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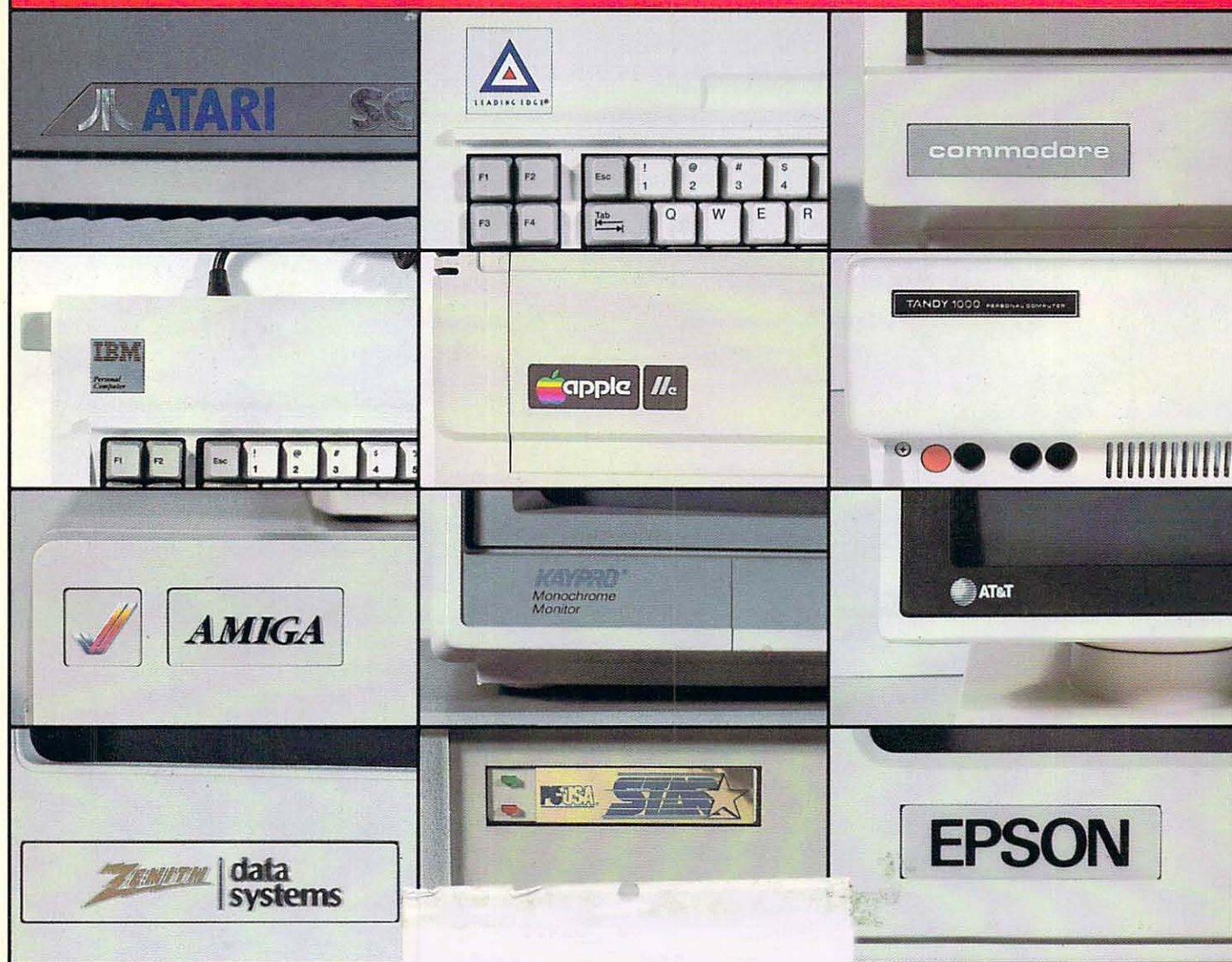
VOLUME 4
NUMBER 11

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Personal Finances Home Office Word Processing Games
Entertainment Home-School Connection Telecomputing

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VIC 20, IBM PC & COMPATIBLES, TANDY COCO
& MODELS III & 4, TI-99/4A

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AT-A-GLANCE
SOFTWARE REVIEWS



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FAMILY COMPUTING®

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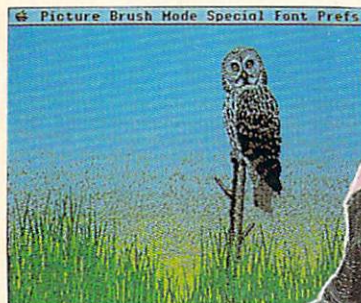
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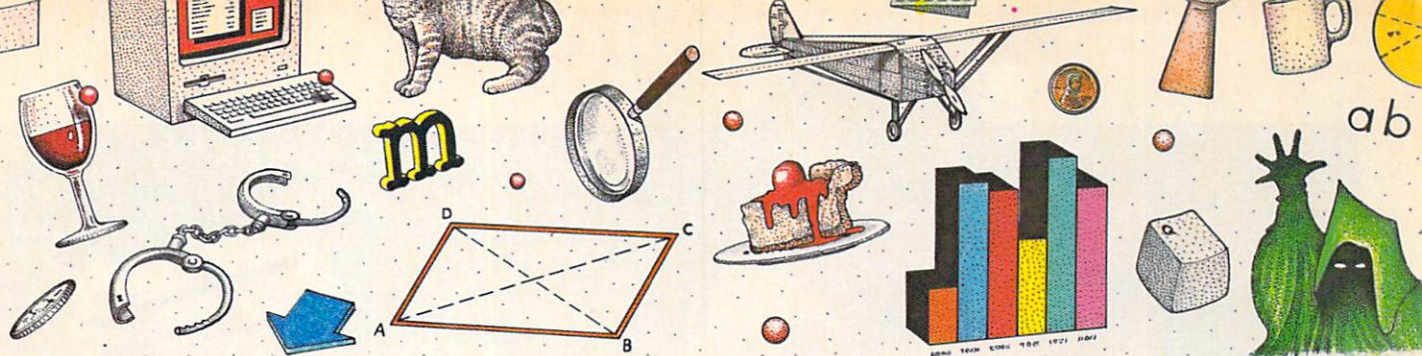
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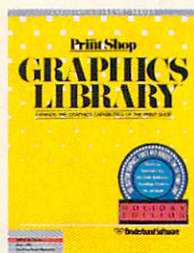
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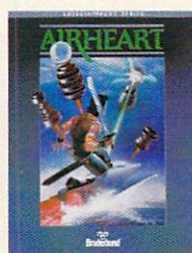
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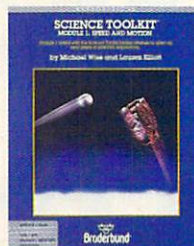
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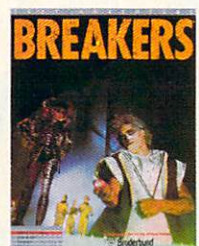
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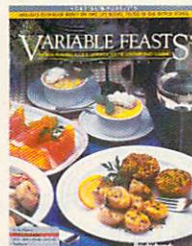
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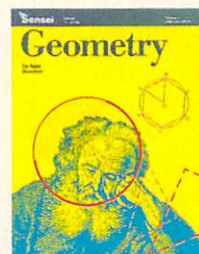
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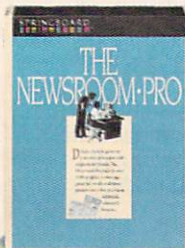


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EDITOR'S NOTE

COLLECTIBLES

Jamie Delson, our major games reviewer, immediately comes to mind when I think about people and their collectibles. Jamie's hundreds, possibly thousands, of toy soldiers are legendary around our office.

I also think of my friend Liz and her collection of political campaign buttons, Frank's books and records, Suzie's matchbooks, David's programs from plays and musical events, and Dorothy's sapphires. Above all, I could never forget our publisher, Shirrel Rhoades, and his collection of computers.

My own personal collections are limited and have never really been serious. My mother once thought I should collect miniature shoes because she was sure I had a shoe fetish, and on my own I've been an on-and-off collector of clouds, as in my name, Cloud-ia, as my European-born father pronounced it.

In the world of magazines, there are also collectibles. Issues chronicling a major event, like the Bicentennial, the marriage of a future king, or the death of a President are among the kinds of issues people put aside for their children or grandchildren or their own memories.

FAMILY COMPUTING, like many other magazines, repeats special features on an annual or semi-annual basis, and these too are anticipated and saved by many readers. Last month we ran our "Second Annual Parents' Guide to Learning at Home with Computers." Next month, we'll feature our "Third Annual Best-Ever Shopping Guide for Computer Lovers." And this issue contains our "Buyer's Guide to Computers," which runs semi-annually.

Twice each calendar year we present readers with rundowns of major computer models, including an assessment of each one's strengths and weaknesses.



As you read our reviews, try to keep in mind that we start by following the same advice we give to readers—by asking what is the primary intended use for the machine. We know, for example, that there are people who run businesses using now-defunct Timex 1000s, but that would never be the best first choice for a business computer.

In compiling this guide, Senior Editor Nick Sullivan considered software, expandability, and experience—his own, our readers', and our reviewers'.

Shoppers who have followed his guidelines in the past have reported back to us with news of a satisfying buying experience. We think that if you're in the market for a computer—again (perhaps to add to your own collection) or for the first time—you'll find his words worth savoring.

A handwritten signature of Claudia Cohl in dark ink.

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LETTERS

ADULTS ARE LEARNERS, TOO

I have observed in the past several years that nearly 95 percent of educational software is produced mainly for children or parents of children. Why don't the software producers offer reasonably priced programs for adults?

And I don't mean those containing questions and answers. I mean the type of educational software that incorporates principles and data on a given educational topic. Such software could cover a wide range of subjects, such as: American geography, world history, social science, physics, or general electronics.

When a person leaves school, the thirst for knowledge does not stop. I am 73 years old, and I still search for new knowledge.

JOHN B. GENTILUCCI
San Francisco, California

TUNING IN WITH THE RIGHT COMPUTER

Joey Latimer's article in the August 1986 issue, "1986 Buyer's Guide to

Music Hardware and Software," was an excellent survey of the musical possibilities of computers.

While your ratings of computers for their potential as "musical gems" is quite accurate, your readers could easily be misled about the best choice of a computer for musical education. For that specialized purpose, the Apple IIe is without peer in my opinion. The specialized software is dominated by the Apple IIe. While the machine is technically lacking in intrinsic sound capabilities, I find that its sound can be easily augmented with an inexpensive amplifier and speakers, or as stated in your article, by a MIDI interface and synthesizer for completely transformed sound.

SANDRA BOWEN
Lafayette, California

FINDING THE RIGHT WORD PROCESSOR

I noticed a couple of titles conspicuously absent from your list of professional-level word processors ("Finding the Right Word Processor,"

August 1986). Even though you do not purport to give an exhaustive evaluation of each word processor or a comprehensive list, I feel that the absence of MicroPro's *WordStar* is particularly conspicuous.

Also deserving inclusion, in my opinion, are Thorn EMI's *Perfect Writer* and my personal word processor of choice, NewStar's *NewWord*. After running articles on how to choose a clone and how to order by mail, I thought your word-processing article could have been more thorough.

JEFFREY BEARD
Bowling Green, Kentucky

AMIGO OF THE AMIGA

Several months ago, I purchased a Commodore Amiga personal computer. I really believe that this is the most advanced personal computer available and that it will someday set the standards by which personal computers will be judged.

I am saddened to see that your magazine seems to have no interest

Infocom introduces four new gam

Infocom,™ the crazy people who brought you "Zork"® and "The Hitchhiker's Guide to the Galaxy,"™ has a habit of coming up with games that add a new dimension to interactive fiction. And the best keeps getting better. Case in point: "Leather Goddesses of Phobos."™ It has a scratch n' sniff card and a 3-d comic book to excite all your senses. Once your interest is

piqued, you'll embark on a rowdy romp through the solar system. This hilarious spoof of 1930's pulp science fiction has 3 "naughtiness levels," for the prude to the lewd. "Leather Goddesses" is sure to amuse members of either sex.

One's really warped.

Then there's "Trinity."™ It answers the question of whether a game can be both light-hearted

and profound. You journey through a time warp into a mischievous fantasy world where all atomic explosions are mysteriously connected. "Trinity" takes you back to the dawn of the atomic age and puts the course of history in your hands.

One's a real circus.

It has been said that the circus is the only really mysterious thing left in civilization.

One thing's for sure, there is plenty of mystery in "Ballyhoo."™ While trying to locate the circus owner's kidnapped daughter, you are somersaulted into a three-ring world of deception and crime. To solve the crime



in providing coverage of this fine machine. To me, this is very unjust.

D.M. HARTIGAN, SR.
Rohnert Park, California

EDITOR'S NOTE: We hope you didn't miss the strong support FAMILY COMPUTING's contributing editor, Louis Wallace, gave the Amiga in "Why I Love My Amiga" in the August issue, page 42. He mentioned 13 programs in that article. In addition, two Amiga software titles were reviewed in June's Software Guide, three in August's and four in September's.

A THOROUGH READER

While I was scanning the August issue to see what was of interest, the bottom paragraph on page 27 (regarding mail-order buying) caught my eye. The author states, "You don't have to pay taxes on goods bought in another state." This is not 100 percent true. If you buy from a company outside your state and this company has a store in your state, you pay your state sales tax to the

out-of-state company.

Your type-in programs printed in small type on colored background are a little hard to read. Would not a check-sum listing aid in an error-free program?

RALPH E. BROWN
Shelton, Connecticut

MIFFED AT MAIL-ORDER COMPANY

The article by Dan Gutman in the August issue, "Dial M for Mail Order Buying," should have been written a lot sooner.

On March 17, 1986, I sent a \$222 check for software to Northeastern (a company mentioned in this article). On April 16, my merchandise arrived, minus *Apple Logo II* (\$75). On April 17, I called Northeastern a total of 28 times, always getting busy signals or getting cut off. I finally spoke to a woman who put me on hold, and eventually I was cut off again.

I sent letters to the company on April 18 and June 16, including copies of the order and my cancelled check, but it seems they are intent on keeping my \$75. By the way, I

purchased *Apple Logo II* locally, for a little bit more money, but no aggravation.

MARY ANN RIECKE
Chicago, Illinois

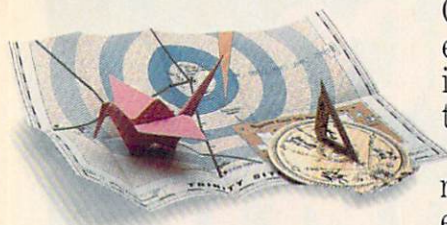
PROGRAMS GET DOWN TO BUSINESS

For my small business, I recently converted to Commodore equipment, hooking a 1541 disk drive and an Okidata 120 printer to a C 64. I must say I am really happy with the conversion, and I admit that the main reason for converting to Commodore was the support that users like me get from magazines like FAMILY COMPUTING. I am writing in hope of getting some programming help, too.

I am eagerly waiting for a good inventory and invoice program to be published. Or if one has appeared in a past issue, could you please tell me which one? I really enjoy using your programs and eagerly await the next issue. Please keep up the excellent work.

ROBERT L. DIXON
Everett, Washington

es. One really smells.



Every package includes an integral set of props to excite your senses and enhance the game.

and save your hide from a permanent spot in the freak show, you'll need to stretch your puzzle-solving skills to the limit.

One's really haunting.

Wrapping up this new quartet is a classic gothic mystery set in a haunted castle on the mist-shrouded seacoast of Cornwall. In "Moonmist"™ you'll explore the darkest reaches of Tresyllian

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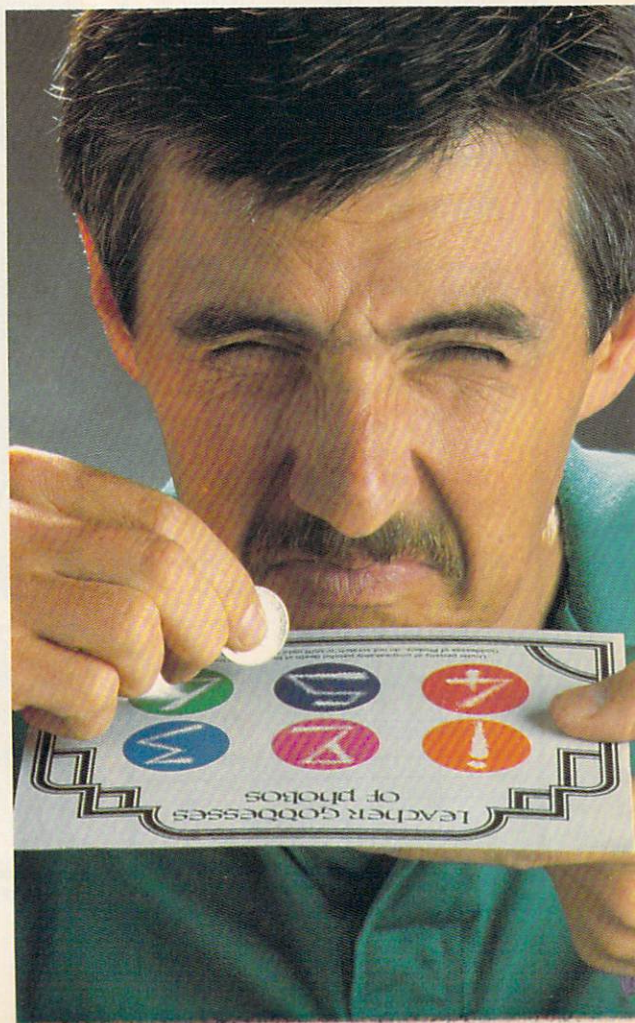
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LETTERS

EDITOR'S NOTE: A data-base program such as Home Information Manager (the C 64 version appeared in the August 1985 issue) should do the trick for your inventory; invoices can be produced with your word processor.

AND THANK YOU, TOO!

Happy Third Anniversary! Thanks for staying loyal to the consumer.

JOHNNY MOON
Broxton, Georgia

You have a following you may not be aware of—readers who don't own a computer, but buy FAMILY COMPUTING. They read every article and advertisement, searching for light on their quest to buy a computer. They are generally older than the gurus of technology who understand all the common words used uncommonly in "computerese."

I belonged to this category for over a year, and your magazine, with its clearly written articles, helped me

understand enough to buy a computer. My heartfelt thanks go to you.

DOROTHY FREEMAN
Placentia, California

CORRECTIONS

Adam was mentioned erroneously in the machine availability listing for *Electronic Typewriter* in July's table of contents. Adam owners will know that their computers already possess the capability this program provides.

Apple was also listed by mistake in the Microtones section of the July table of contents. We apologize to FAMILY COMPUTING readers for these errors.

FAMILY COMPUTING looks forward to letters from all our readers. Please direct your correspondence to: Letters to the Editor, FAMILY COMPUTING, 730 Broadway, New York, NY 10003. Include your name, address, and phone number. We reserve the right to edit letters for length and clarity. Due to the large volume of mail we receive, we are not able to respond personally to every letter.

Peace On Earth.

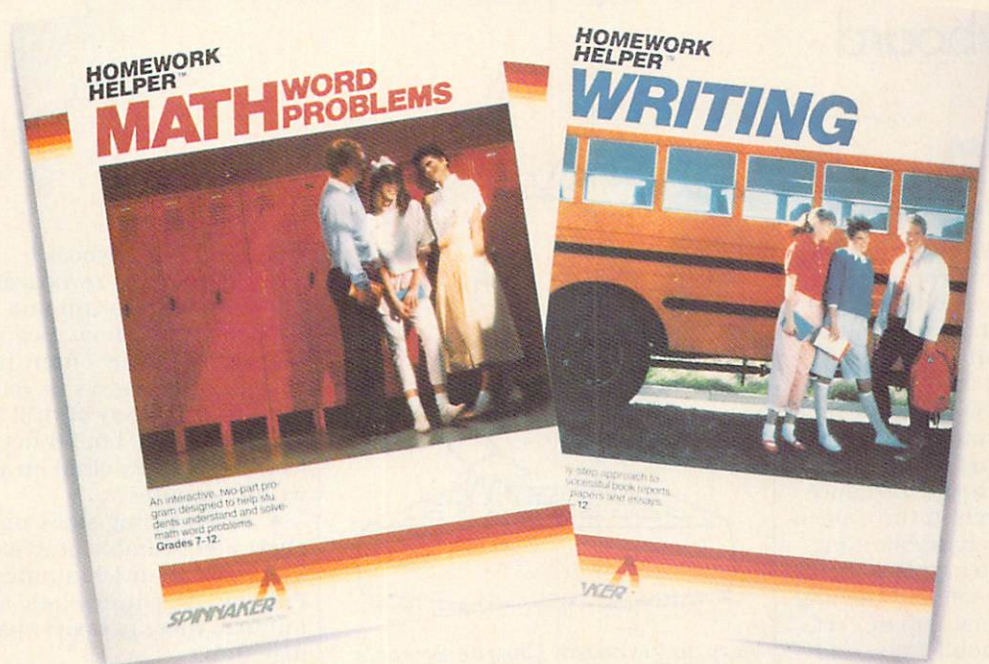


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Ralph has \$1.20 in nickels and dimes. If he has six more dimes than nickels, how many of each type of coin does he have?

	Nickels	Dimes	Total
Price/Unit	5 cents	10 cents	
# of coins	X		
Value			\$1.20

DATA ENTRY: Represent the number of dimes in relation to the number of nickels.

ing word problems into manageable parts. And it shows students how any math word problem can be analyzed in a methodical way. There's even a built-in algebra calculator that removes the drudgery of doing tiresome calculations.

MATH

MATH WORD PROBLEMS helps the student translate word problems into workable equations. A step-by-step tutorial uses a unique grid system for break-

WRITING

WRITING helps the student define the goals of a writing assignment. By answering a series of questions posed by the computer, the student gets a quick and easy first draft. Then, the draft pops into the word processor, where the student edits it into a final essay or book report, spellchecks it, prints it out and hands it in.

Only hard work will get your teenagers straight A's in school. THE HOMEWORK HELPERS are a step in the right direction.

BOOK REPORT

What is the theme—the main idea—of *Great Expectations*? Type your answer.

Finding the theme sometimes takes a little digging.

Press **Ctrl** **H** for some common themes.

Some common themes are: the power of love, the triumph of persistence, the beauty of nature, greed, intolerance, alienation, escape from conformity, the journey of life.

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HOME-SCHOOL CONNECTION

KEYS TO COMPUTING

Typing Software Can Help Your Kids Get Comfy at the Keyboard

BY TRISHA AINSA

More and more children like yours are getting their hands on computers at home and at school. Unfortunately, they don't know how to use those eager hands the correct way. Most children—and many adults—lack keyboarding proficiency, a skill that would help them operate computers with more ease.

Although most schools introduce computers to children in the elementary grades, few teach keyboarding. If children were better typists, much of the software they use for learning would be easier to manipulate. Yet, teachers, software publishers, and parents brush off the importance of touch-typing and assume it's OK for children to search for keys using their index fingers. As many a typing teacher has preached, this self-taught, hunt-and-peck habit of typing, although curable, is torturous to break.

EARLY-CHILDHOOD KEYBOARDING

Your children—from preschoolers to college students—will be more willing to approach computers for learning if they have passable touch-typing skills. Scoffers should note that successful pilot programs have been set up in preschool, kindergarten, and early-elementary classes and have shown that children younger than 5 years old can, indeed, learn to touch-type. No kidding. It makes sense when you consider how much easier it is for young children to type their ABCs than it is to write them with a pencil or crayon.

There is a variety of typing software and other learning materials appropriate to help young children



learn to keyboard. *Charlie Brown's ABCs* (Random House) and *Muppet Learning Keys* (Sunburst) are among the breed of typing packages that can teach and amuse young children. These programs, which include many goodies, utilize learning techniques such as active body movement, story telling, and games to grab and hold the attention of youngsters as they practice keyboarding.

For instance, one program uses stories to transform a giant reproduction of a keyboard into a magical place: The top row becomes the blue sky where numbered birds fly across; the second—or QWERTY row—is likened to green grass where rabbits hop; the home row is said to be a neighborhood; and the bottom row is brown ground. Children can match numbers and letters on the bird, bunny, house, and worm rows of keys, and they can sharpen their large-motor skills as they hop, jump, crawl, and “fly” on the big keyboard, which lies on the floor.

However, don't think that a playful keyboarding package alone will be able to teach your children how to touch-type. As a parent, you'll have to play the role of a teacher, helping your kids with their keyboarding skills. Here are some ways you can help your young children get com-

fortable at the keyboard:

- Try to make keyboarding drill and practice pleasant and fun. When I was in high school, Beginning Typing wasn't exactly on my list of all-time favorite classes. If you don't reduce the drudgery of drill and practice, you're bound to have at least one cranky child on your hands within minutes.

- Teach typing skills in several short and bearable practice intervals (not more than 10 minutes each). Finding 10 minutes here and 10 minutes there is easier than you may think.

- Start with the strongest fingers and teach those keys before progressing to weaker fingers. It will take some time before a 4 year old will be able to snap down those a's and g's without difficulty.

ELEMENTARY KEYBOARDING

As children move up to second, third, and fourth grade, those who enjoy computers know for themselves the value of basic keyboarding skills. As a result, you won't have to hide learning behind laughter as much as you do with younger children. Children in this age group learn fairly quickly and with determination, and it's likely that they'll want to enrich their keyboarding skills to make computing easier.

Clever and engaging software, which includes print materials, such as workbooks and stickers, is appropriate to teach elementary-school children keyboarding. Programs such as *MasterType* (Mindscape/Scarborough), *Typing Tutor* (Simon & Schuster), and *Success with Typing* (Scholastic Software) combine rules with games to provide drill and practice. Of course, you can help, too.

For example, when your children turn on the computer to practice their keyboarding skills, be sure they are sitting correctly at the key-

DR. TRISHA AINSA, Ph.D., is associate professor of education at the University of Texas at El Paso. She is also the director of Computer Literacy in Children, a project that teaches English and technology to non-English speaking students.

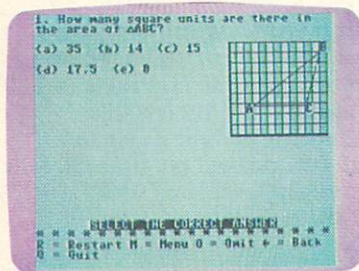
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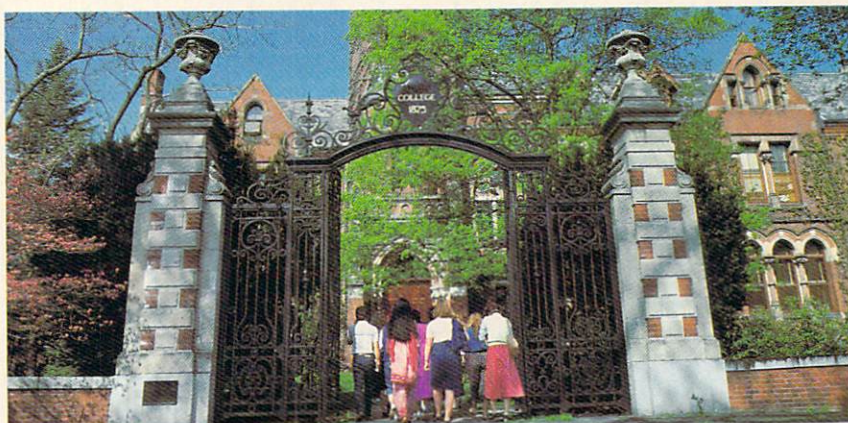
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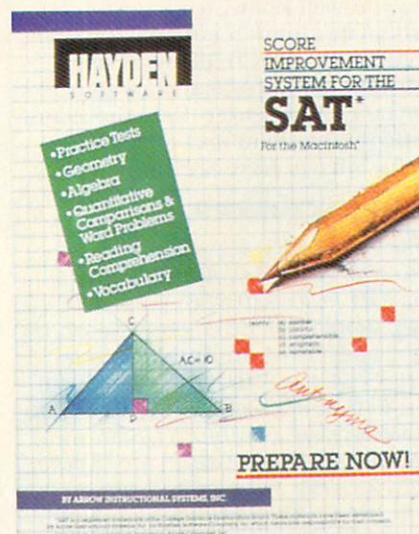
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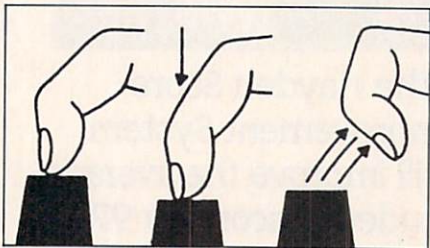
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HOME-SCHOOL CONNECTION

board. Stress the five posture points:

1. Sit in front of the keyboard, body centered on the B key.
2. Hold elbows close to the body.
3. Sit tall and lean forward from the waist.
4. Put both feet flat on the floor, a few inches apart.
5. Hold wrists low, but not resting on the computer.

Not only is there a proper way to sit, but there's a correct way to depress keys. Pressing keys as shown below will help your children speed up their typing and prevent them from getting repetitions of the same key (e.g., bbbbbb) caused by holding down a key too long.



1. The finger is over the key. Notice that the finger is slightly curved.
2. The finger goes down to strike the key with a firm, sharp stroke and quickly releases it.
3. The finger snaps away from the key and curves a little more as it lets the key go.
4. Combine the three pictures for a complete stroke.

For older children, challenging decoding activities can be used to reinforce their knowledge of the keyboard. Try the following example:

- | | |
|---|---|
| <input type="checkbox"/> right pointer, down | <input type="checkbox"/> left pinky |
| <input type="checkbox"/> left middle, up 1 | <input type="checkbox"/> left middle, down 1 |
| <input type="checkbox"/> left middle, up 1 | <input type="checkbox"/> left middle, up 1 |
| <input type="checkbox"/> left pointer, up and right 1 | <input type="checkbox"/> left ring |
| <input type="checkbox"/> right pointer, down | <input type="checkbox"/> left pointer, up and right 1 |
| <input type="checkbox"/> left middle, up 1 | <input type="checkbox"/> left pinky |
| <input type="checkbox"/> left pinky | <input type="checkbox"/> left pointer, up and right 1 |
| <input type="checkbox"/> left pointer, up and right 1 | <input type="checkbox"/> right pointer, up and right 1 |
| <input type="checkbox"/> left ring | <input type="checkbox"/> right middle, up 1 |
| <input type="checkbox"/> right pinky, up 1 | <input type="checkbox"/> right ring, up 1 |
| | <input type="checkbox"/> right pointer, down and left 1 |
| | <input type="checkbox"/> right ring, up 2 |

Your children can crack the code by knowing exactly where their fingers go on the keyboard and by filling in the blanks with letters.

HELPING YOUNG ADULTS LEARN KEYBOARDING

It's easy to convince parents of junior-high and high-school students that keyboarding is an important computer skill. Parents are beginning to think about the practical job skills that their children will need, and they know that professionals find typing skills necessary to take full advantage of computers. If your children graduate from high school and college with keyboarding skills, they'll be better prepared to work in today's working world—an ever-advancing technological society. And for the present, good typing skills will help them with their word processing, programming, and other school projects that are done with the computer.

Most secondary schools offer typing courses, which are, as always, dominated by girls. Could this indicate that girls want to improve their computing skills? Not likely. All indications are that boys still think typing is for sissies, and they'd rather stick with a fast and furious hunt-and-peck method.

Try to encourage your children—sons and daughters—to enroll in a typing course. But if they don't have the time or (more likely) don't want to learn keyboarding in school, there are a number of keyboarding programs—such as *Success With Typing* and *Typing Tutor*—intended to help older children learn to type.

As you well know, teenagers don't want or need much supervision from parents, and they're likely to roll their eyes at cutesy learning games. But you can peer over their shoulders to encourage them and offer some helpful advice. Here are some ways

MANUFACTURERS

Charlie Brown's ABCs: Random House Software; ages 2-6; Apple, C 64/128, IBM PCjr; \$20-\$30; (212) 872-8036. **MasterType:** Mindscape/Scarborough; ages 7-adult; Amiga, Apple, Atari, C 64/128, IBM PC/PCjr, Macintosh; \$40-\$50; (312) 480-7667. **Muppet Learning Keys:** Sunburst Communications; preschool-grade one; Apple, C 64/128, IBM PCjr; \$80; (800) 431-6616, (914) 769-5030 in New York. **Success With Typing:** Scholastic Software; ages 10-18, 64K Apple series, IBM PC/PCjr; \$40; (212) 505-3000, (800) 325-6149. **Typing Tutor:** Simon & Schuster; ages 12+; Apple, C 64/128, IBM PC/PCjr, Macintosh; \$40-\$60; (212) 333-2882.


WHAT HAPPENS WHEN WE KEYBOARD?

Physiologically, when young people learn to type, several things happen between their muscles and their brain. Let's look at the process. Between the bones of the fingers lie muscles called the interossei. Special sensory nerve endings are buried within these muscles. You can observe this simply by closing your eyes and squeezing your fingers together and spreading them apart. Do you know where your fingers are? You can probably "feel" where they are. The reason for this is that thousands of muscle spindle fibers are firing nerve impulses to your brain telling your cerebellum the relative position of your fingers (a process called proprioception). This sense of proprioception is the basis for learning touch-typing. A piano student trains his or her brain to learn unconsciously the proprioceptive input patterns for specific keys on the instrument. Keyboarding is a similar skill. It also requires proprioceptive input patterns.

There is a hierarchy of sensory input to the brain. This hierarchy dictates that sight takes precedence over proprioception (touch). This means that sight-learning can hinder touch-learning. Children who learn to type by hunting and pecking (no matter how good they are at it), can inhibit their ability to learn touch-typing.

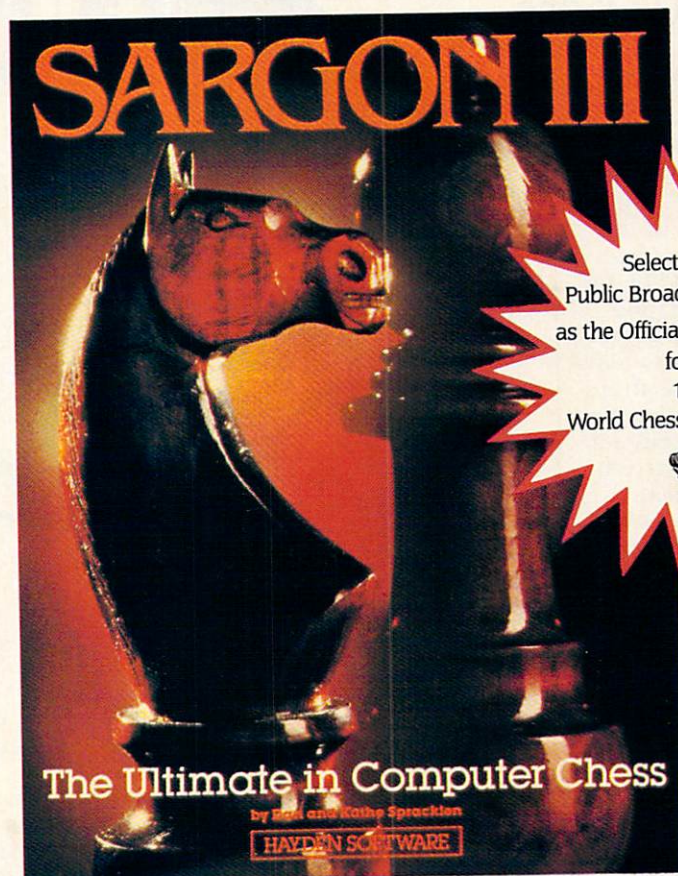
you can help:

- Encourage your teenagers to set aside a regular time every day to learn and practice their skills.
- Demonstrate how to sit in a comfortable, relaxed position directly in front of the keyboard with both feet on the floor or on a foot rest.
- Make certain your teens keep their arms parallel to the slant of the keyboard.
- Reward them somehow for learning new skills. Maybe you can make a special dinner, buy a new programming book, or take over the lawn-mowing duty for the week.

Whatever your children's ages, keyboarding has been demonstrated to be an effective skill for computer users. Not only can children keyboard effectively after systematic instruction, drill, and practice, but they can also improve academic skills through the use of a computer-based curriculum. Your children can type words, sentences, and neater homework assignments for all of their classes—from English to science. 

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A+ Magazine



"An excellent personal computer
chess program."

MacWorld Magazine



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HOME OFFICE

WHY PAY MORE?

Tax Write-offs For Your Home Business

BY MICHAEL C. THOMSETT

Sweeping new tax laws have been going through Congress, and before the year's out, tax reform may mean significant changes for the 1.1 million home-business owners in the United States. Many financial experts believe that 1986 could be the last year for any meaningful long-term tax planning, and they are advising home-office operators to take a look at potential tax-saving strategies such as incorporation, depreciation, and other deductions. Plus, if you've been planning to buy a computer, you might want to make that move before the end of 1986 when deductions such as the investment tax credit will be restricted.

DEDUCT WITH CARE

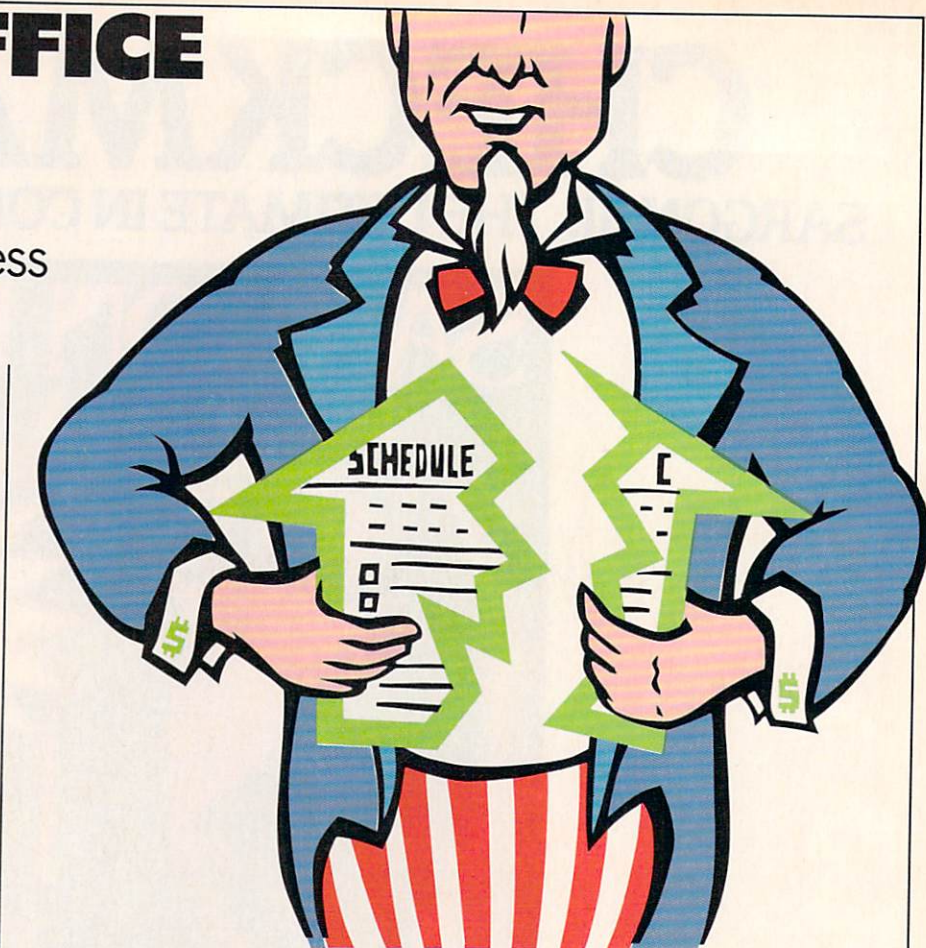
You would think that claiming a deduction for an office at home should be a fairly simple matter. If you have a business and you use a room or part of a room as a work area, you have a legitimate deduction, right?

Not necessarily. This is one of the many cases that has special rules and restrictions. Since it is so hard to monitor the validity of home-office deductions, the Internal Revenue Service has made them a special target, rendering it very difficult to qualify for full home-office deductions.

The self-employed must report their business income on Schedule C. You are asked in question H of that form, "Did you deduct expenses for an office in your home?" On Part II, you itemize deductions such as depreciation, insurance, interest, office expenses, utilities, repairs, rent, and taxes.

A "yes" answer to question H might trigger an audit of your tax return. That's because very few people can meet the three tests the IRS applies against a home-office deduction.

■ The first test is the "exclusive-use



rule." The rule states that the area for which you claim deductions must be used exclusively for work. If it isn't, you do not qualify for any deduction.

An importer kept records and operated his business from a den in his house, where his business equipment consisted of one desk, two filing cabinets, a telephone, and two chairs. The room was not used

for any other purposes, so he believed claiming a deduction was all right.

