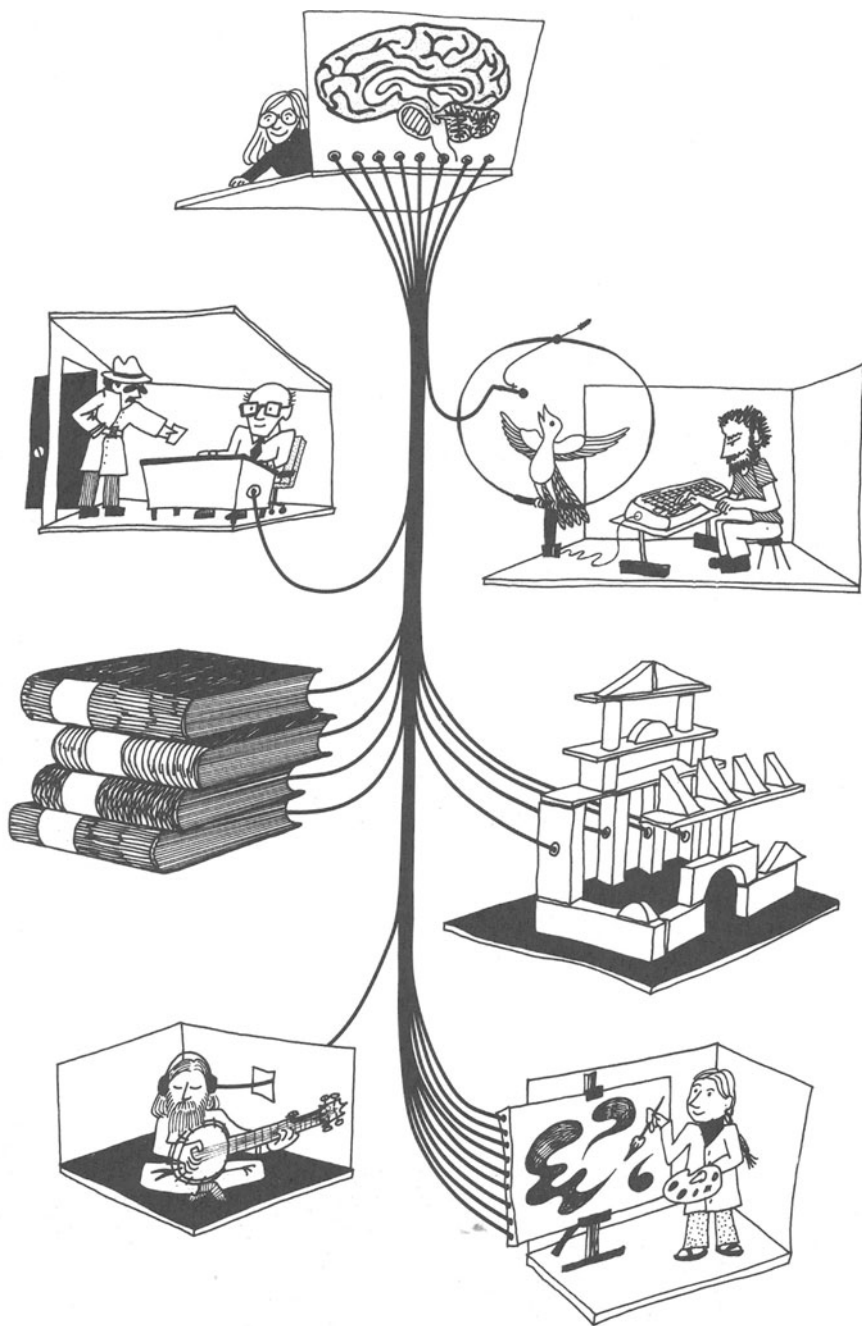


An Introduction to the Commodore 64

Adventures in Programming



An Introduction to the Commodore 64

Adventures in Programming

Nevin B. Scrimshaw
and
James Vogel

Springer Science+Business Media, LLC

Library of Congress Cataloging in Publication Data

Scrimshaw, Nevin, 1950-
An introduction to the Commodore 64.

Bibliography: p.

Includes index.

1. Commodore 64 (Computer) — Programming. I. Vogel,
James, 1952- . II. Title.
QA76.8.C64S37 1983 001.64 '2 83-15650

ISBN 978-1-4899-6789-3 ISBN 978-1-4899-6787-9 (eBook)
DOI 10.1007/978-1-4899-6787-9

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior permission of the copyright owner.

