Book Reviews

Andrew J. Viterbi

CDMA: Principles of Spread Spectrum Communication

Addison–Wesley, Reading, Massachusetts, 1995, pp. xix + 245., ISBN 0–201–63374–4

In this book, Andrew J. Viterbi presents the principles underlying spread spectrum communication. The goal of this book is not to describe in detail how the principles were applied. This is left to the practicing engineer to delve into details and correlate them with the principles presented here.

Spread spectrum communication technology has been used in military communications for over half a century, primarily for two purposes: to overcome the effects of strong intentional interference (jamming), and to hide the signal from the eavesdropper (covertness). Both goals can be achieved by spreading the signal's spectrum to make it virtually indistinguishable from background noise. Several texts, or portions of texts, on this subject have been published over the past twenty years. This book is the first to present spread spectrum technology specifically for commercial wireless applications.

The book consists of six chapters. The first chapter is a brief description of definitions and spread spectrum principles. It is shown that the "pseudonoise"spreading process is most easily implemented as a linear binary sequence generator followed by a linear filter. The necessary properties of the sequence generator and of the linear filter are developed in Chapter 2. It is equally important in realizing a spread spectrum system to implement a synchronization technique that allows the receiver to synchronize the random signal that it generates to the signal received from the transmitter. Techniques both for initially acquiring such synchronization and for tracking it through variations due to motion and random effects will be treated in Chapter 3. Demodulation techniques are treated in Chapter 4, and their further amelioration, through coding and interleaving, is dealt with in Chapter 5. These two chapters deal with digital modulation and coding systems that are more general than those employed in spread spectrum systems. In Chapter 6 the interference contribution of other-cell users and other-cell base stations are evaluated. These results, as well as those of Chapters 4 and 5 on modulation, coding, and power-control performance, are used to analyze cell coverage and the true system capacity measured in erlangs per hertz of bandwidth per cell, for both reverse and forward links. Techniques for improving performance, including handoff between cells, and the use of sectored and distributed antennas and interference cancellation are also covered in Chapter 6.

This book is an excellent treatment of digital communication theory, stressing the physical layer of multiple user, multiple cell, communication networks. Among the unconventional topics that are introduced, the foremost are: universal frequency and time occupancy, the role of power control in improving the efficiency of two-way systems, soft handoff among multiple nodes in a cellular network, the central role of low-rate forward error correction in enhancing terrestrial transmission and the increased network capacity through distributed adaptive processing. Although this book is strongly motivated by applications, it concentrates on principles rather than detailed methods. The book provides an understanding of the "why" of the implementation techniques of a CDMA system rather than of the details of "how". My opinion is that this book can serve as a step along the path of full exploitation of theoretical concepts by means of ever-improving implementation technologies.

On the whole, I recommend it to anyone interested in the theory and practice of spread spectrum communication.

Alen Bažant
Faculty of Electrical Engineering and Computing
University of Zagreb
Zagreb, Croatia

Anthony S. Acampora

An Introduction to Broadband Networks: LANs, MANs, ATM, B-ISDN, and Optical Networks for Integrated Multimedia Telecommunications

Plenum Press, New York, 1994, pp. xiv, 336, ISBN 0–306–44558–1

The last decade of this century has seen dramatic increases in switching and transmission capacity, accompanied by an increasing need to integrate communication services — including voice, data, video and multimedia — over the same telecommunication network. These trends have led to the development of asynchronous transfer mode (ATM), a new standard for the transport of all telecommunication services over a common network. ATM is embraced by the voice, data and multimedia communities, and, within the next few years, it is expected to be the dominant transport technology for all services in both the local and wide areas.