The expenses he claimed were questioned by the IRS, and his claim was disallowed. The reason: He used the room for storage of personal effects. The bookcase in the room was filled with books that were not connected with his business, and the room was also used to store furniture. He was allowed to deduct only a fraction of what he originally claimed—for the space his desk and files took up—about one-fourth of the total room.

If you will claim a deduction for a home office, dedicate a room or a portion of a room exclusively for business use. Do not put any personal effects in that room, not even items you need to store.

The "exclusive-use" rule will disqualify the majority of people who would like to take a deduction for a home office.

■ Another rule requires that you use the area on a regular basis.

A draftsman who was employed by a firm full time also did consulting work on the side. For this, he used a small room in his house.

The tax rules require that you use an area in your home not only exclu-

HOW TO DEPRECIATE A

\$5,000 COMPUTER

As long as your computer at home is used more than 50 percent for business, you can claim depreciation on an accelerated (prescribed) basis.

You can elect to use a straight-line method, writing off your computer over five years. If you use your computer less than 50 percent for business, you must use the straight-line method.

Year	Prescribed Method	5-year Straight-line Method
1*	\$ 750	\$ 500
2	1,100	1,000
3	1,050	1,000
4	1,050	1,000
5	1,050	1,000
6	0	500

*assuming asset is purchased at mid-year.

MICHAEL C. THOMSETT is a freelance writer and author of nine books, including *Computers: The Builder's New Tool* and *How To Buy A House, Condo or Co-op*.

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LET THE RECORD SHOW

If you use your home computer for business, you are subject to special rules and restrictions.

To establish the business use of your home computer, it is critical to keep thorough records of your usage.

Maintain a log of usage for business and non-business purposes. You can create this log right on the system itself in many cases. If you have a time and date feature in the sign-on, use it and keep hard-copy evidence for all usage.

Your log can consist of a book in which you record pertinent details. You should make your recordings in this book each

time you use the computer. Include the following information:

DATE
TIME ON
TIME OFF
TOTAL TIME ON THE SYSTEM
FILE NAME(s)
BUSINESS DESCRIPTION
NON-BUSINESS (CHECK ONLY)

If you have your tax return prepared by someone else, you should provide them with a copy of your record. Use will be computed based on the total amount of time you use your computer for business.

sively, but also regularly for business purposes. Aware of this provision, the draftsman kept records of his use on a regular basis.

He kept this information by tracking his time on the job, something he had to do in order to bill his clients. In an audit, this record also served to prove his case that he used the room for business regularly.

■ The third restrictive rule is that your home office must be your *principal* place of business for your enterprise. If you are employed by an outside company, but also run your own business from your home, you can meet this test. But there are two instances in which you may not: 1) if you have a separate business location, and 2) if you are an employee of an outside company and do company-related work in your home office.

If you also operate a store or office outside your home, you can only claim a home-office deduction if you can establish your home office as your principal place of business. One way to do this is to prove the absolute need for a home office as a place to meet with clients or perform work that could not be done at the outside office.

If you are an employee and are using a home office to do company work, it is equally difficult to claim a deduction. You must be able to prove that keeping such an office must be for the convenience of the employer. You will need a letter from your employer explaining that you are required to work at home. You also must be able to prove the regular and exclusive use of that area.

PROVING YOUR CASE

With all of these rules, it is extremely difficult to qualify. But thousands of Americans do. If you answer "yes" to question H on Schedule C, expect the IRS to apply their tests—exclusive use, regular use, and principal place of business.

You might also want to anticipate the questions being asked and supply extra information on your tax return. (You should still keep copies of these documents in case of an audit by the IRS.)

An interior decorator claims a deduction for two rooms, one used as an office and the other used as a storage room.

Along with her tax return, the decorator sends in computations of her square footage, copies of bills, and a complete explanation of how she arrives at the deduction. She also writes up an explanation of how she meets the three tests. (However, sending additional information does not guarantee that you won't be audited.)

Her deductions fall into several categories. You are allowed to deduct appropriate expenses for a portion of your home, depending upon the usage. For example, if your home measures 2,500 square feet and you use one room for business that is 250 square feet, you are entitled to a 10 percent deduction for home-fire insurance, interest, property taxes, utility bills, and repairs and maintenance. You can also claim 10 percent of your monthly rent charges. You may deduct 100 percent of some expenses, such as a telephone used exclusively for business.

APPRECIATING DEPRECIATION

If you own your home, you can claim depreciation. Most homeowners who operate businesses in their homes and who meet the qualifications for a home office will be allowed to write off a portion of the expense of their home over 19 years. Like the other types of expenses, you can take only that portion relating to business, at least under the tax laws for 1986. So if you use 250 out of 2,500 square feet for your business, you can claim only 10 percent of the allowable depreciation. You cannot claim any write-off for land, and the calculation is based on your purchase price and improvements, not the current market value. An example of the calculation:

PURCHASE PRICE	\$75,000
LESS: LAND	\$20,000
BUILDING VALUE	\$55,000
PORTION USED FOR BUSINESS	10%
QUALIFIED VALUE	\$5,500
ANNUAL DEPRECIATION (1/19th)	\$289

There are a couple of reasons why you might be better off not claiming a depreciation deduction, even if you qualify for it.

If you use only 10 percent or less of your home for business, the deduction does not provide you with a large write-off. In addition, you have two consequences to think about.

First, when you sell your house and buy another, you are usually allowed to defer any tax on the transaction, as long as your new house costs more than the selling price of your old house. But any portion used for business is excluded from this provision. So you will be taxed on that portion of your house you depreciate.

Second, anyone over age 55 is allowed to exclude up to \$125,000 of profits from tax. This is a once-in-a-lifetime provision. But any portion of your home that you depreciate does not qualify. So you could gain a small advantage now, and pay for it later.

Considering the risks and restrictions, claiming a home-office deduction must be an individual decision. The dollar amount of the deduction might not be enough to risk exposure to an IRS audit. And for others, even a completely legitimate claim might not be worth the risks. **RE**

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PERSONAL FINANCE

IS YOUR HOUSE WORTH THE MONEY?

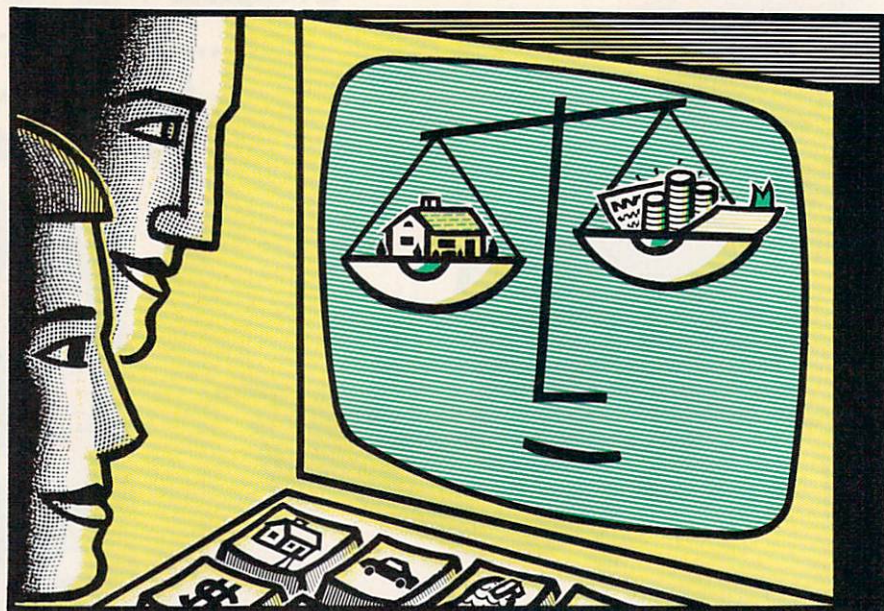
Type in Our BASIC Program and Get a Dollars-and-Cents Evaluation

BY KIMBALL BEASLEY

While businesses evaluate their assets to find out whether they are "productive," individuals are more likely to ask, "Is my house or car worth it? Am I getting my money's worth?" Indeed, your house is either a better or worse deal than one down the street. Some houses are worth paying a high monthly mortgage for, and others are not.

Of course, other factors, such as location and emotion, play a big role in determining value. You may love your old house even if it's a money pit because it's near great tennis courts! But, if you're uncertain about whether to buy or sell a house or car, taking a hard look at its hard-cash value may help sway you.

Here are two examples that illustrate what I call the "personal asset productivity concept" and a short BASIC program (for IBM PC and



compatibles and Tandy Models III & 4), that will compute the value of your assets

KIMBALL J. BEASLEY is a senior engineer at a consulting firm in Princeton, New Jersey. He has an MBA, and he wrote the Mortgage Renegotiation Analysis program in the July 1986 issue.

EXAMPLE 1 The Smith House:

The Smith family's major asset is a house they just bought for

\$150,000. They paid \$100,000 in cash and have a mortgage balance of \$50,000. In this analysis, the cost of owning and operating the house is compared with its product value.

OPERATING COSTS. Most of the owning and operating costs—such as

(Text continued on page 24)

Figure 1

VALUE ANALYSIS FOR HOUSE

***** DATA *****	
CURRENT AVAILABLE INTEREST, AFTER TAX =	8%
ASSET OWNER'S INCOME-TAX BRACKET =	35%
ASSET'S ESTIMATED APPRECIATION RATE† =	5% PER YEAR
ASSET'S CURRENT MARKET VALUE =	\$150,000
ASSET'S CURRENT DEBT BALANCE =	\$50,000
ASSET'S OWNING/OPERATING COST =	\$950 PER MONTH
TAX-DEDUCTIBLE PORTION =	\$800 PER MONTH
ASSET'S UTILITY VALUE =	\$750 PER MONTH
***** ANALYSIS *****	
OWNER'S EQUITY IN ASSET =	\$100,000.00
OWNING/OPERATING COST =	\$ 11,400.00 PER YEAR (950 PER MONTH)
FROZEN EQUITY COST =	\$ 8,000.00 PER YEAR (8% INTEREST ON \$100,000 EQUITY)
TOTAL ASSET COST =	\$ 19,400.00 PER YEAR (\$1616 PER MONTH)
INCOME-TAX BENEFIT =	\$ 3,360.00 PER YEAR (35% TAX BRACKET x \$9600 DEDUCTIBLE COST)
NET APPRECIATION ESTIMATE =	\$ 7,500.00 PER YEAR (5% APPRECIATION ON \$150,000 ASSET VALUE)
UTILITY VALUE =	\$ 9,000.00 PER YEAR (\$750 PER MONTH)
TOTAL ASSET VALUE =	\$ 19,860.00 PER YEAR (\$1655 PER MONTH)
NET ASSET VALUE =	\$ 460.00 PER YEAR (\$38 PER MONTH)

† For depreciation, enter a negative value.

Figure 2

VALUE ANALYSIS FOR CAR #1

***** DATA *****	
CURRENT AVAILABLE INTEREST, AFTER TAX =	8%
ASSET OWNER'S INCOME-TAX BRACKET =	35%
ASSET'S ESTIMATED APPRECIATION RATE† =	-15% PER YEAR
ASSET'S CURRENT MARKET VALUE =	\$10,000
ASSET'S CURRENT DEBT BALANCE =	\$6,000
ASSET'S OWNING/OPERATING COST =	\$300 PER MONTH
TAX-DEDUCTIBLE PORTION =	\$175 PER MONTH
ASSET'S UTILITY VALUE =	\$350 PER MONTH
***** ANALYSIS *****	
OWNER'S EQUITY IN ASSET =	\$ 4,000.00
OWNING/OPERATING COST =	\$ 3,600.00 PER YEAR (\$300 PER MONTH)
FROZEN EQUITY COST =	\$ 320.00 PER YEAR (8% INTEREST ON \$4,000 EQUITY)
TOTAL ASSET COST =	\$ 3,920.00 PER YEAR (\$326 PER MONTH)
INCOME-TAX BENEFIT =	\$ 735.00 PER YEAR (35% TAX BRACKET x \$2100 DEDUCTIBLE COST)
NET APPRECIATION ESTIMATE =	\$ -1,500.00 PER YEAR (-15% APPRECIATION ON \$10,000 ASSET VALUE)
UTILITY VALUE =	\$ 4,200.00 PER YEAR (\$350 PER MONTH)
TOTAL ASSET VALUE =	\$ 3,435.00 PER YEAR (\$286 PER MONTH)
NET ASSET VALUE =	\$ -485.00 PER YEAR (-\$41 PER MONTH)

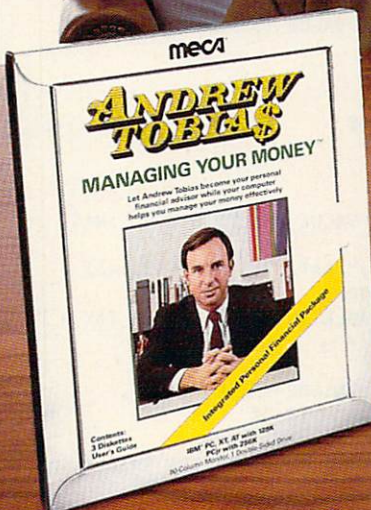
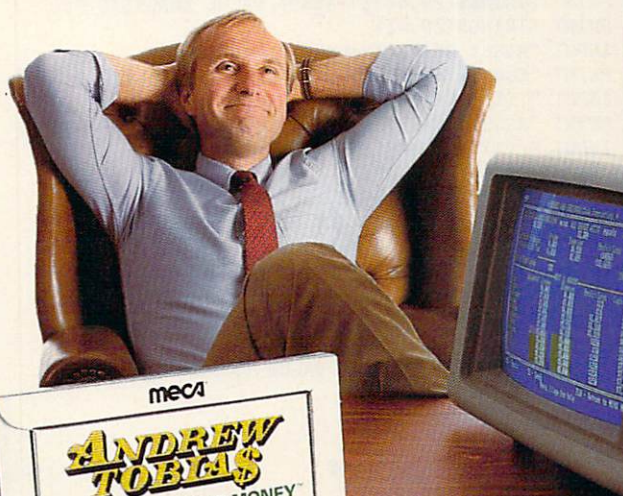
† For depreciation, enter a negative value.

MANAGING YOUR CHECKBOOK?
 MANAGING YOUR BUDGET?
 MANAGING YOUR BILLS?
 MANAGING YOUR CASH FLOW?
 MANAGING YOUR TAXES?
 MANAGING YOUR INSURANCE?
 MANAGING YOUR STOCKS?
 MANAGING YOUR BONDS?
 MANAGING YOUR REAL ESTATE?
 MANAGING YOUR TAX SHELTERS?
 MANAGING YOUR SAVINGS?
 MANAGING YOUR MORTGAGE?
 MANAGING YOUR AUTO LOAN?
 MANAGING YOUR RETIREMENT?
 MANAGING YOUR CALENDAR?
 MANAGING YOUR CHARGE ACCOUNTS?
 MANAGING YOUR CAPITAL GAINS?
 MANAGING YOUR ANNUITIES?
 MANAGING YOUR APPOINTMENTS?
 MANAGING YOUR DIVIDENDS?
 MANAGING YOUR INTEREST?
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Figure 3

VALUE ANALYSIS FOR CAR #2

```

***** DATA *****
CURRENT AVAILABLE INTEREST, AFTER TAX = 8%
ASSET OWNER'S INCOME-TAX BRACKET = 35%
ASSET'S ESTIMATED APPRECIATION RATE† = -15% PER YEAR
ASSET'S CURRENT MARKET VALUE = $15000
ASSET'S CURRENT DEBT BALANCE = $13000
ASSET'S OWNING/OPERATING COST = $425 PER MONTH
TAX-DEDUCTIBLE PORTION = $375 PER MONTH
ASSET'S UTILITY VALUE = $500 PER MONTH

***** ANALYSIS *****

OWNER'S EQUITY IN ASSET = $ 2,000.00

OWNING/OPERATING COST = $ 5,100.00 PER YEAR
($425 PER MONTH)

FROZEN EQUITY COST = $ 160.00 PER YEAR
(8% INTEREST ON $2000 EQUITY)

TOTAL ASSET COST = $ 5,260.00 PER YEAR
($438 PER MONTH)

INCOME-TAX BENEFIT = $ 1,575.00 PER YEAR
(35% TAX BRACKET
x $4500 DEDUCTIBLE COST)

NET APPRECIATION ESTIMATE = $ -2,250.00 PER YEAR
(-15% APPRECIATION
ON $15000 ASSET VALUE)

UTILITY VALUE = $ 6,000.00 PER YEAR
($500 PER MONTH)

TOTAL ASSET VALUE = $ 5,325.00 PER YEAR
($443 PER MONTH)

*****
NET ASSET VALUE = $ 65.00 PER YEAR
($5 PER MONTH)
*****
† For depreciation, enter a negative value.

```

Base Version (IBM PC & compatibles w/80+ col- umn printer)/Asset Productivity Analysis

This program has been tested and found to work on the following computers and hardware configurations, using the BASICS shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome/Printer card. w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. It should also work on many PC compatibles.

```

10 CLS:WIDTH 80:WIDTH "LPT1:";80:SPS=STRING$(42,32)
20 KEY OFF:FS="\ \###,###.## \ \"
30 PRINT STRING$(29,42);" ASSET VALUE ANALYSIS ";
40 PRINT STRING$(29,42)
50 INPUT "ASSET BEING ANALYZED";NAS
60 PRINT "CURRENT AVAILABLE INTEREST RATE, AFTER TAX";
70 INPUT " (X)";CRT
80 PRINT "ASSET OWNER'S MARGINAL INCOME-TAX BRACKET";
90 INPUT " (X)";BKT:PRINT
100 INPUT "ASSET'S CURRENT MARKET VALUE ($)";AVL
110 INPUT "ASSET'S CURRENT DEBT BALANCE ($)";DBT
120 PRINT "ASSET'S ESTIMATED NET APPRECIATION RATE";
130 INPUT " (% PER YEAR)";ARP
140 PRINT "ASSET'S OWNING/OPERATING COST";
150 INPUT " ($ PER MONTH)";OPC
160 PRINT "ASSET'S TAX-DEDUCTIBLE COSTS";
170 INPUT " ($ PER MONTH)";DED
180 INPUT "ASSET'S UTILITY VALUE ($ PER MONTH)";UTV
190 EQT=AVL-DBT
200 FZE=INT(EQT*CRT)/100
210 TAC=OPC*12+FZE
220 TXB=INT(DED*12*BKT)/100
230 AYP=AVL*ARP/100
240 TPV=TXB+AYP+UTV*12
250 W=(57-LEN(NAS))/2
260 LPRINT STRING$(W,32);"VALUE ANALYSIS FOR ";NAS
270 LPRINT
280 LPRINT STRING$(35,43);" DATA ";STRING$(35,43)
290 LPRINT:Y=CRT:GOSUB 2000
300 LPRINT "CURRENT AVAILABLE INTEREST, AFTER TAX = ";
310 LPRINT Y$;"%"
320 Y=BKT:GOSUB 2000
330 LPRINT "ASSET OWNER'S INCOME-TAX BRACKET";
340 LPRINT STRING$(6,32);" = ";Y$;"%"
350 Y=ARP:GOSUB 2000
360 LPRINT "ASSET'S ESTIMATED APPRECIATION RATE*";
370 LPRINT STRING$(2,32);" = ";Y$;"% PER YEAR"
380 Y=AVL:GOSUB 2000

```

```

390 LPRINT "ASSET'S CURRENT MARKET VALUE";
400 LPRINT STRING$(10,32);" = ";Y$;
410 Y=DBT:GOSUB 2000
420 LPRINT "ASSET'S CURRENT DEBT BALANCE";
430 LPRINT STRING$(10,32);" = ";Y$;
440 Y=OPC:GOSUB 2000
450 LPRINT "ASSET'S OWNING/OPERATING COST";
460 LPRINT STRING$(9,32);" = ";Y$;" PER MONTH"
470 Y=DED:GOSUB 2000
480 LPRINT STRING$(8,32);"TAX-DEDUCTIBLE PORTION";
490 LPRINT STRING$(8,32);" = ";Y$;" PER MONTH"
500 Y=UTV:GOSUB 2000
510 LPRINT "ASSET'S UTILITY VALUE";STRING$(17,32);
520 LPRINT " = ";Y$;" PER MONTH":LPRINT
530 LPRINT STRING$(33,43);" ANALYSIS ";STRING$(33,43)
540 LPRINT
550 LPRINT "OWNER'S EQUITY IN ASSET";STRING$(5,32);
560 LPRINT USING F$;" = ";EQT
570 LPRINT STRING$(76,45)
580 LPRINT "OWNING/OPERATING COST";STRING$(7,32);
590 LPRINT USING F$;" = ";OPC*12;"PER YEAR"
600 Y=OPC:GOSUB 2000
610 LPRINT SP$;"($";Y$;" PER MONTH)"
620 LPRINT "FROZEN EQUITY COST";STRING$(10,32);
630 LPRINT USING F$;" = ";FZE;"PER YEAR"
640 Y=CRT:GOSUB 2000
650 LPRINT SP$;"("";Y$;"% INTEREST ON ";
660 Y=EQT:GOSUB 2000
670 LPRINT Y$;" EQUITY)"
680 LPRINT STRING$(31,32);"-----"
690 LPRINT "TOTAL ASSET COST";STRING$(12,32);
700 LPRINT USING F$;" = ";TAC;"PER YEAR"
710 Y=INT(TAC/12):GOSUB 2000
720 LPRINT SP$;"($";Y$;" PER MONTH)"
730 LPRINT STRING$(76,45)
740 LPRINT "INCOME-TAX BENEFIT";STRING$(10,32);
750 LPRINT USING F$;" = ";TXB;"PER YEAR"
760 Y=BKT:GOSUB 2000
770 LPRINT SP$;"("";Y$;"% TAX BRACKET"
780 Y=DED*12:GOSUB 2000
790 LPRINT SP$;" x ";Y$;" DEDUCTIBLE COST)"
800 LPRINT "NET APPRECIATION ESTIMATE";STRING$(3,32);
810 LPRINT USING F$;" = ";AYP;"PER YEAR"
820 Y=ARP:GOSUB 2000
830 LPRINT SP$;"("";Y$;"% APPRECIATION"
840 Y=AVL:GOSUB 2000
850 LPRINT SP$;" ON ";Y$;" ASSET VALUE)"
860 LPRINT "UTILITY VALUE";STRING$(15,32);
870 LPRINT USING F$;" = ";UTV*12;"PER YEAR"
880 Y=UTV:GOSUB 2000
890 LPRINT SP$;"($";Y$;" PER MONTH)"
900 LPRINT STRING$(31,32);"-----"
910 LPRINT "TOTAL ASSET VALUE";STRING$(11,32);
920 LPRINT USING F$;" = ";TPV;"PER YEAR"
930 Y=INT(TPV/12):GOSUB 2000
940 LPRINT SP$;"($";Y$;" PER MONTH)"
950 LPRINT:LPRINT STRING$(76,42)
960 LPRINT " NET ASSET VALUE";STRING$(12,32);
970 LPRINT USING F$;" = ";TPV-TAC;"PER YEAR"
980 Y=INT(TPV-TAC)/12:GOSUB 2000
990 LPRINT SP$;"($";Y$;" PER MONTH)"
1000 LPRINT STRING$(76,42)
1010 END
2000 Y$=STR$(Y):IF Y<0 THEN RETURN
2010 Y$=RIGHT$(Y$,LEN(Y$)-1):RETURN

```

MODIFICATIONS FOR ANOTHER COMPUTER

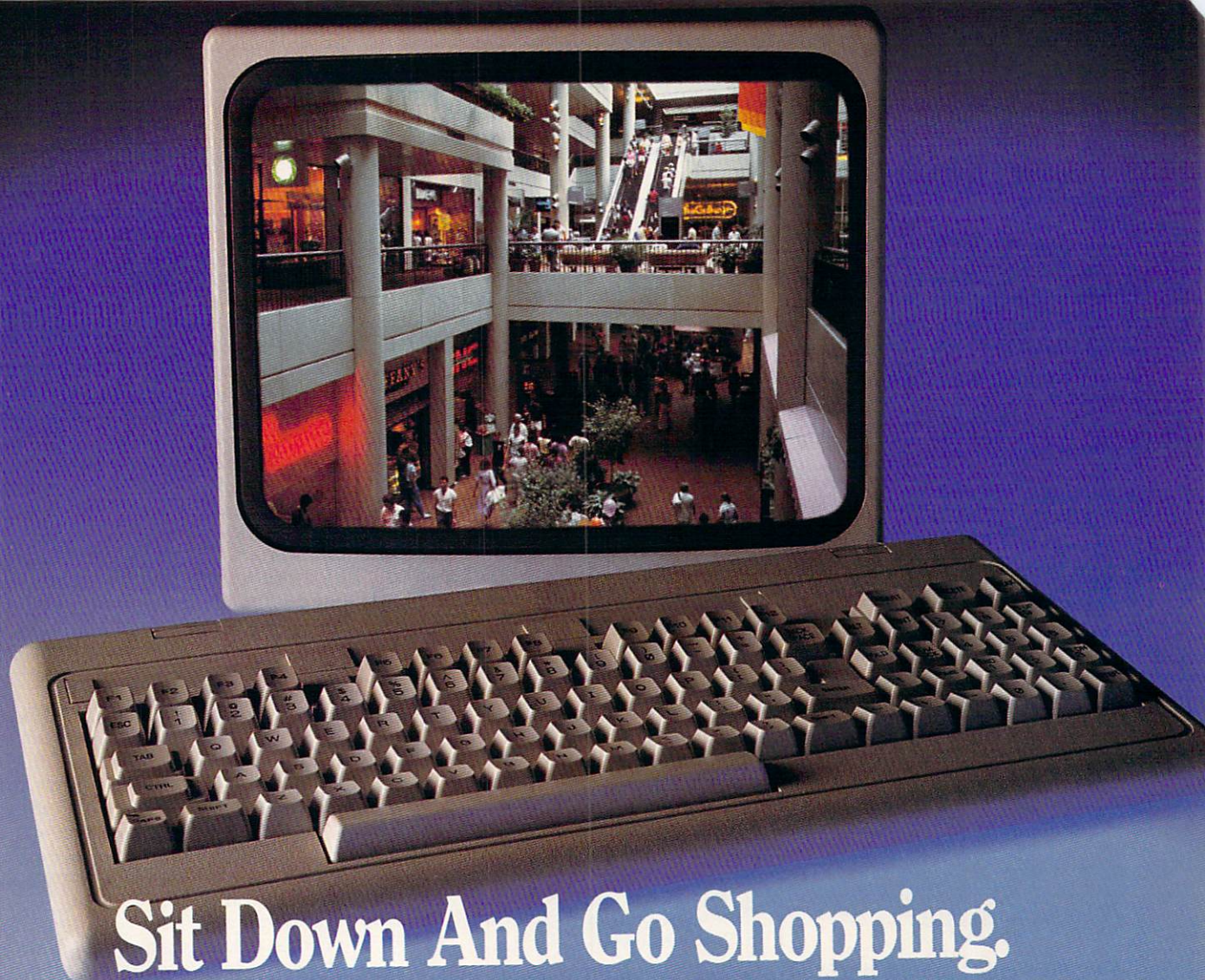
Tandy Models III & 4 (Model III mode) w/80 + col- umn printer/Asset Productivity Analysis

Use the base version except change lines 10, 20, 30 and 40 to read as follows:

```

10 CLEAR 3000:CLS:SPS=STRING$(42,32)
20 FS="% %###,###.## % %"
30 PRINT STRING$(21,42);" ASSET VALUE ANALYSIS ";
40 PRINT STRING$(21,42)

```

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mortgage payments and maintenance and real-estate taxes—can be easily identified or estimated. The “frozen-equity” cost is a little harder to identify. This figure measures the loss of potential interest that could be earned if your capital were not frozen in the house. Example: If 8 percent after-tax interest is available with current savings instruments, the yearly “frozen-equity” cost for the Smith house is 8 percent of their \$100,000 equity—or \$8,000.

PRODUCT VALUE. To assess the “product value” of the Smith house, three factors are considered. One is the income-tax benefit. This is the amount you save in income taxes because you deduct owning/operating costs such as mortgage interest payments and real-estate taxes. Second, appreciation—the amount the house’s value is expected to rise each year—is added to the value.

Finally, the house’s “utility value” is added to the product value. This is the value the Smith family assigns to having use of the house. The utility value usually may be considered as the amount you would pay to rent an equivalent house. But, it can also include intangibles that add value to the market price, such as proximity to work or friends or a neighborhood that you love.

USING THE COMPUTER

To evaluate the house’s costs versus product value, the Smiths use their computer and the *Asset Productivity Analysis* program. After organizing their information, they respond to the computer prompts, as in Figure 1.

The Smith house is a “productive” asset. The total **PRODUCT VALUE** exceeds the **ASSET COST**. If the Smiths thought they were paying too much money every month, at least they can be glad that they’re not throwing good money after bad. Of course, if the Smiths are having trouble meeting the monthly payments, they shouldn’t necessarily continue to hold the house just because it’s valuable.

EXAMPLE 2

The Smith Car:

Now the Smith family evaluates their second most valuable asset, their car. Back at the computer, they enter data, as in Figure 2.

Since the car’s **ASSET COST** exceeds the car’s **PRODUCT VALUE**, the Smith

car is an unproductive asset.

The Smiths have three options. They can keep their car if it’s in good shape and appears to have a long life ahead of it or has other intangible value (like comfortable seats) that cannot be computed. They can sell the car and lease an equivalent car for approximately the same amount as the expected utility value. Or they can sell their car and buy a new one that provides a better value. Figure 3 shows how they analyze the new-car option.

Notice that the **UTILITY VALUE** on the new car is \$500, compared to \$350 on their current car. That’s because the car they now have is 2 years old. Also, notice that the new-car option reduces the Smiths’ equity and consequently the “frozen-equity” cost. Based on this analysis, the new car gives them more for their money.

DOS AND DON'TS

The *Asset Productivity Analysis* BASIC program is intended for use with personal assets that are financed and have a measurable market (resale) value. An in-ground swimming pool, for instance, may be a substantial asset, but since it cannot be sold, the owner’s options are somewhat limited.

And you shouldn’t base any major purchase decision on this analysis alone. An asset’s value should be one of many factors you consider as you weigh the pros and cons of any decision. For instance, just because an asset is a good value doesn’t mean that you can afford it easily. A Jaguar could be valuable, but too expensive to maintain.

Second, the program measures the effect of “frozen equity” by computing the interest you are not getting on, say, \$5,000. It does not, however, consider what else you might do with \$5,000, if you treated it as cash and not equity. For instance, you could sell your car and lease a new one, and spend the \$5,000 gain on a new bathroom.

Finally, the program does not take into consideration any costs associated with buy/sell transactions. When buying a house, especially, the effect of closing costs (legal fees and points) should be considered.

Nonetheless, this *Analysis* program does allow you to take a hard look at your property and assess it from a businesslike point of view. Once you’ve done that, you can begin to make a decision. ☐

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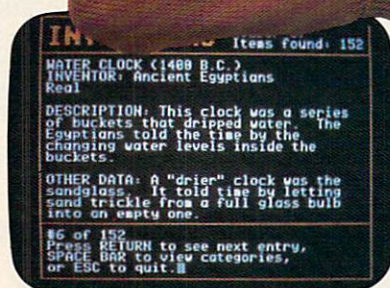
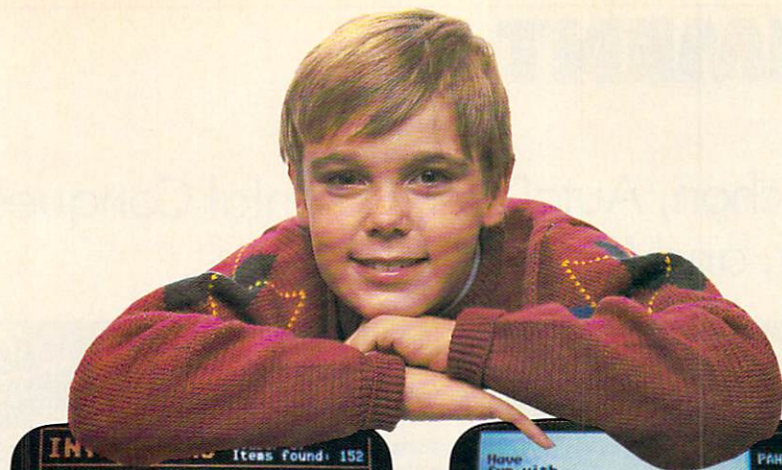


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ENTERTAINMENT

BECOME A WINNER!

Tricks for Mastering Archon, AutoDuel, Colonial Conquest, The Ancient Art of War, and More

BY JAMES DELSON

After last month's hints for winning at role-playing adventures, are you ready for more? To find out, ask yourself the following questions:

Would you like to become an ace at *Archon*? Are you tired of being a "have-not" nation when you play *Colonial Conquest*? Do you feel old when you boot up *The Ancient Art of War*? Has *AutoDuel* become a nickname for your daily commute instead of a game to enjoy?

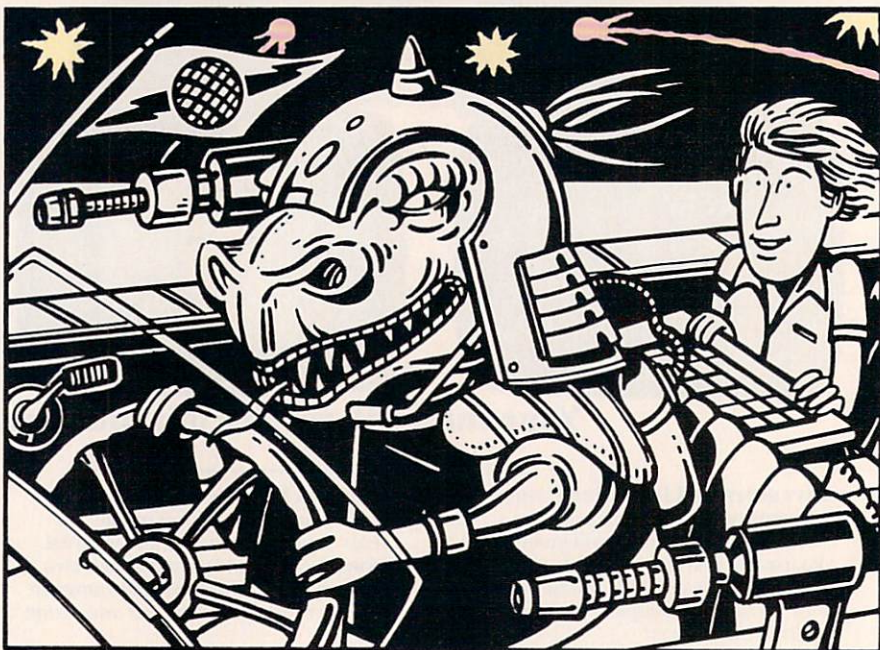
If the word "yes" leaps to mind in response to any of these questions, you'll want to read on.

ARCHON

It's three years old and still one of the most entertaining games around, yet *Archon* can be difficult to master. You'll have to think and plan and also be quick with the joystick in this strategy/arcade game that includes animated pieces.

Whether you're playing against people or the computer, you won't become a big winner until you can shoot diagonally with ease. Here's a hint to help you learn how: Set up a two-player game, but play by yourself. Since you control both characters, one can remain still on the combat board, while you practice shooting diagonals. Once you've mastered this basic skill, it will prove invaluable in dozens of other games, including *Archon II* and *AutoDuel*.

Pay close attention to the shifting color squares. Otherwise you'll get caught standing on the wrong color, which gives an enormous advantage to your opponent. On the other hand, try taunting your adversary



into attacking you on squares of favorable hues.

Electronic Arts, (415) 571-7171. Amiga, Apple, Atari, C 64/128, IBM PC/PCjr, Macintosh. \$15-\$40.

ARCHON II

This program offers a rarity among sequels: an original handling of familiar material combined with enough new elements to separate it from the first scenario. Yet, the original qualities of the program are maintained.

In your first few moves, have your adepts seize the corners of each element to use as "home bases." As the power points shift from corner to corner with each turn, they partially "recharge" the adepts. The power points are at the core of the game, so defend them at all costs.

If you feel confident using wraiths, another sound opening move is to attack your opponent's earth adept. When successful, your wraith will become very powerful and very difficult to eliminate. Also, your adversary will be enormously weakened just as the game begins.

Electronic Arts, (415) 571-7171. Amiga, Apple, Atari, C 64/128. \$33-\$40.

AUTODUEL

My instincts for this highway warrior game were developed with an eye toward the best way to survive instead of pursuing the easiest way to eliminate the opposition.

Why go through all the hassles of training to drive the smaller cars and slowly working your way up to the big, heavily armed vehicles? Instead, begin the game by going directly to Atlantic City by bus. Enter the casino and gamble until you've won \$300,000 or more. Take the bus back to New York City, clone yourself, and then buy the best vehicle you can afford.

My idea of a dream machine is a pickup with an extra-heavy chassis, heavy suspension, a super power plant, and solid tires. For weapons, add a laser up front, recoilless rifles on the sides, and mount a flame-thrower, smoke screen, oil sprayer, and mine layer on your rear. Layer on the heaviest armor the vehicle will take. This prize is ideal for long hauls and can fight anything you'll meet on the road, and it will allow you to outrace all but the fastest enemies.

And yes, clone your character. It costs a good sum of money, but it's

JAMES DELSON welcomes letters from readers.

Soviet division arrives in Tripoli

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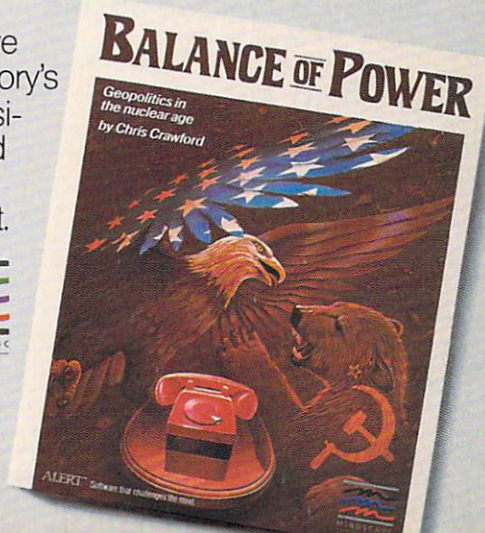
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ENTERTAINMENT

not *that* expensive. Do it for the same reasons you would back up an important data disk when word processing; you could lose weeks of labor in an instant!

Origin Systems. (603) 644-3360. *Amiga.* 64K Apple, Atari, Atari ST, C 64/128, Macintosh. \$50.

COLONIAL CONQUEST

In the land of hybrid games, this combination of political, financial, and military elements is king. *Colonial Conquest* lets both novice and expert players simulate the experience of ruling the world.

When planning an overall game strategy, try to seize and hold the continental regions in this order of numbers: 5, 4, 2, 6, 1, 3, 7, and 8.

Nothing can stunt your growth as much as a protracted war early in the game. So, to increase your chances of achieving long-term goals, make alliances and nonaggression pacts with the other human players.

Bearing that in mind, it would be prudent to try a little backroom politicking with the neutral countries. Say, for instance, that you and your friend Sam agree to let him take over Asia, while you go for the South Pacific nations. Then, in your annual build phase, lend as much money as you can afford to the strongest neutral countries Sam is trying to conquer. This should delay his expansion, weaken his forces, and allow you to grow to the point that he will be just one more easy pickin' for your imperialist forces.

Never risk huge transport fleets in landing areas where you might be opposed. Instead, first seize or subvert a province, then garrison it, and finally use it as a staging area. If you follow this dictum, you'll probably never lose a transport fleet.

Strategic Simulations, Inc., (415) 964-1353. 64K Apple, Atari, C 64/128. \$40.

MAIL-ORDER MONSTERS

"Can a Tyrannosaurus Rex still be happy with gills and a jet pack?" Here's a game that answers "yes" to that question.

Don't assume that one monster is more your style than another just because you have a fondness for it. Each gruesome beast has strengths that can be built up and weaknesses that can be compensated for while you play. After trying all the crea-

tures, I found the lyonbear, carnifern, and tyro to be the best for me (although all three take a long time to develop fully).

You're better off buying speed and life at the start. Add armor and mind later, and build up muscle only after you've started picking up sophisticated weapons. Healing is my first choice for extras, followed by hands (to hold more weapons).

Electronic Arts. (415) 571-7171. C 64/128. \$15.

THE ANCIENT ART OF WAR


In order to win at this war game, which is also a construction set, note the following tips.

Each formation your troops can take offers advantages and disadvantages. One formation is better against certain enemy forces, and another can be greatly affected by the terrain. Your knowledge of these differences is a key to victory.