A B C D E F G H I J

© Springer Science+Business Media New York 1983
Originally published by Birkhäuser Boston, Inc., in 1983

Contents

Preface	
1 First Things First	1
Tips on the quirks and strong points of your Commodore 64. A journey through the keyboard is included.	
2 BASIC Number Crunching	8
Learning to keep track of all those numbers!	
3 A BASIC Sampler	14
How to talk in a way that the computer understands. A closer look at what BASIC is and what it has to offer.	
4 Program Editing	19
Using the first measure of Beethoven's Fifth Symphony to explain the ins and outs of editing and entering programs—a chapter on debugging in disguise.	
5 The Case of the Cursory Cursor	26
A chance to practice your newfound editing skills with a game that exercises your cursor control.	
6 Loops in Loops in Loops...	29
The use of nested loops is examined. Loop technology is used to explore probability via simulations.	
7 Graphics	35
Exploring the fourth dimension—a fish tank for randomly swimming square fish made out of sprites.	
8 Program Design	42
An in-depth charge at subroutines.	
9 Number Theory I	48
Put the computer to work doing what it does best.	
10 Sound and Music	52
How to write sound programs for music and special sound effects. Includes Nick's favorite.	
11 Real-Time Graphics	71
The first steps toward a program that will use sprites to fly a spaceship around your screen. An exposé of the sprite switchboard.	
12 Microsurgery	77
An introduction to the use of string variables. The odd hexmas tree is examined as an application.	
13 Number Theory II	82
Exploring mathematical oddities. How long does it take a drunken graphics bug to totter off the screen?	

14	Launching a Sprite	89
	Build your fleet, sail in your home computer waters. Will you fall off the edge? Complete with fog horn.	
15	Tricks Of The SID	98
	Variations of a simple music program provide an amazing range of effects.	
16	Out of This World Graphics.	105
	The rocket takes off amidst a thundering roar and disappears into hyperspace.	
	Appendices and Charts	111
	Index	123

Preface

Your Commodore 64 is a powerful microcomputer whose memory, color graphics, and sound effects far exceed those of other computers in its class. At first, learning to control these features may seem difficult and complex, but don't be intimidated; there's nothing mysterious about your machine—it is, after all, only a machine. To communicate with it you simply need to use its language: Commodore 64 BASIC (Beginner's All-purpose Symbolic Instruction Code), a version of the most popular language used on today's microcomputers. This book will introduce you to Commodore 64 BASIC and to the fun you can have with your computer.

Learning a new language takes time, effort, and practice—especially practice. So when you first set up your Commodore 64, take time to read the first few chapters of the *User's Guide*, which this book supplements but does not replace. Then you'll be ready to practice your new language using the programs and skills developed in this book. In addition, there is a rather thick book put out by Commodore called the *Programmer's Reference Guide*. It contains enough information about your 64 to occupy a long New England winter.

The first three chapters introduce some fundamental principles of microcomputers, review the Commodore 64 and its quirks, and get you into the basics of BASIC. The next two chapters use music and a game to explore the 64's editing features and cursor controls. Chapter 6 demonstrates some numerical acrobatics, and Chapters 7 and 11 introduce graphics and the notion of binary arithmetic. In Chapter 8 we examine the planning behind writing long programs. Chapters 9 and 13 introduce some number theory in disguise, and Chapters 10 and 15 sample the full range of music-making with your Commodore. In Chapters 14 and

16 we pull the numbers, sound, and graphics together to create a screen full of sound and light. Our goal is to present some critical programming concepts while giving you a collection of programs to practice and play with.

One note: the programs in this book use the Commodore's full range of sound and color. If you don't have a color TV, you can still run the programs, but the results will be less spectacular. If you do have a color TV, you might want to turn off the color while are you keying or editing in programs to ease the eye strain sometimes associated with using video terminals. If you wish to use the programs as models for future efforts of your own, you will need an external storage device, either a disk drive or DATASSETTE™ recorder. Refer to Chapter 2 in the *User's Guide* for more information.

With all the talk of "computer illiteracy" it is easy to lose track of what you really want computers to do for you—expand your sense of life. This can't be done for you by some computer expert. You, at some point, must do it for yourself. When you get to the song called "Chariot" in Chapter 11, shut your eyes, lean back and listen: you'll hear one reward of having spent time learning about your computer.

Acknowledgements

The able assistance of the following people is deeply appreciated:

David Epstein
Virginia Michie
Cort Shurtleff
Roy Piascik

Special thanks to the students of Northeastern University.

N. Scrantz Lersch did all of the illustrations for this book. She is a freelance illustrator living in Worcester, Massachusetts with her husband and two children. She also works as a photographer in the Anatomy Department at the University of Massachusetts Medical School.

This book was produced on an IBM PC and telecommunicated and typeset by Arts & Letters, Brookline, Massachusetts.

An Introduction to the Commodore 64

Adventures in Programming