The book under review is 336 pages long and contains eight chapters, starting with an introductory chapter that presents the context surrounding the emergence of broadband networks. Chapter 2 contains a review of LANs (Aloha, CSMA, token ring and short-bus), including simple performance analysis of considered protocols. Various ATM switching structures are examined in Chapter 3. Several switch architectures are presented and compared, including the Banyan switch, the fully connected Knockout switch, the multistage Batcher–Banyan switch, the Tandem Banyan switch, and the Shared Memory switch. Chapter 4 describes DQDB and FDDI, including operating principles, protocols performance, offered services, and integration into the broadband network environment. Chapter 5 provides a review of ATM, the underlying technology for B-ISDN, including cell formats, virtual circuit and virtual path routing, the adaptation layer, signaling, control, and ATM LAN.

Chapter 6 covers the principles of traffic control and performance management. The chapter starts with admission control and then describes window flow control and its limitations, rate-based control, priority control and self-learning strategies. Chapter 7 presents advanced concepts for all-optical ligthwave networks and includes direct and indirect coherent detection, WDM, optical devices and broadcast-and-select lightwave packet networks. Because the author (director of the Center for Telecommunications Research and professor at Columbia University) invented the concept of multihop networks, a significant and the most interesting part of the chapter is devoted to multihop networks. Chapter 8 briefly introduces some possible applications such as briefly videoconferencing, transfer of medical images, video-on-demand, etc.

This is an excellent introductory book for the readers who are interested in acquiring more knowledge on high-speed networking today. However, the chapters in this book are very brief and the readers interested in details have to refer to previously published papers. In summary, I highly recommend this book, either as a reference or as textbook for practice engineers as well as undergraduate students.

Mladen Kos
Faculty of Electrical Engineering and Computing
University of Zagreb
Zagreb, Croatia

Gerald L. Hopkins

The ISDN Literacy Book

Addison–Wesley Publishing Company, Inc., Reading, Massachusetts, 1995, pp. xvi, 367, ISBN 0–201–62979–8

Gerald L. Hopkins, the author of this book, is extensively involved in developement and promo-

tion of interoperable Integrated Services Digital Network (ISDN). He is the co-founder of the North American ISDN User's Forum (NIUF), the organization which provides a way for end-users to help fashion a powerful ISDN. During his 25 years of work with Bell Atlantic, he has been active in defining ISDN standards, planning network architecture, digital overlay networks and metropolitan trunks, selling voice and data telecommunications systems directly to end-users, managing the selection and use of equipment to provide special services, and engineering solutions to problems in an outside plant environment.

In my opinion, this book is equally suitable for both the beginners as well as readers with some experience in telecommunications, to become sufficiently "ISDN literate" to participate in a discussion on ISDN when the topic arises.

ISDN is a forward-looking telecommunication network that accomodates both the present and near-future information transfer needs. The goal of ISDN is to have one common network to transfer all possible types of information (text, music, images, video, fax, etc.). This book offers a broad, even treatment of the perspectives necessary to understand ISDN. It includes a technical overview, an evolutionary view, and it discusses related legal and regulatory issues. The author discusses the importance of this technology, and how it will affect the future of telecommunications.

In this book, ISDN is introduced in the context of these real-world considerations and requirements. In addition to defining and surveying key aspects of ISDN, it is explored how ISDN fits into the world, an why it is worthwhile. After reading it, one will be better equipped to read more technical literature concerning ISDN. The book also provides an additional perspective on ISDN for readers interested in social, political, or economical view of American society.

Starting the book by defining ISDN — what it is — the author ends by describing what it might become. In between, he explores how ISDN can work for us — now and in the near future. Attempting to provide a unifying view of ISDN, he tries to explain how its different pieces fit together. Various uses of ISDN are explored, generally from the perspective of end-user applications and benefits, and potential pitfalls of ISDN are discussed in order to help the user avoid any potholes in the on-ramp to the Information Highway. Finally, the author reviews current work for future ISDN and speculates on its applications.

The book is organized for reading front to back. Each chapter builds on the previous chapters, and each of them includes enough supporting material, so if one reads the chapters out of their sequence, they will stand alone. Therefore it is possible to read this book through, without unduly struggling with the content.

