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Z80 Assembly Language Programming for Students

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First published 1981

Reprinted 1982, 1983, 1984, 1985, 1986, 1988

Published by
MACMILLAN EDUCATION LTD
Houndmills, Basingstoke, Hampshire RG21 2XS
and London
Companies and representatives
throughout the world

ISBN 978-0-333-32295-6   ISBN 978-1-349-06155-6 (eBook)
DOI 10.1007/978-1-349-06155-6

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Preface

This learning text, based on the Z80 Assembly Language, enables a student to develop through suitable exercises and programming practice a professional approach to programming and produce a work of quality. There is an art to programming: it is not enough for a student to know the rules of a language, it is equally important to develop a readable and intelligible program which has style and uses the best techniques.

This book is not an ordinary text book - it is a learning text. It is intended to accompany a course of lectures or be used as the text for a tutor-assisted, self-instructional course. However, it is suitable as a teach-yourself text for students who have an appreciation of computer programming, or who already know a little of the Z80 assembly language. Practising Z80 assembly language programmers may find the text useful for reference purposes.

The text is divided into sixteen chapters. Each chapter can be used as a self-contained unit for teaching purposes to be used for one or two weeks' lectures and tutorial, or as self-instructional unit. Each chapter assumes that a student has satisfactorily completed the previous chapters.

A chapter consists of short narratives; each narrative covers one or two concepts and is followed by an exercise. The narratives move fast, the exercises are challenging and they encourage students to make many discoveries for themselves, thereby allowing the rapid development of skills. Every opportunity is taken to expose practical problems and develop good programming habits right from the start.

The narratives, the exercises, the exercise answers and the program at the end of each chapter all play an equally important part in the learning process. The exercises have been chosen to be a real test of a student's understanding of both concept and detail and to extend, sometimes by discovery, the knowledge and understanding gained in the narrative. Some of the exercise answers include notes on the answers which also extend a student's knowledge and understanding. A program is specified at the end of each chapter to be coded, run and tested on a computer

system. Each program is designed, as far as is possible, to include the concepts contained in the chapter.

The exercises should be done when they are encountered and before continuing with the text. Additionally, the programs should at least be coded before continuing with the next chapter. Many students will be able to work through the text without assistance, allowing a tutor to concentrate his attention on those students who are unable to complete the text on their own.

The whole text is designed on the premise that one sure way to learn a programming language is by plenty of practical experience - just like learning a foreign language. Proficiency in programming is acquired by writing it. That is one reason why practical exercises have been inserted throughout the text and a program is included at the end of each chapter. The text contains many exercises which call for written answers; it is essential that the answers are written down. Eager students are sometimes tempted to answer the questions mentally in their impatience to make progress with the subject - they should resist this temptation!

Throughout the book, modular design of assembly language programs is encouraged. To allow this, subroutines are introduced early on in the course in Chapter 3.

The text is also designed so that students can code and run programs at the earliest possible stage in a course.

At the end of each chapter there is a program specification. The program should be coded, run and tested, preferably before passing on to the next chapter, although this may not be practicable; however, the program should at least be coded before looking at the next chapter. The program should be a fully correct working version which adheres exactly to the specification. A program is no use to anyone if it does not do exactly what is required of it.

Only one program is specified at the end of each chapter so that a student can concentrate his effort on that one program.

The programs have been carefully chosen to be stimulating and have a visual reward for success - all programs produce some form of output on a display.

If necessary, the programs can be replaced by other programs for specialist courses, although the programs in the text have been carefully chosen to cover as many aspects of Z80 assembly programming as possible.

Instead of covering all of a topic at once, most topics are spread over a few chapters and each chapter covers parts of a few topics. This allows more relevant programs to be written earlier in a course and it makes the text more interesting thereby helping a student's concentration. Additionally, because a topic

is spread throughout the text, a student has time gradually to assimilate the concepts contained within a topic and to absorb each concept before proceeding to the next.

One problem encountered by tutors teaching programming languages to a group of students is the wide variation in the students' rates of learning the language - even groups of students with the same background. Consequently, a favoured method of teaching programming languages is by tutor-assisted, self-instructional methods, so that students may learn at their own rate and not become bored or lost. This text is particularly suitable for such a course.

This book is not written for use with one particular Z80 computer system - it can be used with any Z80-based microcomputer. A minimum configuration of a Z80 processor, screen and keyboard is assumed to be available for the practical programs.

This book is suitable for BSc, HND and BEC/TEC courses in computing and engineering and as a reference book for practising Z80 Assembly Language programmers.

ACKNOWLEDGEMENTS

My thanks to Leicester Polytechnic for allowing me to use their computer facilities for the development of programs and production of the book, and to Bob Reeve, of Wolverhampton Polytechnic, for his thorough checking of the text and many suggested improvements. Also, I wish to thank my wife, Susan, for her support in many ways, particularly in the typing of the text using a word processor. Thanks too to Nicolas and Elisabeth for their patience on occasions when having to wait for parental care and attention.

Roger Huty