BOOK REVIEWS

Introduction to microcomputer programming by Peter Sanderson. Published by Newnes Technical Books, Borough Green, Sevenoaks, Kent TN15 8PH, England, 1980, pp. 138, £. 3·75.

In the preface, the author mentions that 'this book is a simple introduction to programming for users of microcomputers, whether commercial users, domestic hobbyists or teachers' and he succeeds to a great extent in presenting the subject in an easy-to-comprehend style to these identified readers.

There are ten chapters in the book along with a glossary, an index and solutions to exercises. The first two chapters consider general aspects of computers in the context of programming; the next five chapters concentrate on the programming language Basic; the following two chapters are devoted to assembly language and machine language programming; the last chapter considers program development and testing.

The chapter on 'Introduction to computer programming' elucidates the principles of problem analysis, flowcharting and documentation. Many concepts have been introduced through examples and the subject-matter is well organised.

The chapter on 'Choosing a computer programming language' presents the concepts of low- and high-level language programming. The sections on high-level language programming deal with Basic, Cobol, Fortran, Pascal, Algol, PU/I and APL. The presentation tends to highlight the advantages and disadvantages of each language but is not comprehensive; not all the characteristics of a language and its implementations are considered in each case. Comprehension of subject-matter becomes difficult as the same set of attributes are not being considered for the seven languages presented in the text.

The chapters on Basic are presented in a lucid and elegant manner. Many examples have been introduced in the text to help the readers. The presentation starts with simple statements in Basic and advanced or specialised features are introduced subsequently. Each chapter on Basic (except Chapter 7) has exercises at the end to enable the reader to test his comprehension of the presented subject-matter.

The chapter on 'Variants of Basic' presents in detail the characteristics of 22 different packaged microcomputer systems which will be quite useful for a reader to make a choice based on his requirements.

The two chapters on the low-level language programming are based on the instruction sets of the four processor chips Intel 8080, Motorola 6800, MCS 6502 and Zilog Z-80. Though the author has tried to present the subject-matter in a systematic style starting

from fundamentals to advanced facilities available in each one of the languages, presentation is too concise to be of use to the reader. In addition, the presentation of the subject-matter resembles that of a manual making it difficult to comprehend. The principles of loops, arrays and subroutines could have been introduced much earlier in the text. It would have been more convenient to the reader if the chapter has been organised in four sections, one for each processor.

The chapter on 'Program development and testing' presents the various stages involved in coding a program and testing it on a computer. Many typical errors in programs are indicated to help the user to guard against them. Some illustrative examples would have been helpful.

The three-page Glossary will be useful for a reader for an uninterrupted reading of the text.

The contents of the book are fairly extensive but the coverage on low-level languages has been inadequate. The absence of exercises following chapters 8, 9 and 10 is quite conspicuous.

This book will be useful for a microcomputer user who programs in Basic.

N. CHAKRAPANI

Principles of process control by D. Patranatis. Published by Tata McGraw-Hill Publishing Co. Ltd., New Delhi 110 002, 1981, pp. xiv + 272, Rs. 36.

This is an introductory book with concise treatment of the significant concepts in a number of topics related to control and instrumentation of industrial processes. Starting from the fundamental notion of control systems, Chapter 1 deals with the various modes of control such as on-off, proportional, integral and derivative action. Transfer function representation and evaluation of transient response have been discussed with illustrative examples in Chapter 2. Even though the concepts of controllability have been discussed for single-input single-output and multivariable systems in Chapter 3, a sudden transition to state space equations in page 38 without an appendix/introduction on state variable methods may pose some problems to a reader not exposed to this topic. Though state space approach has not been used elsewhere in this book, some references to textbooks on this topic could have been provided in view of its importance in the context of computer-aided automation. Stability studies involving Nyquist criterion, Routh-Hurwitz method, Rout-locus and Bode-plot methods have been discussed in this chapter. A systematic treatment of on-off control, PID control, tuning of controller parameters, principle of operation of pneumatic, electronic, hydraulic controllers and practical implementation of programmed controllers can be found in Chapter 4.