Observation is another key. Beginners should let the computer play against itself in early games, which provides the chance to watch how each enemy general fights. Later on, take notes about each commander as you play. As the general goes, so go his troops.

Just as in real life (ancient times), the largest army usually wins. Here are two tips for maintaining the size of your forces. First, each time any unit is eliminated, detach one or more of your soldiers to form a new unit. Second, "seed" your forts and other centers for replacement troops with one or two men as soon as you're able. Then leave them there for a while, and you'll end up with large numbers of reinforcements that can be sent to the front.

Don't hesitate to retreat when a battle is going against you. Your archers can still pick off a few of the enemies as you depart, saving the rest of your forces until they're evenly matched again with the enemy.

Broderbund Software. (415) 479-1700. Apple, IBM PC/PCjr (with graphics adapter card), Macintosh. \$45. 

Do you feel you're winning enough yet? Or are you looking for more tips and tricks? Do you have some of your own you'd like to share? Let us know. Write to The Entertainment Department, FAMILY COMPUTING, 730 Broadway, New York, NY 10003.

(Boldly go where no game has gone before.)

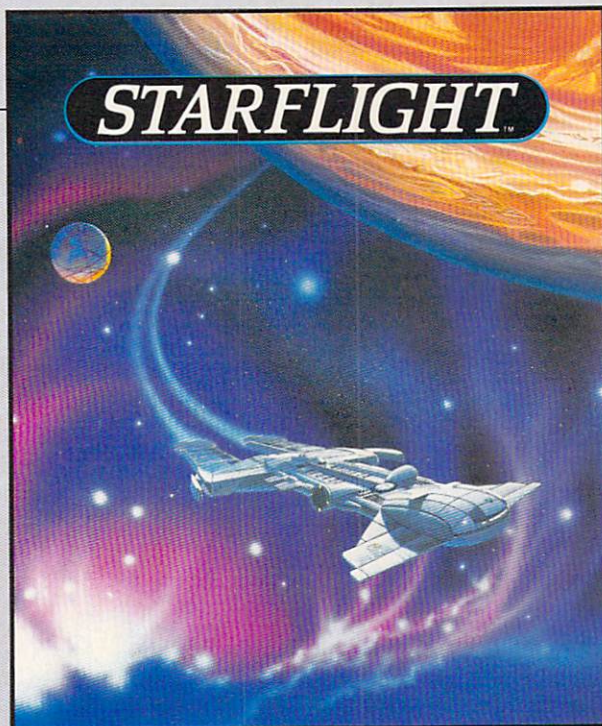
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TELECOMPUTING

NETWORKING

Stay Current With Ideas and Colleagues in Your Profession

BY RICHARD W. SLATTA

"Networking"—developing a wide range of business or professional contacts—became a catchphrase in the seventies. Networking, of course, is not a new phenomenon. Doctors, lawyers, and other professionals have always read special journals to track new ideas and attended conferences to keep up with people in their field.

But attending conferences once a year is the old-fashioned way to network. Nowadays, what better place to network than on a computer network?

"Within the last 15 months, I've added hundreds of colleagues to my personal and professional network of contacts," says Ron Solberg, head of PRLink, part of the Public Relations and Marketing Forum on CompuServe. "And I have the means to get to them whenever I need them."

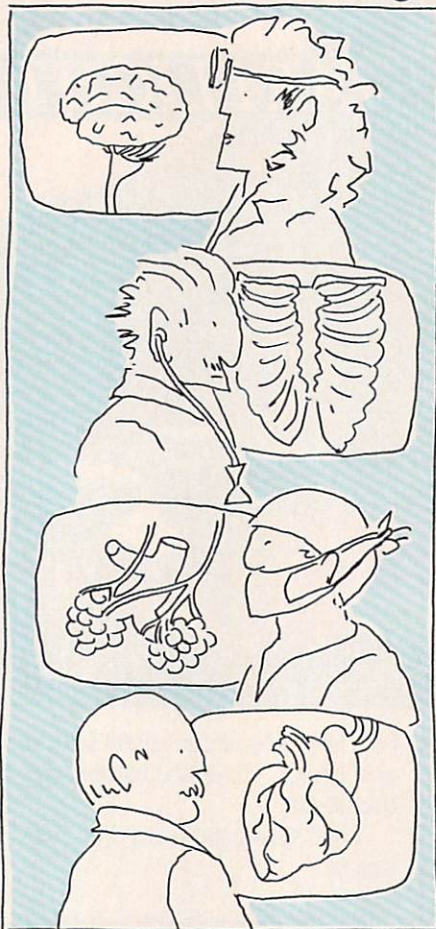
A Kansas City member of PRLink asked for help to set up an in-house print shop. Within 24 hours, she had received three responses on the subject from people she'd never met.

Carl Purcell, a photographer and columnist for *Popular Photography* magazine, sees PHOTONET, a network for professional photographers, as vital in linking those who take pictures with those who purchase them.

"When taking a trip, a photographer can put his or her itinerary on an electronic bulletin board that can be read by picture editors and photo agencies," says Purcell. "If someone needs coverage in that area, the person can contact the photographer by phone or computer network."

Nothing beats direct contact. And some people can turn one phone call into an endless and extensive network of contacts. But a computer network can bring many people together at once, on a daily basis.

RICHARD W. SLATTA is associate professor of history at North Carolina State University at Raleigh and director of the ScholarNet network. He has written several articles on communications for FAMILY COMPUTING.



ELECTRONIC NETWORKS

Many electronic information services—like Delphi, CompuServe, and The Source—are general-interest networks. You can meet people from every walk of life, read and leave messages for them, and download files on every conceivable topic. Networks for professionals have the same features, but their content is customized for a given profession.

Unlike a bulletin board system (BBS), which can usually accept only one caller at a time, networks can take many callers at one time. Network subscribers (see box for fees) can sign on from anywhere in the nation just by making a local call with their computer and modem. Usually, the call goes through Tele-net or Tymnet, "packet-switching" services that carry your call to a distant computer system. These services generally charge between \$2 and \$10 per hour.

Prices for using the network itself

vary. For instance, ABA/net, a legal network, charges \$14 an hour during the workday and \$10 an hour at night. PHOTONET charges \$24 an hour. Of course, for many people these charges can be billed as expenses to a client or deducted from taxes.

MESSAGE BOARDS

Networks provide a wide range of services. On-line conferencing permits users to communicate with each other "in real time." The comments of each person appear on the monitors of all who join the conference.

Ongoing discussions over a period of time are possible using "forums" or bulletin boards. Comments about a given topic are readable for days or weeks on end. Subscribers may scroll through the messages, pick up the "thread" of a discussion, and add their comments at any point. On any given message board, several topics can be active at once.

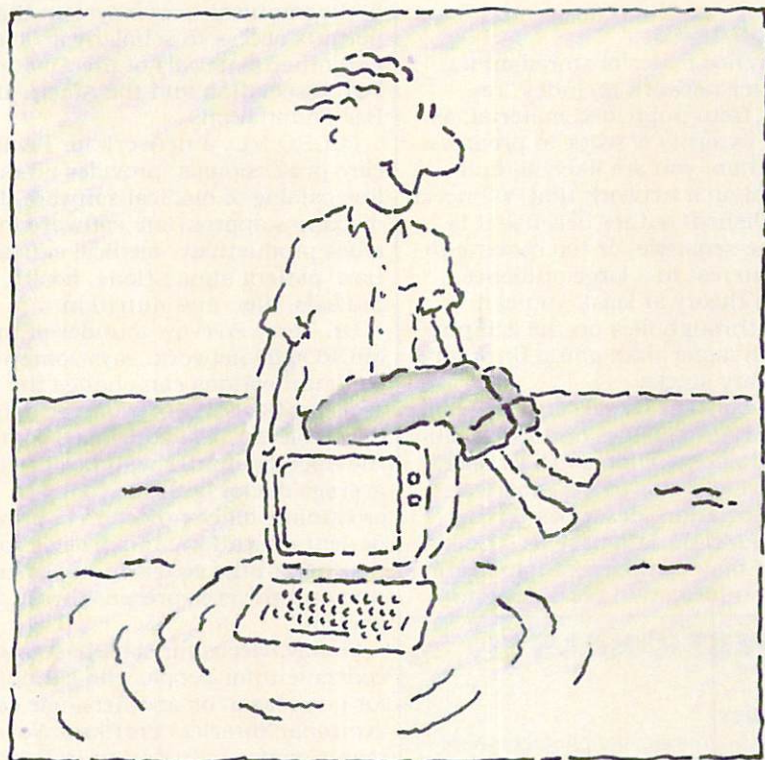
Finally, many networks have database libraries, full of articles or interviews. Subscribers can read these files while on-line or download them to their computer at home and print them out.

CONFERENCES

Because people can connect to a network at the same time, on-line meetings or conferences are possible. People who might never have a chance to meet can use the network to find others with similar interests and thoughts and then communicate with them.

Dr. Alex Pattakos, for instance, a professor at Boise State University in Idaho, instituted an electronic visiting-professor program while at the University of Maine at Orono. To conduct a class, he and a cooperating professor elsewhere in the nation connected their micros to ScholarNet (see box), a network for university professors. Using the conference facility, which allows several people to talk at once by typing at

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TELECOMPUTING

their respective keyboards, his students type in questions that are answered by the electronic visitor.

Students are thrilled at the chance to "chat" with a visiting professor thousands of miles away. It is a cost-effective alternative when personal visits are not possible. One student said that the experience made him feel like Alexander Graham Bell.

PRLink, a network for public relations professionals, hosted a time-management seminar sponsored by the Public Relations Society of America (PRSA). Two panelists, Chet Burger in New York City and Peter Brooks in Chicago, discussed their views and fielded questions from 35 persons who logged on around the country.

Another time, students from three college campuses went on-line via PRLink to discuss the publicity implications of the Challenger tragedy with communications experts from

the Aviation and Space Writers Association.

DATA BASES

Reference material stored on a computer network includes "reprints" from published material, as well as excerpts of work in progress. In addition, you are likely to find material on a network that will never be published—either because it is too time-sensitive, or too esoteric to be of interest to a large audience. And, in theory at least, you can search through files on the computer much faster than going through the library stacks.

A network for the legal profession, called ABA/net, offers one such valuable data base. Thomas H. Gonser, executive director of the American Bar Association, describes the network's AMBAR data base as "the key to what may be the most important body of information pertaining to

the legal profession outside of published case law today." AMBAR is a bibliographical search system that permits access to scholarly articles and other materials of the American Bar Association and the American Bar Foundation.

MICRO MD, a network for health-care professionals, provides an on-line catalog of medical software. It discusses appropriate software for office productivity, medical education, patient simulations, health appraisals, diet, and nutrition.

Dr. Terry Polevoy, founder of the MICRO MD network, says computer communications can change the average physician into a "super-doc." Says Polevoy: "I'm convinced that the microcomputer will provide the average doctor with the tools to streamline office procedures, provide patient education, and protect patients from the errors in documentation and the ever-present threat of a lawsuit."

Finally, electronic data bases are convenient for people who cannot—for one reason or another—use conventional libraries. Professor Norman Coombs, a historian in Rochester, New York, who is blind, reads material available in Braille, and he has people read to him. However, he also signs on to ScholarNet to hear reviews of academic books, course descriptions, and other helpful teaching and research materials available on ScholarNet. Coombs uses an Apple II Plus, an Echo Speech Synthesizer, and Talking Termex communications software to translate the text into sound.

Professionals who want access to data bases only—and who don't care to meet colleagues through a bulletin-board message center or a conference facility—will do better to focus on specialized data bases rather than networks. (See *Telecomputing*, February 1986.)

NETWORKS FOR PROFESSIONALS

ABA/net

AUDIENCE: The legal profession; members of the American Bar Association.

INFORMATION/SUBSCRIPTIONS: ABA/net, 1109 Spring St., Silver Spring, MD 20910; (800) 435-7342.

ABA members pay a one-time fee of \$50. Non-ABA members pay an annual fee of \$150. All subscribers pay a \$10 monthly minimum usage fee.

Eyenet

AUDIENCE: Ophthalmologists.

INFORMATION/SUBSCRIPTIONS: Eyenet, attn: Ms. Mary Beth Whalan, 233 E. Erie, Suite 1710, Chicago, IL 60611; (800) 621-4002. Subscription cost is \$12.

MICRO MD

AUDIENCE: Physicians and health care professionals.

INFORMATION/SUBSCRIPTIONS: MICRO MD, Terry Polevoy, MD, 6389 Colby Way, Virginia Beach, VA 23464; toll free for membership only: (800) 334-0854, ext. 581; for information: (804) 424-5800.

Membership fee: \$39.95. Members are entitled to purchase software through the network at a discount.

Public Relations & Marketing Forum

AUDIENCE: Public relations professionals.

INFORMATION/SUBSCRIPTIONS: PRLink, c/o Public Relations Society of America, 845 Third Ave., New York, NY 10022; (212) 826-1755.

Available on CompuServe.

PHOTONET

AUDIENCE: Professional photographers and photo agencies.

INFORMATION/SUBSCRIPTIONS: PHOTONET, 250 W. 57th St., New York, NY 10019; (800) FOTONET; call (212) 757-0320 in New York.

One time fee of \$100 for individuals; \$300 for corporations. One hour minimum (\$24) on-line charge per month.

ScholarNet

AUDIENCE: University professors and research librarians in the humanities and social sciences.

INFORMATION: Dr. Richard W. Slatta, ScholarNet, Box 8101, North Carolina State University, Raleigh, NC 27695; (919) 737-7908; CompuServe ID: 70156.404; Delphi Username: ScholarNet.

SUBSCRIPTIONS: General Videotex Corp., 3 Blackstone St., Cambridge, MA 02139; (800) 544-4005. One-time fee of \$100 for an academic department or \$30 per individual.

MORE INFORMATION

This article mentions only a few examples of professional networks. Others may be found by checking the *Directory of Data Bases*, published quarterly by Cuadra Associates (one of the most comprehensive data-base references, but information on networks isn't extensive); for information, call (213) 829-9972.

SUBSCRIPTIONS: Cuadra/Elsevier, P.O. Box 1672, Grand Central Station, New York, NY 10163; (212) 916-1180.

BEYOND THE ROLODEX

From university campuses to physicians' offices and photo darkrooms, the micro and modem are aiding America's professionals. Professionals need not be overwhelmed by the rapid changes of the information age. They can create, apply, and communicate new ideas more readily than ever. They can stretch their personal network far beyond their old dog-eared Rolodexes. ☐



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CIRCLE READER SERVICE 53

MACHINE SPECIFICS

NEWS, OPINIONS, QUOTES, & RUMORS

ABOUT YOUR FAVORITE COMPUTER

APPLE

BY CHARLES H. GAJEWAY

Since it costs about \$90 to realign a drive, it usually doesn't pay to fix a disk drive with head problems. Such a mechanical problem is usually indicated by strange noises, inability to read commercial disks, and persistent I/O errors when saving or loading files.

However, many disk-drive problems, particularly problems that are frequent but intermittent, are often not mechanical in nature. They result from aging or failure of IC (integrated circuit) chips within the disk drive or on the interface card.

On the Apple Disk II for the IIe and II Plus, these chips are mounted in sockets and are easily and inexpensively replaced by the user. (*Opening the IIc to fix its internal drive is not advised.*)

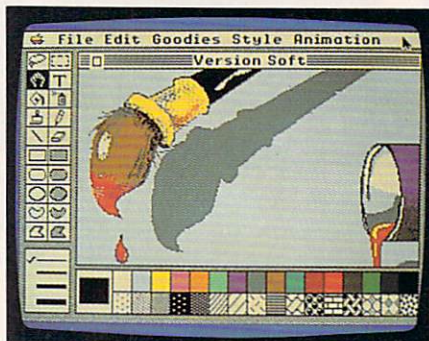
Test Driving. At the onset of drive problems, begin by cleaning the drive with a "wet-style" cleaning diskette. Then test the drive with a number of disks because the problem may just be damaged disks.

If the problem still persists, try using a different interface card. Replacement interface cards are available for about \$50 from many mail-order sources; heavy users should even consider investing in a spare as insurance.

If these steps don't clear things up, unplug the computer, open the disk-drive case, and check to see whether all the connectors are tight. Then begin replacing the chips.

Changing Chips. With your II Plus or IIe computer turned off, remove the casing on your disk drive (with a Phillips screw driver). Trace the path of the connecting cable to the "controller board" inside the drive, and write down the numbers of the socketed chips mounted on that board. You should be able to obtain a set of replacements for \$25-50 from an Apple dealer.

While it's not absolutely necessary, using an IC extractor and inserter to replace ICs makes the job easier (Radio Shack sells both in a set for about \$7). Make sure to notice which way the notched end of the



Paintworks Plus (Activision) and DeluxePaint (Electronic Arts) for the Apple IIs

chip points; the replacement must point the same way.

After you change an IC, turn on the power and test the drive (you don't need to put the casing back on). When everything works properly, it's usually safe to assume that the last chip you replaced was faulty.

Keep In Touch. Please, please, please! Send me your questions, tips, favorite tricks, or whatever; this column is for you and about you. Next month I'll preview some of the new software for the Apple IIs (the screen shots here are an appetizer) and point out some old classics from Beagle Bros.

CHARLES H. GAJEWAY can be reached on *The Source* (ID: BBQ794).

ATARI

BY JOHN ANDERSON

Atari enthusiasts have always been a rather close-knit bunch, and one of the ways they stick together is via modem. If you're not involved with telecommunications, you ought to

give it some thought; you can make some really good friends. If you agree with all this, but you have been delaying your purchase of a modem until prices come down, your time could be coming.

Brace Yourself. Atari has announced that it will soon introduce a 1200-baud, Hayes-compatible modem, for a mere \$99. What a pleasant surprise!

The modem will ship without cables or software. Separate add-on packs—with a custom cable and terminal software—will complete the system for your 400, 800, XL, XE, or ST computer. If you have an ST, you may use a standard RS-232 cable instead, which is widely available. You may then choose from a range of excellent terminal packages, including my personal favorite, *Flash*, from Antic software. *Flash* truly capitalizes on the ST's GEM operating system and makes operating on-line an absolute pleasure.

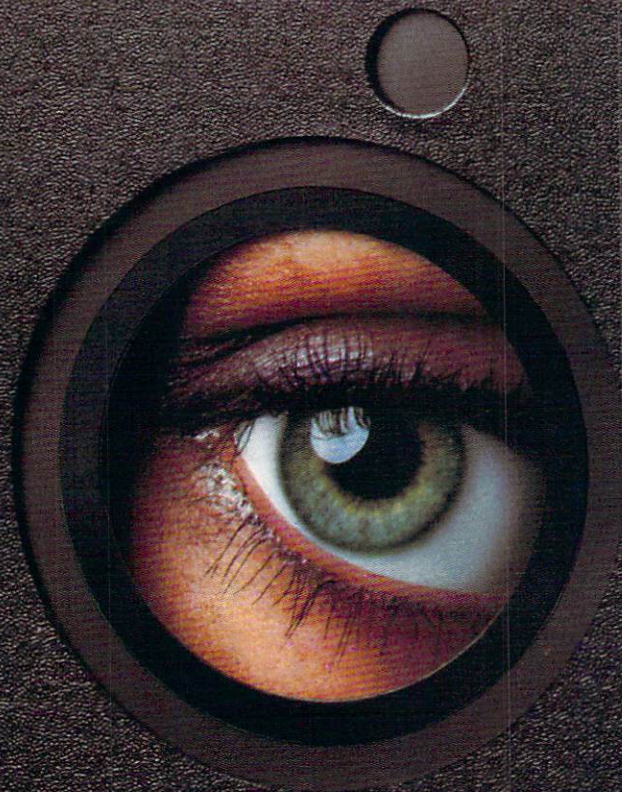
Meet Me On-line. Once you're suited up and ready to telecommunicate, your first stop should be the FAMILY COMPUTING Forum, on CompuServe. There you can meet other Atari owners, respond to FAMILY COMPUTING editors, and get in touch with me. Leave me a message (ID: 76703.654), and I promise I'll make every effort to answer your messages and questions personally. Type GO FAM at any "!" prompt.

Your next stop on CompuServe should be the AtariSIG, where the largest, most active Atari users network in the country meets 24 hours a day (or close to it). The SIG has been divided into two forums, one for 8-bit machines and another for the ST series. To reach one of the most active SIGs on CompuServe, type GO ATARI at any "!" prompt.

Viva L'Arcade. The arcade outlook for the ST is very good. *Joust* should be in the warehouses now, with *Millipede* and *Battlezone* soon to follow. Progress continues on *Star Raiders ST*, a fairly faithful translation of the original, upgraded to support the incredible graphics of

Note: Please send comments to: Author, FAMILY COMPUTING, Machine Specifics, 730 Broadway, New York, NY 10003.

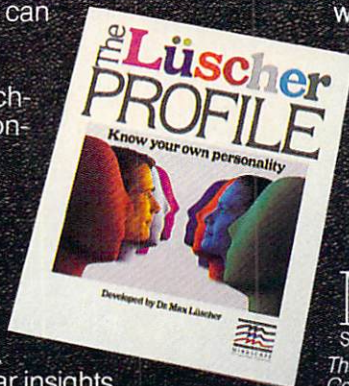
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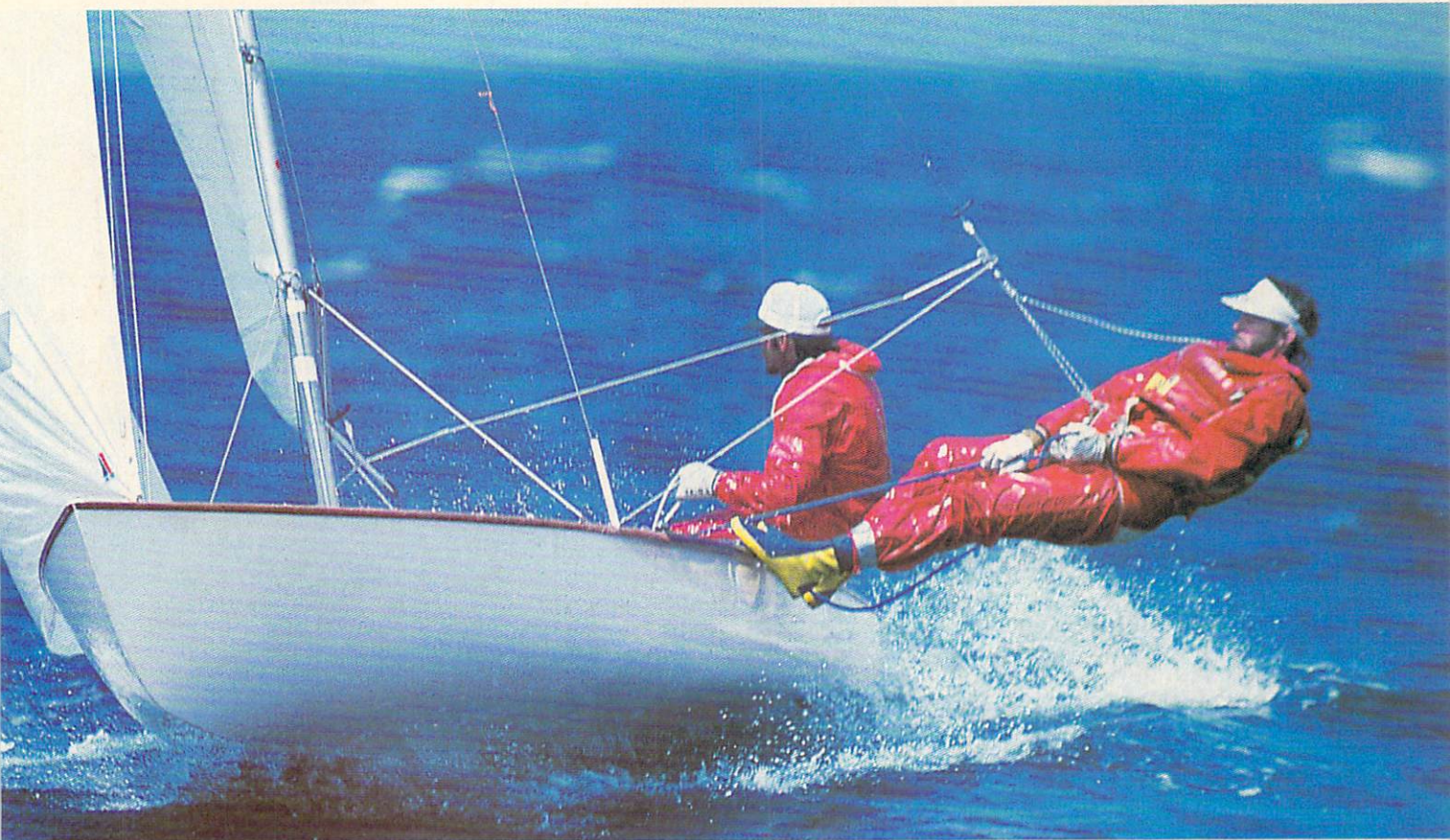
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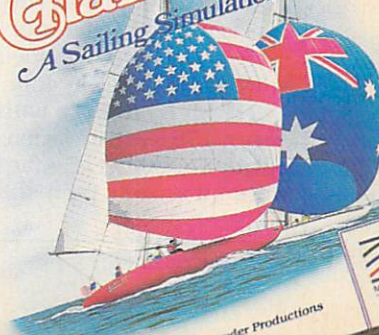
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The American Challenge
A Sailing Simulation



MACHINE SPECIFICS

the ST, and it should be out this fall.

80-column 800. An 80-column board for 800, XL, and XE is also nearing release. In addition to driving an 80-column monitor through a couple of magic tricks that retain compatibility with most existing software, the board also includes a parallel printer port as a bonus.

ST "Blitter." The juicy rumor of the summer has come true—a "blitter" chip for the ST, which provides advanced animation capabilities similar to that computer named for a female Spanish friend. The custom chip is accompanied by a replacement ROM chip set designed to acknowledge and capitalize upon its presence. And voilà—you have multi-color multiple object animation that is smooth and quick.

JOHN ANDERSON can be reached on CompuServe (ID: 76703.654).

COMMODORE

BY SHAY ADDAMS

I Want My C-TV! Already I'm going crazy from setting my VCR to tape "Late Night with David Letterman"—only to play it back the next day and get 90 minutes of a Grade B movie. Now Electronic Arts wants me to hook the VCR to an Amiga? *DeluxeVideo* enables "video-computerphiles" to create videos with *DeluxePaint* graphics and play them on-screen or tape them on a VCR. You can also capture freeze frames off the television or VCR; do special effects like wipes and fades; and create hi-res titles and credits for home-made videos. For a sound track, rock-video maestros can pipe in tunes from *Deluxe Music Construction Set* or *Instant Music Data Disk*.

GEOS Software. For the C 64 and 128, more software for the GEOS "icons & window" operating system is on the way from Berkeley Softworks; (415) 644-0883. Upcoming software titles include *GEOS-calc*, *GEOSpublisher* and *GEOS-database*, as well as the GEOS Programmers' Reference Guide.

C 64 and 128 users will be able to store up to 780K of data on double-sided 3.5-inch disks with Commodore's 1581 drive, which should be out by December. So far there's no word on anyone publishing software on these disks.

Offbeat Communications Department: Microlog Short Wave Listener (\$64) snaps into the C 64/128 cartridge port and connects a short-wave radio to the computer, converting Morse Code and RadioTeletype signals into text and displaying it on the screen. With a good radio and Microlog, you can read and print Reuters Press service dispatches from London and other worldwide transmissions.

Question From the Mailbag: If you've got a question, send it in and I'll try to track down the answer. Here's one that came my way: "Is there any way of converting my 200 text and data-base files created with the Plus/4 to the IBM format, so I won't have to re-create them manually when I upgrade my system?"

I checked with Dick Ollins, technical adviser of the Plus Exchange Users Group, who suggested that with the Modem 300 for the Plus/4 and a modem on an IBM, you could transfer the text as ASCII files, then reformat them with an IBM word processor. The sticky part will be finding an IBM data-base program that has a utility for inserting data into the proper fields; check with an IBM users group on that one.

By the way, The Plus Exchange Users Group [(800) 826-4859] publishes a bi-monthly newsletter on the C 16 and Plus/4, and even sells software for these discontinued machines.

SHAY ADDAMS can be reached on CompuServe (ID: 72267.601) or QuantumLink (ID: JB CHALMER).

IBM

BY PHIL WISWELL

This month, I'll try to answer a few common questions from IBM owners.

Q: What's the difference between CGA and EGA displays, and which should I invest in now?

A: The new EGA (Enhanced Graphics Adapter) displays have a higher resolution—640 X 350 pixels—than the CGA (Color/Graphics Adapter) resolution of 640 X 200 pixels. Text and graphics are therefore much clearer. In addition, EGA adapter boards are equipped with extra memory, allowing them to display up to 16 colors at a time from a palette of 64 colors, versus only four colors using CGA.

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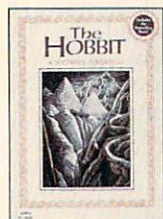
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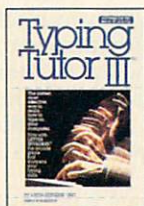
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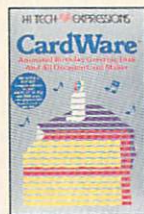
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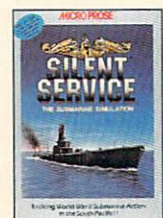
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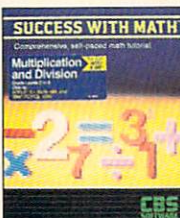
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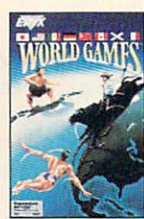
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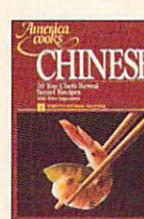
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MACHINE SPECIFICS

Whether you go for CGA or EGA, you need both the monitor and the adapter card. Some EGA adapters and monitors work with CGA components, so you might upgrade in stages: Buy an EGA monitor now and the adapter later, or vice-versa. EGA is becoming the graphics standard, so there is little sense in buying a complete CGA setup now.

Q: I have a PC and I'm about to upgrade by adding a hard-disk drive. The salesperson says I need a new power supply, too. Do I, or is he "padding" my bill?

A: No pad here. The 65-watt power supply that comes on most PCs is not enough to handle the requirements of a hard drive. You will need a power supply with at least 130 watts to run a system with a 20-megabyte hard drive.

Q: What does the CONFIG.SYS file on my MS-DOS disk do? I've never used it for anything, to my knowledge.

A: The file carries information on your system configuration. Your computer reads this file every time it's turned on. My CONFIG.SYS file reads:

```
FILES = 20
BUFFERS = 20
BREAK = ON
DEVICE = MOUSE.SYS
```

The FILES command tells DOS how many files it may keep open at once. The default setting is 8, and the maximum setting is 99.

The BUFFERS command tells DOS how much memory is available for transferring data between the disk and RAM (the computer's active memory). The default setting for buffers is 2 (3 for the AT), and the maximum is 99.

The more FILES and BUFFERS available, the faster your access to data. However, each reduces the amount of RAM available to your application, so you may have to experiment. Stick with the default settings until you run into problems.

The BREAK command tells DOS to let you break out of a program using the CTRL-BREAK key combination. The default setting is OFF.

The last line of my CONFIG.SYS file tells DOS that I have a Microsoft Mouse installed. Any other devices you wish to use, such as a hard disk, can be installed with the DEVICE command.

PHIL WISWELL is a small-business consultant and computer journalist.

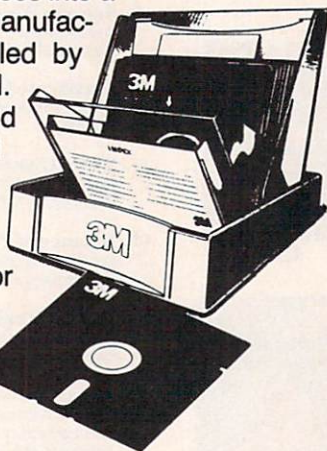
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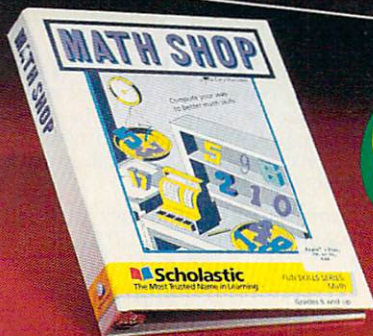
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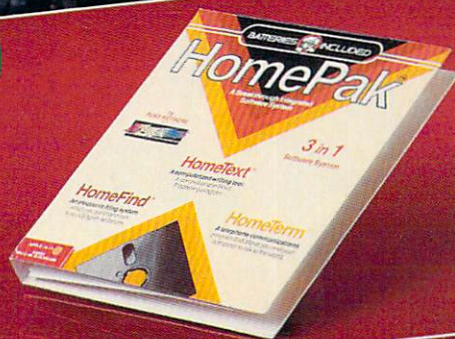
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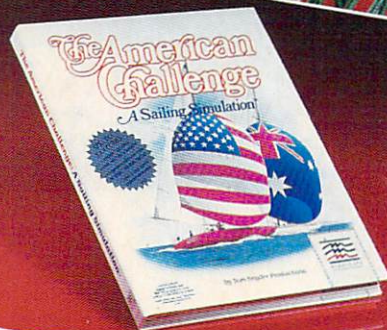
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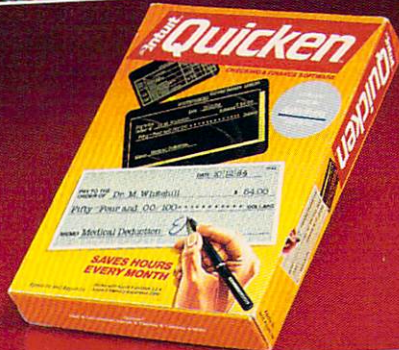
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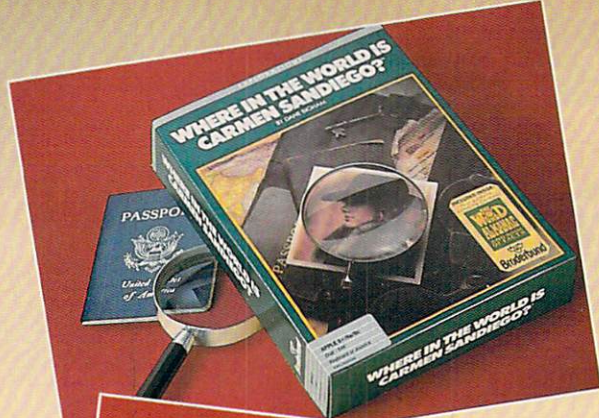


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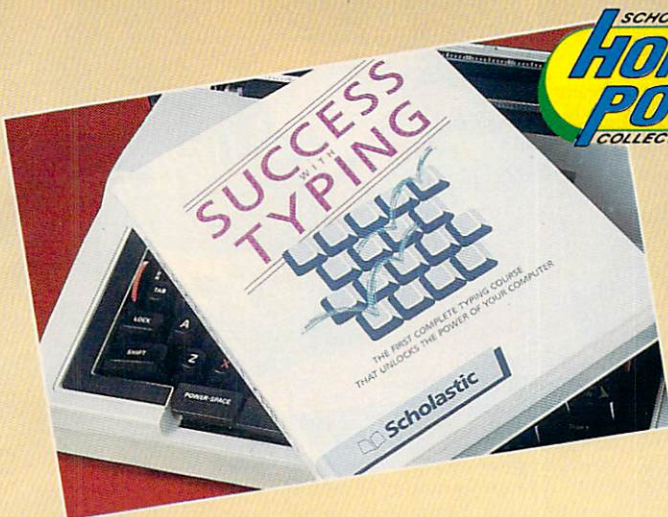
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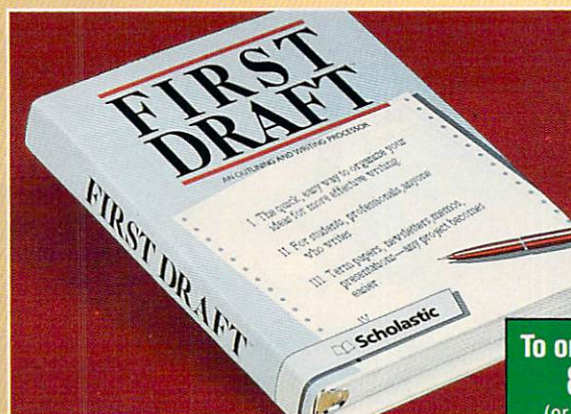
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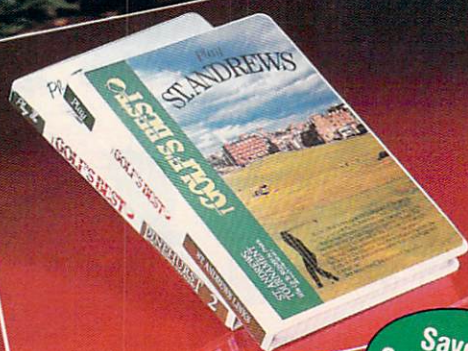
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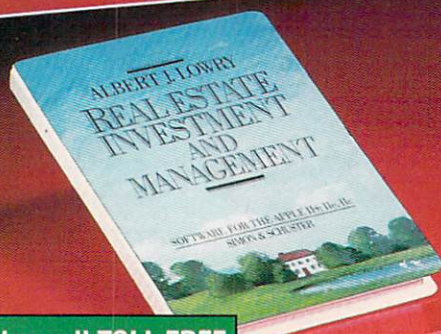
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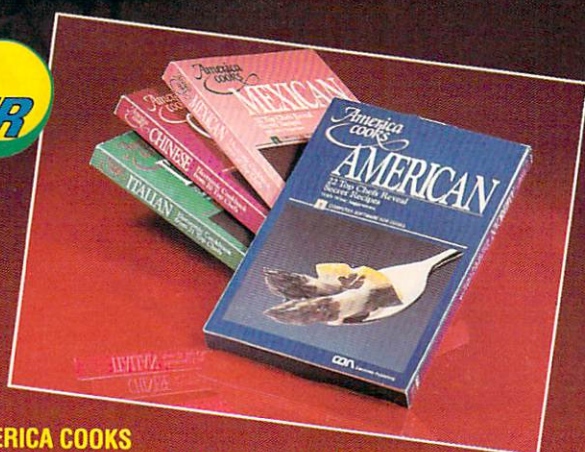
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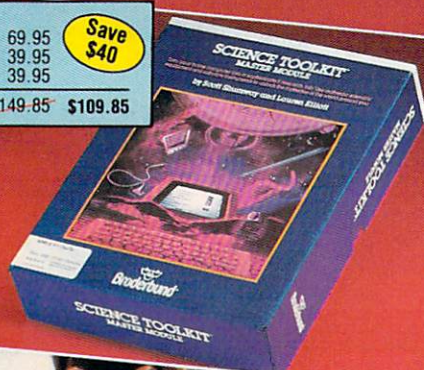
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MACHINE SPECIFICS

MS-DOS

BY STEVE MORGENSTERN

Every time I turn on my computer, I read a copyright notice about Phoenix Technologies Ltd. Tandy, Xerox, Kaypro, and Wyse owners, among others, have seen the flight of the Phoenix across their screens. Who are these people?

Phoenix has been in business since 1979 in Norwood, Massachusetts, performing custom engineering jobs for micro manufacturers. Two years after the IBM PC was introduced, somebody there had the bright idea to create a BIOS that would emulate the IBM BIOS—without infringing on Big Blue's copyright—and license the system to manufacturers.

BIOS is short for Basic Input-Output System. It functions as a middleman between the operating system (MS-DOS) and the computer hardware. If the BIOS does not do its job extremely well, software compatibility suffers. The BIOS by Phoenix does work very well indeed; it is extraordinarily difficult to find a piece of PC software that doesn't work under the Phoenix system.

The company first offered their IBM-compatible BIOS in May 1984. Before that, manufacturers interested in building IBM compatibles could either develop their own BIOS, a time-consuming and expensive undertaking (Compaq chose that route), or make machines that ran the MS-DOS operating system but were incompatible with large amounts of software developed for the IBM PC's chip peculiarities.

Several manufacturers, including Tandy, Leading Edge, Xerox, and AT&T, chose to use the Phoenix BIOS or sections of it. That makes our friends in Norwood a major factor in the development of inexpensive PC compatibles.

Made in a Garage. An interesting change in company policy could make the Phoenix name even more common with IBM compatible users. Manufacturers used to pay a large sum up front for unlimited usage of the BIOS. In April, Phoenix switched over to a royalty arrangement.

They now get a fee for each machine installed with their BIOS. This makes a substantial difference to the people building PC compatibles in their garages, who no longer have to

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CIRCLE READER SERVICE 26

MACHINE SPECIFICS

shell out big dollars up front for the privilege of using the Phoenix BIOS.

