could be. While it supports the need for user-centred design and shows that after *one* day new users were as productive as trained existing users, much of this benefit seems to accrue simply from the use of a graphical user interface allowing WYSIWYG document display. No evidence is provided to support the view that it is the structure and design of the UI *per se* which had promoted productivity.

A further discomfort with the book is that Browne criticizes, quite rightly, design principles because they offer little in the way of real guidance to designers, but then he proceeds to present STUDIO's design principles which are more of the same sort of thing. This is followed by a section on user interface options which seems strangely at odds with the highly structured layout of the rest of the book (and methodology). In this section he considers haphazardly topics such as colour, windows, tailoring, undo/redo, response times, menus, etc. This is all useful advice but lacks a unifying user-centred framework consistent with the philosophy of the method.

Another concern is the misleadingly superficial treatment of research techniques such as Keystroke Level Modelling and Semantic Differential Scaling. Rather than risk inadvertent misuse of these techniques in unskilled hands it would be better to suggest that expertise in these research skills is sought.

Finally, the most serious limitation relates to the treatment of prototyping. Browne introduces the notion of throwaway versus evolvable prototypes but does not really give any arguments for the use of one over another. User involvement in evaluating 'prototypes' in earlier STUDIO stages appears generally to be restricted to paper screen designs and various diagrammatic notations. To be genuinely user centred, PC based prototypes should be used at all stages, even the initial concept stage, as a way of extracting user requirements and exploring new ways of working. Only through 'hands-on' experience of working prototypes can users contribute their ideas fully to the development process.

Despite its shortcomings this book's real value and significance is that it succeeds in putting User Interface Design firmly on the agenda as an important area of expertise in its own right. Moreover it reveals that systematic user-centred methods for analysis and design are now well developed and have been tried and tested in real development environments. The book is a thus a welcome addition to the literature and includes many good references, unusual for a 'proprietary' methodology. The material it contains will be particularly helpful for dedicated systems where a solid task analysis can be documented as user procedures. Whether it will be as useful for generic applications is less certain.

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JAN HARDENBERGH
Building Applications with PEXlib. Prentice Hall. 1994. ISBN 0 13 012535 0 £36.50 540pp. softbound.

PEX is, as you may or may not know, a set of 3D graphics extensions to the X system. This book sets out to teach the use of PEX and to act as a basic reference to the PEX system.

Along the way is built up the 3D art package named/em PEXDRAW (a 'canonical' PEXlib application, used to test PEX servers); there are therefore plenty of examples of use of the functions presented along with their definitions, which considerably helps those beginning to use PEX.

The documented calls most strongly featured are those which are actually used in /em PEXDRAW: the others are documented but are not presented in as much detail. Since these are mostly more advanced functions, the reduced information is not so much of a problem—when one has reached the point of using them, the PEXlib concepts should be much clearer.

The render pipeline is discussed in general first, followed by the various sections of PEX stages, in (roughly) the order one needs to know them to get PEX to work, in more detail. These sections are covered very well—there are some complex topics involved in PEX and they are described clearly enough that even a newcomer to computer graphics will find them easy to understand while not being 'dumbed down' enough to irritate those with more experience.

The book also forms a reasonably good introduction to three-dimensional graphics, even if this is not its primary purpose. It is not the only book you will need, but a book which concentrates on the implementation of graphics in practice makes a great companion to some of the more academic works.

The end of the book consists of various appendices, including a very handy 'PEX lexicon' which explains the terminology used in the rest of the book, a complete list of the PEX output commands and (possibly most important for a useful reference) a good, detailed, well laid out index.

The book is much more readable than many such works, and does form an ideal introduction—while not losing the ability to form a desktop reference guide after one has really got into the subject.

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JEFFREY S. ROSENSCHEIN & GILAD ZLOTKIN
Rules of Encounter. MIT Press. 1994. ISBN 0-262-18159-2 £31.50. 229pp. hardbound.

