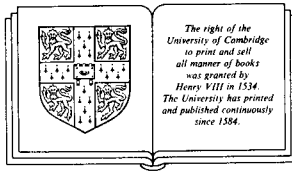


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ILLUSTRATING BBC-BASIC

DONALD ALCOCK



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To the men of the Surrey Fire Brigade
who quenched the fire in the Old
Georgian House before it could consume
the draft of this book. Had they
arrived a little later...

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PREFACE

BBC-BASIC is the main language of the BBC Microcomputer, widely used in schools in Britain and some countries abroad. To make the computer *do* something it must be given instructions encoded in BBC-BASIC, a full set of such instructions being called a *program*. Programs written in BBC-BASIC can make the computer do mathematical calculations, display animated pictures in colour on the screen, play tunes in harmony, maintain records of names and addresses, and do many other things besides. This book explains how to write such programs in BBC-BASIC and run them on the BBC Microcomputer.

This book should be found directly applicable by users of BBC Master Series Microcomputers which offer BBC-BASIC (BASIC IV) as a programming language. BASIC IV has several new facilities — such as plotting stipple patterns, ellipses, circles, rectangles — which are not described here. But the rest of the language should be compatible. The many example programs in this book were developed on the BBC Model B Microcomputer using BASIC III.

Although this book is concerned with programming in a particular language on particular ranges of computer it will be found useful by those who have to write in other dialects of BASIC on other computers. The programs in this book are short and explained in fine detail, so will be found readily translatable.

BBC-BASIC features some "structured" statements which make it possible to write more intelligibly than could be achieved in the original BASIC of 1964. In particular it is often (though not always) possible to avoid the GOTO statement — an instruction distasteful to many teachers of computer science. In this book, those programs which have no need of GOTO are presented without the distraction of line numbers.

The book is organized as a programming language manual. After an introductory example in chapter 1 (analysed in some depth for the benefit of the complete beginner) there is a quick canter through the rudiments of programming in chapter 2. Here are introduced such basic concepts as variables, expressions, strings, decisions, loops and functions; easy going for the reader who can already write programs.

Chapter 3 is short but important; it explains the notation used throughout the remainder of the book for defining the syntax of BBC-BASIC. But if this notation appears self explanatory the reader may prefer to skip chapter 3, using it only for occasional reference.

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From chapter 4 onwards the book introduces each facility of BBC-BASIC in turn and provides examples of its use. *Nothing is introduced without example.* The longer examples serve a double purpose: to illustrate a facility of BBC-BASIC and explain a fundamental technique of programming.

How do you make a computer sort names into alphabetical order? Not as obvious as it might seem. Three different sorting techniques are explained by example in this book: bubble sort, monkey puzzle (more formally the "binary tree") and Quicksort. Quicksort relies on recursion — an important programming concept which is explained and demonstrated. Making coloured objects rebound around the walls of a squash court is another technique demonstrated; so is making voices sing in harmony; so is computerizing a humble address book.

Because of the wide scope of BBC-BASIC, and the many "back door" facilities dealt with in chapter 14, there was not enough room to introduce more tricks of the programmer's trade. Sadly missing are such techniques as stacks and queues, linked lists, parsing expressions and so on. Several of these techniques are explained among my other books published by Cambridge University Press: *Illustrating BASIC* (1977), *Illustrating Fortran* (1982), *Illustrating Super-BASIC* (1985).

This book may be used as a self-contained manual for BBC-BASIC. Information is tabulated in a form handy for reference. Page 163, for example, tabulates all characters in the ASCII range; pages 124-5 summarize all information needed when composing screens of MODE 7 graphics. A quick reference for all operators and functions is given on page 179; the syntax of every statement and command of BBC-BASIC is summarized on pages 180-1.

I have retained the hand-written format of my earlier books because this medium best permits *pictorial* explanation of concepts, reducing verbiage to a minimum.

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Donald Alcock
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