

The Practical Apple[®]

A GUIDE
FOR
EDUCATORS



NICKLES & CULP

THE PRACTICAL APPLE[®]

**A Guide
for
Educators**

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A Guide for Educators

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Carl Brown



It has been said that there are three types of people in the world:
—those who make things happen,
—those who watch things happen,
—and those who wake up one day and wonder what happened!

This book is dedicated to
the Davy Crocketts,
the Neil Armstrongs,
the Jackie Robinsons,
the Martin Luthers, and
the John J. Audubons
of the future who will use computers as tools to make things happen!

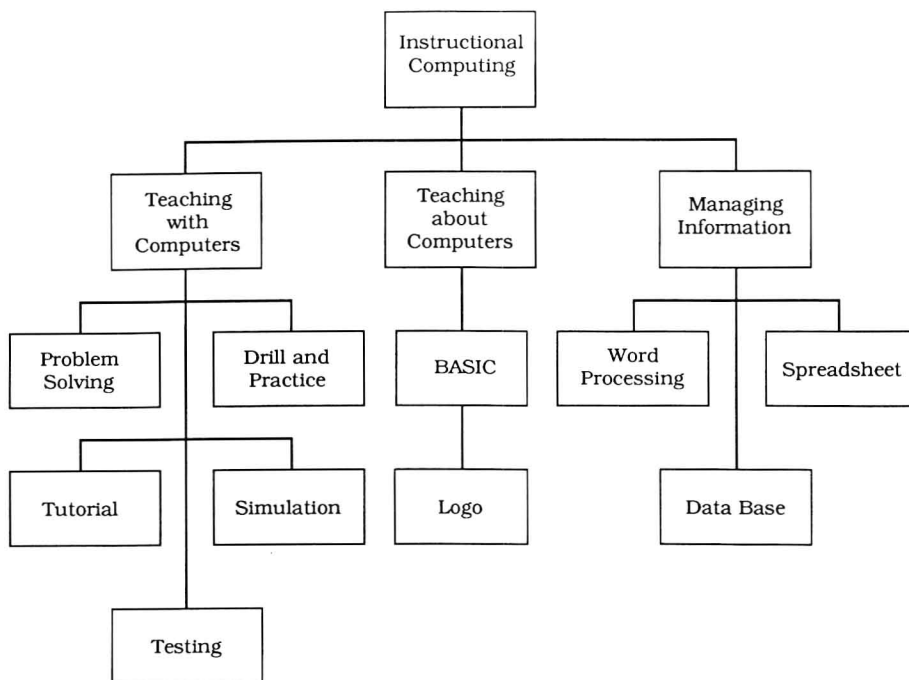
PREFACE

This book is written for the professional or student teacher who needs to know practical ways in which the Apple II computer can be used in instructional computing. For the context of this book, *instructional computing* is defined as teaching with computers, teaching about computers, and managing information with computers. Teaching with computers is commonly known as CAI, computer assisted instruction, and includes problem solving, drill and practice, tutorial, simulation, and testing applications. Teaching about computers includes teaching the BASIC and Logo programming languages. Managing information with the computer uses the applications of word processing, spreadsheet, and data base as tools for the educator to improve productivity. Figure 1 graphically represents this concept, which forms the basic organization for the book.

Individual sections in the book provide a foundation in the BASIC programming language, provide instruction in the use of personal productivity tools contained in AppleWorks, and introduce a "language for learning," Logo. In addition, an extensive appendix with practical tips is included that makes the book a valuable reference for every computing teacher. For those readers unfamiliar with the Apple II computer, an introduction to the system and instructions on how it works are also included in the appendix.

The topics covered in the book have been selected from introductory and intermediate instructional computing courses. They represent a wide range of classroom computing techniques, applications, and issues. Not all instructors will want or have time to include all topics in a single course. The book is organized so that an instructor can choose which topics to include and in what order they be covered. *The Practical Apple* can be adopted as the required text for multiple courses that sequentially build on the student's knowledge base.

The emphasis in each chapter is to provide a brief, descrip-

**Figure 1**

tive discussion of the topic followed by hands-on exercises using commonly available software. This approach not only provides the student with a theoretical foundation in instructional computing but also the tools to use the computer in the classroom as well.

In order to receive the most benefit from the book, the student will need access to certain software packages. The exercises in Part I use software that is included with each Apple II computer: Applesoft BASIC (stored in internal memory) and utility programs on the System Master diskette. Part II exercises use the popular AppleWorks program that integrates word processing, spreadsheet, and data base applications. The turtle graphics and list-processing exercises in Part III use the Apple Logo program. These packages were chosen because of their widespread use in education.

