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Book reviews

Computer Organization: Hardware/Software, by G. W. Gosline, 1980; 309 pages. (*Prentice-Hall*, £12·95)

The text has been designed as an introduction to digital computer organisation and computer structures without concerning itself with the associated topics of designing and building computers and is aimed at readers whose primary interest is software rather than hardware. The author considers the text to have two overall objectives: to allow students to acquire the organisational concepts of various extant computers, and to acquire an understanding of the effects that these organisations can have on overall computational system design, effectiveness, efficiency and economy.

The first chapter introduces some basic concepts including data types, addressing structures, registers and, interestingly, the PMS notation first developed by Bell and Newell as an attempt to formalise a descriptive notation of computer systems. In the author's opinion, an opinion with which I concur, PMS notation is accurate and terse enough to be of importance and interest. Unfortunately this notation has evinced scant interest since its postulation in 1971. This chapter is then followed by an important chapter on instruction variations and instruction repertoires, a sound knowledge of which is a prerequisite for a thorough understanding of computer organisation.

After a chapter in which control units are discussed and some basic microprogramming concepts introduced, the characteristics of random-access, serial-access, and direct-access memories are considered. This is followed by a chapter on interrupts and a consideration of various data path topologies.

Chapter 6 looks at the ways that may be used to increase CPU processing power by providing parallelism at the instruction level and below and includes pipelining, instruction lookahead and memory interleaving. In this context machines including the CDC STAR and 7600, CRAY1 and ILLIAC 1V are discussed. The final chapter discusses computer networks and looks at various network topologies classified under multidrop-line, loop, and hierarchical.

Since complete books and indeed series of volumes have been written on the material contained in the individual chapters of this book it has not been possible to cover exhaustively the material thus presented. Indeed the author has no pretensions of doing so. What he has done is to produce a well balanced introductory text for students who, ideally, will already have programming experience in both procedure level and assembly level languages and some knowledge of data structures and operating systems. It must also be reported that the author continues a welcome trend in books of this ilk; the inclusion at the end of each chapter of many stimulating and worthwhile problems, theoretical investigations and practical projects.

R. LOVETT (Addlestone)

Linear Algebra with Applications, Second Edition by Hugh G. Campbell, 1980; 330 pages. (*Prentice-Hall*, £11·65)

This book is the second edition of a book first published in 1971. It is aimed at an American audience of students 'enrolled in a conventional freshman-sophomore linear algebra course', but is well suited to the first year of a UK university course. In writing the book a special effort has been made to interweave the concrete with the abstract, and to present topics in a manner that will gently impose the necessary abstractions upon the student. Introductory chapters on matrices and vectors, and systems of linear equations are followed by a chapter (labelled 'optional') on linear programming. There follow three short chapters on the inverse matrix, determinants, and eigenvalues and eigenvectors of a matrix. Substantial chapters on vector spaces and linear transformations complete the book. Each chapter contains numerous and diverse examples, and also sections on 'applications', which reflect the fact that the book is also intended for nonspecialist students of mathematics. The tailpiece of each chapter reviews the 'new vocabulary' of that chapter and is rather irksome. That apart the book is well organised and produced and deserves the success which it has enjoyed over the past decade.

N. RILEY (Norwich)