded computer systems of his own, author John Catsoulis brings a wealth of real-world experience to show readers how to design and create entirely new embedded devices and computerized gadgets, as well as how to customize and extend off-the-shelf systems. Loaded with real examples, this book also provides a roadmap to the pitfalls and traps to avoid. Designing Embedded Hardware includes:

- The theory and practice of embedded systems
- Understanding schematics and data sheets
- Powering an embedded system
- Producing and debugging an embedded system
- Processors such as the PIC, Atmel AVR, and Motorola 68000-series
- Digital Signal Processing (DSP) architectures
- Protocols (SPI and I2C) used to add peripherals
- RS-232C, RS-422, infrared communication, and USB
- CAN and Ethernet networking
- Pulse Width Monitoring and motor control

If you want to build your own embedded system, or tweak an existing one, this invaluable book gives you the understanding and practical skills you need.

The way developers design, build, and run software has changed significantly with the evolution of microservices and containers. These modern architectures use new primitives that require a different set of practices than most developers, tech leads, and architects are accustomed to. With this focused guide, Bilgin Ibryam and Roland Huß from Red Hat provide common reusable elements, patterns, principles, and practices for

designing and implementing cloud-native applications on Kubernetes. Each pattern includes a description of the problem and a proposed solution with Kubernetes specifics. Many patterns are also backed by concrete code examples. This book is ideal for developers already familiar with basic Kubernetes concepts who want to learn common cloud native patterns. You'll learn about the following pattern categories: Foundational patterns cover the core principles and practices for building container-based cloud-native applications. Behavioral patterns explore finer-grained concepts for managing various types of container and platform interactions. Structural patterns help you organize containers within a pod, the atom of the Kubernetes platform. Configuration patterns provide insight into how application configurations can be handled in Kubernetes. Advanced patterns covers more advanced topics such as extending the platform with operators.

An introduction to embedding systems for C and C++++ programmers encompasses such topics as testing memory devices, writing and erasing Flash memory, verifying nonvolatile memory contents, and much more. Original. (Intermediate).

If you create, manage, operate, or configure systems running in the cloud, you're a cloud engineer--even if you work as a system administrator, software developer, data scientist, or site reliability engineer. With this book, professionals from around the world provide valuable insight into today's cloud engineering role. These concise articles explore the entire cloud computing experience, including fundamentals, architecture, and

migration. You'll delve into security and compliance, operations and reliability, and software development. And examine networking, organizational culture, and more. You're sure to find 1, 2, or 97 things that inspire you to dig deeper and expand your own career. "Three Keys to Making the Right Multicloud Decisions," Brendan O'Leary "Serverless Bad Practices," Manases Jesus Galindo Bello "Failing a Cloud Migration," Lee Atchison "Treat Your Cloud Environment as If It Were On Premises," Iyana Garry "What Is Toil, and Why Are SREs Obsessed with It?", Zachary Nickens "Lean QA: The QA Evolving in the DevOps World," Theresa Neate "How Economies of Scale Work in the Cloud," Jon Moore "The Cloud Is Not About the Cloud," Ken Corless "Data Gravity: The Importance of Data Management in the Cloud," Geoff Hughes "Even in the Cloud, the Network Is the Foundation," David Murray "Cloud Engineering Is About Culture, Not Containers," Holly Cummins

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