Miroslav Bijele
HPT — Croatian Post and Telecommunications
Zagreb, Croatia

Peter Thomas, Ray Weedon

Object-Oriented Programming in Eiffel

Addison–Wesley Publishing Company, Wokingham, England, 1995, pp. xvii, 518, ISBN 0–201–59387–4.

Eiffel is a programming language specifically designed to support the object-oriented paradigm. The main idea behind developing Eiffel was not only to design a new programming language, but also to introduce new programming principles and methodology, which will enable the construction of correct software through the use of the object-oriented paradigm. The authors of the book *Object-Oriented Programming in Eiffel* recognised well this idea. The book provides a language reference to Eiffel, as well as background material to object-oriented programming and principles for writing correct software.

The book consists of seventeen chapters, two appendices, a solution to exercises, and an index. Meaningful examples and exercises are included within the body of the chapters, which helps the reader to test his/her understanding of the material. *Solution to Exercises*, at the end of the book, provides the solutions to the most of the exercises. Each chapter ends with a

practical work entailing the skills learned in the chapter, and a well-written summary.

Chapter 1 is an introductory chapter, where the basic principles of the object-oriented paradigm are given. The concept of *programming by contract*, a powerful programming technique introduced by Eiffel that enforces the construction of correct software by imposing pre and post-conditions in using a class, is shortly discussed, too. Chapter 2, titled *Beginning Eiffel*, gives a quick overview of Eiffel programming. In spite of the fact that it is better to learn the theory before beginning to use a language, the chapter is very useful for gaining a global view of Eiffel capabilities.

One approach for writing a specification of what a software is supposed to do, the specification being independent of any particular programming language, uses abstract data types (ADT). Eiffel has been especially designed to allow a very natural translation of ADTs to classes, one of the main structural components of the object-oriented approach. The theory of ADTs, along with their class representations, are given in Chapters 3 and 4, respectively, while the benefits of data hiding are discussed in Chapter 4. The topic of ADT is tackled once again in Chapter 8, where the various approaches for defining their semantics are described.

Chapters 5 to 7 deal with writing the fundamental programming constructs — sequences, conditionals and loops (Chapter 5), using existing storage structures, such as arrays, queues and lists (Chapter 6), as well as expressions and calling routines (Chapter 7).

Chapters 9 to 15 cover one of the most important features of object-oriented paradigm, the building of new data types. Chapters 9 and 10 discuss building of new classes by using a client-supplier relationship. Special attention is given to the issue of correctness, by discussing the idea of programming by contract in detail. This includes the question of what to do when the contract is broken, which is the subject of Chapter 14 introducing the reader to Eiffel's exception mechanism. Chapters 11 and 12 deal with the building of new classes using inheritance, the powerful mechanism for enabling software components reuse. The inheritance mechanism involves polymorphism and dynamic binding, both of which are covered in Chapter 13. Chapter 15 gives the comparison of two methods used for building new classes: composition (client-supplier relationship) and inheritance. Chapter 16 gives an overview of Eiffel facilities omitted in previous chapters. Since the main goal of Eiffel is software components reuse, attention is given to a description of the Eiffel class libraries. Finally, Chapter 17 provides a case study in which the majority of Eiffel constructs are exploited.

The two appendices provide the full Eiffel syntax (Appendix A), and the solution for including special characters within manifest strings (Appendix B), respectively.

In spite of the fact that Eiffel cannot become as widely used as C++, the latter being already established as the *de facto* standard for object-oriented programming, some of the principles for constructing correct object-oriented software (e.g. programming by contract), that are introduced by Eiffel, should be also used in designing other object-oriented systems. This is the reason why learning Eiffel doesn't necessarily restrict to programming language specialists. Thus the book *Object-Oriented Programming in Eiffel*, while being most useful for writers of Eiffel programs, can also be recommended to students of programming as well as professional programmers.