In view of the significance of special control schemes such as ratio-control, cascade control, feed forward control, inverse derivative control, antireset control, the author has rightly devoted major portion of Chapter 5 to discuss these configurations. The idea of multivariable non-interacting control is brought out in the same chapter. Block schematic representations of pressure, level and temperature control loops have been extensively treated in Chapter 6. A case study of a boiler control has been presented in Chapter 7 to illustrate the complexity involved in typical industrial control systems of multivariable nature.

Mathematical models of heat transfer process, mixing process, tubular chemical reactors, distillation columns and nuclear reactors have been derived in Chapter 8. The next chapter presents a synthesizing overview of typical computer-controlled systems. Various functions of control computers, approaches for set-point and direct digital control, role of microprocessors in distributed direct digital control, and standard DDC algorithms have been presented in Chapter 9 to highlight the current trends in industrial automation. A brief presentation of the different adaptive control techniques in Chapter 10 is useful to get an overview of this important topic. The concluding eleventh chapter presents some important system design aspects related to process instrumentation and covers a number of other topics such as the organizational details of control room, sizing control valves, automated design of control systems.

Dr. Patranabis should be congratulated for authoring such a book useful to students and working engineers specialising in the area of Process Control and Instrumentation Systems. A few printing errors have crept in at some places (for example, the left side of the first equation in 3.21b should read $\dot{x}$ (t) instead of $x(t)$), but these do not seriously affect the understanding of the topics. At some places (for example in the concluding chapter) one gets an impression that there is a heterogeneous collection of topics. On the whole, this can definitely serve as a good textbook for a course on Process Control meant for students with some exposure to basic control theory concepts.

L. M. PATNAIK

Ultrasonics by A. P. Cracknell. Published by Weykeham Publications (London) Ltd., London, 1980, pp. 200, £ 5·00.

This is an introductory text requiring very marginal knowledge of mathematics. The style is elementary and is sure to be appreciated by all readers. The stress is on applications of ultrasonics in industry.

After first three introductory chapters on the subject, subsequent chapters have been devoted to generation and detection of ultrasound, pulse echo techniques, ultrasound in nature, ultrasonic optics, ultrasound in industry and medicines and various scientific applications. The book takes the reader through a journey where one is made to

know that ultrasonic can be used in food industry (like condensed milk, fruit juices, pulps, gravies and soups, ice cream, ketchup, margarine, mayonaise, salad cream, peanut butter and processed cheese).   Use of ultrasonic in welding, cleaning and soldering of plastics is briefly explained.   Ultrasonic has found great many applications in medicine like scaling of teeth, cutting and drilling of bones.   Welding of bones is also briefly mentioned in the book.   According to the author the general safety of the public is not endangered by the use of ultrasonics.   However, in some specific cases, the safety factor becomes critical.

This book is well written.   There are no obvious errors, no printing mistakes.   Even a first year undergraduate can understand most of the book.

S. KRISHAN

Handbook for limit state design of reinforced concrete members by V. K. Ghanekar and J. P. Jain.   Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1981, pp. xv + 763,   Rs. 300.

The handbook is intended to assist engineers in designing and detailing reinforced concrete structures according to the provisions of the IS 456—1978 Code.   Limit state design concepts having been introduced into this code; the handbook serves a very useful purpose of clearly explaining the basic concepts and assumptions involved in the equations given, along with providing numerous time-and-labour saving design aids through tables and graphs.

The information presented in the handbook is in three parts, viz., commentary, design examples and design aids.   Commentary explains the basic concepts, equations used in preparing design aids given in the third part and the scope, format and applicability of the design aids.   In the second part, typical examples are worked out, illustrating the design procedure and the specific application of the design aids.   The third part presents 600 design aids in a form useful for design practice under the headings: flexure, shear and torsion, slabs, deflection, columns, footings and detailing.   Also for convenience the third part is divided into three sections with respect to the three grades of steel, viz., steel having yield strengths of 415, 500 and 250 N/mm^2, as are now permitted by IS 456—1978.

One point that the users of the handbook have to note is that the notations used in the handbook do not correspond to those used in IS 456—1978, but are those recommended by CEB.   The authors seem to have preferred the latter with the hope that in future they will become more widely acceptable in the country.

PRAKASH DESAYI