has similarities to the McCluskey version of Quine's method (McCluskey, 1962) but is more geared to general types of Boolean expressions. McCluskey's approach is more dependent on many similar Boolean expressions occurring in the set of Boolean expressions to be simplified. This allows drastic simplification to take place early on, but in the integer programming problems it was found that the type of Boolean expressions arising were not amenable to this treatment. Hence a completely systematic approach of the type described was necessary.

**References**


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# Book reviews

*FORTRAN IV in Chemistry*, by G. Beech, 1975; 303 pages. (*John Wiley*, £8·75)

Dr. Beech's book is a useful addition to the growing literature on the use of computers in undergraduate science courses. In his introductory chapter he states that users of the book should be familiar with FORTRAN IV and he makes no attempt to give the potted version of the language that wastes so much space in similar works. The reviewer agrees with his statement that many programs published in similar books are so simple that they would be better suited to a desk calculator. Dr. Beech's examples go significantly beyond this but he still limits them to the capacity of a relatively small computer and throughout implies the use of teletype display. There can be few institutions therefore, that could not benefit directly from the examples given, although sophisticates with access to large computers and to graphical display will be somewhat impatient with them. A good feature of the book is the full theoretical background given to all the examples cited.

The chapter on numerical methods gives an adequate survey of techniques such as simple statistics, solution of simultaneous equations, curve fitting, eigenvalue problems and numerical differentiation and integration, most of which are used in later chapters. A chapter follows in which are presented several introductory examples allied to a course in practical chemistry. These should find universal acceptance. The heart of the book is contained in chapters entitled 'Tutorial and dry-lab applications' and 'Theoretical chemistry' in which Dr. Beech and a colleague present seventeen useful programs, with attendant theory, covering topics such as lattice energies, spectrum deconvolution, transition metal spectra, Huckel molecular orbital calculations, etc. The reviewer has written his own version of several of these programs; if he had not he would use Dr. Beech's and save considerable time and effort. All must find some place in a modern chemistry course.

The penultimate chapter is the least satisfactory. In introducing the topic of data acquisition and processing, it is geared solely to the medium of paper tape. The author's justification for this is somewhat ingenious.

The book will be bought and read by those committed to the subject and they will be disappointed it did not go further. The uncommitted who, along with their students, would benefit most from the book, will not get past the title.

J. E. PARKIN (London)

*Graph Theory: An Algorithmic Approach*, by Nicos Christophides, 1975; 400 pages. (*Academic Press*, £12·50)

There are at least twenty textbooks on graph theory in print. What does a new one offer? Well, the subject is so large that no one book can deal with all of it, so we are treated to a new combination of topics. In this case they seem to have been chosen for their practical applicability. Most welcome are chapters on the location of medians and centres; suitably absent is discussion of enumeration and planarity.

There is an elegant departure from the overworked style of 'Theory-followed-by-applications'. Each new subject is introduced with an informal discussion which gives a hint of the likely applications. This is followed by a brief formal statement of the problem together with appropriate definitions. More detailed discussion of applications occurs only by way of examples.

The algorithms are expressed informally and they are described rather than defined. Proofs are given for some, examples of application for others. I like this method of explanation because it gets you to the core of the ideas quickly. There is detail enough to enable you to write an actual computer program, but not so much that the main theme is obscured.

Each chapter ends with a reasonable set of problems and a bibliography which is thorough but (mercifully) not exhaustive. The book is ideally suited to the engineer or computer scientist who is already solving problems of graph theory and seeks a deeper theoretical knowledge, a range of suggestions and an easy path into the literature. The pure mathematician would find it less satisfactory. Contents include: basic definitions, reachability, set covering, colouring, medians and centres, spanning trees, shortest paths, circuits (Euler graphs and Hamiltonians), network flows, matchings and assignment.

G. WYVILL (Bradford)

*Information Retrieval and the Computer*, by C. D. Price, 1977; 206 pages. (*MacDonald and Jane's Computer Monographs* No. 26; £5·95)

The author's lectures on document retrieval systems for courses at the University of Lancaster are here presented as a textbook. Though the courses were given to students of computer studies, only a basic knowledge of computer science is assumed so the book is also of potential interest as a text for courses in information science. The main sections of the text are The retrieval process, Documents and their classification, Indexes, Automatic classification, Abstracts and extracts and Automated document retrieval systems.

Once he has established his level of discourse, the author maintains it uniformly to the end. The text provides a general descriptive overview of the field, as seen by someone standing back from the active research fronts. The result is a balanced, readable survey supported by sensible judgements about the several issues still unresolved and by well chosen suggestions for further reading on topics which invite closer scrutiny.

In summing up the results of research on the document retrieval process, the author suggests that great effort has been expended on experimental work only 'to arrive at a surprisingly meagre set of firm conclusions' (page 196). He is right. But some are coming to the conclusion that the general validity of long standing basic concepts such as *relevance* and *precision* must now be questioned. Within the context of work on the well known text collections they may retain their accepted meaning but their application to read operating systems becomes more and more dubious. By the time that this text reaches its deserved second edition, I believe it will be this last section of the book which will demand most of the revision.

B. C. BROOKES (London)