Zoran Đukić
Ruđer Bošković Institute
Zagreb, Croatia

Ian Graham

Migrating to Object Technology

Addison–Wesley Publishing Company, Reading, Massachusetts, 1995, pp. xxiii, 552, ISBN 0–201–59389–0

Object technology is nowadays present as the only logical solution in the software arena, since it has become obvious that building a modern application simply cannot be efficiently accomplished with conventional technology. Migrating from legacy environments especially in commercial organizations is not so simple,

whereas the strategy of development must protect existing investments but also include comprehensive methods for object-oriented analysis, design and development.

The author of the book *Migrating to Object Technology* is an internationally recognised authority in the field of object technology, with a wide experience of a practioner in information technology, working for Swiss Bank. The book acts as the second volume of *Object-Oriented Methods* by the same author, actually creating two books in one: a book on migration strategy and a complete exposition of the SOMA (Semantic Object Modelling Approach) method.

The first part of the book covers the important issue of interoperability between conventional and object-oriented systems. All aspects of object technology with possible methods and reasons for moving toward object-oriented systems from the old conventional legacy ones are discussed in the first chapters of the book. In a tutorial-like way the author describes what object technology really means, not only in an academic theoretical form, but also giving very concrete examples from real life. All the important keywords are discussed and explained (objects, identity, encapsulation, messages, inheritance, polymorphism) with an approach to expert and fuzzy systems and human-computer interaction. Practical problems with migration to object technology are discussed with the emphasis on reusing of existing software, combining relational and object-oriented databases, and building object wrappers as the interface to conventional applications. Client/server computing, collaborative work and distributed systems are also covered with an estimation of different approaches and evaluation of presently available commercial products.

In the second part of the book the author gives a comprehensive and detailed exposition of SOMA — a complete object oriented analysis, design and management method, covering all stages of the system development life cycle and organized mainly according to the OMG (Object Management Group) reference model, although with more issues, notably coordination and reuse. It also covers object modeling (with fuzzy extensions), enterprise modeling, business process re-engineering, analysis and design, human-computer interaction design principles, GUI (Graphical User Interface) construction, coordination and reuse, object management and distribution. Metrics, estimation and testing as general issues are covered with a discussion of testing for object-oriented systems.

The book is written very fluently, providing much useful advice to developers who are currently involved in this field, but also to novices adopting the new technology. All chapters are covered with recommended additional readings from relevant authorities in this field. A useful free Windows based software tool SOMATiK is also included. It is not only a demonstrator of the method, but it also allows readers to create, build and maintain their own object models. Several CASE studies that help to understand the method, are presented as well.

The book *Migrating to Object Technology* is intended for IT professionals, software engineers but also for managers and projects planners. It is my opinion, that the reader can easily apply the knowledge acquired from it to his/her own projects, regardless of the specific tool that has been used to accomplish an efficient and fast result.

Željko Giljanović
MULTILINK
Rijeka, Croatia

Keneth J. Turner, Ed.

Using Formal Description Techniques. An Introduction to Estelle, Lotos and SDL

John Wiley & Sons, Chichester, 1993, pp. xxviii, 431, ISBN 0–471–93455–0

The incentive for standardised FDTs (Formal Description Techniques) developments was the growing awareness that only formal approaches to system (complex systems, especially) specification, verification, analysis, implementation, testing and operation could provide the best means to control the ever-growing complexity of standards for telecommunications and Open System Interconnection (OSI). One of the major problems, reflected in this book and strongly

marked in the development of FDTs, is the vast complexity of the systems in the application area involved.

However, an FDT can strongly assist in elucidating and controlling complexity. In this respect it acts like a mirror, showing the quality of system design, its structural grace and functional consistency. But an FDT also shows structural poverty and functional deficiency. Indeed, it is a mirror without mercy, forcing the designer to consider the system in all its aspects. At first you may find this cumbersome and tedious, but later on you will realise that it enables you to control every facet of the system. It allows you to structure a system strongly and to fill in all its functional features and details gradually, including those that are much too easily forgotten in informal approaches and are the primary source of incompatibility and errors.

