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# Book reviews

*Microarchitecture of Computer Systems*, edited by R. Hartenstein and R. Zaks, 1975; 293 pages. (*North-Holland*, US $24.95)

Thirty-eight quite interesting papers go to make up a set of proceedings which require a lot of work to read and digest. About half are about what are conventionally called microprocessors and how they are or can be used; the rest are mainly concerned with an interesting mix of software and hardware computer science, dealing with microprograms and methodologies for producing them. Methodologies is rather a horrid word but seems now to be 'in'. Principal preoccupations of the methodologists seem to be with the use of Petri Nets and similar techniques to expound and solve problems of synchronisation between parallel processes. In the minds of many of the writers there seem to be interesting ideas for using microprocessors and PROMs to do the routine work of operating systems and compilers.

The overall impression I have gained from this set of papers is that, all over Europe, there are groups of clever young men who are, at this stage, frustrated computer designers but who, as the price of LSI hardware falls, will develop a whole new range of computing machinery the like of which we have not seen. It is a challenging and exciting prospect but it makes me a little apprehensive for, in the whole set of papers there is not one from UK. I wonder if this is because most of this is really all 'old hat' with new feathers, or are we missing out on something that we should be looking at rather seriously?

Certainly this set of papers is worth reading by people who are interested in microprocessors and microprogramming as a part of computer science in its truest sense or who are interested in machines based on LSI technology.

B. S. WALKER (Reading)

*Introduction to Microcomputers and Microprocessors*, by A. Barna and D. I. Porat, 1976; 108 pages. (*John Wiley*, £5·95)

*Minicomputers and Microprocessors*, by M. Healey, 1976; 353 pages. (*Hodder and Stoughton*, hardback £9·50, paperback £6·25)

For books with somewhat similar titles it is not unreasonable to compare prices. The price per character (including embedded blanks) is 2·15 times greater for Barna and Porat's book; Healey's is actually 3·25 times cheaper in paperback. The former book is an introduction that is so sparse it amounts to an outline that must be used in a course or in conjunction with other books; it looks as if it is aimed at American High School 'bit bashers'. There is a useful list of abbreviations, the chapter headings are: Perspective, Basic Structure of Microcomputers & Micrprocessors, Basic Programming Techniques, I/O, Arithmetic Operations, Arithmetic & Logic Circuits, Main Memory, Control Unit, Additional Features. Each chapter has exercises with answers at the back and there is a good index but a poor bibliography.

Healey's book is about minis (not defined), is more detailed and practical, ranges widely to include peripherals, has a bibliography leading on to 47 other books (though there are no references to original publications) and has a rather cursory index—how does one find where ROMs, PROMs and EAROMs are described? The chapters are titled: Digital Computers & Their Applications, A Rudimentary Digital Computer, Further CPU Features, I/O,

Microprocessors, Peripheral Devices, Software, Advanced Features, Selecting a Computer System. There are substantial appendices too on Number and Logic Systems, I/C Technology and RAMs.

Neither book contains any elementary explanation of the solid state physics of the interior of the black boxes (or should one say, black chips, now?).

I. R. WILLIAMS (London)

*Microprocessors and Microcomputers* by Branko Souček, 1976; 607 pages. (*John Wiley and Sons*, £15·30)

This book illustrates just how difficult it is to write a worthwhile text on microprocessors! Microprocessors and microcomputers are in the main embryonic first generation computers implemented using modern LSI technology. Consequently, most books on the subject resort to a description of basic computer hardware, followed by a survey of machine language programming and conclude with a catalogue of currently available devices; Souček's book is no exception and follows this pattern precisely.

When microprocessors are used as a programmable replacement for random control logic, or assembled into microcomputers, there is little new one can say about them, except at the detailed technology and applications level. The real advantages of microprocessors lies in the fact that they can be used as building blocks to provide cheap processing power in sophisticated systems designs employing distributed and dedicated processing, array and parallel computing etc. A good text on computer systems architecture employing microprocessors is urgently required, but has yet to be written.

Souček's book starts from first principles with chapters on number systems and digital codes; logical operation, digital circuits and microchips; basic microcomputer instructions; programming microprocessors; and interfacing microprocessors. The remainder of the book, some eleven chapters, deals with actual microprocessor chips ranging from the Intel 8080 and Motorola M6800 through to the DEC LS11 and Intersil IMP 6100. In all cases the description of the devices is adapted from the relevant manufacturers' publications; no attempt is made to contrast different manufacturers' devices or to give guidance on how a device would be selected for a particular application.

The introductory chapters give an adequate description of computer principles but they suffer from a somewhat illogical and naive presentation. For instance, the important and rather basic functions of stack processing and microprogramming are not mentioned in the introductory chapters, but are used later when describing particular devices. Again, in Chapter 2, when discussing logic design gate minimisation is given as a basic criteria and outdated results are quoted for the state of the art in CAD. Similarly, in the chapter on programming the difference in complexity between assemblers and compilers is under emphasised.

All in all I could not recommend this book either to students or practising engineers who require to update themselves in microprocessor techniques. There could be an advantage in having an edited version of manufacturers data collected together in one volume, but the information will quickly go out of date. The impecunious student would do much better buying a good second hand text book on computer design and making his own collection of manufacturers' data!

D. LEWIN (Uxbridge)