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Book review

Switching and Finite Automata Theory (Computer Science Series). by Z. Kohavi, 1970; 592 pages. (*McGraw-Hill*, £7·90)

Some weeks of devoted work would be needed to give a fair review of this book, and many months to study it properly. For theoretically oriented Computer Scientists, Logic Designers or Control Engineers, the book must be a very valuable one, and one feels that it will probably be from such investigations that fundamental discoveries of value may well spring. It is hard to believe that it can rank as a text for either under- or postgraduate courses, in spite of the preface. One would have difficulty in incorporating more than a small fraction of the contents into such courses unless they were very specialised ones. For this reason it seems unnecessary to attempt to make the book free standing and some of the first two chapters dealing with binary arithmetic, codes, and sets and lattices, might well be assumed knowledge. Certainly some of these early sections are the least well written part of the book.

The second part of the book introduces Switching Functions, AND, OR and NOT operations, and Boolean Algebras. A neat and unified structure is exposed if in the rather refined terminology of set theory. The fourth chapter goes into considerable detail concerning algorithms for the minimisation of switching functions, and explains very clearly some of the techniques which have been developed. However, it is very much oriented towards hand manipulation which, Kohavi admits, become cumbersome for more than six variables. Though the Quine-McCluskey method is systematic enough for computer implementation, we are told on page 90, no explicit references to such work is given. The methods are further weakened when NAND and NOR logic is introduced in Chapter 5 and one is told that the methods prove less effective in this case. However, the discussion of NAND and NOR logic in this Chapter and of Threshold logic in Chapter 7 are very valuable, perhaps more than the network logic of Chapter 6. Part 2 ends with a useful chapter on design and testing of faults. I approve of the use of the word 'fault' in this context even though the word 'error' is used instead in the introductory Chapter 1.

Chapters 9 to 13 of Part 3 are devoted to applications of the techniques of Part 2 to sequential circuits and finite state machines. Again there is a wealth of information which most computer scientists will find is marred by the combination of terse theoretical vocabulary and hand based methods. Although the same may be said for Chapter 14, most will find here a valuable survey of memory and information loss and retention in finite machines which it is hard to find given so concisely elsewhere. Chapter 15 returns to an important subset of finite machines, those which are linear. The last chapter is a rather abstruse one concerned with the characterisation of finite state machines.

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