While increasing their experience with FDTs, the readers will find that they start using general purpose approaches to structuring systems, and general purpose modules (building bricks) to specify system functions. They will come to the position to develop an intimate understanding of how to bind FDT concepts and constructs to the concepts and constructs of the application area. This will become part of the FDT heritage in the field of application — what is usually referred to as the architectural semantics of FDTs. Achievement of this understanding has been the objective in the preparation of various useful examples in this excellent book. It will help the users to move much more easily between specifications once they have grown to share these general-purpose approaches. They are also strongly encouraged to use the idea behind this in their own field of application. After all, the quality of a formal description is more dependent on the competence of the user than on the syntax and semantics of the FDT. Of course, the FDT itself has to be well designed, but it remains only a tool in the hands of the user whose experience, creativity and skills determine the end results of its application.

Part I of the book contains introductions to the general context of FDTs and to each FDT in particular. Chapter 1 explains why FDTs have been developed, their origins and their use. Chapters 2, 3 and 4 give an introduction to ESTELLE, LOTOS and SDL respectively.

Part II illustrates each of the FDTs on a graded series of examples, starting with a simple communications service and working up to a large communications protocol. Chapter 5 specifies the Daemon Game, a simple game of chance for multiple players. Chapter 6 specifies an Unreliable Medium, a basic communications service that does not guarantee correct delivery of messages. Chapter 7 specifies a Sliding Window Protocol that can safely transfer massages over an unreliable medium in a flow-controlled manner. Chapter 9 specifies the Abracadabra Protocol that implements the Abracadabra Service over an unreliable medium.

Part III deals with development methods and tools for each of the FDTs. Chapters 10, 11, and 12 deal with development using ESTELLE, LOTOS and SDL respectively.

Part IV contains reference material for the rest of the book. Appendix A lists references and gives other sources of information on FDTs. Appendix B is an index to the main components of each example specification. Appendix C is the main index.

As we can see, this book will be of interest to various groups of people:

- those who wish to learn how to use the standardised FDTs: ESTELLE, LOTOS and SDL;
- those who wish to learn about formal methods and languages in general by studying the standardised ones;
- those already familiar with another formal language and method, who wish to compare the approaches taken by the standardised FDTs;
- those already familiar with the standardised FDTs, who wish to use them for specifying data communications and distributed systems.

For the complete beginner, the book offers substantial introductory material on formal methods and the three described FDTs. This is complemented by guidance on how to develop specifications and implementations using them. The treatment of FDTs is deliberately non-mathematical to make the book accessible to a wide readership.

The book is copiously illustrated with examples since it is believed that a great deal can be learned from the work of experienced specifiers. The examples can be used to study one FDT or to compare the approaches taken by different

FDTs. Altough the examples mainly deal with data communications, they illustrate important principles that work in many other application areas. The examples have been provided for readers with little knowledge on data communications.

The book is suitable for self-study, too. It would also be appropriate as a textbook for a particular course on formal methods and languages. The examples in particular would be a useful source of material for laboratory exercises and projects.

On the whole, this is a book which I enjoyed very much and I highly value having it on my shelf. I recommend it to anyone interested in the theory and practice of formal approaches to system specification, verification, analysis, implementation, testing and operation.

Marijan Kunštić
Faculty of Electrical Engineering and Computing
University of Zagreb
Zagreb, Croatia

Joseph S. Park

AS/400 Security in a Client/Server Environment

John Wiley & Sons, Inc., 1995, pp. xiii, 290, ISBN 0–471–11683–1

This book is dedicated to AS/400 security, but it also discusses design, organisation and architecture of the most popular business computer on the market, the AS/400. It is recommendable for all the people who would like to secure their own systems, especially in a client/server environment. It is also useful for managers, because without their participation no security policy will ever succeed. The main goal of the book is to give security guidelines based on theories and procedures which consider the disemination of information.

The book has three main parts: management, implementation and auditing of security procedures with an appendix of sample programs. A diskette containg security auditing and antivirus programs that clean up AS/400 bugs and viruses is also included.