As mentioned previously, another objective of this book is to provide the student with a reference guide for future use. The appendix provides answers to the questions most commonly asked after the course is over. Step-by-step instructions are given for initializing diskettes, copying files, making back-up copies, and taking care of diskettes. Hardware maintenance and troubleshooting suggestions are provided in addition to discussions on evaluating software and setting up a computer lab. The appendix also includes summaries of Applesoft BASIC, AppleWorks, and Apple Logo commands.

A supplemental diskette is available without cost by the publisher to adopters who order twenty-five or more copies of the book. This diskette includes the example BASIC programs, AppleWorks files, and Apple Logo procedures that are referred to in the book. Answers to selected problems are also included on the diskette. It should be noted that the student cannot use the AppleWorks or Apple Logo examples without their respective software packages. We believe that the files on the supplemental diskette are very important and integral to the text; therefore, permission is hereby given to copy the diskette for class-related use.

We extend our appreciation and acknowledgment to Linda Polin of Pepperdine University for her preparation of the Logo chapters and Tip Twelve, to David Neighbours of California State University San Bernardino for his friendship, insight, and suggestions over the years, and to all of our students who have contributed to our understanding of the difficulties of learning about computers. Special thanks go to reviewers Harold Bailey, Bloomsburg University; Margaret Niess, Oregon State University; Michael Short, University of Georgia; Royal Van Horn, University of North Florida; and Wenden Waite, Boise State University, and to Joan Marsh and the publication staff at Brooks/Cole Publishing Company. An extra measure of gratitude is given to our past three editors, Mike Needham, Neil Oatley, and Cindy Stormer, who have suffered with us through what seems like years of revisions.

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George H. Culp

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ONE

**A Bit
about BASIC**

Introduction

More than a hundred books are available that teach BASIC (the Beginner's All-purpose Symbolic Instruction Code, developed by John G. Kemeny and Thomas E. Kurtz at Dartmouth College). Although most of these books are very thorough in describing the language, they usually emphasize problem-solving applications. Our emphasis, on the other hand, is on instruction in the use of BASIC to design and develop materials for instructional computing.

Simply put, any use of computing techniques within the classroom may be broadly defined as instructional computing (sometimes known as computer-assisted instruction, or CAI). Specifically, it includes:

1. Problem solving, in which computer programs are written to solve discipline-oriented problems.
2. Drill and practice on fundamental concepts using computer programs in a given discipline.
3. Tutorial dialog, in which computer programs provide "tutorlike" assistance in pointing out certain types of mistakes, providing review if needed, skipping areas in which proficiency is shown, and so on.
4. Simulation, in which computer programs allow manipulation and interpretation of certain elements related to given physical or social phenomena without the constraints of time, space, equipment, and environmental or logistical limits.
5. Testing, in which computer programs ask the questions, check the answers, and record the performance.

In this section we will concentrate on simple applications of instructional computing, including drill, testing, and, to a limited degree, tutorial dialog.

■ **The use of BASIC.** An introduction to some of the fundamentals of BASIC is provided in this section. This introduction is not intended to produce highly accomplished and skilled programmers. Rather, it gives only the fundamentals needed to write simple programs for instructional computing applications. Model programs are described that illustrate this use. Most of these programs may be easily modified for, or used directly with, actual classroom activities.

■ **TOP-DOWN design.** A general concept of a logical approach to program design is introduced in the early chapters of this section. Beginning with PROGRAM 3 in Chapter 2, each of the programs is designed in a “top-down,” step-by-step, frame-by-frame approach. This is a familiar approach to instructional design for educators and facilitates program development, even for the novice computer user.

1

Think about This (for Fun)

Rearrange the letters of NEW DOOR to form one word. (Note: answers to Think about This (for Fun) questions may be found in Tip 14.)

Think about This (Seriously)

Is the use of computers in education just another fad?

"Nothing in life is to be feared. It is only to be understood."
Marie Curie

"In certain trying circumstances, urgent circumstances, desperate circumstances, profanity furnishes a relief denied even to prayer."
Mark Twain

"If at first you don't succeed, you are running about average."
M. H. Alderson

**A Simple
Instructional
Computing
Program:
Problem
Solving—
What's Your
Age in Days?**

1.1 Objectives

For the successful completion of this chapter, you should be able to:

1. Define what (not who) composes a BASIC program (Section 1.3.1).
2. Distinguish between BASIC statements and commands (Sections 1.3.1–1.3.2).
3. Define the action of the following BASIC commands: NEW, RUN, LIST, and SAVE (Section 1.3.2).
4. Define and give at least one example of both a NUMERIC variable and a STRING variable (Section 1.3.3).
5. Describe the use of commas and semicolons in BASIC for purposes other than punctuation (Section 1.3.4).
6. Define the purpose and give at least one example of the following BASIC statements: PRINT, INPUT, LET, and END (Sections 1.4.1–1.4.4).