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REVIEW OF: William Webb. Introduction to the Wireless Local Loop. Boston, MA: Artech House Publishers, 1998.

by Kathleen Loomis

Wireless technology is becoming more and more prevalent across the business world and popular even in academic institutions. The problem for an administrator is how to understand and implement the technology with a minimum of difficulty.

This book begins with a good overview of the background of Wireless technology and the Wireless Local Loop (WLL) covering such topics as radio propagation and radio systems. An entire chapter is dedicated to a comparison of the benefits of two main types of access: TDMA (Time division multiple access) and CDMA (code division multiple access). This information is useful for determining the best type of access given local needs. Another section gives detailed information on implementation of the WLL system including applying for licensing. A case study illustrating the points covered in the book gives the reader a real-world example of the technology.

Written for someone who has little knowledge of this technology, William Webb's book is a good introduction to the workings of Wireless Local Loops and the implementation of them in business. The easy-to-understand language is useful to a beginner in the field. When technical terminology is used, the author defines each term. A glossary in the back of the book covers the acronyms and abbreviations used. Clear, concise illustrations are used to demonstrate key points in each chapter. A bibliography at the end of every section provides the reader with access to more detailed information about the topics covered. This book is recommended for people thinking of implementing wireless technology and looking for information on how it all works.

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REVIEW OF: Michael Barr. Programming Embedded Systems in C and C++. O'Reilly and Associates, 1999.

by Ray Olszewski

If you are accustomed to programming on desktop PCs and servers, as I am, venturing into the world of embedded systems is a trip into the demimonde of computer operations. Compared to our familiar home territory, embedded systems are raw processing engines, wrapped in none of the simplifying abstractions that make everyday applications programming a relatively easy, routine task.

For those of us new to venturing behind the curtain, Michael Barr is a welcome guide. His Programming Embedded Systems in C and C++ is a superb introduction to the basics of programming without a net, to working in an environment where you have to pay explicit attention to the details of the operation of interfaces, to the speed of context shifting, and to an assortment of details about your hardware.

To make his tour concrete, Barr focuses on a specific system: the Arcom Target188EB, a single-board computer based on the relatively ancient 80188 CPU. He has even arranged for purchasers of the book to get a discount on these boards in the form of a free development system. Although I was unable to take advantage of that option in reviewing this book--even with the discount, the cost of a system plus the Borland compiler Barr uses remained too high for me. Serious students of embedded systems programming will benefit from having that option.

For the rest of us--programmers interested in embedded systems work but not making a major commitment to it--the book still has a lot to offer. Barr is good at what he does, and equally good at explaining it. In this relatively short book, he goes quickly through the mechanics of developing for embedded platforms, discussing suitable compilers and development systems, the use of emulators and simulators, external debuggers, and memory options.

Much of the book is built around development of a simple operating system called ADEOS ("A Decent Embedded Operating System"). Intended as a teaching tool, not a commercial-grade embedded operating system, ADEOS provides a simple task manager and a scheduler that always gives the high-priority task exclusive access to the system. He touches on the additional demands imposed by real-time operating systems (roughly defined as systems for situations in which "a late answer is as bad as a wrong one" (page 119)), the use of timer-based interrupts to change task scheduling, mutexes as a technique for avoiding deadlock between processes that compete for the same system resource, and many other features that are essentials in any operating system that permits more than one task to be active at a time.

The actual code is a mix of C, C++, and x86 assembly language, with the C and C++ examples consistently presented and clearly explained. The assembler programs, typically omitted from the text (though available for download at an associated Web site), provide the abstract interfaces that shield the reader from the full details of the mechanisms used to flash LEDs, read to and write from serial and parallel ports, and the like.

Barr notes in the introduction that "... I know from my personal experience just how hard it can be to learn the craft [of embedded systems programming]. There aren't any embedded software courses in school, and I've never been able to find a decent book about the subject in any library." (page xi) But embedded systems are becoming more and more important, and programming them promises to be a growth industry in the coming years.

This book won't by itself turn you into a proficient embedded systems programmer. Reading it will give a programmer already proficient in C and C++ a good general understanding of how embedded systems work (and a great beginning on how operating systems work), and I expect that using it together with a Target188EB development system will give a programmer excellent hands-on experience in writing embedded software.

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REVIEW OF: Rudi Bekkers and Jan Smits. Mobile Telecommunications: Standards, Regulation, and Applications. Boston, MA: Artech House, 1999.

by James L. Van Roekel

Read practically any business or computer magazine and you'll find quite a bit of content and advertisements regarding mobile telecommunications. These issues are typically geared to both office-based and home-based users. Mobile computing, paging, email, and telephone services are becoming more prevalent and less expensive in price. In this book, Rudi Bekkers and Jan Smits offer a good explanation of where these technologies come from, how they are becoming increasingly standardized, and how to utilize these technologies.

Mobile Telecommunications was originally printed in the Netherlands. The 470+ page volume contains 15 chapters, suggested readings list, abbreviations, glossary, and index. Chapter One deals with the types of telecommunications, particularly telecommunications (in general and wireless), radio, and mobile communications while setting the pace for the remainder of the work. Chapter Two addresses mobile telecommunication "history," beginning with early radio communications and leading up to current developments in the U.S., Europe, and the Far East. From this, Chapter Three begins a discussion on policy by illustrating the need for regulation because of the fixed number of frequencies available and the fact that boundaries, physical or otherwise, do not limit access to said frequencies. By nature radio waves are an international commodity.

Chapters Four and Five are the "technical" chapters in this volume, describing the structure and techniques of radio systems ranging from system components to configurations and architecture to transducers and antenna multiplexing. Chapters Six through Twelve present divergent standards for cellular telephony, mobile radio, satellite, cordless, and paging telephonies, focusing primarily on personal technologies.

Chapter 13 describes policy development, the implementation of networks in Europe, and licensing in the European Union among the number of analog and Global System for Mobile Communications (GSM) providers.

I found the final two chapters and the glossary to be extremely useful. The chapters speak to the advent and use of integrated speech and data, electronic mail and fax, the mobile office, availability and security, all of which are of concerns to users and content providers. The glossary, too, is put together very well and is a nice quick reference for those interested in the issue of mobile telecommunication. It gives concise definitions in lay terms. These chapters are helpful for librarians who are finding themselves engaging in distance education learning and planning (as these technologies are sometimes used). This book is a helpful tool in defining concepts and terminology which in turn improves the communication between technical support and those implementers of a system.

Each chapter ends with a bibliography and the book itself includes an appendix of recommended reading. The recommended reading list is annotated and includes European references.

Mobile Telecommunications is an excellent reference for anyone wishing to gain a better understanding of how these technologies are and can be used. While this volume deals primarily with countries of the European Union, others (particularly the U.S.) are included as well. This is an important aspect as these technologies are global technologies by nature. Because of this, the authors' description of standards lends to practical thinking in the global village. Corporate and educational entities often host international teleconferencing for many reasons. These across-borders systems must be able to communicate with each other whether they be satellites, radio, cellular, or land-based. Thus, a thorough understanding of similar and divergent standards is necessary; this volume is up to the task and delivers well.

The information in Mobile Telecommunications can be utilized in thinking of mobile systems of any size from corporate mobile fleets to small mobile classrooms geared to bibliographic instruction.

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