The Write Price. If people are buying reasonably priced MS-DOS computers, they expect to buy reasonably priced software, right? Unfortunately, corporate budgets have allowed publishers to charge hundreds of dollars for most worthwhile IBM word-processing packages, and bargains have been hard to come by. I just received one, though. It's *Webster's New World Writer*, from Simon & Schuster.

It combines two top-notch products—the *Webster's New World Spelling Checker* (\$59.95 sold alone) and *Webster's New World On-Line Thesaurus* (\$69.95 sold alone)—and adds a full-featured word processor. The price for the complete package is \$150, so you're getting the word processor for about \$20.

Safety In Numbers. The Model "L" 1200-baud modem from Leading Edge is a Hayes-compatible internal modem. It comes with software and lists at a modest \$149. I can't vouch for its performance yet, but I know one thing I like already: It comes with a 24-month warranty. Leading Edge obviously understands the power of long warranties when it comes to quelling the qualms of buyers who can't afford top-of-the-line brand names. A key factor in my decision to buy their Model D computer was the generous 15-month warranty on that machine.

Contributing editor STEVEN MORGENSTERN can be reached on CompuServe (ID: 72545.606).

ORPHANS

BY PATRICK SPERA

It always gives me a chuckle the way some people are amazed to find me using a Timex Sinclair 1000 (those people who know what one is, I mean!). While my 1000 can do a lot more than most people expect, the problem for the Timex, and all "orphans"—computers whose manufacturers either went bankrupt or left the business—is finding support for it. I hope the information in this and future columns will help end this struggle for Adam, Timex, and TI owners.

Adam 80-Column Video Board. John Lingrel of Orphanware (P.O. Box 324, Canal Fulton, OH

44614) has announced an 80-column video board for the Coleco Adam computer. Currently, the Adam's own screen display is only 32 columns. The card uses the Adam's external slot and will require a separate monitor. (The cost of the board and monitor will be about \$170. The board alone is approximately \$55.) The card will allow the full use of CP/M on the Adam. Also, it adds a serial (RS 232C) port so you'll be able to use third-party modems and printers on your Adam.

Orphanware also sells an internal Centronics interface and 64K RAM expansion cards.

TS 2068 Technical Manual. If you love your TS 2068 and would like to make it do everything that Timex said it could, then you need this technical manual. The first version of this manual was released just as Timex said bye-bye to computers. It was a horrid mess of listings, diagrams, and text, which cost an appalling \$25! The second edition is spiral bound, has over 300 printed pages (not photocopied like the first manual!), and best of all, the errors in the first issue have been corrected.

The manual still costs \$25, but this little gem (if you think a two-pound book is little!) is well worth the cost. To find a copy, check with Timex dealers, or write *Time Designs* magazine, 29722 Hult Rd., Colton, OR 97017. Oh, yeah! They print a bi-monthly Timex Sinclair magazine, too.

TI-99 Computer Fayuh. The Second Annual TI-99 Computer Fayuh will be held in the Greater Boston area on April 4, 1987. It is an all-day affair, with lectures, demonstrations, and the ubiquitous dealers area (and if last year was any indication, lots of TI-99 users!). Many well-known suppliers of TI hardware and software have indicated that they will attend the festivity. Further information and updates can be found on the TI Forum on CompuServe or by writing to the Boston Computer Society (TI-99/4A Club, One Centre Plaza, Boston, MA 02108).

It Can't Happen Here Department. A true story: Paul R. Todd, of Manassas, Virginia, has a friend in the sanitation department. While his friend was making the rounds, he discovered parts of an Adam computer in the trash. Luckily, he recovered all the hardware and software,



Tandy 1000 SX

too. However, the computer was fouled with garbage! It took a lot of cleaning, but the first time Paul powered it up, it ran! As Paul later quipped, "This disproves the saying, 'Garbage In, Garbage Out!'"

TANDY

BY STEVE MILLER

There has been some confusion over Tandy's new policy of fee-based customer support. The main fear is that Tandy's push into the business market will be at the expense of regular customers who can't afford the higher prices. But, it's not quite that bad. "The phone lines to Fort Worth for the average customer are still open," says a Tandy spokesperson. The number comes with your computer when you purchase it.

However, when you buy a Tandy computer you can also purchase a service contract. If you want regional phone support, you must pay for it. You can get a three-month, six-month, or one-year contract.

In addition, there are several phone numbers (not toll-free) you can call in Texas, depending on the nature of your question. For DOS and language support, Color Computers and portables, and home software questions, call (817) 338-2395; for educational software, call (817) 338-2396.

1000 This, 1000 That. The hot-selling Tandy 1000 has been discon-

PATRICK SPERA, who has been in the Air Force for 10 years, started with a Super-Elf kit computer. He then progressed to the Sinclair series. He is the Sysop of the Computer Club Forum (GO CLUB) on CompuServe (ID: 74125.552), which caters to Actrix, Eagle, Sanyo, Panasonic, and Timex/Sinclair users.

tinued and replaced by the 1000 EX (see "Buyer's Guide") and the 1000 SX (see photo). The EX is especially interesting because it brings IBM compatibility within the price range of many families who felt they couldn't afford it before. Many of the cheapie "no-name clones" are priced to compete with Tandy, but they don't have the brand-name authority and backup service that emanates from Fort Worth.

The 1000 SX, however, seems better dressed for the long haul. It comes with 384K, and two built-in disk drives. Also included is *DeskMate II*, an improved version of the multi-application program that comes with many Tandy computers. Five expansion slots leave plenty of room for future expansion.

CoCo 3 Gets RGB. More than one million Color Computers have been bought, according to Tandy, and most of them are being used with televisions for screen displays. The CoCo 3 however, can be connected to an RGB color monitor. **FC**

STEVE MILLER, former computer columnist for UPI, writes frequently about computers.

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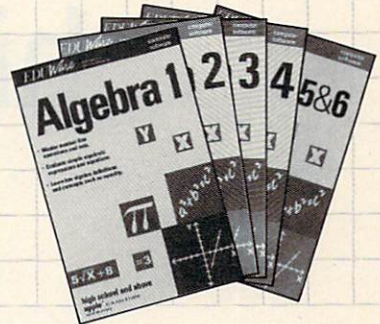
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CIRCLE READER SERVICE 27

A funny thing happened on John Hart's first day at his computer...



he got results.

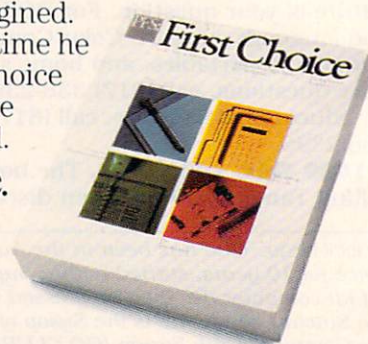
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BUYER'S GUIDE TO COMPUTERS

BY NICK SULLIVAN



This is the seventh Buyer's Guide to Computers since FAMILY COMPUTING's first issue in September 1983. For a while, each guide appeared to treat new machines that were supplanting the old, and the rapid pace of change certainly didn't help consumers (or editors) make choices. Looking back now, the pace of change does not seem so dramatic. In fact, five of the nine computers reviewed in our first issue are here—gussied up in new clothes.

For the archivists in the audience, the long-playing machines are the Apple IIe, Atari 600XL (now 130XE), Commodore 64 (now 64C and 128), IBM PC, and Tandy Color Computer (now CoCo 3). Consumers can be assured that these computers have been refined over the years and are well supported by software and add-ons—not to mention users groups. Sticking with the venerables is one way for shoppers to go.

The second way to go is with an IBM or compatible computer system. Even though its system design is relatively old, the IBM PC is quite powerful. It's fast, can be expanded extensively, and runs high-powered programs. IBMs and compatibles have reputations as "business" machines, but so many individuals have bought them that new entertainment and educational software is now hitting the stores. Besides the IBM PC XT, we review the AT&T 6300, Epson Equity, Kaypro PC, Leading Edge Model D, Tandy 1000 EX, and Zenith PC.

A third direction for computer shoppers is to consider the new high-powered machines that use the Motorola 68000 microprocessor. These are the Amiga (from Commodore), the Atari 520ST and 1040ST, and the Macintosh (Apple). All come with a mouse and use a "point-and-click" operating system. These audiovisual machines are a great deal of fun to operate.

How do you decide which path to follow? Read the reviews that follow, and let your heart dictate its preferences. Then read the Shopping Tips, and reread the reviews with common sense as your dictator.

NICK SULLIVAN is senior editor of FAMILY COMPUTING.



APPLE IIe

List Price: \$1,359

Memory (Standard/Maximum*): 128K/1 megabyte

Hardware included: One 5.25-inch disk drive (143K), monochrome monitor, 80-column card

Software included: ProDOS, BASIC, tutorial

Text (characters by lines): 80 x 24

Colors: 16

Built-in Ports: Joystick, monitor, cassette

Sound: 1 channel

Strengths: The Apple IIe works very well. Even though the computer is old, its eight open slots allow you to keep adding cards and boards that bring new life to the machine. Memory can be expanded to 1 megabyte, for instance. And Apple keeps bringing out new peripherals, such as the 800K 3.5-inch UniDisk, the Apple 20-megabyte hard-disk drive, and the ImageWriter II color printer. By replacing the main circuit board, you can turn the IIe into a IIgs. Software developers have been writing programs for the Apple IIe for so long, they know how to milk the machine for all it's worth; most new Apple IIe software is a pleasure to use.

Weaknesses: The IIe is not fast, at least when compared to many of the IBM compatible computers on the market. Its Disk II drives store only 143K, so you're better off with the new 800K UniDisk, which is expensive (\$399). And to connect a printer, modem, or RGB monitor, you need to add interface cards, which usually cost around \$100 each.

Recommendation: It's relatively costly, but for parents who want to keep step with the schools, the IIe is a smart buy. If your kids use computers at school, chances are they use Apple IIe's. Despite its terrible sound output, the IIe is still a great game machine. Though the IIe can handle most business tasks, few people today purchase it primarily for business reasons. Now that the IIe can be upgraded to a IIgs, that may no longer be the case.



MACINTOSH (APPLE)

List Price: \$1,999

Memory: 512K/1 megabyte

Hardware included: 3.5-inch disk drive (800K), monochrome monitor, mouse

Software included: Finder, desk accessories

Text: Varies with size of type

Colors: Black and white

Built-in Ports: 2 Apple serial, disk drive, mouse, sound

Sound: 4 channels

Strengths: The Macintosh, which you control with a mouse, has one of the clearest and most flexible screen displays of any computer. Dots on the screen can be arranged to form various type sizes and styles, and graphic layouts look like pointillist paintings. Thus, the computer is ideal for creating graphic presentations of data. When connected to the Apple LaserWriter printer, the Macintosh turns into a typesetting and print shop. Beyond this, the point-and-click mouse operating system can make using otherwise confusing spreadsheet or communications programs a breeze. The Macintosh's four-channel sound output can produce beautiful harmonic music.

Weaknesses: The screen is relatively small, and the display is black and white only. Though its sharpness compensates adequately for lack of color, there's no doubt that a key visual dimension is missing. The Macintosh has no parallel port, and the eight-pin serial port is nonstandard. The MacWrite/MacPaint freebie that once came with purchase is now sold separately. You need two 800K disk drives to operate it effectively.

Recommendation: The Macintosh, more so than most computers, is a state of mind. Some people love the way it works, and others find it confusing. It's a much better machine than it was two years ago, and it does everything well now. The Mac Plus, with one megabyte, an 800K disk drive, and a numeric keypad, is especially good. And, if you're eager to try out desktop publishing, the Macintosh is the best choice.

*Maximum supported by manufacturer



The Apple IIc (above) is a portable version of the IIe, with built-in ports and a disk drive. However, with the new IIes (introduced too late to make press date), the unexpandable IIc has taken a backseat in the II line.

APPLE IIcs

List Price: \$1,000 (editor's estimate)

Memory: 256K/4 megabytes

Hardware included: Mouse

Software included: Finder, ProDOS

Text: 80 x 24; **Colors:** 4,096

Built-in Ports: 2 Apple serial, RGB monitor, sound, keyboard, mouse/joystick, disk drive, video

Sound: 15 channels (built-in synthesizer)

Strengths: The Apple IIcs runs all existing Apple II software, plus a host of exciting new software designed to take advantage of its extra memory (up to four megabytes), graphics, sound, and speed. Old Apple II software runs nearly three times as fast on the IIcs. Most existing Apple II equipment will work on the IIcs, which has the same eight expansion slots as the IIe. However, two serial ports and an RGB-monitor port are built-in, so you don't need any extra interfaces to start. The computer comes with a mouse and functions much like a Macintosh. Over 4,000 colors are available and up to 64 can be on-screen at once. Unlike the rest of the Apple II line, the IIcs has superb music-making ability, with 15-channel sound. It can even talk.

Weaknesses: This is the fifth Apple II computer and the fifth without a parallel port. Oh, well; parallel cards are pretty cheap. And, despite its fabulous sound capability, the IIcs has a tinny little speaker.

Recommendation: What preservation engineering! With a rare blend of power and diverse software, the IIcs is equally useful to students, game players, and businesspeople. However, the IIcs is probably not the computer you use at the office, so don't count on taking disks home.



Apple IIcs



AT&T 6300

List Price: \$2,820

Memory: 640K

Hardware included: Two 5.25-inch disk drives (360K), monochrome monitor, color/graphics adapter, numeric keypad

Software included: None

Text: 80 x 25

Colors: 16

Built-in Ports: Serial, parallel, RGB monitor

Sound: 1 channel

Strengths: The AT&T 6300 is an IBM XT compatible computer that runs software nearly twice as fast. The AT&T monitors are excellent and include tilt-and-swivel bases for easy viewing. The AT&T color monitor, in particular, is a gem, and worth the money if you spend long hours at the screen. You can upgrade the 6300 to a 6300 Plus, a computer that can run several programs at once, even if they use the UNIX operating system. The AT&T toll-free hotline for technical help is quite useful.

Weaknesses: Coming from a company with a reputation for good user interfaces, the keyboard is a disappointment. It has a small RETURN key, and the keys in general are slippery and flat. The AT&T's speed (8 megahertz to 4.77 on the IBM PC) means that it cannot run some IBM programs. Some other compatibles have a switch to select the proper speed, but not this one. Many AT&T add-ons—and there are many—are expensive (the color monitor costs \$945!), as the company is used to dealing with corporate clients.

Recommendation: If you want a super-charged workhorse to calculate large spreadsheets or sort through large data-base files, the 6300's speed makes it a contender. And the quality of its design and support is not to be overlooked, especially if you live in front of a computer screen. If you work in color, go AT&T. But because of its price, the AT&T is probably best considered if you are running a small business.



COMMODORE 64C

List Price: \$229

Memory: 64K

Hardware included: None

Software included: GEOS, GEOWrite, GEOPaint, QuantumLink software, MECC educational software

Text: 40 x 24; **Colors:** 16

Built-in Ports: Commodore serial, cartridge, user port, joystick, disk drive, TV, monitor

Sound: 3 channel (built-in synthesizer)

Strengths: The Commodore 64C is the Commodore 64—the computer over 5 million people have bought—in a new casing. The 64C comes with the new GEOS operating system, which allows you to use a joystick or mouse to make menu choices (or pick icons), instead of using keyboard commands. (Current 64 owners can buy the GEOS operating system on disk, [\$59].) The 64C has great sound and good colors and runs software of all kinds. In general, the software is less expensive than it is for Apple and IBM computers. The 64C has a cartridge port, and you can run educational/entertainment programs without buying a disk drive. The C 64 user port is valuable for plug-in hardware such as modems and speech synthesizers.

Weaknesses: The 64C has Commodore-specific interfaces, not the industry-standard parallel and serial. Thus, you have to use made-for-Commodore peripherals or get an additional interface. The memory cannot be expanded beyond 64K (except by adding a cartridge), which can be a frustratingly narrow confine these days. And the screen display is only 40 characters wide, not so good for intensive text applications.

Recommendation: The Commodore 64C is a good, low-cost, fun-to-use machine that will introduce the whole family to computing. You can use it with cartridge software and a television to start, and then add a disk drive and color monitor later if you wish. The 64C is not a business machine, though software of all types is widely available, and more is being written.



COMMODORE 128

List Price: \$350

Memory: 128K/512K

Hardware included: Numeric keypad

Software included: BASIC, tutorial, CP/M (with disk drive)

Text: 80 x 25; **Colors:** 16

Built-in Ports: Commodore serial, RGB monitor, TV/video, disk drive, joystick/mouse, cartridge, user port.

Sound: 3 channel (built-in synthesizer)

Strengths: The Commodore 128 is the next step up from a 64 or 64C. Compared to its predecessor, it's got more memory (expandable to 512K) and an 80-column screen display. These generally make software easier and quicker to use. A numeric keypad is a blessing for number crunchers. Besides these welcome additions, the 128 also keeps all the alluring features of the 64—great sound, a user port (for modems and speech synthesizers), and a cartridge port. And it works with all 64 software and hardware, providing a smooth upgrade path. The C 128's BASIC is superb, with 140 commands, some of which give you direct control over color, sprites, and sound.

Weaknesses: To fully utilize the 128, you need the Commodore 1902 monitor (\$349) and the 1571 disk drive (\$299). This package costs around \$900; add software and you bump up against the \$1,000 mark. Like the 64 and 64C, the 128 requires Commodore-specific interfaces to connect peripherals. Finally, the whole system takes up a lot of desk space.

Recommendation: The 128, in some ways, finds itself between a rock and a hard place. It's too expensive to be a start-up computer for kids, and it doesn't have the school-related software that the Apple II line does. As a business machine, its price is in a league with the new Tandy 1000 EX and other IBM compatibles, but as a performer it's not really in their league. The 128 is a wise choice if you have existing 64 equipment and want to upgrade.



AMIGA (COMMODORE)

List Price: \$1,295

Memory: 256K/512K

Hardware included: 3.5-inch disk drive (800K), mouse, numeric keypad

Software included: AmigaDOS, BASIC, Amiga Tutor, Intuition, desk accessories

Text: Varies with size of type; **Colors:** 4,096

Built-in Ports: Serial, parallel, RGB monitor (analog and digital), mouse, disk drive, expansion, video, sound

Sound: 4 channels

Strengths: Unlike other computers, which depend on one central microprocessor to drive the machine, the Amiga has special chips that control sound, graphics, and animation. Thus, the computer is capable of some outstanding outputs, mixing animation and sound. The best Amiga software, which you run with a mouse via a point-and-click operating system, takes full advantage of these features. Play a game like *Marble Madness* on the Amiga, and you walk into another dimension of time and space. From BASIC, you can program the computer to speak in a male or female voice. If any computer is fit to be the centerpiece of a home entertainment system, it's the Amiga. The computer is flexible enough to allow different settings (type size, color, etc.) to match your workstyle and can run more than one program at a time.

Weaknesses: The major problem with the Amiga is that it's not catching on as expected. Plenty of software is available—true—but you might have to struggle to find it. Also, you really need a second drive to make the system hum.

Recommendation: If you've got a VCR and want to use a computer to make custom tapes, look at the Amiga. If you've got any kind of specialized application, check the Amiga first for a solution. But if you are just starting out in computers or need a computer for straightforward business tasks, look elsewhere. It's not that the Amiga cannot do everything; it's just that you can get it done just as well by spending far less money.



EPSON EQUITY

List Price: \$995

Memory: 256K/640K

Hardware included: One 5.25-inch disk drive (360K), numeric keypad

Software included: MS-DOS, BASIC

Text: 80 x 25

Colors: 16

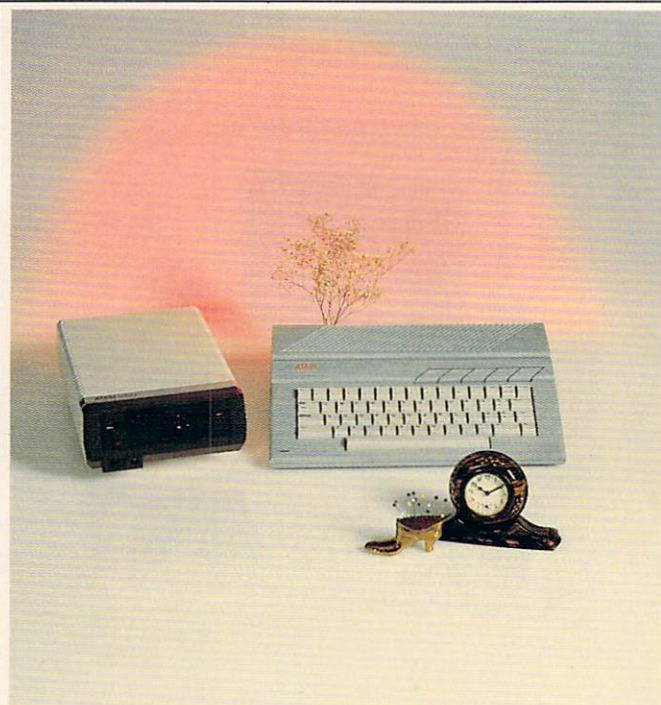
Built-in Ports: Serial, parallel

Sound: 1 channel

Strengths: The Epson Equity, an IBM-compatible computer from the well-known printer manufacturer, is a compact and stylish system. It takes up one-third less room than the IBM PC, and it fits well on a small or crowded desk. The keyboard has large RETURN and SHIFT keys. Most unusual and most laudable is the System Setup menu that you can use to choose MS-DOS functions. This method lets you accomplish basic tasks without getting all tangled up learning to outwit MS-DOS. The Equity II and III (\$1,695 and \$3,495, respectively) come with more memory, expansion slots, and a hard-disk drive option.

Weaknesses: The screen display suffers from blurred edges, at least on some units. In addition, the image area at the top is sometimes larger than at the bottom. Since the screen display is your lifeline, this is a major drawback. The Equity has only three slots, which is not a problem at the outset, but somewhat limits your future growth path. For instance, to connect a monitor, you have to buy an adapter and use up one slot. To expand the memory from 256K to 640K, you'll use up another slot.

Recommendation: The Equity's main virtues are smallness and attractive styling, making it a logical choice for many home settings. Its questionable screen display and relative lack of expandability make it not well suited as a workhorse business tool. For this purpose look at the more powerful Equity II and III.



ATARI 130XE

List Price: \$149

Memory: 128K

Hardware included: None

Software included: BASIC

Text: 40 x 24

Colors: 256

Built-in Ports: Atari serial/disk drive, monitor, TV, 2 joystick, cartridge, parallel

Sound: 3 channels

Strengths: The 130XE is the latest (and most likely the last) incarnation of the old Atari 800, adding more memory and a slightly different design. Even though its predecessor was known in its prime as a game machine, the 130XE has four function keys that make most applications software extremely easy to use. The superb color and graphics displays and very realistic sound effects enhance most software. The high quality of Atari software is partly due to the love that early software developers had for the machine. The XE has a cartridge port, so you can run some programs without a disk drive. And you can use a television instead of a monitor.

Weaknesses: The 130XE has a 40-character display, limiting the amount of text you can view at one time. It has no standard serial or parallel port, so you can directly connect only peripherals with special Atari interfaces. Because it's near the end of its life cycle, equipment and software will become increasingly hard to find.

Recommendation: If you can find a good deal on a complete system with a disk drive and printer (under \$500) and enough software to get you going, the Atari will give everyone in the family a lively workout. A lot of today's top programmers got their start on an Atari. But you can't expect to keep growing with the computer. So you might carefully consider putting the \$500 toward an ST system.



ATARI 520ST

List Price: \$799

Memory: 512K

Hardware included: 3.5-inch disk drive (360K); monochrome monitor, mouse, numeric keypad

Software included: BASIC, Logo, GEM, TOS, desk accessories, 1st Word, NeoChrome Sampler

Text: Varies with size of type

Colors: 512

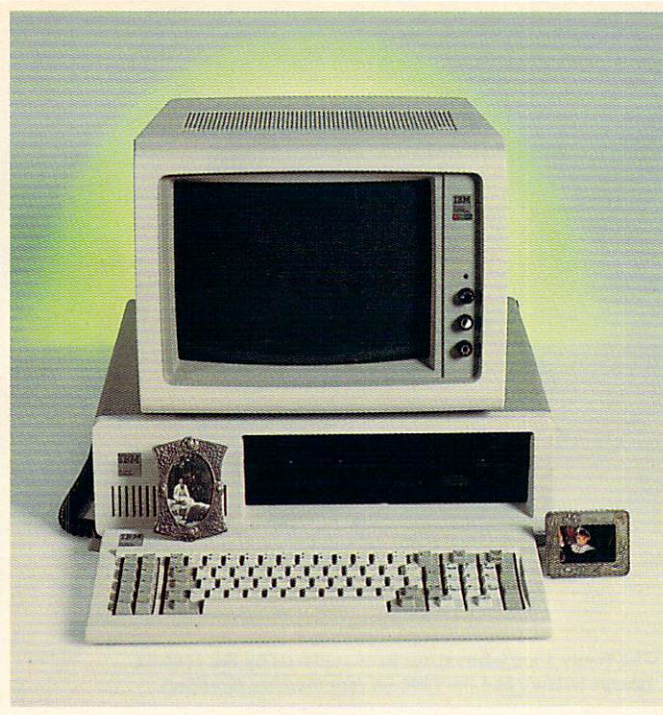
Built-in Ports: Serial, parallel, disk drive, TV, hard-disk drive, MIDI in and out, cartridge, 2 joystick, mouse, video, RGB monitor

Sound: 3 channels

Strengths: The Atari 520ST, which comes with a mouse, operates fluidly under the GEM "point-and-click" operating system. Some software can be loaded into memory and called up at any time by clicking the "desk-accessories" icon. On both the 520ST and 1040ST (which comes with one megabyte of memory and a 720K built-in disk drive), the screen displays are stunning. Likewise, on both computers, the 68000 microprocessor executes instructions rapidly. Both ST's have a built-in hard-disk drive port, the only machines with such an advanced feature. Musicians and audiophiles also applaud the MIDI ports that connect music synthesizers.

Weaknesses: The 520ST sprawls somewhat. The power supply is separate, and the disk drive is not internal. (The 1040ST [\$999], however, is more compact, with a built-in power supply and disk drive.) You can upgrade the 520's memory to one megabyte or more, but it often requires taking the computer apart and soldering boards, which voids your warranty.

Recommendation: Both STs are fast, effective, and fun to use. Plenty of good software is available in every conceivable category. But the ST has not yet defined its speciality—what sets it apart from other computers. The most compelling reason to buy the ST is still its price, and that's not always the best way to shop for a computer. It is, of course, a major factor to consider.



IBM PC XT

List Price: \$2,295

Memory: 256K/640K

Hardware included: Two 5.25-inch disk drives (360K), numeric keypad

Software included: BASIC

Text: 80 x 25; **Colors:** 16; **Sound:** 1 channel

Built-in Ports: None

Strengths: The IBM PC XT is an enhanced version of the IBM PC (pictured here), and much more widely sold nowadays. The XT can hold more expansion cards than the PC and has a larger power supply (130 watts). Thus, the XT is often sold with a 20-megabyte hard-disk drive. Because the XT is an "open" system, new plug-in cards are always coming out. The most noteworthy of late is the Enhanced Graphics Adapter, which gives beautiful color screen displays. The PC XT's memory can be expanded to 640K and beyond—enough memory to hold several programs in memory at once and/or work with very large files.

Weaknesses: To properly configure an IBM, you need a certain display adapter to connect a certain monitor and the right graphics card to run a given program. While a dealer can certainly outfit you, the system may not run the software you eventually buy. Because you have to add so much to the bare-bones unit (even the PC-DOS operating system costs extra), the price can mount quickly. Finally, the original IBM keyboard, with a small RETURN key and misplaced SHIFT key, has been much maligned. You can opt for the new keyboard, which is better, but still not a marvel.

Recommendation: You know the system works, you know it's a time-tested business tool, and you know IBM's not going to go out of business. You may also be glad to know that since IBMs and compatibles are entering more and more homes, new educational and entertainment software is in the pipeline. Given all this, your only question is, "Can I get a better deal from someone else?" Usually, the answer is, "Yes."



KAYPRO PC

List Price: \$1,595

Memory: 256K/768K

Hardware included: Two 5.25-inch disk drives (360K), numeric keypad, monochrome monitor, multi-video board

Software included: MS-DOS, BASIC, WordStar, Polywindows, Mite

Text: 80 x 25

Colors: 16

Built-in Ports: Serial, parallel, RGB monitor

Sound: 1 channel

Strengths: The Kaypro PC, a large desktop IBM-compatible computer, delivers the same value that Kaypro was known for delivering with its portable Kaypro II. A word processor and communications program are included with purchase. They're not the newest programs in the world, but they do work well and they are free. Beyond that, the PC includes all the interfaces you need for most tasks (including color/graphics adapter), and has six open expansion slots if you feel the need to expand. You can even run and view color software on a monochrome monitor, which most IBM compatibles will not do. The Kaypro 286 PC card (\$799 w/trade-in) turns the PC-compatible into an AT-compatible computer, with more speed and memory. Thus, you needn't worry about immediate obsolescence.

Weaknesses: Big is not always beautiful, as you'll find if you have a small desk area for the Kaypro. And given the solidity of the American-made system, the flimsy keyboard is a surprise. Also, the keyboard connector plugs into the back of the unit (some plug into the front), making it more difficult to move around.

Recommendation: The Kaypro is a solid system that leaves many doors ajar for growth. The main drawback is its size, which could scarf too much real estate in your house. But, if the included software suits your needs, you save yourself several hundred dollars, and that could be the deciding factor.



At presstime, the Tandy Color Computer 2 (above) was replaced by the Color Computer 3 (shown below).

COLOR COMPUTER 3

List Price: \$220

Memory: 128K/512K

Hardware included: None

Software included: Extended BASIC

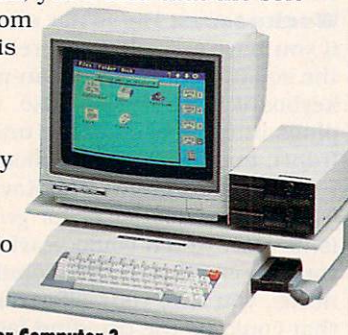
Text: 80 x 24; **Colors:** 64; **Sound:** 1 channel

Built-in Ports: Color Computer serial, 2 joystick, TV, video, RGB monitor, cassette, sound, cartridge, disk drive

Strengths: The Color Computer 3 is the third version of this popular computer. The CoCo 3 can run all software and use all hardware designed for the CoCo 2, which gives it a good base to grow from. In addition, its screen display is now 80 characters by 24 lines. To take advantage of the larger screen and the computer's colors, you can connect an RGB monitor without any additional interface. The built-in Extended BASIC is even more versatile than before, with 21 new commands. The CoCo can run the powerful OS-9 Level 2.0 operating system, which allows multi-tasking—the ability to run more than one program at once. You can use a TV and cartridge software without purchasing a monitor or disk drive.

Weaknesses: To take full advantage of the CoCo's enhanced screen displays, you need the Tandy CM-8 monitor (\$300). So the system really costs over \$500 without a disk drive. If you consider the CoCo primarily as a game or educational machine, you'll find that the software selection, almost all from Tandy, is not as wide as it is for some of its competitors.

Recommendation: While you can assemble a CoCo system for less than a Tandy 1000 EX system, the savings are not that pronounced. However, the CoCo is an inexpensive startup computer with great potential for upgrades.



Tandy Color Computer 3



The Tandy 1000 (above) has been replaced by the 1000 EX (shown below) and the 1000 SX (see Machine Specifics).

TANDY 1000 EX

List Price: \$799

Memory: 256K/640K

Hardware included: One 5.25-inch disk drive (360K), monochrome graphics adapter, color/graphics adapter

Software included: MS-DOS, BASIC, DeskMate

Text: 80 x 25; **Colors:** 16; **Sound:** 3 channels

Built-in Ports: Parallel, disk drive (5.25-inch or 3.5-inch), video, RGB monitor, two joystick, sound

Strengths: The Tandy 1000 EX is a new version of the best-selling Tandy 1000. It is IBM compatible and runs most software nearly twice as fast as the 1000 and IBM PC. Included with the system is *Personal DeskMate*, a handy program that will introduce you to the main types of applications software—word processing, spreadsheet, filing, and communications. It also includes a paint program, calendar, calculator, notepad, and filer. You can connect an external 3.5-inch disk drive.

Weaknesses: The EX comes with one disk drive, and much MS-DOS software requires two drives. You'll probably want to add a second, which increases the system cost another \$279, and makes it less tidy than the original 1000. In addition, you'll have to add a monitor (\$129 for monochrome). The keyboard is not detached, as on the 1000, so you have less control over your seating and desk arrangements. Only two or three expansion boards can be added and no internal hard-disk drive.

Recommendation: At first blush, it seems that Tandy has taken a good thing (the 1000) and truncated it for the home market. The machine suffers from the changes. Most people would be better off with the 1000 SX, a truly improved and more expandable version of the 1000 (see "Machine Specifics").



Tandy 1000 EX



LEADING EDGE MODEL D

List Price: \$1,295

Memory: 512K/768K

Hardware included: Two 5.25-inch disk drives (360K), monochrome monitor, numeric keypad, color/graphics adapter

Software included: MS-DOS, BASIC, Leading Edge Word Processor

Text: 80 x 25

Colors: 16

Built-in Ports: Serial, parallel, RGB monitor

Sound: 1 channel

Strengths: The Leading Edge Model D has all the key ingredients you need in an IBM compatible: It's compact and stylish, has all the major interfaces built-in, and leaves four free expansion slots. You can even expand the memory to 768K without using up an expansion slot. The keyboard is excellent and even includes a slotted tray for pens and pencils. The screen display is sharp and displays monochrome graphics for programs such as Lotus' 1-2-3. As a bonus, you get the commendable Leading Edge word-processing program when you buy the D. The hard-disk model (\$1,995) comes with a 30-megabyte drive, a massive amount of storage for the price. Leading Edge's toll-free help phones are quite useful, and the 15-month warranty is a security blanket.

Weaknesses: On hard-disk drive installations, some dealers install third-party brands that aren't covered by the Leading Edge warranty. Otherwise, the Model D is so good in most respects that its only real drawback is hardly a weakness—it's a minor shortcoming. That is, the computer cannot display color graphics on a monochrome monitor; you need to use a color monitor.

Recommendation: With a good keyboard and a clear screen display, the Model D is particularly well suited for long stints of work. If you want an IBM compatible, you may find less expensive models, but you probably won't find better ones. Leading Edge has built a better mouse-trap.



ZENITH PC

List Price: \$2,199

Memory: 256K/640K

Hardware included: Two 5.25-inch disk drives (360K), numeric keypad, video adapters

Software included: MS-DOS

Text: 80 x 25

Colors: 8

Built-in Ports: Serial, parallel, RGB monitor

Sound: 1 channel

Strengths: The Zenith Z-158-42 is a solid, well-made, and reliable IBM compatible. It's made of good old American steel. The keyboard is comfortable and well laid out, with a large RETURN key and well-placed SHIFT keys. The system case is large and well ventilated, with six expansion slots. The whole system seems well designed to add an internal hard-disk drive. The Zenith has a "turbo" high-speed mode, which you control with a switch on the back of the unit, so you run software 60 percent faster than the standard IBM speed.

Weaknesses: The Zenith color monitor (we did not test the monochrome) has an annoying "ghosting" problem. When you scroll up or down, a phosphorous outline of the old screen data flickers faintly in the background. From a television company, this is an unpleasant surprise. The system unit is large—though not unattractively so. But its main drawback is its price, which is not competitive with the new generation of IBM compatibles now on the market.

Recommendation: The Zenith is built to last. This factor and Zenith's American heritage have made it the choice of many state governments and corporations. Beyond these strengths, there is nothing special about the machine, and individuals looking for the best price/value relationship may want to look elsewhere. It's a straightforward IBM compatible that performs as advertised.

SHOPPING TIPS

Choose a "Type." As outlined earlier, there are three main categories of computers. Picking the category you want to explore will make your comparison shopping easier.

CATEGORY 1: Old standbys that have withstood the rigors of the marketplace and continually been improved. **PAYOFF:** Can be relatively inexpensive and a good value.

CATEGORY 2: IBM and compatibles, which are powerful and expandable. **PAYOFF:** Workhorses that can do just about everything.

CATEGORY 3: Mouse-operated computers with great graphics and sound. **PAYOFF:** Generally more exciting to use, and well suited for creative work.

Primary Benefit. When you set out to buy a computer, you probably have one primary task in mind. Identify it. Do you want to bring work home from the office? Do your kids want to bring schoolwork home? Do you want to research through the various electronic data bases? Do you want to write and do mass mailings? If you look at computers without your needs in mind, you'll be shopping in a vacuum.

Similarly, all computers have one or more elements that set them apart—a good keyboard, a sparkling screen display, more expandability, excellent sound or color, and free software. In our reviews, we've tried to highlight those features; you should look for others that speak to your needs.

Pricing. When you first look at computers, ignore the price. Figure out what you need and what you want. Then get out your calculator. Comparing computer prices without a system in mind will lead you to compare apples and oranges, and that is not the way to get a system that will work for you.

When you do consider pricing, look at the cost of a complete system. For instance, the Commodore 128 sells for around \$350, but you don't get a monitor or disk drive at that price. The Atari 520ST, on the other hand, costs \$799, but comes with a disk drive and monitor.

Finally, don't be penny wise and pound foolish. Buy components that are designed to work together rather than trying to save money by mixing and matching. The money you save will likely cost you aggravation.

Software. When you buy a computer, bring home a piece of software. Otherwise, you'll set up the computer, turn it on, and stare at a blank screen. If at all possible, buy software you've seen in action. The dealer may try to sell you a bestseller that is totally wrong for you. The beauty of computers that come with software is that you don't have to figure out what to buy before you've had a chance to try out the computer.

Retail Outlets. It's Saturday and you're going out to look at computers. Do you go to K-Mart, ComputerLand (if it's open on Saturday), Sears Business Center, Macy's, Radio Shack, or your local computer shop? It depends on what type of computer you're looking for.

K-Mart and other mass merchandisers stock Atari and Commodore computers. Radio Shack stocks Tandy computers. ComputerLand, Sears, and other big national computer chains stock Apple, IBM, and compatible systems. Some may sell Amiga. Macy's and other large department stores probably carry a wide range of computers, as do independent computer stores.



IBM COMPATIBLES

Besides the many IBM-compatible computers with well-known brand names (such as AT&T, Epson, Kaypro, Leading Edge, Tandy, and Zenith), there's a whole slew of compatibles from companies you've probably never heard of. The PC USA Star, pictured here, is sold via mail order by a company in Texas. The ComputerLand Business Computing System is sold by the big computer retail chain. Fountain Technologies Model 2 is made and sold by a small New York City outfit. Standard Brand PC is sold by CompuAdd, a Texas shop. And so on.

