can study the form of the words in the language directly, the decision is immediate, and we know, in advance, about the eventual existence of an $LL(k)$ grammar for this language.

We also note that $\mathscr{LL} \not\subseteq \mathscr{P}$ since $L = \{wcw^R : w \text{ in } \{a, b\}^*\}$ is not in $\mathscr{P}$, but L is in $\mathscr{LL}$.

We have seen that the family $\mathscr{P}$ contains languages like $\{a^n b^n\} \cup \{a^n b^{2n}\}$ which are not deterministic, i.e. not $LR(k)$ for any k. It would be interesting to find the conditions for determining if a power language is or is not deterministic.

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Book reviews

Design of Man-Computer Dialogues, by James Martin, 1973; 559 pages. (*Prentice-Hall*, £8·00)

This is an extremely well written, copiously illustrated, book which measures up to the high standard we have come to expect of Mr. Martin. While it is concerned to cover the whole field of Man-Computer Dialogues, it is basically a book with a simple message.

Within the next decade computers could, and should, become a commonplace tool for every class of person, and in every branch of industry and commerce. The overwhelming majority of these people will be technically non-sophisticated. The clearly enunciated message of this book is that unless systems designers match their systems to the talents of their users, then the extension of the use of computers will be significantly retarded. Thus, however technically brilliant a systems design may be, unless it takes into account, from its inception, the overall characteristics and psychology of its users, there is a high probability that it will be rejected by the users.

This may seem a somewhat exaggerated viewpoint. However, when one considers the considerable suspicion and hostility with which many people in this country view the use of computers, it becomes apparent that it is a viewpoint that systems designers will do well to heed. In the past the emphasis has been on fully exploiting expensive hardware, so that operating systems have been designed to maximise the throughput of the machine, rather than of the man-machine combination. Even with highly motivated and technically competent users, there are serious arguments against such a policy, particularly in view of the relative decline in hardware costs. With non-technical users a similar approach will be disastrous. In such an environment DP managers will need to stop worrying about maintaining CPU utilisation and concentrate on the morale and productivity of their users.

The book is divided into six sections. Introduction; A survey of alphanumeric display techniques; Interactive graphics and voice answer-back systems; Psychological considerations; Operators without training; Implementation problems. Each section consists of a number of chapters, with each chapter containing a limited number of references.

Currently, for a general user, interactive communication with a computer means an alphanumeric device. Until recently this meant a teletype, increasingly now it means a VDU. Thus for interactive work the bulk of experience is in this area. This is reflected in the book since the section on Alphanumeric displays comprises over 25% of the book.

Mr. Martin discusses the merits, or otherwise, of some 23 display techniques using alphanumeric devices, and uses many examples to hammer home his point concerning the need to enlist the confidence of the user by good systems design. For anyone concerned to implement a management information system, this section of the book is a mine of information.

The chapters on graphical interaction systems are fairly standard ones, although as ever Mr. Martin has good points to make. The chapter on voice answer-back systems is fascinating. It is mainly devoted to the Touchtone telephone as a computer peripheral. If mass use of computers is ever to take place then it will have to be via some such peripheral. The book reviews what has been achieved with prototype systems in the USA and is optimistic about the future. European readers unfamiliar with the efficiency of the American telephone network may be somewhat more sceptical.

The remaining sections on user psychology, the use of operators without training, and the problems of implementing systems to be used by non-technical personnel, are all well done with many valuable points to make.

Mr. Martin writes so lucidly that it seems unkind to criticise his book. However, it does have a weakness in that it is never quite clear who the book is intended for. There is something for everyone in it, but conversely it is an expensive book for an individual to buy, since only some sections will be directly applicable in any particular area. In this context the Class Problems at the end of the book seem redundant. Unless American students are much richer than their European counterparts it seems unlikely that many students will be able to buy it.

The book is well produced, with few typographical errors, the only clearly noticeable one being a failure to label the figure on page 443.

Overall this is a book that is well worth reading.

R. J. HYNDS (London)

Short notices

Complete Word-indexes to J. van den Vondel's *Bespiegelingen van Godt en Godtsdienst* and *Lucifer* P. K. King, 1973; 594 pages. (*Cambridge University Press*, £12·50)

This is a publication of the Literary and Linguistic Computing Centre at the University of Cambridge. As well as a normal word-index there are ranking lists of frequencies, reverse indexes and rhyming indexes of the 88299 words of these two texts. A line concordance is not given; it is explained that this alone would have taken over 1600 pages. The indexes were prepared on the TITAN computer at Cambridge.

Computer Mathematics, Series II. 1972; 334 pages. (*Cambridge Scientific Abstracts Inc., Maryland*, $29.95)

A collection of over 4,000 abstracts, covering papers in Numerical and symbolic analysis; Elementary algebra; Calculus; Difference, differential and integral equations; Abstract mathematics; Probability and statistics; Optimization and operations research; Communication theory; Control theory; Logic, switching theory and automata. There are also subject and author indexes. There is no indication of the source of the abstracts, internal evidence suggests they are those supplied by the authors of the papers. The selection seems to be limited to papers published *c.* 1970, although there is no indication of this nor of the intended completeness of the coverage. Items are well indexed and easy to find.