Introduction to BASIC

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A case study approach

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CONTENTS

<i>Preface</i>	vii
1 Introduction	1
1.1 Who for and what for	
1.2 Contents and format	
2 The Computer System and You	3
2.1 Introduction	
2.2 The computer system	
2.3 Modes of operation	
3 Problem-solving	7
3.1 Who does what	
3.2 Algorithms	
3.3 Flow charts	
3.4 Case study - linear interpolation	
3.5 An improved linear interpolation algorithm	
3.6 Trace tables	
3.7 A further improved linear interpolation algorithm	
3.8 Postscript	
Exercises	
4 BASIC - The First Essentials	21
4.1 Case study - linear interpolation Mark 1	
4.2 BASIC requirements	
4.3 A program for the case study	
4.4 Check your progress	
4.5 A second case study - the area of a triangle	
4.6 Strings	
4.7 A program for the area of a triangle	
Exercises	
5 BASIC - Loops and Branches	34
5.1 Case study - linear interpolation Mark 2	
5.2 BASIC requirements	
5.3 A program for the case study	
5.4 Check your progress	
5.5 A second case study - graph-plotting, on a terminal	
5.6 Output formats	
5.7 Standard functions	
5.8 A program for the graph-plotting case study	
5.9 Postscript	
Exercises	

6	Programming Practice	48
6.1	Introduction	
6.2	Typical mistakes	
6.3	Editing programs	
6.4	Program-testing	
6.5	Documentation	
	Exercises	
7	BASIC - Arrays	55
7.1	Case study - linear interpolation Mark 3	
7.2	One-dimensional arrays in BASIC	
7.3	FOR loops	
7.4	Check your progress	
7.5	A program for the case study	
7.6	A second case study - matrix manipulation	
7.7	Two-dimensional arrays in BASIC	
7.8	Check your progress	
7.9	A program for the matrix manipulation problem	
7.10	Postscript	
	Exercises	
8	BASIC- Functions	72
8.1	Case study - numerical integration	
8.2	User-defined functions in BASIC	
8.3	Check your progress	
8.4	A program for the case study	
8.5	A second case study - solving an equation	
8.6	A program for Newton's method	
	Exercises	
9	BASIC - Subroutines	85
9.1	Case study - more numerical integration	
9.2	Subroutines in BASIC	
9.3	A program for the case study	
9.4	Check your progress	
9.5	A second case study - a queueing problem	
9.6	A program for the queueing problem	
	Exercises	
10	BASIC - Matrix Operations	96
10.1	Introduction	
10.2	Matrix algebra - a brief summary	
10.3	Matrix statements I	
10.4	Case study - an electrical network problem	
10.5	Matrix statements II	
10.6	A program for the case study	
10.7	A second case study - a vibration problem	
10.8	Matrix statements III	
10.9	A program for the inverse power method	
10.10	Postscript - redimensioning	
	Exercises	
	<i>References and further reading</i>	115
	<i>Solutions to selected exercises</i>	116

PREFACE

Many scientists and technologists working today in the areas of design, research and development have access to a digital computer system. To use such a system to help them solve their problems they need two skills: the ability to converse with the computer and the ability to apply, adapt and invent numerical methods of solution. This book is concerned primarily with the first of these skills, but is inevitably involved with the second as well.

Conversing with a computer means being able to write computer programs in a computer language. This book introduces the computer language BASIC (Beginners' All-purpose Symbolic Instruction Code), which was originally developed in the 1960s in the United States as a simple, 'conversational', computer language for college students. Since then BASIC has been further developed to a stage where it is widely used outside the purely educational field. It is considered by many practitioners to be the best available compromise between the simplicity required to make a computer language usable by non-professionals and the sophistication required to realise the power of a modern computer system.

Computer-programming courses and books vary in their aims from those for computer scientists at one extreme to the gentlest of appreciation courses at the other. Here I have tried to give a working introduction to BASIC programming for undergraduate and H.N.D. students of science and engineering. I believe that the text is sufficiently complete for those who are to use a computer as part of their other studies, also that it will be suitable as an introduction to computing for those who are not. It will also serve as a useful introduction to the subject for practising scientists and technologists.

The book is unusual in two respects. Firstly, it does not attempt to be comprehensive: the details that I have found to be important to students are included, but I have deliberately set out to avoid the appearance and pedantry of a BASIC manual. If the reader requires more detail than appears here then he can, and perhaps should, consult the relevant manual for the computer in question. Secondly, I have sought to reverse the usual order, which introduces BASIC statements and commands and then gives examples of their use (often trivial, and often not showing why the statement or command is really needed). To this end all the chapters on BASIC have one or two case studies that are used to introduce and show the need for the elements of the language. The computer system is thus shown as a problem-solving tool rather than a super-toy.

Although the solution of these case-study problems often involves some use of numerical mathematics, the techniques are usually simple (linear interpolation and the trapezium rule, for example). In each case I have described the numerical method briefly, and given a reference to a suitable book for more details and further reading.

All but the first two chapters have exercises appended to them, and some selected solutions are given at the end of the book. In most cases where a new element of BASIC is introduced there is a 'check your progress' section designed to test comprehension of the material.

I believe that the book would be used to most advantage in a course of some twenty to twenty-five hours duration. It could be made suitable for a fifteen-hour course by omitting chapters 8,9 and 10, and for an even shorter course by omitting chapter 7 as well. Considerable gain would accrue to the students if they had access to computer terminals - because the book is biased towards the interactive use of BASIC - but they are not a prerequisite facility.

That this book exists is in great part due to my mother, Gwyneth Hartley, who typed the text quickly and accurately, and to the staff of the Macmillan Press who asked me to write it in the first place and who were so helpful through all stages of its production. My grateful thanks also go to Lanchester Polytechnic for allowing me to use their computer facilities for the testing of the programs in the book. The figures that show output from a computer terminal were produced on their ICL 1903S system. Lastly, the credit for the flow-chart outlines and other diagrams goes to Ken Waller, also of Lanchester Polytechnic.

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