The information age is upon us. In the minds of many, the future is filled with intelligent agents making deals on our behalf, while we relax, drink in hand, in front of the video wall. However, in *Rules of Encounter*, the authors argue that the future will not necessarily be this rosy. It is

likely that large companies will start spending vast amounts of time and money on the development of software agents that lie, cheat and subvert the negotiating environment in an attempt to gain competitive advantage. However, if the negotiating protocols could be designed so that deception is provably useless, then energy would not be wasted on such Machiavellian strategies. Towards this end, Rosenschein and Zlotkin have attempted to produce a formal foundation for the design of such protocols, using the techniques of game theory.

The book starts by explaining the need for good negotiating protocols and, after describing the simplifying assumptions used, goes on to define three main domains of negotiation: task oriented, state oriented and worth oriented. Task oriented domains are when an agent has to complete a set of tasks that cannot be interfered with by another agent, but where another agent may help. An everyday example is driving children to school; parents may well cooperate by taking turns to drive all the children, reducing the number of journeys each parent has to make. State oriented domains include the possibility of interference; 'Blocks World' is an example of this domain. Worth oriented domains allow agents to choose their own goals, based on the perceived 'worth' of possible, future world states. The rest of the book is taken up with formal definitions, analyses and discussions of the various properties of these domains. The style is relatively clear, although somewhat dry.

With such noble aims, this book deserves to be praised. Unfortunately, this is not easily done. The aims are good, the analysis is fairly rigorous, but the underlying assumptions are greatly oversimplified. For instance, all discussions assume negotiation between exactly two agents that have no method of identification and that do not meet again. Also, all agents are assumed to make rational, utility maximizing decisions. At a stroke the authors sidestep the subtleties of the 'Iterated Prisoner's Dilemma' and ignore the possibilities of 'irrational' agents being used to destroy negotiations among competitors. If the assumptions are unacceptable, then the conclusions are of little use. However, this is always a criticism of new, formal foundations.

Having point out its weaknesses, it must be stated that this book is certainly not without merit, it contains many useful ideas and, most importantly, has the right approach to the problems of intelligent agents. Rosenschein and Zlotkin have made the first steps towards a formal framework for agent interaction, it is to be hoped that this work is developed. Although flawed, I would recommend that *Rules of Encounter* be read by anyone interested in this exciting new field.

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FREDERICK B. COHEN
It's Alive! John Wiley. 1994. ISBN 0 471 008605 £32.95, 153pp. softbound.

'*A fascinating journey through the world of new and emerging information life forms*'.

The blurb says it all, really. This book takes a focused look at artificial life in an engrossing way that makes it a cover-to-cover read. Starting with the earliest experiments with 'The Game of Life', we are given a guided tour of what has happened so far, by accident and intent, accompanied throughout by speculations about where this could lead to in the future.

Early on, Cohen makes the point that people take the wrong attitude when the term 'computer virus' is used and consequently he uses the more benevolent name 'living program'. With all the media hype surrounding the terrible nature of viruses, it is refreshing to read something positive and more far reaching that encompasses not just malicious viruses and their problems but also the good that can be achieved with self-replicating and changing programs.

While giving a practical view of the existence and uses of living programs, to the extent of including a disk containing safe example programs for the reader to experiment with, the book also tackles some of the deeper philosophical issues, such as the definition of life itself. What defines life, either physically or sentiently, is a timeless question and Cohen concisely presents some of the opposing theories in an approachable manner.

Aside from the occasional seemingly conceited remark on the part of the author—perhaps, after all, justified as he is one of the few experts in this area—the book reads fluidly and entertainingly. More of a coffee table book than a text book (another recent book by Cohen on viruses alone would be far more suitable for a course involving such study) but recommended reading for anyone interested in the subject. My only serious complaint about this book would be that it is overpriced. Even the inclusion of the floppy disk does not justify more than £30 for a book with only 150 pages.

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