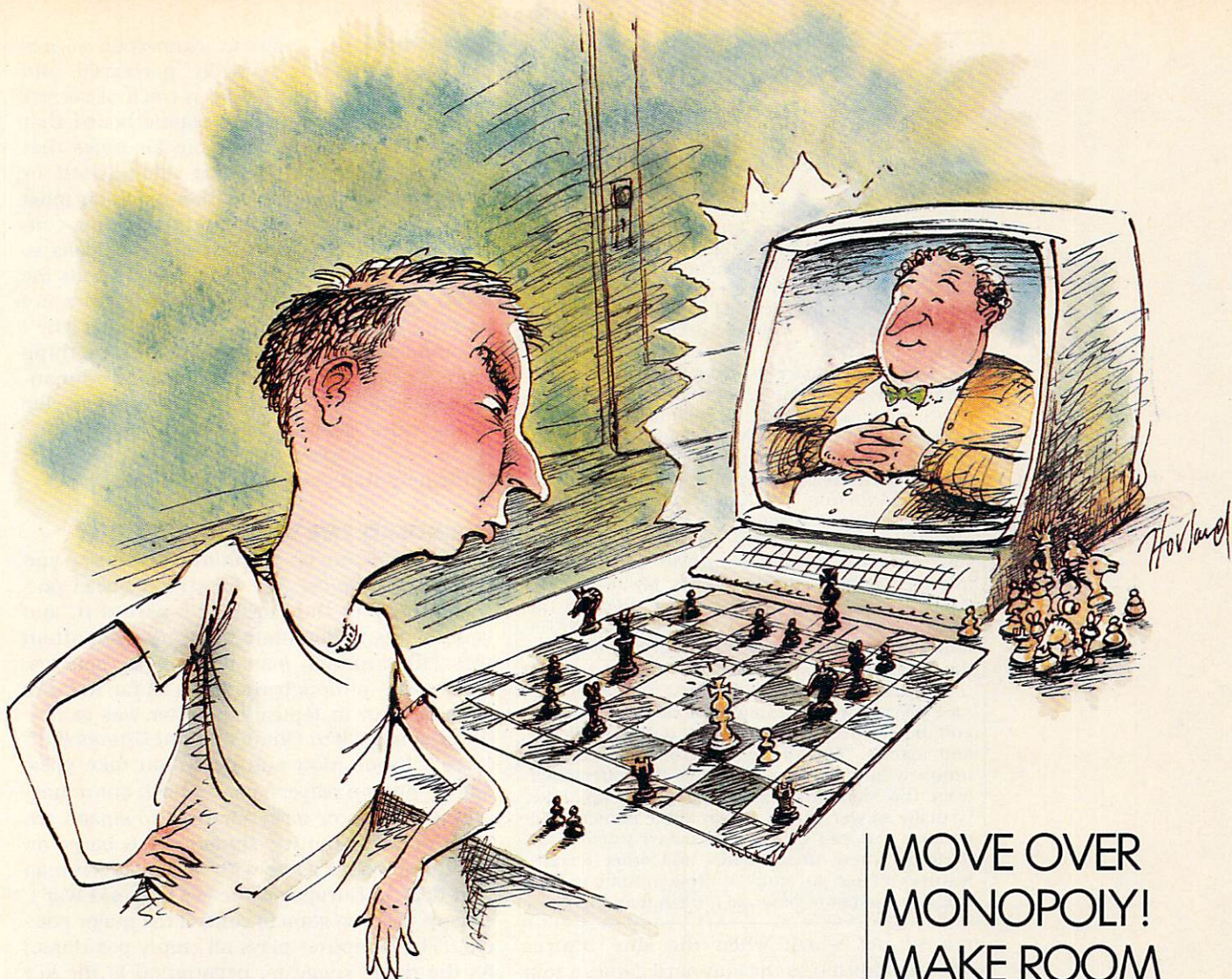
By and large, these computers are made and/or assembled in the Far East. These computers are full-fledged IBM compatibles. Manufacturers can churn out compatibles as easily as they can color televisions—some better than others.

All low-cost compatibles offer a lot of computing power for the money, otherwise they wouldn't be able to compete with well-known brand names. Most come with 640K, built-in parallel and serial ports, two disk drives, and a monitor, though the deals vary radically.

This profusion of low-cost IBM compatibles is bound to raise questions for many consumers. Can you buy on price alone? Can you trust mail-order companies to deliver what they say they will? Can you get support if the company you buy from fails? Can you assume these computers will hold up under heavy use?

No blanket answer can possibly cover all the unknowns—and be fair. The current marketplace is turbulent, like water seeking its own level. It's "sink or swim" for the manufacturer and for each individual consumer.

Under these conditions, the best advice is not to buy an unknown computer unless you have seen it in action and know someone else who has dealt with the company. And buying a low-cost computer from a small company is definitely not a good idea for a first-time buyer. Even if the computer is fine, the level of support from the company is likely to be low. **FC**



Board Games That Think

MOVE OVER
MONOPOLY!
MAKE ROOM
FOR GAMES
THAT ARE
ALWAYS READY
TO PLAY

Monopoly and Risk, checkers and chess—these were the kinds of board games we played back when the smallest computer filled a large room. The main drawback was that you had to round up at least one more player, but too often everyone else wanted to watch cartoons instead. Today's "smart" board games solve that dilemma by including a computer-controlled foe that is always ready to play. The software also does the dirty work of refereeing and acting as banker.

LIKE MONOPOLY ON ANOTHER PLANET

My favorite computer board game is *M.U.L.E.*, which is like Monopoly on an alien planet. The board consists of squares that are

plots of land. Instead of building houses and hotels, however, up to four players compete to stake out and develop their plots by raising crops, digging for minerals, and constructing energy plants. With a joystick, you move mechanical *M.U.L.E.*'s around your plots and control other aspects of the game. The players are represented by aliens like Bonzoids or Mechtrons, which have varying capabilities. In a solo game, you determine the enemy's "intelligence" by choosing weak or strong computer opponents. Strategy is vital, but there's a lot of animation as the Bonzoids and other colonists engage in a tug-of-war with other players to bargain for prices when buying or selling goods. Other events are also animated, and the sound effects are lively. The player with the

**BY
SHAY ADDAMS**

SHAY ADDAMS is the editor of "Questbusters," a newsletter for adventure fans. In the April issue of *FAMILY COMPUTING*, he wrote "From Towers to Dungeons: The Universe of Fantasy Role-Playing Software."

WAR GAMES: BOARD GAMES WITH GUTS

In a computerized war game, your troops are represented by little "counters" that have specific weapons, defensive and offensive ratings, and other factors the program uses to calculate battle results. In this manner, history's most memorable campaigns can be refought without spilling a drop of blood, and hypothetical wars between current world powers are even available. These are the most complex kind of computer games, so it pays to start off with one designed for beginners.

One good choice is *Operation Whirlwind*, which makes you the general of a fictitious nation's army as it invades a neighbor. For something more authentic, *Nam* delivers six mini-game scenarios that range from easy to tough and combines helicopter units with the infantry. *Battle of Antietam* is an American Civil War game that includes an introductory module with simplified rules. Once you've mastered the basics, you can learn the more intricate rules in the intermediate and advanced levels. My all-time favorite beginner war game is *Mech Brigade*, in which war breaks out between Soviet and NATO forces in West Germany and you are armed with the latest missiles and tanks.

If you'd rather be flying, take a spin in *Europe Ablaze*, which restages the Battle of Britain, and more. If you want to duke it out with swords and arrows, *The Ancient Art of War* features uniquely animated battle scenes that offer relief from the standard aerial view of a map. Like virtually all war games, replay value is increased because you can create your own battlefield by deciding where trees, roads, and other terrain features should go. Many of these military games will also randomly generate a fresh map for you.

greatest net worth when the ship returns, wins. In addition to the standard game, a tournament version is included.

THE FOIBLES OF "FOOBLES"

Fooblitzky looks like a traditional Monopoly-style board game, offering shops to visit as you travel the board trying to buy four particular items before anyone else does. The shops are connected by other squares that form the city's blocks, which you traverse by spinning the wheel of fortune for a number and moving your token that many steps in any direction. You may meet the "Chance Man" (remember Monopoly's Chance cards?) or get to bump another player by landing on his or her square.

But the point of the game is decidedly different, as you rely on logical deduction to figure out which four items are the correct ones to buy. At the start of a game, each player secretly chooses one item—such as light bulbs, tennis rackets, and teddy bears—from 18 items displayed on-screen (if there are fewer than four players, each player picks one item and the computer chooses the rest). As the manual puts it, "These four secretly chosen items become the four correct items that you must obtain and bring to a check point in order to win the game." The value of each item

is measured in "Foobles." Numerous scenes and encounters are vividly portrayed and sometimes animated. To keep track of correct items, each player uses a plastic board that shows the town and has room for notes that can be wiped clean with a damp cloth or sponge. It will take longer than usual for most people to figure out *Fooblitzky*, since the concept is so different (though the board looks so familiar); in some ways, the game reminds me of an algebraic equation—certain factors are known and others are unknown. That's why I recommend it to anyone looking for something truly cerebral and unusual. The detailed manual suggests seven or eight variations and rule changes that give the game extra replay value. Up to four can play, but this is the only game listed here that cannot be played solo.

IF I RULED THE WORLD . . .

In *Diplomacy*, *Colonial Conquest*, and *Lords of Conquest*, the on-screen board portrays a map of the world, or a part of it, and your goal is to dominate the world. You attain this with cunning, management of resources, and battle—although the latter is far less important than in typical computer war games. (See the box, "War Games: Board Games With Guts.") Negotiation and deception take place among human players, as you hash out nonaggression pacts or form alliances to smash another player's country. *Diplomacy* is based on a genuine board game with an on-screen map that depicts Europe on the eve of World War I, and up to seven gamers control the major powers. (The computer plays all empty positions.) As the name suggests, negotiation is the key weapon in the arsenal of the successful "Dippy" player.

The conflict in *Colonial Conquest* unfolds on a bigger battlefield; 125 nations span the globe displayed on a scrolling map. The game offers three scenarios staged under different conditions from 1880 to 1914. Battle between armies and navies is more crucial here than in *Diplomacy*, but strategy and secret treaties remain the order of the day. *Lords of Conquest* resembles the board game *Risk*, as you struggle to develop your nation's resources (gold, timber, coal, etc.) while plotting where to send your troops. Negotiations are instrumental, but players can also trade goods. For those preferring a historical backdrop, *Diplomacy* or *Colonial Conquest* is recommended. Otherwise, *Lords of Conquest*—with its superior graphics, 20 maps, the option of playing on a randomly generated map, and a "map construction kit" that lets you create your own scenarios—is the game of choice.

WILL THE REAL COMPUTER CHESS GAME PLEASE STAND UP?

Chess, the original board game, has adapted well to the era of computer entertain-

ment. For years, *Sargon III* (and its predecessors *Sargons I* and *II*) reigned as champion of the rank and file, offering a formidable opponent for solo games. Like most computer chess games, it will referee two-player matches and also includes a disk of grandmaster games that can be replayed on-screen and studied move-by-move. The latest challenge to *Sargon's* supremacy comes from new titles like *Chessmaster 2000* and *Psion Chess*. In these two games, you can choose a more realistic, almost three-dimensional, view of the board and pieces in addition to the usual overhead perspective. *Psion* also boasts of an algorithm that enables it to "think" faster and perhaps more cunningly, while *Chessmaster* has a "coffeehouse mode" in which it makes more unpredictable moves. Its handy tutorial mode highlights the squares to which any piece can move. *Chess 7.0*, while not new, goes even further by allowing you to see which pieces are attacking or defending a selected square or piece. *How About a Nice Game of Chess* is a full-blown tutorial program, and thus is excellent for beginners. (I've played them all at the easiest level, and *Chess 7.0* was the only one I beat the first time out.)

On the other hand, *Archon* is like playing chess in the "Twilight Zone." The playing field looks like a typical chess board with pieces that look like trolls, dragons, and unicorns instead of pawns and rooks. Some wield magical powers as well as swords and other weapons. When you move a piece onto a square held by the enemy, the board vanishes and is replaced by a close-up of the battle as you fight it out arcade-style. Then the board reappears and the next strategy round of moves is conducted. Animation and sound effects are top-notch. Strategy is vital, but you won't stand a chance here unless you've got a fast finger on the joystick and learn to cast magic spells effectively. The sequel, *Archon II: Adept*, introduces new creatures, spells, and battlegrounds that are woven into an oblong chess board that includes other unique features.

A game of chess can take forever, so for faster fun you might consider *Odin*. Based on Othello, whose roots go back to the 18th century, this battle for territory is pitched on a similar 8 x 8-square board. Players can capture an opponent's piece by catching it between two of his; the pattern looks like the opposite of the successful tic-tac-toe tactic of placing an X between two O's. When no one can move any longer, the player with the most pieces is declared the winner. The best feature of these games, including chess, is the one that lets you take back your last move. You know, the move right before the computer captured your queen—and then the one before that, all the way back to the beginning of the game.

That isn't possible in *Pensate*, an inven-

GAME SOFTWARE INFORMATION

The Ancient Art of War (BR). IBM PC/PCjr, Macintosh. \$45. **Archon** (EA). Amiga, Apple, Atari, C 64/128, IBM PC/PCjr, Macintosh. \$40 (Amiga, Macintosh), \$15 (others). **Archon II: Adept** (EA). Amiga, Apple, Atari, C 64/128. \$33 (Atari, C 64), \$40 (Amiga, Apple). **Battle of Antietam** (SS). Apple, Atari, C 64/128. \$50. **Chess 7.0** (OD). Apple, Atari, C 64/128, IBM PC/PCjr. \$70. **Chessmaster 2000** (EA). Amiga, Apple, Atari, Atari 520ST, C 64/128, IBM PC/PCjr, Macintosh. \$45 (Amiga, Atari ST, Macintosh), \$40 (others). **Colonial Conquest** (SS). 64K Apple, Atari, C 64/128. \$40. **Diplomacy** (AH). IBM PC/PCjr, Tandy Models III/4. \$50 (IBM), \$20 (Tandy). **Europe Ablaze** (EA). Apple, C 64/128. \$50. **Footblitzky** (IC). 128K Apple IIe/IIc, Atari, IBM PC/PCjr. \$40. **How About a Nice Game of Chess** (OD). Apple, C 64/128. \$35. **Lords of Conquest** (EA). Apple, Atari, C 64/128. \$33 (Atari, C 64), \$40 (Apple). **Mech Brigade** (SS). Apple, Atari, C 64/128. \$60. **M.U.L.E.** (EA). Atari, C 64/128. \$15. **Nam** (SS). Apple, Atari, C 64/128. \$40. **Odin** (OD). Apple, Atari, Tandy Models I/III. \$50. **Operation Whirlwind** (BR). Atari, C 64/128. \$40. **Pensate** (PO). Apple, Atari, C 64/128, Macintosh. \$9. **Psion Chess** (PS). 256K IBM PC/PCjr, Macintosh. \$60. **Sargon III** (SP). Apple, Atari, C 64/128, IBM PC/PCjr, Macintosh. \$50 (Macintosh), \$40 (others).

PUBLISHERS' KEY

AH: Avalon-Hill, (301) 254-5300.
BR: Broderbund, (415) 479-1700.
EA: Electronic Arts, (415) 571-7171.
IC: Infocom, (617) 492-6000.
OD: Odesta, (312) 498-5615.
PO: Polarware/Penguin, (312) 232-1984.
PS: Psion Inc., (203) 371-4371.
SP: Spinnaker/Hayden, (617) 494-1200.
SS: Strategic Simulations, (415) 964-1353.

Note: All games for the IBM PC require a color graphics card. Titles listed for the IBM PC/PCjr will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher or your dealer for compatibility. Unless otherwise noted, minimum memory requirements are 48K for Apple II series, 48K for Atari 800/XL/XE series, 128K for IBM PC/PCjr, and 128K for Macintosh.

tive game that can be completed in a few minutes. On a standard chess board, you merely have to move your sole piece from the bottom to the top. The computer moves several pieces and can capture yours if it moves to the same square. It's a tricky game because there are different types of pieces, each with bizarre moves: Some pieces always move one square down and two squares to the right; others always move diagonally. You get to select where your pieces move, and the computer's moves are determined by the skill level you choose. Unlike the previous games, *Pensate* can only be played solo.

So whether you're looking for a trip to another planet or just a friendly game of chess, there's an "intelligent" computer board game for you, one that won't say "I'd rather watch TV!" when you feel like playing.

Editor's Note: Turn to the Entertainment Department on page 28 for tips and tricks to help you in playing some of the games mentioned above, including Archon and Colonial Conquest. ☐

Headers, Footers,*



In learning how to operate a word processor, people seem to follow similar progressions. At first, just writing with a computer is satisfying enough, and the ability to correct mistakes or change the phrasing of thoughts with a few keystrokes is the cherry on top. But after a short time, most people demand more, both from themselves and from their word-processing programs.

If you read Part 3 of this series last month, you saw how any word processor's SEARCH-AND-REPLACE functions can make writing with a computer much easier. That's just the beginning.

LOOKING GOOD FROM HEADER TO FOOTER

What happens when you print out your words? Do your documents appear lackluster on the printed page? Do they lack that certain professionalism you're searching for?

Here's where several word-processing functions such as *headers*, *footers*, and *footnotes* can sweeten your day. We'll begin by looking at headers and footers. These twin functions refer to the lines of text that can appear at the top (headers) and bottom (footers) of each page, separate from the main body of the document. What's their purpose? Well, would you like your word processor to automatically number every page? Or how about place your name and the date or titles and subtitles on every page? Look to your headers and footers. Mixing and matching is usually allowed, so you could, for instance, have your name on the top left-hand corner of the page, the title on the right top, and the page number at the center bottom.

DAVID HALLERMAN, reviews editor for FAMILY COMPUTING, would find it very difficult to write and edit without a word processor.

Almost every word processor offers these header/footer functions. Most limit you to two lines of text, one at the top and one at the bottom, and most look similar on the printed page. When using headers and footers, you decide whether to put the information at the top or bottom of each page or both. Then you choose where on the line to print your information—left, right, or center. In working with *Apple Writer*, Apple Computer's classic word processor, here's how you would create a footer that automatically numbers each page on the bottom right and places this magazine's name on the bottom left.

1. For the printout menu, press CONTROL-P, and then a question mark (?) and RETURN.

2. Type BL—which stands for "Bottom Line," *Apple Writer's* term for footer.

3. Now you need to insert slashes (/) as the *delimiters*. The delimiter characters tell the program where on the line—left, center, or right—each name, number, or any other text should appear. So enter this text before pressing RETURN:

/FAMILY COMPUTING//#/

From left to right, here's how the bottom of the printed page will look: FAMILY COMPUTING, which appears between the first two slashes, will appear on the left side of the page. Nothing will appear in the middle of the page, since the second and third slashes have nothing between them. Then comes the number symbol (#), which is *Apple Writer's* character for automatic page numbering. This means that the page numbers will be printed on the lower-right side of each page. (If you want page numbers on the left side rather than the right, you would enter /#//; for centered page numbers, enter //#/; instead.)

OTHER PROGRAMS, OTHER METHODS

Apple Writer can be more complicated to control than other word processors. Let's look at *HomeWord Plus*, an icon-based word processor from Sierra On-Line. While its headers and footers appear similar to *Apple Writer's* after you print out your text, the procedure to invoke them is very different. Let's say you want to have your name and the page number centered on the top line of each page. Here's how the Commodore 64/128 and Apple IIe/IIc versions of *HomeWord Plus* operate:

1. To go to the headings/footings menu, press the COMMODORE key (OPEN-APPLE key on the Apple) along with the letter "T" (for "top").

2. Highlight HEADING and press RETURN or a mouse's button.

3. Now you are given four menu options: LEFT, RIGHT, CENTER, or OFF. Highlight CENTER and press RETURN.

4. A prompt line appears, reading ENTER THE TEXT. Type your name, a comma (or any punctuation you'd like to separate your text from the page number), a space, and then the "#" sign (which is also *HomeWord's* symbol for automatic paging).

5. Press RETURN. The program will then instruct you to move the cursor to the place you want this header to begin.

6. Press RETURN again. You will see this line on the monitor: HEADER CENTER: your name, #

When you print out this document, the top center of each page will contain your name, followed by a comma, a space, and the page number.

Step 5, above, refers to another feature often found in header/footer functions: the ability to change them at various places in your document. Many word processors, like *HomeWord Plus*, let you change a

*And Footnotes



LEARN HOW TO SPRUCE UP YOUR PRINTOUTS

Guide to Writing with Computers: Part 4

BY DAVID HALLERMAN

header or footer anywhere you want in the text. Such a feature is especially helpful when you're alternating between titles and subtitles in a long report or from chapter title to different chapter title in a manuscript.

FOOTNOTES FOR STUDENTS AND PROFESSIONALS

Mr. Cali, my eighth-grade social studies teacher, introduced me to footnotes. He wouldn't accept my paper on Abraham Lincoln's assassination unless I cited my sources, which meant I had to insert those official-looking numbers halfway up each line and type strange Latin abbreviations such as *ibid.* and *op. cit.* Once you learn how to control a word processor's footnote function, adding footnotes will be a breeze, and your papers and reports will look cleaner and more impressive.

There are two main approaches to footnoting your writing. One choice is to put all of the footnotes on a separate page at the end of the document. With this footnoting style, your word processor doesn't even need a footnote function, just the ability to take advantage of your printer's superscript feature. Your other option is to place footnotes at the bottom of the page where cited.

Separate footnote pages aren't as helpful to the reader as footnotes that appear at the foot of a page. And some teachers insist that footnotes are done using the latter method. Word processors that support this type of footnoting keep track of the page on which the footnote is cited and then automatically reserve lines at the bottom of the page for the footnote and print it.¹

A TALE OF TWO FOOTNOTES²

As a rule, the more sophisticated the word processor, the more likely

you'll find a footnote function. *WordPerfect* (WordPerfect Corporation)—as full-featured a writing tool as you can get—makes footnoting straightforward, if not easy. Let's look at the creation of a footnote with the IBM PC & compatibles and Apple IIe/IIc versions of *WordPerfect*.

1. Move your cursor to the point in your main text where you cite the footnote.

2. Press CONTROL and the F7 key (SOLID-APPLE-8 with the Apple IIe/IIc version) for the footnote menu, as indicated on the keyboard template that comes in the package.

3. Press 1 to select CREATE from the footnote menu. In response, the program prompts you for the text of the footnote.

4. Enter the text.

5. When done, press the F7 key (or OPEN-APPLE-8 on the Apple version), which saves the footnote and returns you to your main document.

You've done your work, and now the program does its job by placing the correct, sequential footnote number at your citation point (should you delete a footnote, the remaining ones are renumbered for you). When you print out your text, each number is automatically superscripted as each footnote is printed below the text on the appropriate page.

In contrast, *Apple Writer's* footnote function is not menu-driven and is not as completely automatic. Let's step through it:

1. Move your cursor to the point in your main text where you cite the footnote.

2. Type in the appropriate printer codes to start superscripting (consult your printer manual), and then insert the footnote number by the citation in the main text, followed by the code that stops superscripting.

3. Type (< open parenthesis,

less than) to start a line of the footnote. Begin typing the footnote's text with the citation number, but make certain you don't have more characters in one footnote line than in the width of your entire printout.


4. Type >) (greater than, close parenthesis) to end the footnote line.

5. If you need more than one line of text for your footnote, type in the additional text. Just make certain each footnote line is no wider than your text and is bracketed like this: (<text of the footnote, *ibid.*>).

With *Apple Writer*, you'll need to keep track of the footnote numbers. Those numbers won't be superscripted automatically, so you'll have to insert the codes yourself.

MAKE YOUR OWN FOOTNOTES

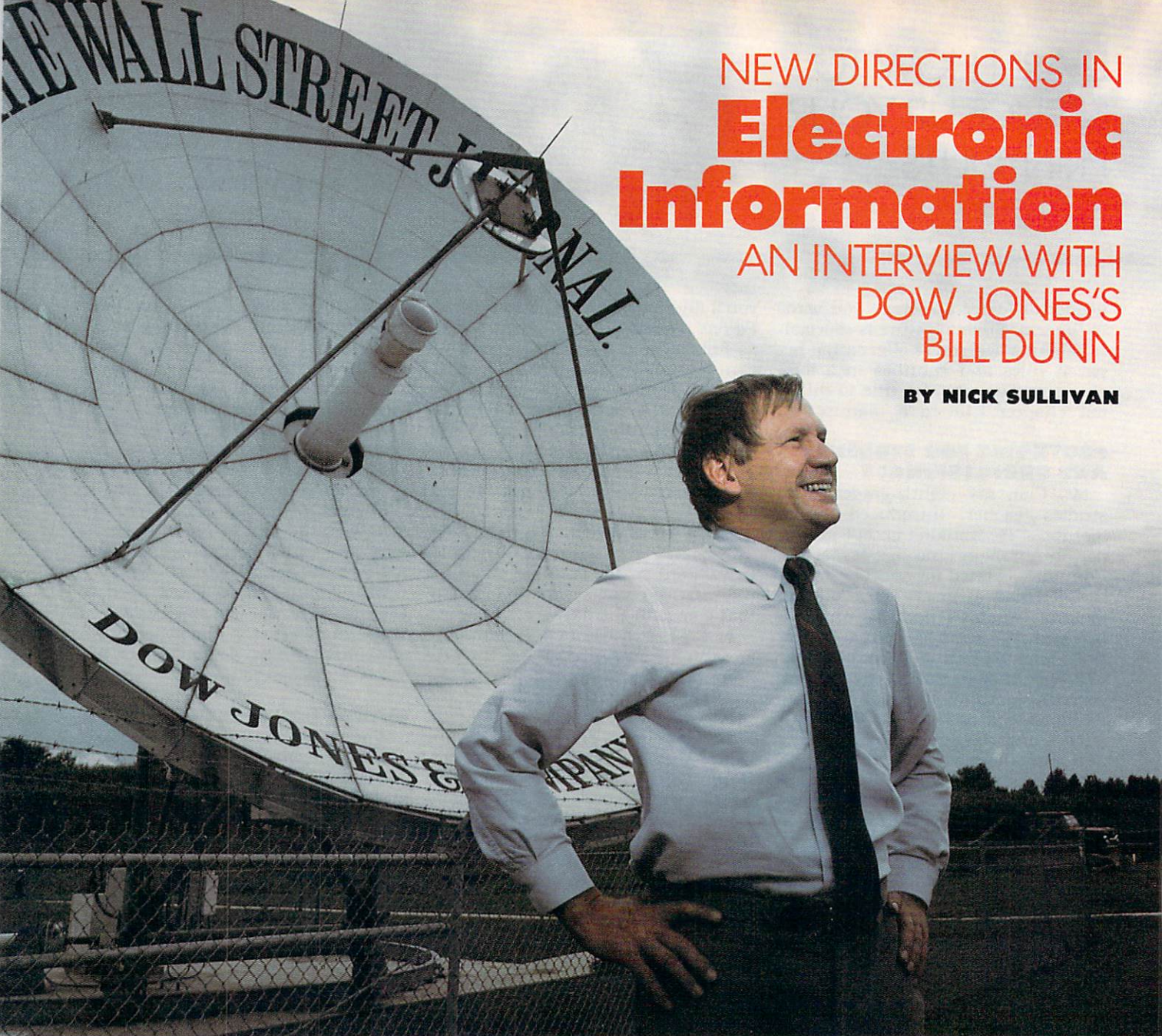
When your word processor doesn't offer footnoting, that doesn't mean you're doomed to put all of your notes at the end of the document. You'll just have to plan ahead. For example, most word processors can show you where page breaks will be when the document is printed, even if you have to go into a separate preview mode to see them. Using this feature, you can figure out how much space is required to keep any footnote on the same page as its citation. Type the footnote in the main body of text so that it will be printed at the end of the appropriate page. Use superscripted numbers where necessary. Then return to the preview mode to check whether or not the footnote is complete on one page. If it isn't, adjust its position and try again. Trial and error is the key to this cumbersome, but workable method.

Next month, the "Guide to Writing With Computers" continues with an examination of macros, powerful tools for customizing your word processing. 

¹Not all word processors have a footnote function, though, so I'll also show you a trick for getting footnotes at the bottom of a page without this special function.

²Apologies to Charles Dickens





NEW DIRECTIONS IN **Electronic Information**

AN INTERVIEW WITH
DOW JONES'S
BILL DUNN

BY NICK SULLIVAN

On one wall is the front page of the first Wall Street Journal ever printed by satellite transmission. Behind the desk is an Einstein quotation: "Imagination is more important than knowledge." On the desk is a Macintosh computer, modem, and telephone. At the desk, across from a wall of sailboat photographs, is Bill Dunn.

Dunn, 50, is a printer. He started at Dow Jones as an assistant manager in a printing plant in 1961, fresh out of Iowa's Drake University. Printing's a bit different now. As more and more information is delivered via computers, the ink in Dunn's blood is slowly being replaced with phosphor.

NICK SULLIVAN IS FAMILY COMPUTING's senior editor.

As president of the Operations Group, responsible for all printing of The Wall Street Journal and Barron's, Dunn directs satellite-transmitted information to various printing plants around the country. As president and publisher of the Information Services Group, Dunn directs much of that same satellite-transmitted information to computer screens, where subscribers to Dow Jones/News Retrieval (DJ/NR), an electronic-information service, can read it.

DJ/NR, with over 250,000 subscribers, delivers up-to-the-minute stock quotes, analysts' reports, news from the Dow Jones news wire, and full-text articles from The Wall Street Journal and The Washington Post.

Because the electronic distribution of information is so new and so little

understood, Dunn has a professional interest in understanding what kind of information people want, what they will do with it, and how much they are willing to pay for it. In the information age, Bill Dunn has a good view of the big picture.

Family Computing: How did Dow Jones get into delivering electronic information ahead of other big news-gathering companies?

Bill Dunn: The Wall Street Journal is the most technically sophisticated publishing operation in the world. And we don't have a mentality that says, "We are a printer of newspapers." Electronic publishing is not a big deal for us.

FC: Where is Dow Jones/News Retrieval used more often, in the office or at home?

PHOTOGRAPH BY JOSEPH BERGER

Dunn: I never bought that home/office nomenclature. We sell to people. The information people buy from us has value at home, in the office, in airports. We give information mobility.

A lot of people send electronic mail messages on Saturday or Sunday. It's there any time I want to read it. That way, I have a work week, without the phone ringing all the time. So is that considered "home" or "office" use? It's both and neither.

FC: Even if information is mobile, people don't always need it immediately, do they?

Dunn: Once you have information, you want to act on it—otherwise why get it? And electronic services should respond to your desire to act. You see a stock—you can buy it. See an airline schedule—book a ticket. See a camera—buy it.

FC: Is the world ready for electronic living in general?

Dunn: The marketplace doesn't quite accept it yet. People look at that stuff on my desk with suspicion and say, "That PC/modem stuff is kind of weird." But then they say, "I wonder what it will do?" It takes time.

The current change in society is more than a ripple. The change is so profound that no corporation can affect it. We can just watch and react and try to direct the change.

FC: Do you think computer communications are too hard for most people or too much trouble for the payback?

Dunn: You have to measure the hard-to-use factor versus the desire-to-get-something-done factor. Go back to Iowa in the thirties. There's Mother in a rocking chair on the porch, shelling peas in her apron. Father wants to go into town. Anything to get off that farm. To start his car, he uses arm power and a crank to turn it over. He cranks and cusses and cranks further until it starts. Did he want to start the car? No. He wanted to get out of there. He had the motivation.

FC: What kind of people subscribe to DJ/NR?

Dunn: They're in their late 30s, 10 years younger than *The Journal* readers. They have salaries in the \$65,000 range.

FC: Do many subscribers trade stocks and bonds on-line through Fidelity Investor's Express?

Dunn: Fidelity has about 2,500 customers through DJ/NR. They average 20 trades a year, compared to six for the typical *Journal* reader. And the value of their portfolio is higher.

FC: Do many use the *Dow Jones Market Analyzer* or other diagnostic software to analyze information taken from DJ/NR?

Dunn: Yes, because raw information is

plankton, just part of the food chain. Information by itself is a crippled form of intelligence. You have to make sense of it.

Take the figure "77 $\frac{1}{2}$." It means nothing. Put the word "Quote" beside it, and you know it's a stock price. Put the letters "IBM" next to it, and it means more. If you know how many shares of IBM you own, what price you bought them at, and what your tax bracket is, you can begin to calculate your losses. But you don't want to spend time calculating. All you really want to know is, "Am I in deep?" And the software can answer that quickly.

FC: So what can you, as an information provider, do for people?

Dunn: The next level for us is to give some kind of decision-support system to people. The more we can enhance raw information, the more valuable it is.

Instead of just saying, "Exxon drops its dividend," reporters and editors simplify it and explain it. What does it mean to Exxon? What does it mean to the investor? What caused it? You get that in the newspaper, but not on-line.

FC: How much information do you have on DJ/NR?

Dunn: Ten billion characters worth. That's equivalent to 76 years worth of *The Journal*.

FC: Is it all used?

Dunn: Put it this way: We live in a world of "incidentally's." People sign on to get stock quotes, but say, "Incidentally, I think I'll check that movie review." Or, "Incidentally, I'll check those sports scores."

To us, the cost of information is insignificant, so we might as well put it up there. Of course, we're not going to lose sight of our target audience, the people who want to read stock quotes and 90-second-old news off the Dow Jones ticker.

FC: What causes a rise in usage?

Dunn: Chernobyl, the shuttle disaster—big news stories like that. And you know something? Once usage goes up, it never comes down. There are the usual seasonal fluctuations and all, but the general level remains higher.

FC: Will you always charge people according to the amount of time they spend on your service, or will you ever sell it like a newspaper or magazine subscription?

Dunn: We don't like the time value of information. We like the content. The value of information is not determined by whether it takes five seconds or five minutes to read. However, pricing is a problem. An individual might look at stock quotes and say, "They're too expensive," because he or she can't do anything more with the information. A funds manager might consider that

same information inexpensive.

We're kind of straddling now, because we do sell the //QUICK report for \$39. Sign onto DJ/NR, type //QUICK DJ (or insert any other stock symbol), and you'll get a full accounting of the financial position of Dow Jones Inc. We put a price on that body of information, not the amount of time it takes to read it, download it, or print it.

FC: Electronic-information services are so competitive these days. Wouldn't they all do better if they were more cooperative?

Dunn: Of course! DJ/NR is connected to MCI Mail and Citibank Direct Access, and I'd like to connect it to all other networks. In fact, I've made several proposals to competitors and told them we weren't competitors. We're in the news business, not the electronic distribution business.

People should be able to hop from network to network. There's no point trying to stop them from going somewhere else. They're going to go where they want to go anyway.

FC: Your *Dow Jones Straight Talk* (communications software) is written only for the Macintosh. Why is that?

Dunn: The Macintosh is the perfect machine for us. The front page of *The Wall Street Journal* is made up of a lot of little dots per square inch. The Macintosh screen has almost as many dots, and you can do anything you want with them. We can reproduce a reasonably good facsimile of the front page on the Macintosh screen.

And when we connect an Apple LaserWriter printer to the Macintosh, we can then print out that page.

FC: Where does this lead?

Dunn: What we want to do is allow people to customize their own daily newsletter—pick out the stocks and news they are following. Then, when they go on-line, they can push a button and DJ/NR will pick out the pertinent stories of the day, then send them to the LaserWriter, laid out just like a little newspaper.

That's another example of the kind of product we could sell by content rather than by time.

FC: How close are you to achieving that?

Dunn: We're working on it. The piece of paper with the information is what people want. They don't want to search for information, or download it, and then calculate it. They want to push a button and see it.

FC: Is DJ/NR making money?

Dunn: Yes, we're profitable now. We don't have to carry lots of papers around and prove anything to the company anymore. We can sit back and have fun. **FC**



Computer Conversations

INTERVIEWS BY ABIGAIL REIFSNYDER
PRODUCT REVIEWS BY STEVE MORGENSTERN

Part I: The People

About fifteen years ago, Peter Duff found out that he had Parkinson's disease. Two years ago, he gave up the presidency of his Cape Cod-area shipbuilding company, Edey & Duff, but remained active in the company, focusing on his two favorite activities: product development and writing advertising copy. Until a year-and-a-half ago, the disease was pretty well controlled with medication, but, as usually happens with Parkinson's, the drugs became ineffectual. Duff got weaker and began losing muscle control. Writing was becoming increasingly difficult—from 60 words a minute, he was down to three or four.

Unwilling to give up the work that is his life, 50-year-old Duff investigated other ways to write. He uncovered the Kurzweil VoiceSystem (KVS), a voice-recognition device that works with IBM PCs and compatibles. (See the box, "The Basics of Voice Recognition and Speech Synthesis.") With a vocabulary of only 1,000 words, the KVS is intended for limited dictation, but Duff saw no reason why he

couldn't use it for word processing. "The old 80/20 rule applies," he explained, "since 80 percent of speech uses only 20 percent of your vocabulary. I took a 24-page brochure I'd written for the company and found that I'd used only 1,307 different words of the 13,000 in the brochure."

These were more words than the KVS could handle, however, so he decided his best option would be to spell the words letter by letter. After some experimenting, Duff opted for the old World War II spelling system—Able, Baker, Charlie, etc.—since the KVS has a hard time distinguishing among B, C, D, and E. For example, to write the word "beauty," he would say "Baker, Echo, Able, Uniform, Tango, Yankee" into the KVS to rep-

resent all of the letters in "beauty."

He recently added the *Mindreader* (Businesssoft) program to his setup. Using this unique word processor, he speaks the first three letters of a word, and the program displays five or six words he is likely to be spelling. He believes that *Mindreader* will double, maybe triple, his speed (currently at 20 words per minute).

Duff considers the \$7,500 he spent on the KVS, plus what he paid for his Compaq computer to run the voice system, as insignificant. "For my situation and my application," he said, "it's cheap. I'd be dead in the water without it. I couldn't do anything."

GRAFTING EARS ONTO COMPUTERS

Peter Duff's story is far from unique. Whether at work, at school, or at home, people have found an invaluable tool in the computer with speech—both voice recognition and speech synthesis. Speech is an effective way (for some folks the only way) to communicate, so it should come as no surprise that listening and talking computers are, in many cases, the best way for people to work and learn.

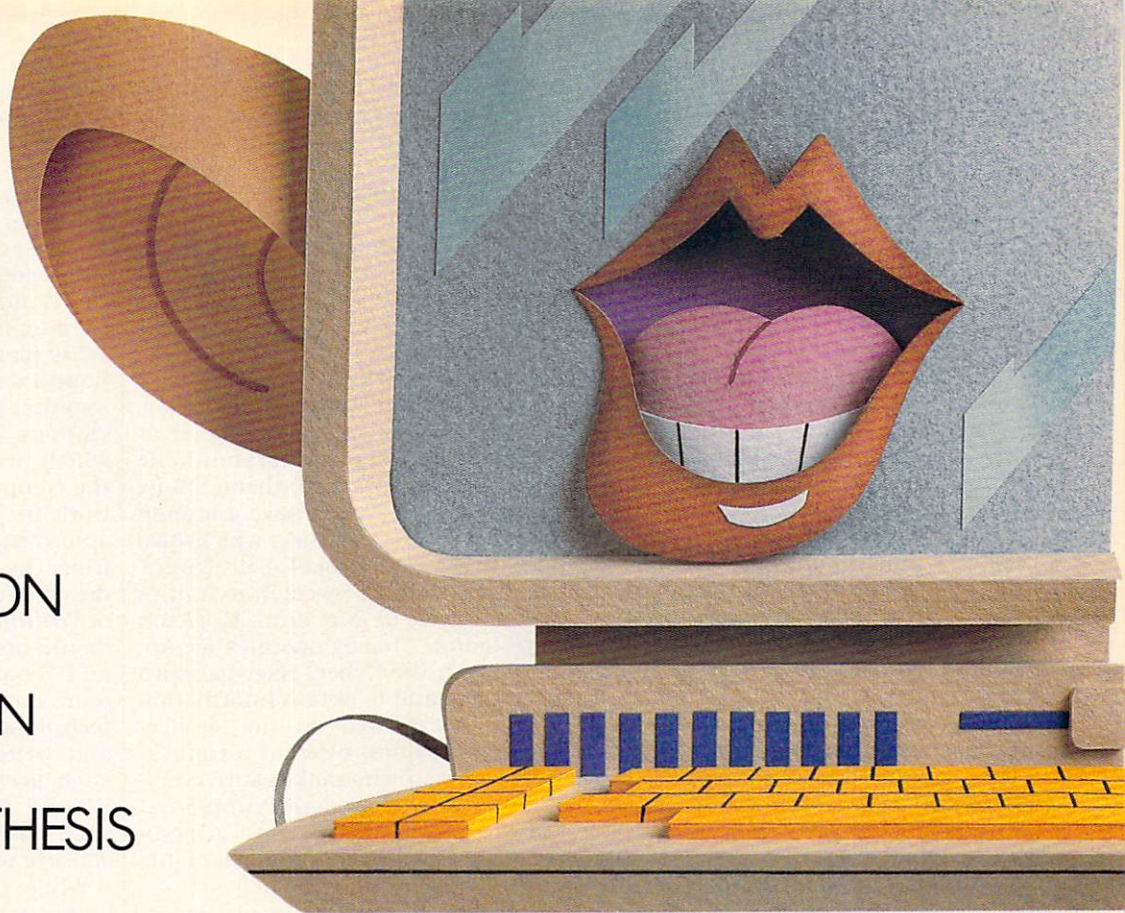
A. Tolu-Honary, a professor of industrial technology at the University of Northern Iowa in Cedar Falls, has added voice recognition to his program to teach sign language, the *Computerized Animated Vocabulary*



Peter Duff

ABIGAIL REIFSNYDER told us why she loves her Macintosh in the August issue of FAMILY COMPUTING. Contributing editor STEVE MORGENSTERN's last article was "Guide to Writing with Your Computer: Part 2" in the September issue.

WORK, PLAY, AND LEARN WITH COMPUTERS THAT LISTEN AND TALK: AN INTRODUCTION TO VOICE RECOGNITION AND SPEECH SYNTHESIS



of American Sign Language. Using the Micro Ear voice-recognition system (manufactured by Artech Systems in Columbia, Maryland), a person can speak words into the computer and see them signed on the screen. While this voice-recognition and software combination can be used by people with normal hearing to learn sign language, its greatest potential lies in helping the hearing impaired and deaf to speak. Creating a voice model for this purpose is a little tricky, though, since the system must be trained to recognize a voice that can't yet speak the words the computer should recognize. Honary and other professors have discovered a way to fool the computer. A deaf person is paired with a hearing person who has a voice similar to the deaf person's. Then they train the system together. The deaf person's voice determines the parameters of the voice to be recognized, while the

hearing person teaches the system the actual words. The deaf person can then use the system to practice saying words. When he or she says a word correctly, the system "signs" it on the screen.