The first part, *Management*, is addressed to complete a picture of AS/400 security, from traditional resource authorisation models to today's client/server environments. One of the most distinctive aspects of the AS/400 is that it utilizes an "object"approach in its operating system design rather than the "file" one. The book describes reliability and consistency of AS/400 operations regarding the fact that an object to be executed by CPU must have some predetermined attributes, which are assigned during its creation. Hardware and software settings that control security within OS/400 are also given. Management issues of various options and techniques that can be used to form security policy are also presented, while some specific technical apects are given in the second part. Security management on an AS/400 network is broken into five areas: physical security, assigments of resource authorities connected with communication objects, validation of communicating entities, confirmation of communication conversation-specific validation and establishment of function security based on user profiles. Security exposures created by object alternations which may make corporate and private assets vulnerable are also given.

The second part, *Implementation*, presents details of security measures and reasons for recommendations. That part of the book is addressed to those who are responsible for security implementation. It tells how to use the tools provided in the Appendix. This is a reference guide for the AS/400 security administrator. Main targets of this part are: realisation of physical security, tuning of system values, designing of user profiles, implementing object authority and running backup and recovery procedures. Physical security has been realised through the use of internal thelephone switching system, browsing digital information transmitted on telephone line and by the use of encryption devices. The system values are reviewed and their adjustement during the instalation of new applications or communication networks are recomended. During the phase of designing the user profile, special attention has been given to the definition of work groups, application groups, group

profiles and user profiles in a client/server environment. Backup and recovery procedures are presented as data processing operations which include saving and recovering security data and restoring objects and programs.

In the third part of this book, *Auditing*, readers are instructed how to spotlight weaknesses in security or detect intrusions if the recommended security has been implemented. It also gives the control mechanisms which they may have on their own AS/400 systems. The existence and creation of viruses, worms and Trojan horses are discussed along with prevention methods for decreasing the chance of infection. To have an overall review of security, the reader is advised to maintain security audit journals, resource accounting journals and graphs. Serious attention is given to auditing of user profiles which includes reports of system values, indefinite password duration, invalid sign-on attempts, system and user profile with all passwords and privileged users with unlimited access. Since system security audit journals are not automatically created and initiated, procedures for creating necessary objects and the scope of security data are presented. This is done by using two objects: a journal and a journal receiver. The effectiveness of system security is provided by the use of system audit journals which review authority failures, changes to distribution directories, adoption of authorities, program failures, saving and restoration of objects and the use of system service tools by unauthorized individuals.

In the Appendix and on the included diskette some utility programs for reference purposes are given. It is the user responsibility to ensure the accuracy and usefulness of those programs. They can be used to configure system values to their recommended values, to remove the specified journal receivers that are not currently attached to their respective journals, to validate user password, to print security journals, to print profile management etc.

Besides some theorethical aspects the book is of great practical importance for people who are responsible for implementing and maintaining security policy in an AS/400 client/server environment. It will help a lot system programmers, operations managers and security officiers. That is, it should not be considered as a course study in security, but as a good reference guide for the phase of implementing new applications or communication networks with AS/400 systems.

Nikola Hadjina
Zagreb Clinical Hospital
University of Zagreb
Zagreb, Croatia

J. Preece, Y. Rogers, H. Sharp, D. Benyon, S. Holland, T. Carey Eds.

Human-Computer Interaction

Addison–Wesley Publishing Company, Wokingham, England, 1994, pp. xxxviii, 773, ISBN 0–201–62769–8