VOICE RECOGNITION GOES TO WORK

But the uses of voice recognition are not limited to the handicapped; these devices have made significant inroads into business, as well. For example, the New York Stock Exchange (NYSE) is examining potential applications of voice recognition. In its ongoing efforts to speed up the trading process and make it more accurate, the NYSE is now looking at the use of voice technology for quotation entry. Currently, a "specialist" tells a NYSE "reporter" the quote (the bid to buy or sell at a particular price). The reporter then marks this on a card, which is fed into an optical

reader, which in turn allows the information to be entered into the computer. Since the specialist is already required to say the price quote aloud, speaking it into a microphone would be a relatively natural transition, and it would speed the work by entering data directly into the computer.

Some problems must be overcome, however. One is that the specialists' vocal qualities may change throughout the day. The normal voice is likely to be altered by the end of the trading day or at moments of excitement. Thus, it is difficult to train the system to consistently recognize each voice. Rapid verification of the quote on a screen is also necessary so the specialists can confirm their quotes. The NYSE is beginning tests of the system this fall, although more sophisticated equipment will be required if it is to be used widely, according to Lois Zarembo, director of Trading Processing Systems.

THE BASICS OF VOICE RECOGNITION AND SPEECH SYNTHESIS

With a voice-recognition system, you train your computer to understand various spoken words or short phrases—from 32 to 1,000 words or phrases, depending on the system. Then, you say one of those words aloud to the computer, which can now recognize it and perform whatever action was assigned to that word, such as cataloging a disk's directory at the word "direct" or inserting the phrase "Sincerely

yours" into a letter when you say "close."

With its aural counterpart, a speech-synthesis system (sometimes called voice synthesis), your computer talks. What it says depends on the program you're running and what you're trying to do. For instance, most speech-synthesis units come with programs that translate everything that's printed on-screen into spoken words. This is invaluable, of course, for

the blind and visually impaired, who cannot read what's on a computer's screen. There are also separate programs that work with speech-synthesis systems to add voice to the computing experience. One example is *Talking Textwriter* (Scholastic Software), a word processor for young children that reinforces learning to read and write by speaking aloud whatever a child writes.

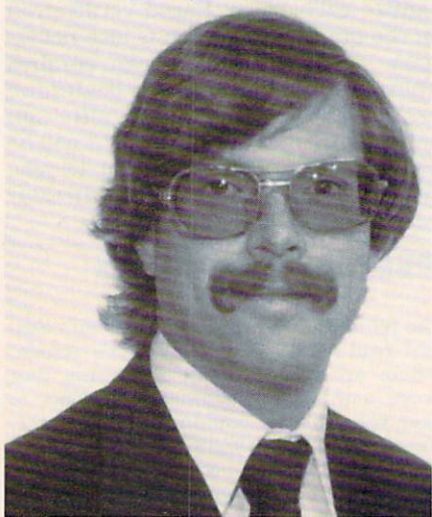
COMPUTERS THAT TALK— LIFELINES FOR THE BLIND

Speech synthesis is more advanced and generally less expensive than voice recognition, and its uses are more wide-ranging. The visually impaired and the blind have been its main beneficiaries. In fact, for many blind people, speech-synthesis devices have meant the difference between a routine job and a career, opening doors for them that would otherwise have been closed.

Peter Mikochik lost his sight while in college. Although he was a straight-A student majoring in computer science, Mikochik spent 18 months trying to find work in his field. "People wouldn't believe I could do the job," he said. "It took a while, but I never worried because I was confident of my own skills." He finally found a job with the Port Authority of New York and New Jersey (PA) as a system design programmer, although his new bosses seemed apprehensive. They bought him a voice enhanced Hewlett-Packard terminal manufactured by Maryland Computer Services, which ties into the PA's IBM mainframe. Not only did Mikochik prove his bosses' fears wrong, he won them over—and the PA has since hired two more visually impaired programmers.

The special terminal Mikochik uses reads everything on the screen at whatever speed he chooses. Most of the time he sets it at 550 words a minute, which is about as fast as the man in the Federal Express commercial speaks. He slows it down to 300 when he's reading documentation and doing detail work.

"It would be possible for me to program without the voice system," Mikochik said, "but it would be bad. It would be slow and leave more room



Peter Mikochik

for error. I don't get slowed down with this system." He recently redesigned the PA's purchasing system, and he is currently working on changing the system for overtime pay to conform with the Fair Labor Standards Act. "They trust me with serious work, not just little stuff," he said.

MEET SVEN, MY SWEDISH FRIEND

Voices created by speech synthesis are often difficult to comprehend at first but become understandable once you get used to them. Many voices seem as if they have a foreign accent. Terry Lee Chaney, who is also blind, calls his CyberTalker "Sven" because it sounds Swedish to him. A media buyer at McCann, Erickson Advertising, Chaney operates an Apple IIe with the CyberTalker for word processing and to obtain information from a syndicated on-line service. When he was first hired as a trafficker (the person who makes sure everything is routed properly throughout the company), Chaney used a modified IBM typewriter for most of his work.



Terry Lee Chaney

When voice systems for computers came on the scene, however, he talked the company into making him a media buyer, which he considers a more interesting position. Chaney now determines what kind of advertising—print, television, radio, etc.—is most appropriate for a company and then buys ad space or time. In his work, Chaney must manipulate and analyze all kinds of information, such as the demographics and purchasing tendencies of a magazine's readers. The CyberTalker has proved invaluable in reading complicated tables of information since it reads data to him letter by letter, word by word, or line by line. Since he discovered speech synthesis, Chaney says, "The future looks exciting!"

TALKING ALOUD IN SCHOOL

The visually impaired are not the

only people to benefit from talking machines. As computers grow more common in schools, educators are learning the advantages of speech synthesis for early learning (pre-school and primary grades), as well as for special education.

Developed by Dr. John Henry Martin, *Writing to Read* is an entire curriculum in which voice-equipped IBM PCjr's play an important role. For an hour a day, children in kindergarten and first grade move through the five stations of the lessons, the first of which uses the speech capabilities of the computer. At each terminal, kids work in pairs with headphones, responding to spoken instructions from the computer. They are introduced to the 42 phonemes at the core of *Writing to Read* and are taught to distinguish between "sound spelling" and "book spelling." The remaining four stations offer a mix of media techniques, including taped lessons and writing with various materials such as clay, chalk, and crayons. The *Writing to Read* program is being used in school systems across the country with documented success.

While most voice-recognition devices remain beyond the average budget, speech-synthesis systems can be purchased for relatively little cost. Their uses range from talking word processors to making text adventures come to life with the power of speech. Just as adding sound to movies brought new excitement to the silver screen, voice can add a new dimension to the computer screen.

Part II: The Products

Talking to a computer is nothing new. I've been talking to mine for years. "What do you mean 'Boot Error'?" "C'mon now, where are you hiding that file?" "That's it, sweetheart, just keep printing like that and we'll actually make this deadline."

Since I started researching this section, though, my computer conversations have become more meaningful. I tell my PC compatible to load a file, and it does. Speaking into a headset microphone, I can lose money hand over fist to my Apple while playing blackjack—without even touching a card or a keyboard. For the first time, my computer has even started talking back to me. For instance, the Macintosh reads me word-processing files so I can proof-read glancing back and forth from the original to the typed copy.

And a Commodore 64 is teaching my daughter Jessica the alphabet.

SPEECH-SYNTHESIS & VOICE-RECOGNITION PRODUCTS

Product/Manufacturer Price	Computers	Comments
SPEECH-SYNTHESIS SYSTEMS		
Echo +/Echo PC2/ Cricket Street Electronics 1140 Mark Ave. Carpinteria, CA 93013 (805) 684-4593 \$100 (Cricket), \$130 (PC2), \$150 (Echo +)	64K Apple II+/Ile (Echo +; 128K required for female voice), Apple IIc (Cricket), IBM PC* (PC2).	The Echo +, Echo PC2, and Cricket are three essentially identical systems that offer two basic ways to make your computer talk. One, the Unlimited Vocabulary mode, speaks in a robotic-sounding voice after you've entered either phonetic spellings or ordinary English text. The other, the "natural-sounding" female voice option, contains a vocabulary of 725 common words and phrases. The manufacturer also makes the Echo GP (a stand-alone unit), and is introducing the Echo IIb, which will replace the Echo +. Dozens of software packages work with Apple units, fewer with IBM. A free list of software is available from manufacturer.
Mockingboard C Sweet Micro Systems, Inc. 50 Freeway Drive Cranston, RI 02920 (401) 461-0530 \$179	Apple II+/Ile.	BASIC programmers have excellent control over the speech quality thanks to software that lets them edit the rules used to convert text to speech, along with further controls over volume, inflection, speed, and voice quality. Comes with <i>Text Reader</i> , a program to read back text files (such as the ones created by most word processors). Also has separate musical and sound effects capabilities without speech, supported by many game packages.
Personal Speech System Votrax International, Inc. 1394 Rankin Troy, MI 48083 (313) 588-2050 \$449	Any computer with a parallel or serial interface.	A stand-alone unit with both parallel and serial ports, a built-in speaker, and volume control. You connect it to any computer as you would a printer; however, instead of printing your words, the PSS reads them aloud using self-contained, text-to-speech translation software. This setup allows you to use the PSS even with copy-protected programs.
S.A.M. Monogram Software, Inc. 8295 S. La Cienega Blvd. Inglewood, CA 90301 (213) 215-0355 \$60 (Atari, C 64/128), \$100 (Apple)	Apple, Atari, C 64/128.	Software-only system for BASIC or assembly language programmers. A two-part program. Load the main portion into memory to make your own programs speak by text phonetically, or add S.A.M.'s <i>Reciter</i> module to read ordinary English text. Either way, S.A.M. stays in memory along with your program, and a simple call from BASIC sets S.A.M. talking. Documentation includes useful phonetic dictionary that lists nearly 1,500 words.
SmoothTalker First Byte, Inc. 2845 Temple Ave. Long Beach, CA 90806 (213) 595-7006 \$100	Macintosh.	Software-only system for nonprogrammers. Will read aloud any text that appears on-screen, such as documents from <i>MacWrite</i> or other programs that save files as text only. Choose between male and female voices, with adjustments for speed, volume, and pitch. Good use of the Mac's pull-down menus and point-and-click commands make this program's exceptionally clear voice easy to operate.
Sound/Speech Cartridge Tandy Corporation 1500 One Tandy Center Fort Worth, TX 76102 (817) 390-3300 \$80	Tandy Color Computer.	It helps to program in BASIC if you want to use this speech-synthesis cartridge that plugs into the Program Pak on the right side of the computer. The device uses a set of ROM-based phonetic rules to translate text into speech. The manual includes demonstration programs to type in that will get you started. Also included is the capability for making music without speech.
SynPhonix 100/200/jr Artic Technologies 1311 N. Main St. Clawson, MI 48017 (313) 435-4222 \$155 (100), \$175 (jr), \$225 (200)	Apple II+/Ile (100), IBM PC* (200), IBM PCjr (jr).	A series of plug-in boards with built-in speakers. Programmers in BASIC and assembly language can create word lists of custom-tailored phonemes, or they can rely on the supplied text-to-speech translation software. Enhanced versions of these products (100/ASR for Apple and Artic Vision for IBM), designed specifically for the blind and visually impaired, allow users to automatically have the screen contents from any commercial program read aloud to them.
Votalker AP/C 64/IB Votrax International, Inc. 1394 Rankin Troy, MI 48083 (313) 588-2050 \$100 (C 64), \$179 (AP), \$249 (IBM)	Apple II+/Ile (AP), C 64/128 (C 64), IBM PC* (IB).	The AP and IB systems are circuit boards with built-in speakers and external speaker jacks. Sophisticated software for text-to-speech translation, a choice of two voices, and clear speech complete the packages. The C 64 system plugs into the expansion port and contains the programs to control it on a chip inside the unit. Its screen echo mode causes anything that appears on-screen to be read aloud, including a character mode that reads everything letter by letter.
VOICE-RECOGNITION SYSTEMS		
Kurzweil VoiceSystem (KVS) Kurzweil Applied Intelligence 411 Waverly Oaks Road Waltham, MA 02154 (617) 893-5151 \$6,500	IBM PC.*	A stand-alone unit, about the size of a shoe box, that boasts the largest available vocabulary for voice recognition—1,000 words—along with extremely sophisticated pattern-matching technology for excellent accuracy. May be used to control a computer without having to touch a keyboard, making a wealth of information and productivity possible at the sound of a user's voice.
Lis'n'r Micromint, Inc. 25 Terrace Drive Vernon, CT 06066 (203) 871-6170 \$149 (C 64), \$189 (Apple)	Apple II+/Ile, C 64/128.	Combining a circuit board, headset microphone, and software, this package helps you set up templates—groups of 32 words each—which you train the system to recognize. Not only does the software let you train the system quickly, it also helps you test the system's accuracy in identifying any or all of the words in a template. This makes it easy to retrain the device for single words. The Apple version is also available with the Mockingboard's speech capability built-in.
VocaLink SRB-LC Interstate Voice Products 1849 W. Sequoia Ave. Orange, CA 92668 (714) 937-9010 \$395	IBM PC.*	A short-slot circuit board, a hand-held microphone, and impressive software make up this system. Handles a 400-word vocabulary, divided into command menus of up to 20 words each. One menu leads to another. For example, if you're word processing, you can tell the unit to take you to a menu of special type styles when you say "type" and train it for phrases like "start underline" to start that action. Pop-up windows on-screen list available voice commands.
COMBINATION SYSTEMS		
Hearsay 1000 Hearsay, Inc. 1825-74th St. Brooklyn, NY 11204 (718) 259-4934 \$80 (C 64), \$150 (Apple)	64K Apple II+/Ile, C 64/128.	A stand-alone unit for the C 64 or a plug-in card for the Apple with built-in software to control it. Capable of speech output from many commercial programs, plus recognition of 64 words or short phrases. Simple commands set the unit to read any text that appears on-screen or adjust the voice, speed, and pitch of the synthesized voice. The manufacturer is also producing some attractive educational software to take advantage of both speech and voice functions.
Voice Master Covox Inc. 675-D Conger St. Eugene, OR 97402 (503) 342-1271 \$90	64K Apple II+/Ile/Iic, Atari 800/XL/XE, C 64/128.	A stand-alone unit with headset microphone, this system allows BASIC programmers to include voice recognition (up to 32 words) in their own programs. Includes a unique speech-production system that actually records your own voice electronically (up to 64 words), then plays it back. Such speech can be accessed with or without the main unit, which makes it easy to add voice to your own programs.

*Products listed for the IBM PC will work with most IBM PC compatibles; owing to the proliferation of compatibles, check with the manufacturer or your dealer for compatibility. Unless otherwise noted, minimum memory requirements are 48K for Apple II series, 48K for Atari 800/XL/XE series, 128K for IBM PC/PCjr or compatibles, and 128K for Macintosh.

This 2 year old is not at all sure she trusts this new development. She knows she can talk to people, and they will answer. She knows she can talk to our dog, and he won't answer. But since when does Daddy's "pooter" engage in conversation? Assuming you're a little older and wiser than Jessica, though, it's fairly easy to explain and quite fascinating.

BEYOND MONITORS AND KEYBOARDS

There are two separate and distinct areas involved in holding computer conversations. Voice recognition means the computer attempts to understand your spoken input. Speech synthesis turns things around; the computer produces speech, and you have to figure out what it's saying. Both capabilities have profound importance for the blind, deaf, or otherwise disabled, as we have already seen. However, there are many ways in which these technologies can be put to use for practical purposes—or just for fun—by those of us without special needs.

Almost every computer on the market has voice-recognition and speech-synthesis products available, in prices ranging from \$30 to several thousand dollars. Some units listen, others talk, and a few integrate both capabilities into a single system. In Part II and the accompanying chart, we'll review several noteworthy products that let you strike up a conversation with your computer.

SPEECH SYNTHESIS: HOW IT WORKS.

The key to making a computer generate humanlike speech is *phonetics*. All spoken words can be broken up into units of individual sounds, called *phonemes*. For example, while "please" is a one-syllable word, it contains four phonemes: the p-sound, the l-sound, the e-sound, and the z-sound. By loading a library of these sounds into the computer and asking for the right sound at the right time, we can produce an approximate facsimile of human speech.

Of course, sounds and spelling don't always match—the letters "th" produce a different sound in "though" than they do in "think." This leads to two basic alternatives when teaching your computer to talk. You can write phonemically, using a special code for your particular speech-synthesis device that identifies each required sound precisely. Or you can use a program (one that is supplied with all units) that analyzes regular English text. By applying a

set of rules, the computer translates speech into phonemes that it can then pronounce.

When you have a limited vocabulary of words you want spoken and you need to have them pronounced as accurately as possible, it pays to prepare a phonetic translation. Sometimes, though, you want the computer to speak any text that comes along—for example, to read an adventure game to you. In that case, you have to choose the most workable rule system you can and hope for the best.

Systems for speech synthesis come in two varieties: software-only packages that rely exclusively on the computer's existing sound capabilities and hardware/software combinations that include special chips on circuit boards or freestanding units, along with software to drive the system. While hardware-based systems are the most common, the sophisticated sound capabilities now being built into the newer computers—such as the Macintosh, Amiga, and Apple IIGs—will be bringing us more software-only speech systems as time goes on.

One caveat, however, is that while prepackaged programs are available that take advantage of many of the speech-synthesis systems' capabilities, a facility for writing at least simple programs in BASIC is also helpful.

VOICE RECOGNITION: HOW IT WORKS

All of the voice-recognition devices we tried shared two characteristics; they were "discrete utterance" systems, and they were "speaker dependent."

Discrete utterance means that you cannot speak at your normal pace and expect the system to make sense of what you're saying. Instead, you must pause after each word or short phrase to mark the end of that word or phrase, and then go on.

Speaker dependent means that the system will basically recognize the speech of one particular user at a time. That user must first train the system to understand his or her speech by repeating the desired word or phrase into the supplied microphone a few times, allowing the computer to build a pattern of that word in memory. However, many voice systems offer some latitude and will recognize similar-sounding voices much of the time. Once you have trained the system, it will compare the words you speak with the patterns in memory and try to come up with a match.

Fortunately, you don't have to train the system each time you want to use it. You can save the vocabulary on disk and simply load it the next time it's needed.

Helping the handicapped is not the only area where voice recognition is useful. In business or industry, workers with busy hands can input information into a computer by speaking into a microphone. In school or at home, children too young to type can speak to the computer and have it react to their commands. And anybody who is tired of pressing keys to play a favorite adventure game should be interested in a system that lets you say "Go North" and have the computer react appropriately. Don't worry; you don't always need big bucks to get involved with voice recognition. In fact, there are several systems priced under \$200 that are impressive performers.

TWO-WAY CONVERSATIONS

The ultimate voice connection to your computer is one that answers back when you talk to the machine. This can be accomplished inexpensively with two combination systems we tested—the Hearsay 1000 from Hearsay, Inc. and the Voice Master, manufactured by Covox.

Having my favorite text adventure read to me was interesting but not very practical. It's difficult to comprehend complicated, unfamiliar text when it's spoken by the computer, especially when you're not reading along. A voice recognition function, though, added a welcome dimension to my adventuring. You can fit a game's direction commands, common verbs, and even several significant nouns into most voice-recognition systems' vocabulary limits.

NOW YOU'RE TALKING!

For those of us who, for one reason or another, cannot physically handle a computer keyboard or read a screen, voice output and speech control are lifelines not only to the world of computers, but through the computer to a wealth of opportunity for learning, earning, and communicating.

For the rest of us, speech synthesis and voice recognition—a group of technologies still in their infancies—are less critical, but still intriguing. You and your computer can have serious conversations about word processing, spreadsheets, and data entry, or you can chat about games and pet programming projects. Whatever your preference, there's a system out there for you. ☐

Tips From Grandma

A SASSY COMPUTING GRANDMA PROVES THAT PAST CAN MEET PRESENT

BY PRISCILLA A. HILL

Do your grandchildren view you as a relic from the past? Just not "with it" in this modern age? Well, all that changes when Grandmother gets a computer! The news flashes from grandchild to grandchild. "Did you hear that Grandmother has a computer? She's really in over her head this time!" In fact, they appear to be more startled than when Grandmother took up water-skiing. And Grandmother knows that when her grandchildren come to visit during the holidays, they plan to figure out how much she *really* knows about computers.

Here are seven proven hints to help you flummox your grandchildren into believing you know more than you really do.

Tip 1: Before their visit, send all of your grandchildren seven-foot long greeting banners announcing, "Greetings from Grandmother's computer." The very size of the output will overwhelm them. The grandchildren might even unfurl it for their friends. Of course, you must never let them see how easy *The Print Shop* (Broderbund) is to use. (Also look for *Banner*, a free printing program that appeared in the April 1985 issue of FAMILY COMPUTING.)

Tip 2: When the grandchildren arrive to view the computer, be sure to have a flashy sign above the computer announcing, "No Food Allowed in Computer Area." This is really a very clever ploy, as it eliminates the need to bake cookies for them.

Tip 3: Load *Summer Games* (Epyx) and stun your sports-minded grandson with a successful pole vault to the cheers of the crowd. Naturally, you never mention the hours you spent honing your skills for that one triumphant leap. You're a bit deflated when your 12-year-old grandson tries shooting and manages to get 23 out of 25. The best you can do is 3 out of 25, and your grandson says in a rather patronizing voice, "Grandmother, you're shooting at the shadows." Oh well, Grandmother never cared for guns anyway.

Tip 4: Now you can move to a more serious aspect of computing and at-



Priscilla Hill dazzles her grandchildren.

tempt to impress your college-age granddaughter with your sophisticated expertise by casually mentioning that you are going to do your annual Christmas letter on the computer. Be prepared for the shocked response of "Grandmother, how impersonal!" Of course, if your granddaughter knew the hours you spent laboring over the letter, she would realize that the letter wasn't so impersonal after all.

Tip 5: Surprising to say, your 10-year-old granddaughter may be the hardest to impress. That is, until the day she walks in with her newly acquired pet, Charlie the Iguana. Her burning question is "What do I feed Charlie?" It's then that Grandmother comes up with a brilliant idea. Grandmother will use her new modem to access information from an on-line encyclopedia. The demonstration gets off to a slow start because a dictionary has to be consulted for the spelling of iguana. Finally, the network is accessed and we wait with bated breath for the information concerning Charlie's daily needs. Suddenly, all of the information, and more than we ever asked for, comes scrolling by at an alarming rate. Hurriedly, Grandmother loftily explains that in order to glean information from the computer, you must become a speed reader. Later (in private), you can figure out how to slow down the scrolling and print out the informa-

tion. However, after this grand demonstration, your granddaughter's final remark is, "Grandmother, wouldn't it have been easier to find information about iguanas in *your* encyclopedia?" Today's youth just do not seem to appreciate progress.

Tip 6: Of course, eventually your college-age grandson will appear on the scene. Then the chips are really down, figuratively speaking, and you must come up with something brilliant. What simpler plan than to offer to set up a format for a title page to his latest term paper. After all, very little typing is involved and it should be a simple, yet impressive, matter to have the printer send out a neat and precise title page. Your grandson gives you the required information and you're ready to begin. In goes the word-processing disk, and with him hanging over your shoulder, you're all set. But what's this with all of the printer commands? Center? Footer? Columns across? This is the time to take a deep breath and inform your grandson that you work better alone. After his departure, you whip over to your typewriter and type out a title page—counting spaces and jotting down the numbers. Then back to your computer and, using the notes on your typed page, you're finally able to produce a beautifully printed title page. When your grandson saunters back an hour later, you are able to hand it to him and say, "It was a breeze." But then there's always that nagging suspicion that he really knows how long it took. Well, you can't win them all.

Tip 7: There is one final ace up your sleeve. For the grandchild who still doubts your expertise, LIST a program onto the screen and glibly read aloud such things as CHARACTER STRINGS, GOSUB, and POKE. Casually mention pixels, pokes, and peeks and let them think that Grandmother has entered a fantasy world. In the end, the most skeptical grandchild will truly believe that Grandmother has mastered the machine. Ha! What they don't know.

Grandmother's bluff is finally called and her days are numbered when her 12-year-old grandson calls with the announcement, "Grandmother, I have a computer." ☐

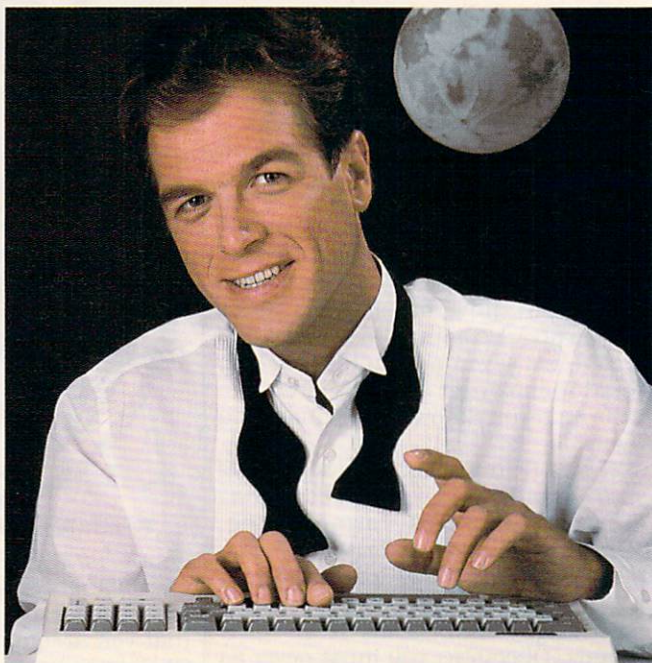
PRISCILLA A. HILL, who lives in Fullerton, California, has five grandchildren ranging in age from 10 to 20 years old.

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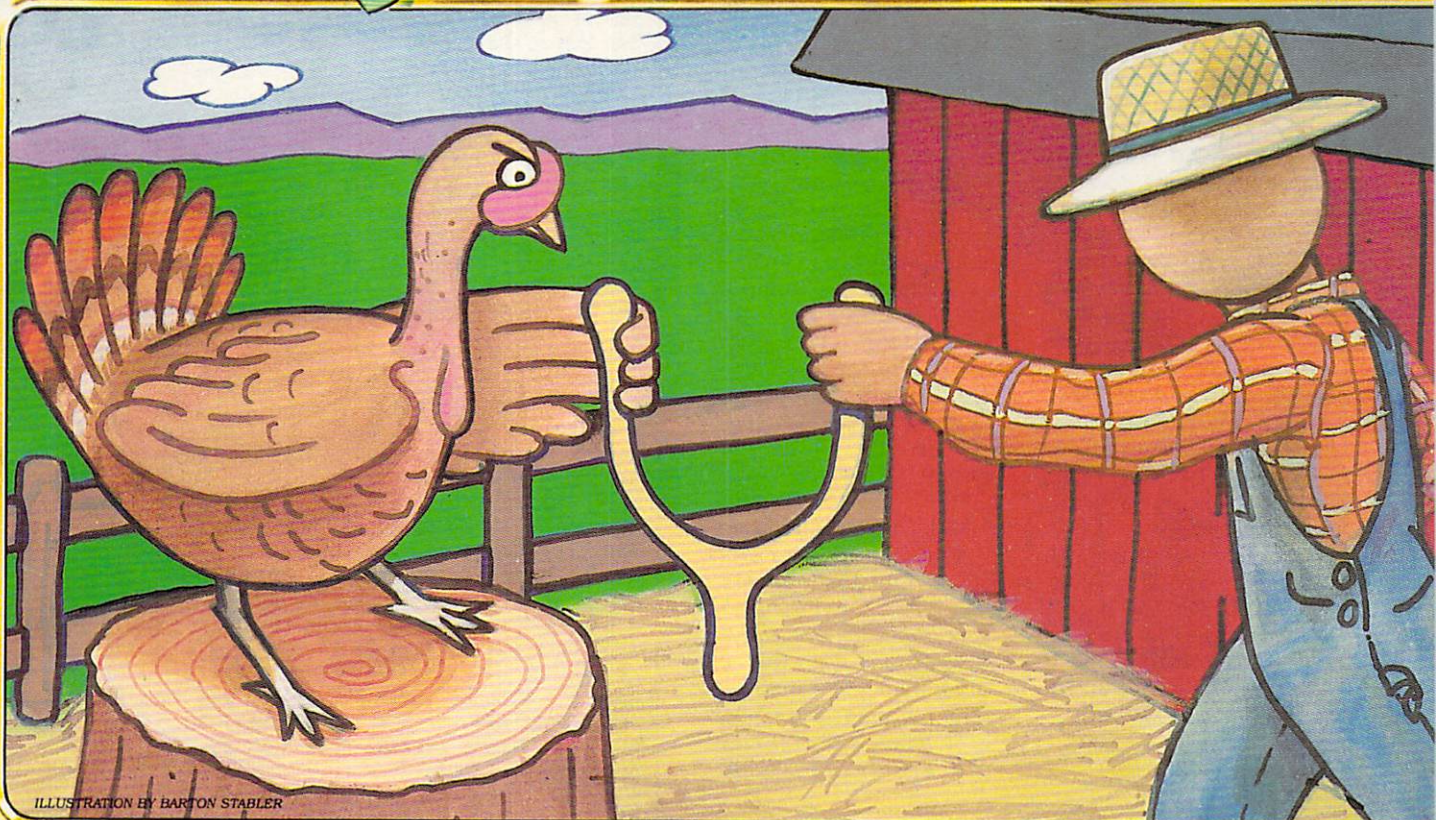


ILLUSTRATION BY BARTON STABLER

★ N O V E M B E R ★

THANKSGIVING PROGRAMS

Work up a Thanksgiving appetite playing *Turkey Chase* (Page 76), and *Wishbone* (Page 88).

ARCADE GAME

Page 93

Electric walls and killer droids menace you. Can you escape before you're vaporized? Find out in *Doors*, a fast-action game for C 64 & C 128 (C 64 mode).

HEALTH AND SAFETY QUIZ

Page 99

Do you know enough about nutrition to plan a healthy, well-balanced daily diet? Test your knowledge of basic food facts with *Nutrition*.

TIPS TO THE TYPIST

Page 92

How to type in FAMILY COMPUTING's programs, and what to do if a program doesn't run.

MORE PROGRAMS IN K-POWER

(Page 112) and

PERSONAL FINANCE

(Page 20)

ILLUSTRATION BY JIM CHERRY III

Cherry

TURKEY CHASE

BY STEVEN C.M. CHEN



Freddy Fleetfoot has the honor of picking the Thanksgiving turkey every year. Early on Thanksgiving morning, he goes into the farmyard and picks the fattest (and slowest) gobbler. This year, however, there is only one turkey in the coop and it's a feisty one. If Freddy isn't fast enough, his dinner will duck past him, leaving the Fleetfoot family with a frozen-food feast.

In order to help Freddy in the chase, type in the *Turkey Chase* program and select one of the five levels of play. (The Color Computer version has only four play levels.) You can move Mr. Fleetfoot in the turkey's direction by pressing the following keys: "I" (up), "J" (left), "K" (down), and "L"

(right). For diagonal direction, use "Q" (up-left), "W" (up-right), "A" (down-left), and "S" (down-right). Or, to customize your own direction keys, replace the letters in lines 20 and 30 with the keys you wish. For example, if you would like to use a numeric keypad to control Freddy's movement, change lines 20 and 30 to read:

```
20 UL$="7":UP$="8":UR$="9":
RT$="6"
30 DR$="3":DW$="2":DL$="1":
LT$="4"
```

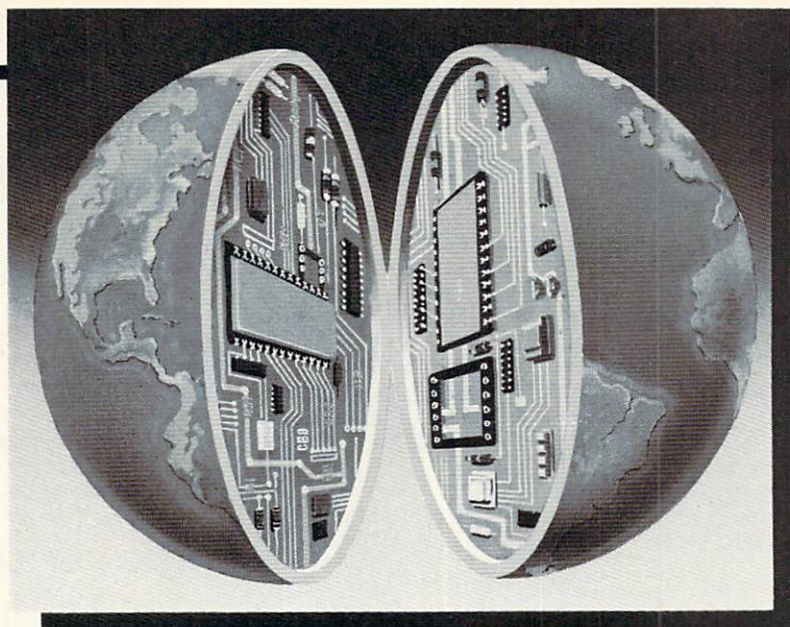
The turkey will dodge the farmer and can even scoot right through his legs. With any luck and a good deal of skill, you will help Freddy grab the gobbling bird. But, if you take too long, the tricky little fellow will trot right past Freddy to freedom.

—KAREN KANE

Apple II series/Turkey Chase

```
10 DIM DR(8,2),T(8),RG(5),LMS(5):NORMAL
20 UL$="Q":UP$="I":UR$="W":RT$="L"
30 DR$="S":DW$="K":DL$="A":LT$="J"
40 DKEY$=UP$+UR$+RT$+DR$+DW$+DL$+LT$+UL$
50 FOR L=1 TO 5:READ LMS(L),RG(L):NEXT L
60 FOR L=1 TO 8:READ DR(L,1),DR(L,2):NEXT L
70 FOR L=768 TO 796:READ T:POKE L,T:NEXT L
80 SP$=CHR$(32):LI$=SP$:FOR L=2 TO 39
90 LI$=LI$+SP$:NEXT L
100 HOME:VTAB 1:HTAB 13:INVERSE
110 PRINT "*TURKEY CHASE*":NORMAL
120 PRINT:PRINT TAB(13);"DIRECTION KEYS":PRINT
130 PRINT TAB(16);UL$;" ";UP$;" ";UR$
140 PRINT TAB(16);LT$;SPC(5);RT$
150 PRINT TAB(16);DL$;" ";DW$;" ";DR$:PRINT:PRINT
160 PRINT TAB(14);"PLAY LEVELS":PRINT
170 FOR L=1 TO 5:PRINT TAB(12);LMS(L):NEXT L:PRINT
180 FOR L=1 TO 3+RND(1)*3:GOSUB 1000:NEXT L
190 PRINT "AT WHICH LEVEL WOULD YOU LIKE TO PLAY? ";
200 GOSUB 2000:IF K$ < "1" OR K$ > "5" THEN 200
210 PL=ASC(K$)-48:DIS=RG(PL):EF=0:MF=0
220 RF=0:ZF=0:ZF=0:ZF=150+10*INT(RND(1)*16)
230 HOME:INVERSE:FOR Y=3 TO 23
240 VTAB Y:HTAB 1:PRINT SP$:HTAB 39:PRINT SP$:NEXT Y
250 VTAB 2:HTAB 1:PRINT LI$
```

```
260 VTAB 24:HTAB 1:PRINT LI$;VTAB 2:HTAB 14
270 FOR L=1 TO 13:PRINT "#";NEXT L:NORMAL
280 ZX=14+INT(RND(1)*13)
290 EX=10+INT(RND(1)*10):EY=15+INT(RND(1)*5)
300 FX=29+INT(RND(1)*9):FY=15+INT(RND(1)*5)
310 IF RND(1) > 0.5 THEN X=EX:EX=FX:FX=X:Y=EY:
EY=FY:EY=Y
320 GOSUB 3000:GOSUB 4000
330 GOSUB 5000:IF JF THEN 350
340 IF EX=FX AND EY=FY THEN 550
350 IF ZF THEN 600
360 IF RND(1) > 0.995 THEN GOSUB 1000
370 IF EF AND EX=ZX AND NOT RF AND RND(1) > 0.1 THEN
MX=0:MY=-1:CU=0:CT=EY-1:MF=1:RF=1
380 IF MF THEN GOSUB 6000:GOTO 330
390 SUM=ABS(EX-FX)+ABS(EY-FY):IF SUM < DIS THEN 460
400 IF RND(1) < 0.99 THEN 330
410 R=1+INT(RND(1)*8)
420 NX=EX+DR(R,1):NY=EY+DR(R,2)
430 IF NX=1 OR NX=39 OR NY=2 OR NY=24 OR (EX=
FX AND EY=FY) THEN 380
440 VTAB EY:HTAB EX:PRINT SP$
450 EX=NX:EY=NY:GOSUB 3000:GOTO 330
460 C=0:CT=6+INT(RND(1)*PL):FOR L=1 TO 8
470 NX=EX+CT+DR(L,1):NY=EY+CT+DR(L,2)
480 IF NX < 2 OR NX > 38 OR NY < 3 OR NY > 23 THEN 500
490 IF ABS(NX-FX)+ABS(NY-FY) >= SUM THEN C=C+1:T(C)
=L
500 NEXT L:GOSUB 5000:IF JF THEN 520
510 IF EX=FX AND EY=FY THEN 550
520 IF C=0 THEN 400
530 MF=1:L=T(INT(RND(1)*C)+1):CU=0
540 MX=DR(L,1):MY=DR(L,2):GOSUB 6000:GOTO 330
550 FOR L=1 TO 10:VTAB 1:HTAB 13
560 PRINT "CONGRATULATIONS!";
570 FOR D=1 TO 50:GOSUB 5000:NEXT D
580 VTAB 1:HTAB 13:PRINT LEFT$(LI$,16)
590 FOR D=1 TO 20:NEXT D,L:GOTO 660
600 VTAB 2:HTAB ZX:INVERSE:PRINT "#":NORMAL
610 VTAB 1:HTAB EX:PRINT SP$:EY=1:FOR L=1 TO 3
620 FOR X=1+38*(L=2) TO 39-38*(L=2) STEP -2*(L=
2)+1
630 EX=X:GOSUB 3000:IF RND(1) > 0.8 THEN GOSUB 1000
640 GOSUB 5000:FOR D=1 TO 20:NEXT D
650 VTAB 1:HTAB X:PRINT SP$:NEXT X,L
660 VTAB 1:HTAB 1
670 PRINT "WOULD YOU LIKE TO TRY AGAIN? ";
680 GOSUB 2000:IF K$ < "Y" AND K$ < "N" THEN 680
690 IF K$="Y" THEN 100
700 HOME:END
1000 POKE 8,140:POKE 6,12:CALL 768:FOR S=1 TO 4
1010 POKE 8,140:POKE 6,2:CALL 768
1020 POKE 8,75:POKE 6,5:CALL 768
1030 FOR D=1 TO 10:NEXT D,S:RETURN
2000 GET K$:K=ASC(K$)
2010 K$=CHR$(K-32*(K > 96)*(K < 123)):RETURN
3000 VTAB EY:HTAB EX:PRINT "T":RETURN
4000 VTAB FY:HTAB FX:PRINT "F":RETURN
5000 JF=0:K=PEEK(-16384)-128:IF K < 0 THEN 5100
5010 K$=CHR$(K-32*(K > 96)*(K < 123))
5020 K=0:FOR L=1 TO 8
5030 IF K$=MID$(DKEY$,L,1) THEN K=L:L=8
5040 NEXT L:IF K=0 THEN 5100
5050 POKE -16384,0:NX=FX+DR(K,1):NY=FY+DR(K,2)
5060 Z=Z+1:IF Z=ZT THEN EF=1
5070 IF NX=1 OR NX=39 OR NY=2 OR NY=24 THEN PR
INT CHR$(7);:GOTO 5100
5080 VTAB FY:HTAB FX:PRINT SP$
5090 FX=NX:FY=NY:VTAB FY:HTAB FX:PRINT "F":RETURN
5100 JF=1:RETURN
6000 IF RND(1) > 0.95 THEN RETURN
6010 VTAB EY:HTAB EX:PRINT SP$
6020 EX=EX+MX:EY=EY+MY
6030 VTAB EY:HTAB EX:PRINT "T":CU=CU+1
```