To agree with Ken Eason, the foreword author, "Human-Computer Interaction (HCI) . . . is one of the most rapidly developing subjects in computer science on both sides of the Atlantic; what was a fascinating research subject is now recognized as a vital component of successful computer applications". Computers which once were only a province of the specialist are now a mass consumer product, resulting in an average user who is not supposed to understand the system any more, but on the contrary, expects a system designed so to accomodate to him. The book *Human-Computer Interaction* aims to offer a comprehensive introduction into this new and exciting interdisciplinary area interweaving computer science, psychology, ergonomics, linguistics, artificial intelligence, human sciences, as well as engineering and design. It is primarily a textbook intended for students in both undergraduate and graduate courses in computer science, psychology and social sciences. The book is based on a series of successful distant learning courses developed jointly for British and Dutch Open Universities by a group of experts in both HCI and in preparation of teaching materials. As such, it shows an elaborate and scrupolously implemented structure, a careful and well chosen selection of topics, and a superb graphical layout. All in all, it is an impressive book both for its subject covering, accuracy and methodology used, and for its sheer bulk (about 800 pages of text), at the same time never losing the inherent fluent exposition of subject matter.

Just to put it plain at the very beginning of the review, this book should be taken as a model for writing a textbook.

Human-Computer Interaction is structured into 6 parts, totaling 34 chapters, and includes a glossary, solutions to questions, an exhaustive list of references and a thoroughly compiled index. Every one of the parts firstly introduces the pertaining chapter group with a short overview, the chapters' structure starting with a list of aims and objectives to be developed and concluding with a list of key points explained within it. Exercises and questions are interspersed within the text, together with special boxes with additional material as e.g. anecdotal and historical observations. The chapters are supplemented with a lot of further reading suggestions. As it is observed in the introductory notes, "students are fascinated by the leaders of a field. They want to know what they do; what they look like; what kind of people they are and why are they so successful and well known"; thus, interviews with some of the most influential researchers in HCI are also included in the book.

Part I (2 chapters) gives the introductory definitions of HCI and its components. Contrary to the concept of the user interface, also denoted as the Man-Machine Interface (MMI), which encompasses "those aspects of the system that the user comes in contact with [and means] an input language for the user, and output language for the machine, and a protocol for interaction", HCI addresses a much broader domain and is defined as "a set of processes, dialogues, and actions through which a human user employs and interacts with a computer"; it is "a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with study of major phenomena surrounding them."

The following two parts consider the human and technological aspects of HCI. Part II: *Humans and Technology: Humans* (8 chapters) addresses the cognitive and organizatorial framework for HCI. Particular issues of the cognitive perspective which are discussed include perception and representation, attention and memory constraints, knowledge and mental models, interface metaphors and conceptual models, as well as learning in context. The last two chapters tackle social and organizational aspects. Part III: *Humans and Technology: Technology* (6 chapters) introduces a range of input and output devices and interaction styles, then considers more complex issues such as designing windowing systems, user support, and on-line information design of hypermedia training modules, concluding with topics on Computer Supported Collaborative Work (CSCW) and virtual reality systems.

The last three parts elaborate on the design process. As its title indicates, Part IV: *Interaction Design: Methods and Techniques* (6 chapters) delves on methodology for interaction design. After an overview of the principles and methods of system design seen from a user standpoint, special topics like requirements gathering and task analysis are worked out. This part ends with a chapter on formal methods in HCI design ("structured HCI design") and one on conceptualization and designing functionality ("envisioning design"). *Interaction Design: Support for Designers* (Part V, 6 chapters) is the second of the parts on interaction design, centering on a semiautomated approach. Guidelines encompassing applicable principles and rules are laid down, such as relevant standards and performance metrics, the design rationale itself, prototyping as the experimental tool used, and a review of available software support tools and environments. The concluding Part VI (*Interaction Design: Evaluation*, 6 chapters) is devoted to evaluation methodology. After elaborating on the role of evaluation, particular topics are closely examined: observing and monitoring, users' opinions, experiments and benchmarking, as well as interpretive and predictive evaluation, ending with a comparison of the methods.

The attentive Glossary comprehends more than 400 well explained terms, detailed Solutions to Questions with ample explications spread over nearly 20 pages, the References include an impressive count of 431 items, while the Index extends over 13 pages.