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THANKSGIVING PROGRAM

```
6040 IF CU = CT THEN MF = 0:IF RF THEN ZF = 1
6050 IF EX <> FX OR EY <> FY THEN RETURN
6060 GOSUB 4000:IF MF THEN 6020
6070 EX = EX-MX:EY = EY-MY:GOSUB 3000:RETURN
7000 DATA <1> BEGINNER,3,<2> INTERMEDIATE,6
7010 DATA <3> ADVANCED,9,<4> EXPERT,13,<5> MASTER,19
8000 DATA 0,-1,1,-1,1,0,1,0,1,-1,1,-1,0,-1,-1
9000 DATA 165,8,74,133,10,164,8,173,48,192,136
9010 DATA 234,234,208,251,165,7,56,229,10,133
9020 DATA 7,176,237,198,6,208,233,96
```

Atari 400/800, 600/800XL, & 130XE/Turkey Chase

```
10 DIM RG(5),DR(8,2),T(8),BK$(1),DK$(8),DL$(1),DR$(1),
DWS(1),KS(1),LTS(1),RTS(1),SP$(1),TAB$(40),UL$(1),UP$(
1),UR$(1)
20 UL$="Q":UP$="I":UR$="W":RTS="L"
30 DR$="S":DWS="K":DL$="A":LTS="J"
40 DK$(1,1)=UP$:DK$(2,2)=UR$:DK$(3,3)=UR$:DK$(4,4)=RT$
50 DK$(1,1)=UP$:DK$(2,2)=UR$:DK$(3,3)=RT$:DK$(4,4)=DR$
60 DK$(5,5)=DWS:DK$(6,6)=DL$:DK$(7,7)=LTS:DK$(8,8)=UL$
70 SP$=CHR$(32):TAB$(1)=SP$:TAB$(40)=SP$:TAB$(2)=TAB$
80 FOR L=1 TO 5:READ X:RG(L)=X:NEXT L
90 FOR L=1 TO 8:READ X,Y:DR(L,1)=X:DR(L,2)=Y:NEXT L
100 BK$=CHR$(160):POKE 82,0:POKE 752,1:OPEN #1,4,0,"K:
"
110 PRINT CHR$(125);TAB$(1,13);"*TURKEY CHASE*"
120 PRINT :PRINT :PRINT TAB$(1,13);"DIRECTION KEYS"
130 PRINT :PRINT TAB$(1,16);UL$;" ";UP$;" ";UR$
140 PRINT TAB$(1,16);LTS;TAB$(1,5);RT$
150 PRINT TAB$(1,16);DL$;" ";DWS;" ";DR$:PRINT :PRIN
T
160 COLOR 2:PRINT TAB$(1,14);"Play Levels:":PRINT
170 PRINT TAB$(1,12);"<1> Beginner"
180 PRINT TAB$(1,12);"<2> Intermediate"
190 PRINT TAB$(1,12);"<3> Advanced"
200 PRINT TAB$(1,12);"<4> Expert"
210 PRINT TAB$(1,12);"<5> Master":PRINT
220 FOR L=1 TO 3+RND(0)*2:GOSUB 1000:NEXT L
230 PRINT "At which level would you like to play?"
240 GOSUB 2000:IF K$<"1" OR K$>"5" THEN 240
250 PL=ASC(K$)-48:DIS=RG(PL)
260 EF=0:MF=0:RF=0:ZF=0:ZF=0:ZF=150+10*INT(RND(0)*16)
270 PRINT CHR$(125)
280 FOR L=1 TO 39:PRINT BK$;NEXT L:PRINT
290 FOR Y=3 TO 23:PRINT BK$;TAB$(1,37);BK$:NEXT Y
300 POSITION 0,23:FOR L=1 TO 39:PRINT BK$;NEXT L
310 POSITION 13,1:FOR L=1 TO 13:PRINT CHR$(252);
320 NEXT L:ZX=13+INT(RND(0)*13)
330 EX=10+INT(RND(0)*10):EY=15+INT(RND(0)*5)
340 FX=29+INT(RND(0)*9):FY=15+INT(RND(0)*5)
350 EY=5:GOTO 370
360 IF RND(0)>.5 THEN X=EX:EX=FX:FX=X:Y=EY:EY=FY:FY=Y
370 GOSUB 3000:GOSUB 4000
380 GOSUB 5000:IF JF THEN 400
390 IF EX=FX AND EY=FY THEN 590
400 IF ZF THEN 630
410 IF RND(0)>.995 THEN GOSUB 1000
420 IF EF AND EX=ZX AND NOT RF AND RND(0)>.1 THEN MX
=0:MY=-1:CU=0:CT=EY-1:MF=1:RF=1
430 IF MF THEN GOSUB 6000:GOTO 380
440 SUM=ABS(EX-FX)+ABS(EY-FY):IF SUM<DIS THEN 500
450 IF RND(0)<.99 THEN 380
460 R=1+INT(RND(0)*8):NX=EX+DR(R,1):NY=EY+DR(R,2)
470 IF NX=0 OR NX=38 OR NY=1 OR NY=23 OR (EX=FX AND EY
=FY) THEN 380
480 POSITION EX,EY:PRINT SP$
490 EX=NX:EY=NY:GOSUB 3000:GOTO 380
500 C=0:CT=6+INT(RND(0)*PL)
510 FOR L=1 TO 8:NX=EX+CT*DR(L,1):NY=EY+CT*DR(L,2)
520 IF NX<1 OR NX>37 OR NY<2 OR NY>22 THEN 540
530 IF ABS(NX-FX)+ABS(NY-FY)>SUM THEN C=C+1:T(C)=L
540 NEXT L:GOSUB 5000:IF JF THEN 560
550 IF EX=FX AND EY=FY THEN 590
```

```
560 IF C=0 THEN 450
570 MF=1:L=T(INT(RND(0)*C)+1):CU=0
580 MX=DR(L,1):MY=DR(L,2):GOSUB 6000:GOTO 380
590 FOR L=1 TO 10:POSITION 12,0
600 PRINT "CONGRATULATIONS!";
610 FOR D=1 TO 50:GOSUB 5000:NEXT D
620 POSITION 12,0:PRINT TAB$(1,16);NEXT L:GOTO 690
630 POSITION ZX,1:PRINT CHR$(252)
640 POSITION EX,0:PRINT SP$:EY=0:FOR L=1 TO 3
650 FOR X=38*(L=2) TO 38-38*(L=2) STEP -(2*(L=2))+1
660 EX=X:GOSUB 3000:IF RND(0)>.8 THEN GOSUB 1000
670 GOSUB 5000:FOR D=1 TO 10:NEXT D
680 POSITION X,0:PRINT SP$:NEXT X:NEXT L
690 POSITION 0,0:PRINT "Would you like to try again?";
700 GOSUB 2000:IF K$<"Y" AND K$>"N" THEN 700
710 IF K$="Y" THEN 110
720 POKE 752,0:PRINT CHR$(125);END
1000 SOUND 0,100+RND(1)*20,10,10:SOUND 1,110,10,8
1010 FOR D=1 TO 16:NEXT D:FOR S=1 TO 2
1020 SOUND 0,140,10,10:SOUND 1,136,10,8
1030 FOR D=1 TO 16:NEXT D:SOUND 0,0,0,0
1040 SOUND 0,130,10,10:SOUND 1,124,10,8
1050 FOR D=1 TO 15:NEXT D:SOUND 0,0,0,0:SOUND 1,0,0,0
1060 NEXT S:RETURN
2000 GET #1,K:K$=CHR$(K)
2010 K$=CHR$(K-32*(K>96)*(K<123)):RETURN
3000 POSITION EX,EY:PRINT CHR$(16):RETURN
4000 POSITION FX,FY:PRINT "F":RETURN
5000 JF=0:IF PEEK(764)=255 THEN 5100
5010 GET #1,K:K$=CHR$(K)
5020 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123))
5030 K=0:FOR L=1 TO 8:IF K$=DK$(L,L) THEN K=L:L=8
5040 NEXT L:IF K=0 THEN 5100
5050 NX=FX+DR(K,1):NY=FY+DR(K,2)
5060 Z=Z+1:IF Z=ZT THEN EF=-1
5070 IF NX=0 OR NX=38 OR NY=1 OR NY=23 THEN FOR L=1 TO
5:SOUND 1,50,10,10:NEXT L:SOUND 1,0,0,0:GOTO 5100
5080 POSITION FX,FY:PRINT SP$
5090 FX=NX:FY=NY:POSITION FX,FY:PRINT "F":RETURN
5100 JF=-1:RETURN
6000 IF RND(0)>.95 THEN RETURN
6010 POSITION EX,EY:PRINT SP$
6020 EX=EX+MX:EY=EY+MY:POSITION EX,EY:PRINT CHR$(16)
6030 CU=CU+1:IF CU=CT THEN MF=0:IF RF THEN ZF=1
6040 IF EX<>FX OR EY<>FY THEN RETURN
6050 GOSUB 4000:IF MF THEN 6020
6060 EX=EX-MX:EY=EY-MY:GOSUB 3000:RETURN
7000 DATA 3,6,9,13,19
8000 DATA 0,-1,1,-1,1,0,1,0,1,-1,1,-1,0,-1,-1
```

Commodore 64 & 128 (C 64 mode)/Turkey Chase

```
10 DIM DR(8,2),T(8),RG(5),LM$(5)
20 UL$="Q":UP$="I":UR$="W":RT$="L"
30 DR$="S":DWS="K":DL$="A":LTS="J"
40 DKY$=UP$+UR$+RT$+DR$+DWS+DL$+LTS+UL$
50 SI=54272:FOR L=0 TO 24:POKE SI+L,0:NEXT L
60 POKE SI+5,36:POKE SI+6,128:POKE SI+12,36
70 POKE SI+13,68:POKE SI+24,15:POKE 650,128:POKE 649,4
80 FOR L=1 TO 5:READ LM$(L),RG(L):NEXT L
90 FOR L=1 TO 8:READ DR(L,1),DR(L,2):NEXT L
100 SP$=CHR$(32):BK$=CHR$(18)+SP$+CHR$(146)
110 LI$=SP$:FOR L=2 TO 39:LI$=LI$+SP$:NEXT L
120 PRINT CHR$(147);CHR$(30)
130 PRINT TAB(12);"*TURKEY CHASE*";CHR$(5)
140 PRINT:PRINT:PRINT TAB(12);"DIRECTION KEYS":PRINT
150 PRINT TAB(15);UL$;" ";UP$;" ";UR$
160 PRINT TAB(15);LTS;SPC(5);RT$
170 PRINT TAB(15);DL$;" ";DWS;" ";DR$:PRINT:PRINT
180 PRINT TAB(12);"PLAY LEVELS:":PRINT
190 FOR L=1 TO 5:PRINT TAB(12);LM$(L):NEXT L:PRINT
200 FOR L=1 TO 3+RND(1)*3:GOSUB 1000:NEXT L
210 PRINT "AT WHICH LEVEL WOULD YOU LIKE TO PLAY?"
220 GOSUB 2000:IF K$<"1" OR K$>"5" THEN 220
```


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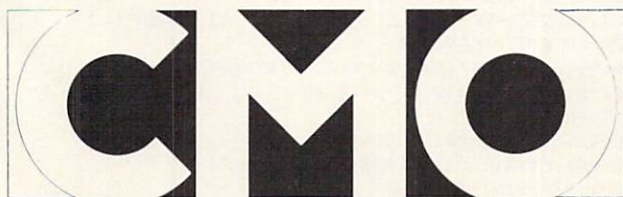
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THANKSGIVING PROGRAM

```

230 PL=ASC(K$)-48:DIS=RG(PL)
240 EF=0:MF=0:RF=0:ZF=0:ZT=150+10*INT(RND(1)*16)
250 PRINT CHR$(147):PRINT CHR$(18):LI$:CHR$(146)
260 FOR Y=3 TO 24:PRINT BK$:SPC(37):BK$:NEXT Y
270 PRINT CHR$(18):LI$:CHR$(146);
280 POKE 214,0:PRINT:PRINT TAB(13):CHR$(18);
290 FOR L=1 TO 13:PRINT CHR$(98);:NEXT L
300 PRINT CHR$(146);:ZX=13+INT(RND(1)*13)
310 EX=9+INT(RND(1)*9):EY=15+INT(RND(1)*5)
320 FX=29+INT(RND(1)*9):FY=15+INT(RND(1)*5)
330 IF RND(1)>.5 THEN X=FX:FX=EX:EX=X:Y=FY:EY=FY:FY=Y
340 GOSUB 5000:GOSUB 4000
350 GOSUB 5000:IF JF THEN 370
360 IF EX=FX AND EY=FY THEN 570
370 IF ZF THEN 620
380 IF RND(1)>.995 THEN GOSUB 1000
390 IF NOT(EF AND EX=ZX AND NOT RF AND RND(1)>.1) THEN 410
400 MX=0:MY=-1:CU=0:CT=EY:MF=-1:RF=-1
410 IF MF THEN GOSUB 6000:GOTO 350
420 SUM=ABS(EX-FX)+ABS(EY-FY):IF SUM<DIS THEN 480
430 IF RND(1)<.99 THEN 350
440 R=1+INT(RND(1)*8):NX=EX+DR(R,1):NY=EY+DR(R,2)
450 IF NX=0 OR NX=38 OR NY=0 OR NY=23 OR (EX=FX AND EY=FY) THEN 350
460 POKE 214,EY:PRINT:PRINT TAB(EX);SP$
470 EX=NX:EY=NY:GOSUB 3000:GOTO 350
480 C=0:CT=6+INT(RND(1)*PL)
490 FOR L=1 TO 8:NX=EX+CT*DR(L,1):NY=EY+CT*DR(L,2)
500 IF NX<1 OR NX>37 OR NY<1 OR NY>22 THEN 520
510 IF ABS(NX-FX)+ABS(NY-FY)>SUM THEN C=C+1:T(C)=L
520 NEXT L:GOSUB 5000:IF JF THEN 540
530 IF EX=FX AND EY=FY THEN 570
540 IF C=0 THEN 430
550 MF=-1:L=T(INT(RND(1)*C)+1):CU=0
560 MX=DR(L,1):MY=DR(L,2):GOSUB 6000:GOTO 350
570 FOR L=1 TO 10
580 PRINT CHR$(19):TAB(12);"CONGRATULATIONS!";
590 FOR D=1 TO 50:GOSUB 5000:NEXT D
600 PRINT CHR$(19):TAB(12);MID$(LI$,16)
610 NEXT L:GOTO 700
620 POKE 214,0:PRINT
630 PRINT TAB(ZX):CHR$(18):CHR$(98):CHR$(146);
640 FOR L=1 TO 3
650 FOR X=-38*(L=2) TO 38+38*(L=2) STEP 2*(L=2)+1
660 PRINT CHR$(19):TAB(X):CHR$(120)
670 IF RND(1)>.8 THEN GOSUB 1000
680 GOSUB 5000:FOR D=1 TO 10:NEXT D
690 PRINT CHR$(19):TAB(X):SP$:NEXT X,L
700 PRINT CHR$(19);"WOULD YOU LIKE TO TRY AGAIN?";
710 GOSUB 2000:IF K$<"Y" AND K$<"N" THEN 710
720 IF K$="Y" THEN 120
730 PRINT CHR$(147):END
1000 POKE SI+4,33:POKE SI+11,33:POKE SI,144
1010 POKE SI+1,16:POKE SI+7,134:POKE SI+8,16
1020 FOR D=1 TO 20:NEXT D
1030 POKE SI+4,32:POKE SI+11,32:POKE SI+4,33
1040 POKE SI+11,33:POKE SI,194:POKE SI+1,14
1050 POKE SI+7,180:POKE SI+8,14
1060 FOR D=1 TO RND(1)*30:NEXT D
1070 POKE SI,184:POKE SI+1,17:POKE SI+7,170
1080 POKE SI+8,17:POKE SI+4,32:POKE SI+11,32:RETURN
2000 GET K$:IF K$="" THEN 2000
2010 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123)):RETURN
3000 POKE 214,EY:PRINT:PRINT TAB(EX);CHR$(120)
3010 RETURN
4000 POKE 214,FY:PRINT:PRINT TAB(FX);"F":RETURN
5000 JF=0:GET K$:IF K$="" THEN 5150
5010 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123))
5020 K=0:FOR L=1 TO 8
5030 IF K$=MID$(DKY$,L,1) THEN K=L:L=8
5040 NEXT L:IF K=0 THEN 5150
5050 NX=FX+DR(K,1):NY=FY+DR(K,2)
5060 Z=Z+1:IF Z=ZT THEN EF=-1

```

```

5070 IF NX<>0 AND NX<>38 AND NY<>0 AND NY<>23 THEN 5120
5080 POKE SI+4,33:POKE SI+11,33:POKE SI,144
5090 POKE SI+1,19:POKE SI+7,134:POKE SI+8,16
5100 FOR D=1 TO 30:NEXT D:POKE SI+4,32
5110 POKE SI+11,32:GOTO 5150
5120 POKE 214,FY:PRINT:PRINT TAB(FX);SP$
5130 FX=NX:FY=NY:POKE 214,FY:PRINT
5140 PRINT TAB(FX);"F":RETURN
5150 JF=-1:RETURN
6000 IF RND(1)>.95 THEN RETURN
6010 POKE 214,EY:PRINT:PRINT TAB(EX);SP$
6020 EX=EX+MX:EY=EY+MY
6030 POKE 214,EY:PRINT:PRINT TAB(EX);CHR$(120)
6040 CU=CU+1:IF CU=CT THEN MF=0:IF RF THEN ZF=-1
6050 IF EX<>FX OR EY<>FY THEN RETURN
6060 GOSUB 4000:IF MF THEN 6020
6070 EX=EX-MX:EY=EY-MY:GOSUB 3000:RETURN
7000 DATA <1> BEGINNER,3,<2> INTERMEDIATE,6
7010 DATA <3> ADVANCED,9,<4> EXPERT,13,<5> MASTER,19
8000 DATA 0,-1,1,-1,1,0,1,0,1,-1,1,-1,0,-1,-1

```

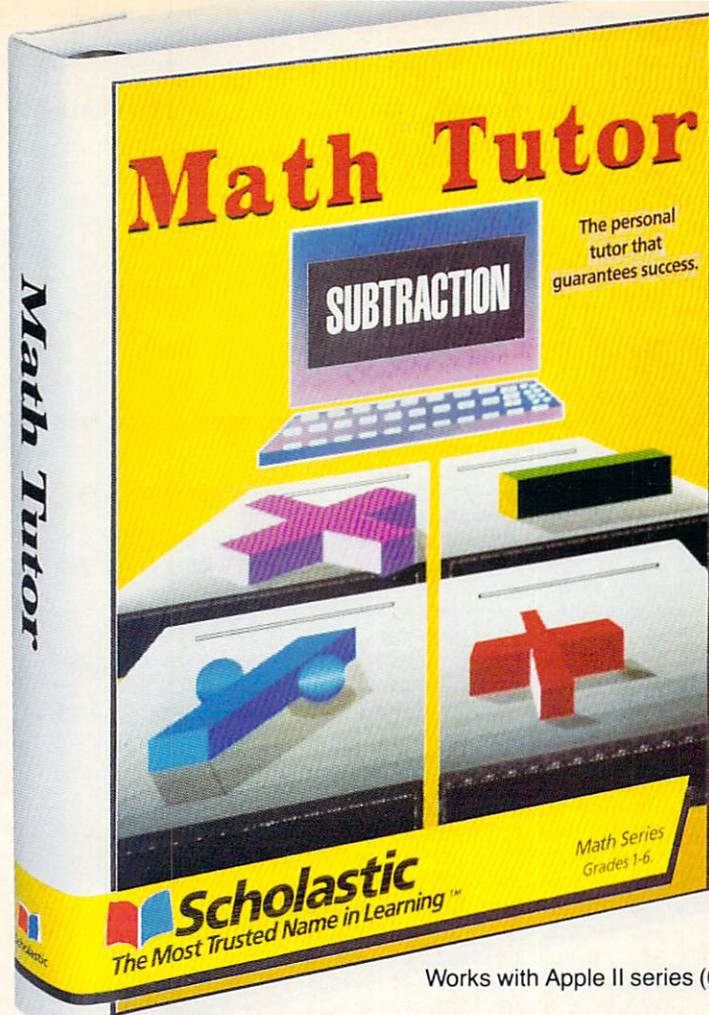
IBM PC & compatibles/Turkey Chase

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome/Printer Card, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. It should also work on many other PC compatibles.

```

10 DIM RG(5),DR(8,2),T(8),LMS(5)
20 UL$="Q":UP$="I":UR$="W":RT$="L"
30 DR$="S":DW$="K":DL$="A":LT$="J"
40 DKEY$=UP$+UR$+RT$+DR$+DW$+DL$+LT$+UL$
50 KEY OFF:WIDTH 40:RANDOMIZE TIMER
60 FOR L=1 TO 5:READ LMS(L),RG(L):NEXT L
70 FOR L=1 TO 8:READ DR(L,1),DR(L,2):NEXT L
80 BK$=CHR$(219):SP$=CHR$(32):LOCATE ,,0
90 CLS:COLOR 14
100 PRINT TAB(13);"TURKEY CHASE":COLOR 2
110 PRINT:PRINT:PRINT TAB(13);"DIRECTION KEYS":PRINT
120 PRINT TAB(16);UL$;" ";UP$;" ";UR$
130 PRINT TAB(16);LT$;SPC(5);RT$
140 PRINT TAB(16);DL$;" ";DW$;" ";DR$:PRINT:PRINT
150 COLOR 2:PRINT TAB(14);"Play Levels":PRINT
160 FOR L=1 TO 5:PRINT TAB(12);LMS(L):NEXT L:PRINT
170 FOR L=1 TO 5+RND*5:GOSUB 1000:NEXT L
180 PRINT "At which level would you like to play?"
190 GOSUB 2000:IF K$<"1" OR K$>"5" THEN 190
200 PL=ASC(K$)-48:DIS=RG(PL)
210 EF=0:MF=0:RF=0:ZF=0:ZT=150+10*INT(RND*16)
220 CLS:FOR Y=3 TO 23
230 LOCATE Y,1:PRINT BK$:SPC(37):BK$:NEXT Y
240 LOCATE 2,1:PRINT STRING$(39,BK$);
250 LOCATE 24,1:PRINT STRING$(39,BK$);
260 LOCATE 2,14:PRINT STRING$(13,177);
270 ZX=14+INT(RND*13)
280 EX=10+INT(RND*10):EY=15+INT(RND*5)
290 FX=29+INT(RND*9):FY=15+INT(RND*5)
300 IF RND>.5 THEN SWAP EX,FX:SWAP EY,FY
310 GOSUB 3000:GOSUB 4000
320 GOSUB 5000:IF JF THEN 340
330 IF EX=FX AND EY=FY THEN 530
340 IF ZF THEN 570
350 IF RND>.995 THEN GOSUB 1000
360 IF EF AND EX=ZX AND NOT RF AND RND>.1 THEN MX=0:MY=-1:CU=0:CT=EY-1:MF=-1:RF=-1
370 IF MF THEN GOSUB 6000:GOTO 320
380 SUM=ABS(EX-FX)+ABS(EY-FY):IF SUM<DIS THEN 440
390 IF RND<.99 THEN 320
400 R=1+INT(RND*8):NX=EX+DR(R,1):NY=EY+DR(R,2)
410 IF NX=1 OR NX=39 OR NY=2 OR NY=24 OR (EX=FX AND EY=FY) THEN 320
420 LOCATE EY,EX:PRINT SP$
430 EX=NX:EY=NY:GOSUB 3000:GOTO 320
440 C=0:CT=6+INT(RND*PL)

```

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```

450 FOR L=1 TO 8:NX=EX+CT*DR(L,1):NY=EY+CT*DR(L,2)
460 IF NX<2 OR NX>38 OR NY<3 OR NY>23 THEN 480
470 IF ABS(NX-FX)+ABS(NY-FY)>SUM THEN C=C+1:T(C)=L
480 NEXT L:GOSUB 5000:IF JF THEN 500
490 IF EX=FX AND EY=FY THEN 530
500 IF C=0 THEN 390
510 MF=-1:L=T(INT(RND*C)+1):CU=0
520 MX=DR(L,1):MY=DR(L,2):GOSUB 6000:GOTO 320
530 FOR L=1 TO 10:LOCATE 1,13
540 PRINT "CONGRATULATIONS!";
550 FOR D=1 TO 50:GOSUB 5000:NEXT D
560 LOCATE 1,13:PRINT STRING$(16,32):NEXT L:GOTO 630
570 LOCATE 2,ZX:PRINT CHR$(177)
580 LOCATE 1,EX:PRINT SP$:EY=1:FOR L=1 TO 3
590 FOR X=1-38*(L=2) TO 39+38*(L=2) STEP 2*(L=2)+1
600 EX=X:GOSUB 3000:IF RND>.8 THEN GOSUB 1000
610 GOSUB 5000:FOR D=1 TO 20:NEXT D
620 LOCATE 1,X:PRINT SP$:NEXT X,L
630 LOCATE 1,1:PRINT "Would you like to try again?";
640 GOSUB 2000:IF K$<>"Y" AND K$<>"N" THEN 640
650 IF K$="Y" THEN 90 ELSE CLS:END
1000 SOUND 150,2:FOR S=1 TO 5
1010 SOUND 75,.5:SOUND 37,.2:NEXT S
1020 FOR D=1 TO 10:NEXT D:RETURN
2000 K$=INKEY$:IF K$="" THEN 2000
2010 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123)):RETURN
3000 COLOR 14:LOCATE EY,EX:PRINT CHR$(139)
3010 COLOR 2:RETURN
4000 LOCATE FY,FX:PRINT CHR$(148):RETURN
5000 JF=0:K$=INKEY$:IF K$="" THEN 5080
5010 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123))
5020 K=INSTR(DKEY$,K$):IF K=0 THEN 5080
5030 NX=FX+DR(K,1):NY=FY+DR(K,2)
5040 Z=Z+1:IF Z=21 THEN EF=-1
5050 IF NX=1 OR NX=39 OR NY=2 OR NY=24 THEN SOUND 50,1
:GOTO 5080
5060 LOCATE FY,FX:PRINT SP$
5070 FX=NX:FY=NY:GOSUB 4000:RETURN
5080 JF=-1:RETURN
6000 IF RND>.95 THEN RETURN
6010 LOCATE EY,EX:PRINT SP$
6020 EX=EX+MX:EY=EY+MY:GOSUB 3000
6030 CU=CU+1:IF CU=CT THEN MF=0:IF RF THEN ZF=-1
6040 IF EX<>FX OR EY<>FY THEN RETURN
6050 GOSUB 4000:IF MF THEN 6020
6060 EX=EX-MX:EY=EY-MY:GOSUB 3000:RETURN
7000 DATA <1> Beginner,3,<2> Intermediate,6
7010 DATA <3> Advanced,9,<4> Expert,13,<5> Master,19
8000 DATA 0,-1,1,-1,0,1,1,0,1,-1,1,-1,0,-1,-1

```

Macintosh w/Microsoft BASIC 2.0 or 2.1/ Turkey Chase

```

10 DIM RG(5),DR(8,2),T(8),LMS(5)
20 UL$="Q":UP$="I":UR$="W":RT$="L"
30 DR$="S":DWS$="K":DL$="A":LT$="J"
40 DKEY$=UP$+UR$+RT$+DR$+DWS$+DL$+LT$+UL$
50 CALL TEXTMODE(4):CALL TEXTSIZE(9):CALL TEXTMODE(0)
60 WINDOW 1,"*TURKEY CHASE*", (0,38)-(527,338)
70 FOR L=1 TO 5:READ LMS(L),RG(L):NEXT L
80 FOR L=1 TO 8:READ DR(L,1),DR(L,2):NEXT L
90 BK$=CHR$(219):SP$=CHR$(32)
100 CLS:PRINT:PRINT
110 PRINT TAB(37);"DIRECTION KEYS":PRINT
120 PRINT TAB(40);UL$;" ";UP$;" ";UR$
130 PRINT TAB(40);LT$;" ";SPC(5);RT$
140 PRINT TAB(40);DL$;" ";DWS;" ";DR$:PRINT:PRINT
150 PRINT TAB(38);"Play levels:":PRINT
160 FOR L=1 TO 5:PRINT TAB(36);LMS(L):NEXT L:PRINT
170 FOR L=1 TO 5+RND*5:GOSUB 1000:NEXT L
180 PRINT TAB(26);"At which level would you like to pl
ay?"
190 GOSUB 2000:IF K$<"1" OR K$>"5" THEN 190
200 PL=ASC(K$)-48:DIS=RG(PL)
210 EF=0:MF=0:RF=0:Z=0:ZF=0:ZT=150+10*INT(RND*16)

```

```

220 CLS:LOCATE 2,1
230 PRINT STRING$(28,BK$);STRING$(28,124);STRING$(28,B
K$)
240 FOR Y=3 TO 24:PRINT BK$;SPC(82);BK$:NEXT Y
250 PRINT STRING$(84,BK$);
260 ZX=29+INT(RND*28)
270 EX=19+INT(RND*21):EY=15+INT(RND*5)
280 FX=51+INT(RND*21):FY=15+INT(RND*5)
290 IF RND>.5 THEN SWAP EX,FX:SWAP EY,FY
300 GOSUB 3000:GOSUB 4000
310 GOSUB 5000:IF JF THEN 330
320 IF EX=FX AND EY=FY THEN 510
330 IF ZF THEN 550
340 IF RND>.995 THEN GOSUB 1000
350 IF EF AND EX=ZX AND NOT RF AND RND>.1 THEN MX=0:MY
=-1:CU=0:CT=EY-1:MF=-1:RF=-1
360 IF MF THEN GOSUB 6000:GOTO 310
370 SUM=ABS(EX-FX)+ABS(EY-FY):IF SUM<DIS THEN 420
380 IF RND<.99 THEN 310
390 R=1+INT(RND*8):NX=EX+DR(R,1):NY=EY+DR(R,2)
400 IF NX=1 OR NX=84 OR NY=2 OR NY=25 OR (EX=FX AND EY
=FY) THEN 310
410 GOSUB 3000:EX=NX:EY=NY:GOSUB 3000:GOTO 310
420 C=0:CT=6+INT(RND*PL)
430 FOR L=1 TO 8:NX=EX+CT*DR(L,1):NY=EY+CT*DR(L,2)
440 IF NX<2 OR NX>83 OR NY<3 OR NY>24 THEN 460
450 IF ABS(NX-FX)+ABS(NY-FY)>SUM THEN C=C+1:T(C)=L
460 NEXT L:GOSUB 5000:IF JF THEN 480
470 IF EX=FX AND EY=FY THEN 510
480 IF C=0 THEN 380
490 MF=-1:L=T(INT(RND*C)+1):CU=0
500 MX=DR(L,1):MY=DR(L,2):GOSUB 6000:GOTO 310
510 EY=0:FOR L=1 TO 10:LOCATE 1,34
520 PRINT "CONGRATULATIONS!";
530 FOR D=1 TO 50:GOSUB 5000:NEXT D
540 LOCATE 1,34:PRINT STRING$(16,32):NEXT L:GOTO 600
550 EY=1:GOSUB 3000:FOR L=1 TO 3
560 FOR X=1-83*(L=2) TO 84+83*(L=2) STEP 2*(L=2)+1
570 EX=X:GOSUB 3000:IF RND>.85 THEN GOSUB 1000
580 GOSUB 5000:FOR D=1 TO 20:NEXT D
590 GOSUB 3000:NEXT X,L
600 LOCATE 1,1:PRINT "Would you like to try again?";
610 GOSUB 2000:IF K$<>"Y" AND K$<>"N" THEN 610
620 IF K$="Y" THEN 100 ELSE CLS:END
1000 SOUND 150,2:FOR S=1 TO 5
1010 SOUND 75,.5:SOUND 37,.2:NEXT S
1020 FOR D=1 TO 10:NEXT D:RETURN
2000 K$=INKEY$:IF K$="" THEN 2000
2010 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123)):RETURN
3000 CALL TEXTMODE(2):LOCATE EY,EX
3010 PRINT CHR$(189):CALL TEXTMODE(0):RETURN
4000 CALL TEXTMODE(2):LOCATE FY,FX
4010 PRINT CHR$(154):CALL TEXTMODE(0):RETURN
5000 JF=0:K$=INKEY$:IF K$="" THEN 5090
5010 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123))
5020 K=INSTR(DKEY$,K$):IF K=0 THEN 5090
5030 NX=FX+DR(K,1):NY=FY+DR(K,2)
5040 Z=Z+1:IF Z=21 THEN EF=-1
5050 IF NX=1 OR NX=84 OR NY=2 OR NY=25 THEN SOUND 50,1
:GOTO 5090
5060 IF EX<>FX OR EY<>FY THEN GOSUB 4000
5070 FX=NX:FY=NY:IF EX=FX AND EY=FY THEN GOSUB 3000
5080 GOSUB 4000:RETURN
5090 JF=-1:RETURN
6000 IF RND>.95 THEN RETURN
6010 GOSUB 3000
6020 EX=EX+MX:EY=EY+MY
6030 CU=CU+1:IF CU=CT THEN MF=0:IF RF THEN ZF=-1
6040 IF EX<>FX OR EY<>FY THEN GOSUB 3000:RETURN
6050 IF MF THEN 6020
6060 EX=EX-MX:EY=EY-MY:GOSUB 3000:RETURN
7000 DATA <1> Beginner,3,<2> Intermediate,6
7010 DATA <3> Advanced,9,<4> Expert,13,<5> Master,19
8000 DATA 0,-1,1,-1,0,1,1,0,1,-1,1,-1,0,-1,-1

```


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Tandy Color Computer/Turkey Chase

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10 CLEAR 1000: DIM RG(5), DR(8,2), T(8), LMS(5), Z$(8)
20 UL$="Q": UPS$="I": URS$="W": RTS$="L"
30 DRS$="S": DWS$="K": DLS$="A": LTS$="J"
40 DKEY$=UPS$+URS$+RTS$+DRS$+DWS$+DLS$+LTS$+UL$
50 FOR L=1 TO 4: READ LMS(L), RG(L): NEXT L
60 FOR L=1 TO 8: READ DR(L,1), DR(L,2): NEXT L
70 BK$=CHR$(191): SP$=CHR$(32): LIS$=SP$: WS$=BK$
80 FOR L=2 TO 31: WS$=WS$+BK$: LIS$=LIS$+SP$: NEXT L
90 CLS: PRINT TAB(9); "*TURKEY CHASE*"
100 PRINT: PRINT TAB(9); "DIRECTION KEYS"
110 PRINT TAB(12); UL$; " "; UPS$; " "; URS$
120 PRINT TAB(12); LTS$; TAB(18); RTS$
130 PRINT TAB(12); DLS$; " "; DWS$; " "; DRS$: PRINT
140 PRINT TAB(10); "PLAY LEVELS:": PRINT
150 FOR L=1 TO 4: PRINT TAB(8); LMS(L): NEXT L: PRINT
160 FOR D=1 TO 2+RND(2): GOSUB 1000: NEXT D
170 PRINT "AT WHICH LEVEL WOULD YOU LIKE TO PLAY?";
180 GOSUB 2000: IF K$<"1" OR K$>"4" THEN 180
190 PL=ASC(K$)-48: DIS=RG(PL)
200 EF=0: MF=0: RF=0: Z=0: ZF=0: ZT=150+10*RND(16)
210 CLS: PRINT: PRINT WS$: FOR Y=2 TO 14
220 PRINT BK$; TAB(30); BK$: NEXT Y
230 PRINT@480, WS$;
240 FOR L=1 TO 10: PRINT@42+L, CHR$(149);: NEXT L
250 ZX=10+RND(10): EX=8+RND(7): EY=10+RND(4)
260 FX=22+RND(7): FY=10+RND(4)
270 IF RND(0)>.5 THEN X=EX: EX=FX: FX=X: Y=EY: EY=FY: FY=Y
280 GOSUB 3000: GOSUB 4000
290 GOSUB 5000: IF JF THEN 310
300 IF EX=FX AND EY=FY THEN 500
310 IF ZF THEN 540
320 IF RND(0)>.995 THEN GOSUB 1000
330 IF EF AND EX=ZX AND NOT RF AND RND(0)>.1 THEN MX=
0: MY=-1: CU=0: CT=EY-1: MF=-1: RF=-1
340 IF MF THEN GOSUB 6000: GOTO 290
350 SUM=ABS(EX-FX)+ABS(EY-FY): IF SUM<DIS THEN 410
360 IF RND(0)<.99 THEN 290
370 R=RND(8): NX=EX+DR(R,1): NY=EY+DR(R,2)
380 IF NX=0 OR NX=30 OR NY=1 OR NY=15 OR (EX=FX AND EY
=FY) THEN 290
390 PRINT@EY*32+EX, SP$;
400 EX=NX: EY=NY: GOSUB 3000: GOTO 290
410 C=0: CT=6+RND(PL)
420 FOR L=1 TO 8: NX=EX+CT*DR(L,1): NY=EY+CT*DR(L,2)
430 IF NX<1 OR NX>29 OR NY<2 OR NY>14 THEN 450
440 IF ABS(NX-FX)+ABS(NY-FY)>=SUM THEN C=C+1: T(C)=L
450 NEXT L: GOSUB 5000: IF JF THEN 470
460 IF EX=FX AND EY=FY THEN 500
470 IF C=0 THEN 360
480 MF=-1: L=T(RND(C)): CU=0
490 MX=DR(L,1): MY=DR(L,2): GOSUB 6000: GOTO 290
500 FOR L=1 TO 10
510 PRINT@8, "CONGRATULATIONS!";
520 FOR D=1 TO 50: GOSUB 5000: NEXT D
530 PRINT@8, SP$: FOR D=1 TO 30: NEXT D, L: GOTO 600
540 PRINT@32+ZX, CHR$(149);: PRINT@EX, SP$;
550 EY=0: FOR L=1 TO 3
560 FOR X=-30*(L=2) TO 30+30*(L=2) STEP 2*(L=2)+1
570 EX=X: GOSUB 3000: IF RND(0)>.8 THEN GOSUB 1000
580 GOSUB 5000: FOR D=1 TO 20: NEXT D
590 PRINT@X, SP$;: NEXT X, L
600 PRINT@0, "WOULD YOU LIKE TO TRY AGAIN?";
610 GOSUB 2000: IF K$<"Y" AND K$<"N" THEN 610
620 IF K$="Y" THEN 90 ELSE CLS: END
1000 SOUND 200,3: FOR S=1 TO 3: SOUND 80,1
1010 NEXT S: RETURN
2000 K$=INKEY$: IF K$="" THEN 2000
2010 K=ASC(K$): K$=CHR$(K-32*(K>96)*(K<123)): RETURN
3000 PRINT@EY*32+EX, "T";: RETURN
4000 PRINT@FY*32+FX, "F";: RETURN
5000 JF=0: K$=INKEY$: IF K$="" THEN 5100

```

```

5010 K=ASC(K$): K$=CHR$(K-32*(K>96)*(K<123))
5020 K=0: FOR L=1 TO 8
5030 IF K$=MID$(DKEY$,L,1) THEN K=L: L=8
5040 NEXT L: IF K=0 THEN 5100
5050 NX=FX+DR(K,1): NY=FY+DR(K,2)
5060 Z=Z+1: IF Z=ZT THEN EF=-1
5070 IF NX=0 OR NX=30 OR NY=1 OR NY=15 THEN SOUND 50,1
: GOTO 5100
5080 PRINT@FY*32+FX, SP$;
5090 FX=NX: FY=NY: PRINT@FY*32+FX, "F";: RETURN
5100 JF=-1: RETURN
6000 IF RND(0)>.95 THEN RETURN
6010 PRINT@EY*32+EX, SP$;
6020 EX=EX+MX: EY=EY+MY: GOSUB 3000
6030 CU=CU+1: IF CU=CT THEN MF=0: IF RF THEN ZF=-1
6040 IF EX<>FX OR EY<>FY THEN RETURN
6050 GOSUB 4000: IF MF THEN 6020
6060 EX=EX-MX: EY=EY-MY: PRINT@EY*32+EX, "T";: RETURN
7000 DATA <1> BEGINNER,3,<2> INTERMEDIATE,6
7010 DATA <3> ADVANCED,9,<4> EXPERT,14
7020 DATA 0,-1,1,-1,1,0,1,1,0,1,-1,1,-1,0,-1,-1