The book *Human-Computer Interaction* is designed as a textbook, with special attention paid to flexibility of use in different courses. Individual parts of the book, can be combined to suit particular course profiles. As a matter of fact, four possible curricula are proposed (two of them technology oriented, the other two human oriented), based on a distinct chapter selection. An accompanying Instructor's Guide is also announced, containing suggestions and

hints for teaching different topics in the book, to be separately ordered from the publisher. Aside the educational role, *Human-Computer Interaction* is a wonderful compendium, systematic and detailed, and is in my opinion an indispensible text for every user interface designer. I myself will be happy to recommend it to my colleagues and students.

Vlado Glavinić
Faculty of Electrical Engineering and Computing
University of Zagreb
Zagreb, Croatia

N. Caroline Daniels

Information Technology: The Management Challenge

Addison–Wesley Publishing Company, Wokingham, England, 1994, pp. xiv, 199, ISBN 0–201–63195–4

Information technology (IT) is a fundamental technology that enables survival and growth of enterprises in our highly competitive and complex world. Many companies have failed to understand the vital role of IT and faced serious difficulties on the market, while others used it to gain a competitive advantage. In order to effectively manage IT, managers have to understand its capabilities and apply them under specific circumstances of their business.

The book *Information Technology: The Management Challenge* aims to help managers to understand what IT is and how it can be successfully applied. The book provides a strategic view on the use of IT, discussing its potential as well as steps that have to be taken in planning, implementation and training with IT.

Chapter 1 of the book is devoted to IT and the global business environment. It discusses the challenge of IT and its global character that requests some major changes in a corporation and its management. It also suggests the necessity of proposing regional and national IT policies required in order to fully exploit the competitive advantages of IT. Chapter 2 provides a framework for thinking about business and IT, and of understanding that IT changes industry structure, creates competitive advantage for companies and creates whole new businesses for companies (like computerised reservation systems in airlines and hotel companies, or use of automatic teller machines in banking round the clock). Chapter 3 investigates the relations between IT and information systems, and discusses an information architecture that models and plans the flow of information throughout the business.

Chapter 4 discusses the use of IT for competitive advantage, and studies information flows and key events in business activities as well as cycles appearing in the business. Value of information is related to its timely, accurate and proper use in business that leads to improvement of customer service. This follows with a discussion of managing the development of IT strategy and analysing IT investment in Chapters 5 and 6. IT has to be related with business mission of the company, and vision has to be translated into action programmes. Stages in the use of IT are described, and managers that control IT spending are identified.

Chapter 7 deals with the impact of IT on the organisation. The knowledge organisation, modern type of organisation that appears in the information age, requires the ability to relate information flows with customers and suppliers, as well as with its own people working with it in the organisation. Functional orientation of business is altered to a process orientation where the whole organisation (instead of some of its functional parts) takes care about processes that spread throughout the organisation to the key goal to achieve high customer satisfaction. In Chapter 8 the problems related to implementation of IT strategy are discussed. For that purposes the new management roles are needed, and a program of planned change has to be defined as well as education and training for use of IT.

Chapter 9 discusses the role of a business manager in development, and especially in enabling the dialogue between the people who know the business and the people who understand the capabilities of IT. This also leads to the emerging of 'hybrid' managers, a new sort of managers who are able to understand both the business problems as well as technological capabilities.

Chapter 10 describes some major trends in the management of business IT, like improving management co-ordination and control over the business, making use of telecommunications built into information networks, integrating the centralising and decentralising forces of the business, managing IT portfolios, changing work designs and roles etc. Chapter 11 concludes the book with discussing management concerns for the future. In order to be able to influence the direction of their companies they have to understand the direction of changes that occur in the business, technology and organisation environment.

The book is very readable, written in plain language, and comes with a good graphic design. It is accompanied with nine brief but informative real-world cases and a dozen of management views, demonstrating key point in chapters. Each chapter ends with the action checklist that reviews major questions relevant about the business of the manager — reader of the book.

Vlatko Čerić
Faculty of Economics
University of Zagreb
Zagreb, Croatia