```

Tandy Models III & 4 (Model III mode)/ Turkey Chase

```

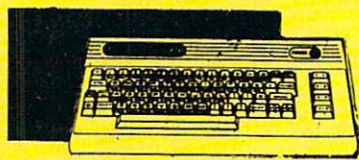
10 CLEAR 1000: DIM RG(5), DR(8,2), T(8), LMS(5): RANDOM
20 UL$="Q": UPS$="I": URS$="W": RTS$="L"
30 DRS$="S": DWS$="K": DLS$="A": LTS$="J"
40 DKEY$=UPS$+URS$+RTS$+DRS$+DWS$+DLS$+LTS$+UL$
50 FOR L=1 TO 5: READ LMS(L), RG(L): NEXT L
60 FOR L=1 TO 8: READ DR(L,1), DR(L,2): NEXT L
70 BK$=CHR$(191): SP$=CHR$(32)
80 CLS: PRINT TAB(25); "*TURKEY CHASE*"
90 PRINT: PRINT TAB(25); "DIRECTION KEYS"
100 PRINT TAB(28); UL$; " "; UPS$; " "; URS$
110 PRINT TAB(28); LTS$; TAB(34); RTS$
120 PRINT TAB(28); DLS$; " "; DWS$; " "; DRS$: PRINT
130 PRINT TAB(26); "PLAY LEVELS:": PRINT
140 FOR L=1 TO 5: PRINT TAB(24); LMS(L): NEXT L: PRINT
150 PRINT "At which level would you like to play?";
160 GOSUB 1000: IF K$<"1" OR K$>"5" THEN 160
170 PL=ASC(K$)-48: DIS=RG(PL)
180 EF=0: MF=0: RF=0: Z=0: ZF=0: ZT=150+10*RND(16)
190 CLS: FOR Y=2 TO 14
200 PRINT@Y*64, BK$; STRINGS(61,32); BK$;: NEXT Y
210 PRINT@64, STRINGS(63, BK$);
220 PRINT@96, STRINGS(63, BK$);
230 PRINT@85, STRINGS(21,149);
240 ZX=20+RND(21)
250 EX=15+RND(15): EY=9+RND(4)
260 FX=46+RND(15): FY=9+RND(4)
270 IF RND(0)>.5 THEN V=EX: EX=FX: FX=V: V=EY: EY=FY: EY=V
280 GOSUB 2000: GOSUB 3000
290 GOSUB 4000: IF JF THEN 310
300 IF EX=FX AND EY=FY THEN 490
310 IF ZF THEN 540
320 IF EF AND EX=ZX AND NOT RF AND RND(0)>.1 THEN MX=
0: MY=-1: CU=0: CT=EY-1: MF=-1: RF=-1
330 IF MF THEN GOSUB 5000: GOTO 290
340 SUM=ABS(EX-FX)+ABS(EY-FY): IF SUM<DIS THEN 400
350 IF RND(0)<.99 THEN 290
360 R=RND(8): NX=EX+DR(R,1): NY=EY+DR(R,2)
370 IF NX=0 OR NX=62 OR NY=1 OR NY=15 OR (EX=FX AND EY
=FY) THEN 290
380 PRINT@EY*64+EX, SP$;
390 EX=NX: EY=NY: GOSUB 2000: GOTO 290
400 C=0: CT=6+RND(PL)
410 FOR L=1 TO 8: NX=EX+CT*DR(L,1): NY=EY+CT*DR(L,2)
420 IF NX<1 OR NX>61 OR NY<2 OR NY>14 THEN 440
430 IF ABS(NX-FX)+ABS(NY-FY)>=SUM THEN C=C+1: T(C)=L

```


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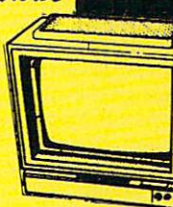
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THANKSGIVING PROGRAM

```

440 NEXT L:GOSUB 4000:IF JF THEN 460
450 IF EX=FX AND EY=FY THEN 490
460 IF C=0 THEN 350
470 MF=-1:L=T(RND(C)):CU=0
480 MX=DR(L,1):MY=DR(L,2):GOSUB 5000:GOTO 290
490 FOR L=1 TO 10
500 PRINT@23,"CONGRATULATIONS!";
510 FOR D=1 TO 40:GOSUB 4000:NEXT D
520 PRINT@23,STRING$(16,32);
530 FOR D=1 TO 10:NEXT D,L:GOTO 600
540 PRINT@64+ZX,CHR$(149);:PRINT@EX,SP$;
550 EY=0:FOR L=1 TO 3
560 FOR X=-62*(L=2) TO 62+62*(L=2) STEP 2*(L=2)+1
570 EX=X:GOSUB 2000:GOSUB 4000
580 IF RND(0)>.8 THEN FOR D=1 TO 30:NEXT D
590 PRINT@X,SP$;:NEXT X,L
600 PRINT@0,"Would you like to try again?";
610 GOSUB 1000:IF K<>"Y" AND K<>"N" THEN 610
620 IF K="Y" THEN 80 ELSE CLS:END
1000 K$=INKEY$:IF K$="" THEN 1000
1010 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123)):RETURN
2000 PRINT@EY*64+EX,CHR$(184);:RETURN
3000 PRINT@FY*64+FX,"F";:RETURN
4000 JF=0:K$=INKEY$:IF K$="" THEN 4100
4010 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123))
4020 K=0:FOR L=1 TO 8
4030 IF K=MID$(DKEY$,L,1) THEN K=L:L=8
4040 NEXT L:IF K=0 THEN 4100
4050 NX=FX+DR(K,1):NY=FY+DR(K,2)
4060 Z=Z+1:IF Z=CT THEN MF=0:EF=-1
4070 IF NX=0 OR NX=62 OR NY=1 OR NY=15 THEN 4100
4080 PRINT@FY*64+FX,SP$;
4090 FX=NX:FY=NY:PRINT@FY*64+FX,"F";:RETURN
4100 JF=-1:RETURN
5000 IF RND(0)>.95 THEN RETURN
5010 PRINT@EY*64+EX,SP$;
5020 EX=EX+MX:EY=EY+MY:PRINT@EY*64+EX,CHR$(184);
5030 CU=CU+1:IF CU=CT THEN MF=0:IF RF THEN ZF=-1
5040 IF EX<>FX OR EY<>FY THEN RETURN
5050 GOSUB 3000:IF MF THEN 5020
5060 EX=EX-MX:EY=EY-MY:GOSUB 2000:RETURN
6000 DATA <1> Beginner,3,<2> Intermediate,6
6010 DATA <3> Advanced,9,<4> Expert,13,<5> Master,19
7000 DATA 0,-1,1,-1,1,0,1,1,0,1,-1,1,-1,0,-1,-1

```

COMPUTERS WE COVER

We regularly present two or more programs in each issue for the Apple II series; Atari 400/800, 600/800XL, & 130XE; Commodore 64 & 128 (in C 64 mode); IBM PC and compatibles; Macintosh; and Tandy Models III/4 and Color Computer. However, occasionally we have to omit versions when a program requires capabilities that some of these computers lack. For example, we usually won't run a Tandy Model III or 4 version of a program featuring sound and/or color graphics. And many Microtones programs can only run on computers that have three voices, which eliminates the Apple II series; IBM PC and compatibles (except the PCjr with Cartridge BASIC and the Tandy 1000); and Tandy Models III, 4, and Color Computer.

In addition, we publish at least one program each issue for the Adam, TI-99/4A, and VIC-20. In the future, we also hope to cover the Atari 520ST and the Amiga. This month, these programs can be found here in The Programmer, in Microtones (in the K-POWER section of FAMILY COMPUTING), and in Personal Finance.

WISHBONE

BY STEVEN C.M. CHEN



Preparing the wishbone from the Thanksgiving turkey is always a fun holiday ritual. You carefully remove the Y-shaped bone, lay it out to dry until it is brittle, and then select one person to challenge in the "tug-of-good luck." If you are successful in snapping the wishbone with the long end in your possession, your wish is supposed to come true. The only problem is that there is only one wishbone in every turkey, and there are usually more than two people who want a crack at it.

This Thanksgiving, you can make as many wishes as you'd like with our *Wishbone* program. The simple game displays a wishbone graphic that can be snapped over and

over again. To play *Wishbone*, you and an opponent each select one side of the bone to "pull." The "Q" key pulls the left side, and the "P" key pulls the right. When you type RUN, the words GET READY! will flash below the wishbone graphic. Place your pinky finger (traditionally, the wishbone is grasped with hooked pinkies) on the chosen key, and when the word GO! appears, each person pulls his or her side of the bone with a quick press of the key. The wishbone will divide on the screen to reveal the lucky winner. Be careful not to press your key before the word GO! appears or you will automatically lose. And, don't forget to make a wish or two!

—KAREN KANE

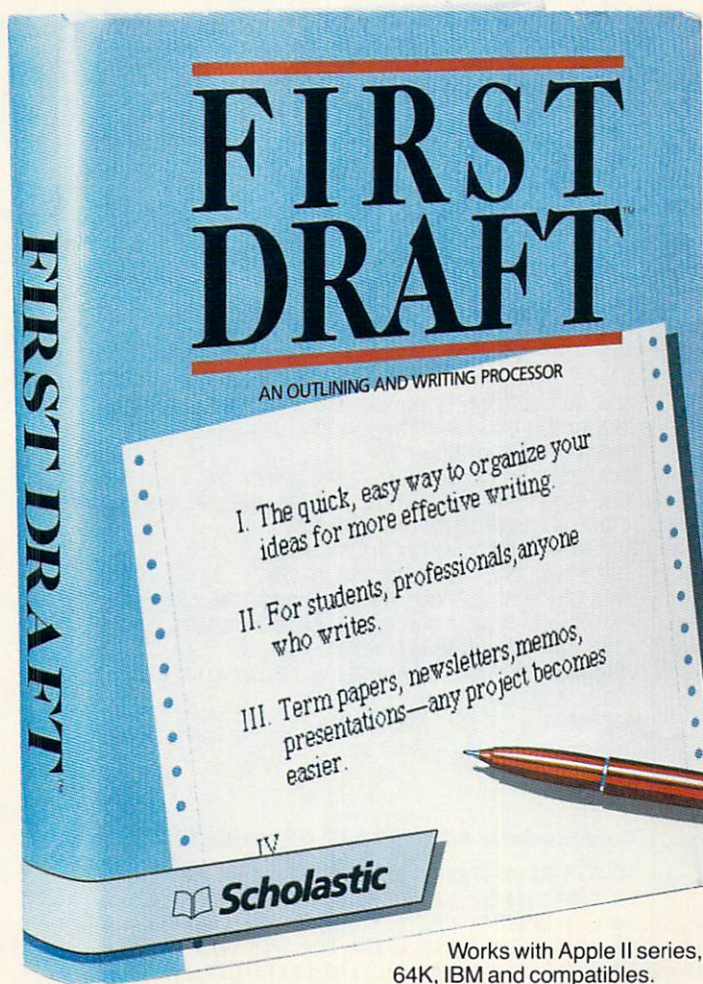
Adam/Wishbone

```

10 LOMEM: 29000:DIM m$(6):NORMAL:HOME
20 FOR i = 28000 TO 28005:READ a:POKE i,a:NEXT i
30 a$ = "B":sp$ = CHR$(32):li$ = sp$
40 FOR c = 2 TO 10:li$ = li$+sp$:NEXT c
50 m$(1) = LEFT$(li$,4)+a$:FOR c = 2 TO 4
60 m$(c) = LEFT$(li$,5-c)+a$+LEFT$(li$,2+c-3)+a$
70 NEXT c:m$(5) = a$+LEFT$(li$,7)+a$:m$(6) = m$(5)
80 x = 11:GOSUB 1000:CALL 28000
90 PRINT "PRESS <Q>";SPC(12);"PRESS <P>"
100 FOR c = 1 TO 10+RND(1)*9
110 VTAB 19:HTAB 11:PRINT "GET READY!"
120 FOR d = 1 TO 25+RND(1)*25
130 k = PEEK(64885):IF k <> 0 THEN d = 50:c = 19
140 NEXT d:VTAB 19:HTAB 11:PRINT li$
150 IF k <> 0 THEN 190
160 FOR d = 1 TO 6:k = PEEK(64885)
170 IF k <> 0 THEN d = 6:c = 19
180 NEXT d
190 NEXT c:IF k <> 0 THEN 230
200 FOR d = 1 TO 100+RND(1)*100
210 k = PEEK(64885):IF k <> 0 THEN d = 200

```


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THANKSGIVING PROGRAM

```

220 NEXT d:IF k = 0 THEN 260
230 GOSUB 2000:IF k <> 80 AND k <> 81 THEN 100
240 GOSUB 3000:x = 1+21*(k = 81):GOSUB 1000
250 x = 2+21*(k = 81):GOTO 350
260 VTAB 19:HTAB 14:INVERSE:PRINT "GO!":NORMAL
270 k = PEEK(64885):z = RND(1):IF k = 0 THEN 270
280 GOSUB 2000:IF k <> 80 AND k <> 81 THEN 270
290 GOSUB 3000:p = 3+2*(k = 81)+INT(RND(1)*2)
300 x = 2+21*(k = 80):t$ = LEFT$(L$,3)
310 FOR c = 1 TO 6:VTAB 10+c:HTAB 10
320 b$ = LEFT$(M$(c),p)+t$+MID$(M$(c),p+1)
330 GOSUB 4000:NEXT c
340 VTAB 19:HTAB 14:PRINT t$
350 VTAB 19:PRINT TAB(x);"WINNER!"
360 CALL 28000:END
1000 FOR c = 1 TO 6:VTAB 10+c:HTAB x
1010 b$ = M$(c):GOSUB 4000:NEXT c
1020 PRINT:PRINT:RETURN
2000 k = k-32*(k > 96)*(k < 123):RETURN
3000 FOR c = 1 TO 6:VTAB 10+c:PRINT TAB(11);L$
3010 NEXT c:RETURN
4000 FOR j = 1 TO LEN(b$):z$ = MID$(b$,j,1)
4010 IF z$ = SP$ THEN PRINT SP$;:GOTO 4030
4020 INVERSE:PRINT SP$;:NORMAL
4030 NEXT j:RETURN
5000 DATA 62,0,50,117,253,201

```

Apple II series/Wishbone

```

10 DIM M$(6):NORMAL:HOME
20 AS = "B":SP$ = CHR$(32):LIS = SP$
30 FOR L = 2 TO 10:LIS = LIS+SP$:NEXT L
40 M$(1) = LEFT$(LIS,4)+AS:FOR L = 2 TO 4
50 M$(L) = LEFT$(LIS,5-L)+AS+LEFT$(LIS,2*L-3)+AS
60 NEXT L:M$(5) = AS+LEFT$(LIS,7)+AS:M$(6) = M$(5)
70 X = 16:GOSUB 1000:POKE -16368,0
80 PRINT "PRESS <Q> KEY.":SPC(12);"PRESS <P> KEY."
90 FOR L = 1 TO 7:RND(1)*7
100 VTAB 18:HTAB 16:PRINT "GET READY!"
110 FOR D = 1 TO 15+RND(1)*15:K = PEEK(-16384)-128
120 IF K > -1 THEN D = 30:L = 14:POKE -16368,0
130 NEXT D:VTAB 18:HTAB 16:PRINT LIS
140 IF K > -1 THEN 180
150 FOR D = 1 TO 3:K = PEEK(-16368)-128
160 IF K > -1 THEN D = 3:L = 14:POKE -16368,0
170 NEXT D
180 NEXT L:IF K > -1 THEN 220
190 FOR D = 1 TO 20+RND(1)*20:K = PEEK(-16384)-128
200 IF K > -1 THEN D = 40:POKE -16368,0
210 NEXT D:IF K < -1 THEN 250
220 GOSUB 2000:IF K <> 80 AND K <> 81 THEN 90
230 GOSUB 3000:X = 3+26*(K = 81):GOSUB 1000
240 X = 4+26*(K = 81):GOTO 340
250 VTAB 18:HTAB 19:INVERSE:PRINT "GO!":NORMAL
260 K = PEEK(-16384)-128:IF K < 0 THEN 260
270 GOSUB 2000:IF K <> 80 AND K <> 81 THEN 260
280 GOSUB 3000:P = 3+2*(K = 81)+INT(RND(1)*2)
290 X = 4+26*(K = 80):T$ = LEFT$(LIS,3)
300 FOR L = 1 TO 6:VTAB 10+L:HTAB 15
310 B$ = LEFT$(M$(L),P)+T$+MID$(M$(L),P+1)
320 GOSUB 4000:NEXT L
330 VTAB 18:HTAB 19:PRINT T$
340 VTAB 19:PRINT TAB(X);"WINNER!"
350 POKE -16368,0:END
1000 FOR L = 1 TO 6:VTAB 10+L:B$ = M$(L)
1010 PRINT TAB(X);:GOSUB 4000:PRINT:NEXT L
1020 PRINT:RETURN
2000 K = K-32*(K > 96)*(K < 123):RETURN
3000 FOR L = 1 TO 6:VTAB 10+L:PRINT TAB(16);LIS
3010 NEXT L:RETURN
4000 FOR J = 1 TO LEN(B$):Z$ = MID$(B$,J,1)
4010 IF Z$ = SP$ THEN PRINT SP$;:GOTO 4030
4020 INVERSE:PRINT SP$;:NORMAL
4030 NEXT J:RETURN

```

Atari 400/800, 600/800XL, & 130XE/Wishbone

```

10 DIM B$(54),LIS(10):GRAPHICS 0
20 POKE 752,1:OPEN #1,4,0,"K:"
30 B$=CHR$(32):B$(54)=CHR$(54):B$(2)=B$:LIS=B$
40 FOR L=1 TO 7:READ T:B$(T)=CHR$(160):NEXT L
50 B$(37)=CHR$(153):B$(45)=CHR$(25)
60 B$(46)=CHR$(124):B$(54)=CHR$(124)
70 PRINT CHR$(125);:X=15:GOSUB 1000
80 POSITION 0,16:PRINT "PRESS <Q> KEY."
90 POSITION 26,16:PRINT "PRESS <P> KEY."
100 K=0:FOR L=1 TO 7+RND(0)*7
110 POSITION 15,16:PRINT "GET READY!"
120 FOR D=1 TO 10+RND(1)*10:IF PEEK(764)=255 THEN 140
130 GET #1,K:D=20:L=14
140 NEXT D:POSITION 15,16:PRINT LIS
150 IF K<>0 THEN 190
160 FOR D=1 TO 3:IF PEEK(764)=255 THEN 180
170 GET #1,K:D=3:L=14
180 NEXT D
190 NEXT L:IF K<>0 THEN 230
200 FOR D=1 TO 20+RND(0)*20:IF PEEK(764)=255 THEN 220
210 GET #1,K:D=40
220 NEXT D:IF K=0 THEN 260
230 GOSUB 2000:IF K<>80 AND K<>81 THEN 100
240 GOSUB 3000:X=2+26*(K=81):GOSUB 1000
250 X=3+26*(K=81):GOTO 330
260 POSITION 18,16:PRINT "GO!"
270 GET #1,K
280 GOSUB 2000:IF K<>80 AND K<>81 THEN 270
290 GOSUB 3000:P=3+2*(K=81)+INT(RND(0)*2)
300 X=4+26*(K=80)
310 FOR L=0 TO 5:S=L*9+1:POSITION 14,9+L
320 PRINT B$(S,S+P-1);LIS(1,3);B$(S+P,S+8):NEXT L
330 POSITION 18,16:PRINT LIS(1,3)
340 POSITION X,17:PRINT "WINNER!"
350 POKE 764,255:POKE 752,0:END
1000 POKE 82,X:POKE 83,X+8:POSITION X,9:PRINT B$
1010 POKE 82,2:POKE 83,39:PRINT:RETURN
2000 K=K-32*(K>96)*(K<123):RETURN
3000 FOR L=9 TO 14:POSITION 15,L:PRINT LIS
3010 NEXT L:RETURN
4000 DATA 5,13,15,21,25,29,35

```

Commodore 64 & 128 (C 64 mode)/Wishbone

```

10 DIM M$(6):PRINT CHR$(147);
20 SP$=CHR$(32):AS=CHR$(18)+SP$+CHR$(146)
30 LIS=SP$:FOR L=2 TO 10:LIS=LIS+SP$:NEXT L
40 M$(1)=LEFT$(LIS,4)+AS:FOR L=2 TO 4
50 M$(L)=LEFT$(LIS,5-L)+AS+LEFT$(LIS,2*L-3)+AS
60 NEXT L:M$(5)=CHR$(182)+LEFT$(LIS,7)+CHR$(181)
70 M$(6)=M$(5):X=15:GOSUB 1000
80 PRINT "PRESS <P> KEY.":SPC(12);"PRESS <Q> KEY"
89 REM --PUT "." INTO MEMORY LOCATION 1783--
90 POKE 1783,46:FOR L=1 TO 8+RND(1)*8
100 POKE 214,17:PRINT:PRINT TAB(15);"GET READY!"
110 FOR D=1 TO 80+RND(1)*80:NEXT D
120 POKE 214,17:PRINT:PRINT TAB(15);LIS
130 GET K$:IF K$<>" " THEN L=16:GOTO 150
140 FOR D=1 TO 8:NEXT D
150 NEXT L:IF K$<>" " THEN 180
160 FOR D=1 TO 150+RND(1)*150:NEXT D
170 GET K$:IF K$=" " THEN 210
180 IF K$<>"P" AND K$<>"Q" THEN 90
190 GOSUB 2000:X=3-26*(K$="Q")
200 GOSUB 1000:X=4-26*(K$="Q"):GOTO 320
210 POKE 214,17:PRINT
220 PRINT TAB(18);CHR$(25);"GO!";CHR$(154)
230 GET K$:IF K$=" " THEN 230
240 IF K$<>"P" AND K$<>"Q" THEN 230
250 GOSUB 2000:P=3-2*(K$="Q")+INT(RND(1)*2)
260 X=4-26*(K$="P"):T$=LEFT$(LIS,3)

```



```

270 POKE 214,10:PRINT:FOR L=1 TO 6:BR=P
280 IF L<5 THEN BR=P-2*(P+L>5)-2*(L=2)*(P=6)
290 PRINT TAB(14);LEFT$(M$(L),BR);T$;MID$(M$(L),BR+1)
300 NEXT L
310 POKE 214,17:PRINT:PRINT TAB(18);T$
320 POKE 214,18:PRINT:PRINT TAB(X);"WINNER!"
330 GET K$:IF K$<>"" THEN 330
340 END
1000 FOR L=1 TO 6:POKE 214,9+L:PRINT
1010 PRINT TAB(X);M$(L):NEXT L:PRINT:RETURN
2000 FOR L=1 TO 6:POKE 214,9+L:PRINT
2010 PRINT TAB(15);L$:NEXT L:RETURN

```

IBM PC & compatibles/Wishbone

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome Printer Card, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. It should also work on many other PC compatibles.

```

10 DIM M$(6):KEY OFF:WIDTH 40:LOCATE ,0:CLS
20 AS=CHR$(219):BS=CHR$(179)
30 M$(1)=STRING$(4,32)+AS:FOR L=2 TO 4
40 M$(L)=STRING$(5-L,32)+AS+STRING$(2*L-3,32)+AS
50 NEXT L:M$(5)=CHR$(222)+STRING$(7,32)+CHR$(221)
60 M$(6)=BS+STRING$(7,32)+BS:T$=STRING$(3,32)
70 COLOR 2:X=16:GOSUB 1000
80 PRINT "PRESS <Q> KEY.":SPC(12);"PRESS <P> KEY."
90 FOR L=1 TO 10+RND*9
100 LOCATE 18,16:PRINT "GET READY!"
110 FOR D=1 TO 50+RND*50:NEXT D
120 LOCATE 18,16:PRINT STRING$(10,32)
130 K$=INKEY$:IF K$<>"" THEN L=19:GOTO 150
140 FOR D=1 TO 10:NEXT D
150 NEXT L:IF K$<>"" THEN 180
160 FOR D=1 TO 200+RND*200:NEXT D
170 K$=INKEY$:IF K$="" THEN 210

```

```

180 GOSUB 2000:IF K<>80 AND K<>81 THEN 90
190 GOSUB 3000:X=3-26*(K=81):GOSUB 1000
200 X=4-26*(K=81):GOTO 280
210 COLOR 12:LOCATE 18,19:PRINT "GO!":COLOR 2
220 K$=INKEY$:IF K$="" THEN 220
230 GOSUB 2000:IF K<>80 AND K<>81 THEN 220
240 GOSUB 3000:P=3-26*(K=81)+INT(RND*2)
250 X=4-26*(K=80)
260 FOR L=1 TO 6:LOCATE 10+L,15
270 PRINT LEFT$(M$(L),P);T$;MID$(M$(L),P+1):NEXT L
280 LOCATE 18,19:PRINT T$
290 LOCATE 19,X:PRINT "WINNER!"
300 IF INKEY$<>"" THEN 300 ELSE END
1000 FOR L=1 TO 6:LOCATE 10+L,X:PRINT M$(L):NEXT L
1010 PRINT:RETURN
2000 K=ASC(K$):K=K-32*(K>96)*(K<123):RETURN
3000 FOR L=1 TO 6:LOCATE 10+L,16:PRINT STRING$(9,32)
3010 NEXT L:RETURN

```

Tandy Color Computer/Wishbone

```

10 CLEAR 1000:CLS:DIM M$(6)
20 AS=CHR$(175):SP$=CHR$(32):LIS=SP$
30 FOR L=2 TO 14:LIS=LIS+SP$:NEXT L
40 M$(1)=LEFT$(LIS,4)+AS:FOR L=2 TO 4
50 M$(L)=LEFT$(LIS,5-L)+AS+LEFT$(LIS,2*L-3)+AS
60 NEXT L:M$(5)=AS+LEFT$(LIS,7)+AS
70 M$(6)=M$(5):X=11:GOSUB 1000
80 PRINT@352,"PRESS <Q>":LIS="PRESS <P>";
90 FOR L=1 TO 6+RND(6):PRINT@363,"GET READY!";
100 FOR D=1 TO 20+RND(20)
110 K$=INKEY$:IF K$<>"" THEN D=40:L=12
120 NEXT D:PRINT@363,LEFT$(LIS,10);
130 IF K$<>"" THEN 160
140 FOR D=1 TO 5:K$=INKEY$:IF K$<>"" THEN D=5:L=12
150 NEXT D

```

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resource today. In fact, if you can't find what you need in Coda, chances are it doesn't exist.

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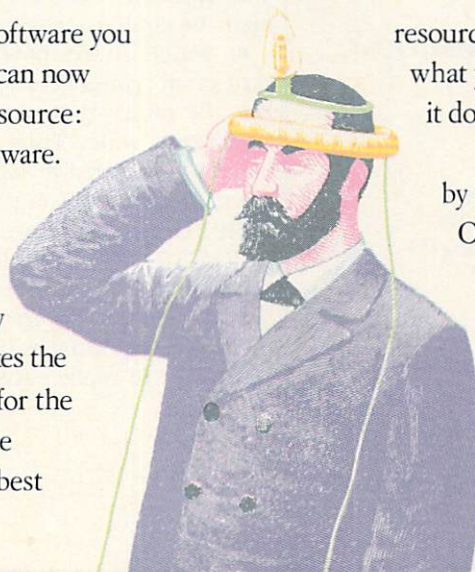
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Elsewhere call collect 1-507-451-3010.



THANKSGIVING PROGRAM

```

160 NEXT L:IF K<>" THEN 200
170 FOR D=1 TO 40+RND(40)
180 K$=INKEY$:IF K$<>" THEN D=80
190 NEXT D:IF K$="" THEN 230
200 GOSUB 2000:IF K<>80 AND K<>81 THEN 90
210 GOSUB 3000:X=-23*(K=81):GOSUB 1000
220 X=1-23*(K=81):GOTO 320
230 PRINT@366,"GO!";
240 K$=INKEY$:IF K$="" THEN 240
250 GOSUB 2000:IF K<>80 AND K<>81 THEN 240
260 GOSUB 3000:P=3-2*(K=81)+INT(RND(0)*2)
270 X=1-23*(K=80):T$=LEFT$(L$,3)
280 FOR L=1 TO 6
290 PRINT@106+32*L,LEFT$(M$(L),P);T$;MID$(M$(L),P+1)
300 NEXT L
310 PRINT@366,T$;
320 PRINT@384+X,"WINNER!"
330 IF INKEY$<>" THEN 330 ELSE END
1000 FOR L=1 TO 6
1010 PRINT@96+32*L+X,M$(L):NEXT L:RETURN
2000 K=ASC(K$):K=K-32*(K>96)*(K<123):RETURN
3000 FOR L=1 TO 6:PRINT@96+32*L+11,LEFT$(L$,9)
3010 NEXT L:RETURN

```

Tandy Models III & 4 (Model III mode)/Wishbone

```

10 CLEAR 1000:CLS:DIM M$(6)
20 A$=CHR$(191):B$=STRING$(12,32)
30 M$(1)=STRING$(4,32)+A$:FOR L=2 TO 4
40 M$(L)=STRING$(5-L,32)+A$+STRING$(2*L-3,32)+A$
50 NEXT L:M$(5)=CHR$(170)+STRING$(7,32)+CHR$(149)
60 M$(6)=M$(5):X=26:GOSUB 1000
70 PRINT@713,"PRESS <Q> KEY.":STRING$(16,32);"PRESS <P>
> KEY."
80 FOR L=1 TO 7+RND(7):PRINT@730,"GET READY!";
90 FOR D=1 TO 10+RND(10):K$=INKEY$
100 IF K$<>" THEN D=20:L=14
110 NEXT D:PRINT@730,STRING$(10,32);
120 IF K$<>" THEN 150
130 FOR D=1 TO 5:K$=INKEY$:IF K$<>" THEN D=5:L=14
140 NEXT D
150 NEXT L:IF K$<>" THEN 190
160 FOR D=1 TO 25+RND(25)
170 K$=INKEY$:IF K$<>" THEN D=50
180 NEXT D:IF K$="" THEN 220
190 GOSUB 2000:IF K<>80 AND K<>81 THEN 80
200 GOSUB 3000:X=11-30*(K=81):GOSUB 1000
210 X=12-30*(K=81):GOTO 310
220 PRINT@733,"GO!";
230 K$=INKEY$:IF K$="" THEN 230
240 GOSUB 2000:IF K<>80 AND K<>81 THEN 230
250 GOSUB 3000:P=3-2*(K=81)+INT(RND(0)*2)
260 X=11-30*(K=80):T$=STRING$(3,32)
270 FOR L=1 TO 6
280 PRINT@217+64*L,LEFT$(M$(L),P);T$;MID$(M$(L),P+1)
290 NEXT L
300 PRINT@733,T$;
310 PRINT@768+X,"WINNER!"
320 IF INKEY$<>" THEN 320 ELSE END
1000 FOR L=1 TO 6
1010 PRINT@192+64*L+X,M$(L):NEXT L:RETURN
2000 K=ASC(K$):K=K-32*(K>96)*(K<123):RETURN
3000 FOR L=1 TO 6:PRINT@218+64*L,STRING$(9,32)
3010 NEXT L:RETURN

```

VIC-20/Wishbone

```

10 DIM M$(6):PRINT CHR$(147);
20 SP$=CHR$(32):A$=CHR$(18)+SP$+CHR$(146)
30 L$=SP$:FOR L=2 TO 10:L$=L$+SP$:NEXT L
40 M$(1)=LEFT$(L$,4)+A$:FOR L=2 TO 4
50 M$(L)=LEFT$(L$,5-L)+A$+LEFT$(L$,2*L-3)+A$
60 NEXT L:M$(5)=CHR$(182)+LEFT$(L$,7)+CHR$(181)
70 M$(6)=M$(5):X=7:GOSUB 1000

```

```

80 PRINT TAB(4);"PRESS";SPC(5);"PRESS"
90 PRINT TAB(4);"<Q>";SPC(7);"<P>"
100 PRINT TAB(4);"KLY.":SPC(6);"KEY."
110 FOR L=1 TO 8+RND(1)*8
120 POKE 214,17:PRINT:PRINT TAB(7);"GET READY!"
130 FOR D=1 TO 120+RND(1)*120:NEXT D
140 POKE 214,17:PRINT:PRINT TAB(7);L$
150 GET K$:IF K$<>" THEN L=16:GOTO 170
160 FOR D=1 TO 8:NEXT D
170 NEXT L:IF K$<>" THEN 200
180 FOR D=1 TO 200+RND(1)*200:NEXT D
190 GET K$:IF K$="" THEN 230
200 IF K$<>"P" AND K$<>"Q" THEN 110
210 GOSUB 2000:X=2-10*(K$="Q")
220 GOSUB 1000:X=3-10*(K$="Q"):GOTO 340
230 POKE 214,17:PRINT
240 PRINT TAB(10);CHR$(28);"GO!";CHR$(31)
250 GET K$:IF K$="" THEN 250
260 IF K$<>"P" AND K$<>"Q" THEN 250
270 GOSUB 2000:P=3-2*(K$="Q")+INT(RND(1)*2)
280 X=4-10*(K$="P"):T$=LEFT$(L$,3)
290 POKE 214,6:PRINT:FOR L=1 TO 6:BR=P
300 IF L<5 THEN BR=P-2*(P+L>5)-2*(L=2)*(P=6)
310 PRINT TAB(5);LEFT$(M$(L),BR);T$;MID$(M$(L),BR+1)
320 NEXT L
330 POKE 214,17:PRINT:PRINT TAB(10);T$
340 POKE 214,17:PRINT:PRINT TAB(X);"WINNER!"
350 GET K$:IF K$<>" THEN 350
360 END
1000 FOR L=1 TO 6:POKE 214,5+L:PRINT
1010 PRINT TAB(X);M$(L):NEXT L:PRINT:RETURN
2000 FOR L=1 TO 6:POKE 214,5+L:PRINT
2010 PRINT TAB(6);L$:NEXT L:RETURN

```

TIPS TO THE TYPIST

1. Read instructions and program headings carefully.
2. Don't let fatigue and boredom contribute to inaccuracy. If you're new to programming, type in a longer program in easy stages, saving each installment as you go.
3. Assume that every character in a program listing must be copied accurately if a program is to work.
4. Watch out for potential trouble spots. About 90 percent of all typing errors occur in DATA statements.
5. Be aware that our program listings are printed 54 characters wide. Thus, a single BASIC program "line" (sometimes called a "logical line") may appear as several lines in our listing. If you are typing along and reach the right margin of the printed listing, don't press RETURN or ENTER before checking to see if the program "line" you're typing really ends there.
6. To correct an error in a BASIC program line, type the line in again from the beginning, and press RETURN or ENTER to replace the old line.

DOORS

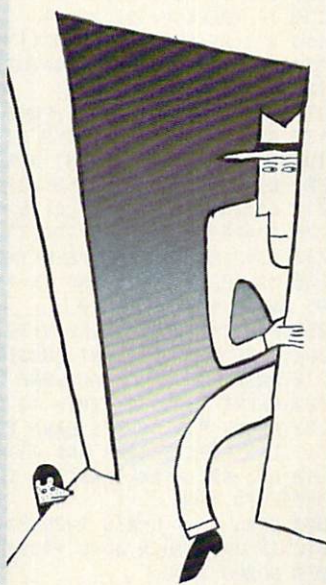
This Fast-Action Arcade/Strategy Game Is a Real Shocker!

BY JOEY LATIMER

When the D.A. handed you the job, you knew it wouldn't be easy to find evidence proving that giant Geothermal, Inc. is fronting for an international spy ring. To get the evidence, you knew you had to go to the source: Geothermal Headquarters itself. Getting there was easy—the trouble began when you tried to get inside.

Telling the robot at the front gate that you had a search warrant got the engine ripped out of your car. So you took what you thought was the path of least resistance and entered the building by crawling through an air-conditioning vent. So far, so good, but when you tried getting past the alarm system, you blew it. The wrong wires touched together, and everything went fireworks. Now you're trapped in Geothermal Headquarters: a three-story building where killer security droids pace the halls, doors open and close without warning, electrified walls and furniture surround you, and booby-traps appear out of nowhere. The only way to get out is via the elevator, but you need to find a special pass-key before you can leave the building. You also have to find the evidence you came for, or you'll lose your job.

Luckily, even without the key, the elevator can take you from floor to floor. Enter and leave the elevator through its door in the south wall (bottom). When you're on a floor, you can move around using the joystick. To search an object such as a desk, bookshelf, table, or wastebasket, stand



close to the object's left- or right-hand side, press the fire button, and push the joystick in the object's direction. If you find something, it'll be shown at the bottom of the screen. You can return to a given floor at any time, so don't hesitate to make for the elevator, even if you haven't searched a floor completely.

The furniture and walls are electrified, so don't run into them. For the same reason, don't get too close when searching an object. You're wearing rubber gloves, but if you touch the object with anything other than your fingers or forearm, you can wind up vaporized!

Although there's no time limit when playing *Doors*, once you've mastered the game, it's fun to find the key and evidence and make your escape in the shortest possible time. The elevator clock will tell you how long you've been in the building. If you make it out alive, your total time will be displayed. (If you don't, the D.A. insists you'll never work again—an understatement if I ever heard one!)

Commodore 64 & 128 (C 64 mode)/Doors

```

10 POKE 52,128:POKE 56,128:CLR
20 DR=49369:M=34808:RT=49165:SB=33792
30 SL=51152:V=53248:D1=SL+11:D2=SL+12
40 DL=4030:DX=SL:DY=SL+1:SI=V+16
50 DIM CM$(4),D%(3,3,2),DC$(2),F%(6,2,3)
60 DIM B$(20,3),S$(20),XY(7)
70 POKE 56576,(PEEK(56576) AND 252) OR 1
80 POKE 648,132
90 FOR I=V+30 TO V+33:POKE I,0:NEXT I:POKE V+21,0
100 PRINT CHR$(147);CHR$(158)
110 PRINT "PLEASE WAIT WHILE I SET UP ";
120 BL$=CHR$(32):FOR I=1 TO 17:BL$=BL$+CHR$(32)
130 NEXT I:FA$=CHR$(125)+LEFT$(BL$,3)
140 FB$=LEFT$(BL$,3)+CHR$(125)
150 FOR I=1 TO 6:READ F:F%(I,1,1)=F:F%(I,1,2)=F
160 F%(I,1,3)=F:NEXT I:FOR I=0 TO 4
170 READ CM$(I):NEXT I
180 D$(0)="" :FOR I=1 TO 2:FOR J=1 TO 7
190 GOSUB 2000:DC$(I)=DC$(I)+CHR$(D)
200 NEXT J,I:FOR I=1 TO 3:FOR J=1 TO 3
210 GOSUB 2000:D%(I,J,1)=D:GOSUB 2000:D%(I,J,2)=D
220 NEXT J,I:FOR I=32768 TO 32831:GOSUB 2000:POKE I,D
230 POKE I+64,D:POKE I+128,D:NEXT I
240 FOR I=32880 TO 32895:GOSUB 2000:POKE I,D:NEXT I
250 FOR I=32944 TO 32959:GOSUB 2000:POKE I,D:NEXT I
260 FOR I=32960 TO 33151:IF I>33127 THEN D=0:GOTO 280
270 GOSUB 2000
280 POKE I,D:NEXT I
290 POKE M,0:POKE M+1,5:POKE M+2,5:POKE M+3,5
300 FOR I=1 TO 20:GOSUB 2000:S$(I)=D:NEXT I
310 FOR H=1 TO 3:FOR I=0 TO 20
320 IF H>1 AND (I<4 OR I>16) THEN B$(I,H)=B$(I,1):GOTO 370
330 GOSUB 2000:K=D
340 FOR J=1 TO K:GOSUB 2000:X=D:GOSUB 2000:Y=D
350 FOR N=1 TO Y:B$(I,H)=B$(I,H)+CHR$(S$(X))
360 NEXT N,J
370 NEXT I,H
380 FOR I=0 TO 7:GOSUB 2000:XY(I)=D:NEXT I
390 FOR I=49700 TO 49710:GOSUB 2000:POKE I,D:NEXT I
400 FOR I=49165 TO 49611:GOSUB 2000:IF D=2 THEN D=208
410 IF D=99 THEN D=2
420 POKE I,D:NEXT I:GOSUB 2000
430 FOR H=1 TO 3:FOR J=1 TO 6:F%(J,2,H)=0:NEXT J,H
440 FOR I=1 TO 4:IF I=1 THEN J=1:GOTO 460
450 J=INT(RND(1)*3)+1
460 K=INT(RND(1)*6)+1
470 IF F%(K,2,J)=0 THEN F%(K,2,J)=I:GOTO 490
480 GOTO 450
490 NEXT I
500 TIS$="000000":F1=0:F2=0:F3=0
510 POKE V+33,0:POKE V+32,0:POKE V+39,7
520 POKE V,168:POKE V+1,190:POKE V+21,1
530 POKE M,0:PRINT CHR$(147);CHR$(159);CHR$(142)
540 PRINT:PRINT "YOU ARE IN THE ELEVATOR."
550 PRINT:PRINT "PLEASE SELECT A FLOOR:":PRINT
560 PRINT"<M>AIN EXIT"
570 PRINT"<1> SUBLEVEL 1":PRINT"<2> SUBLEVEL 2"
580 PRINT"<3> SUBLEVEL 3":PRINT
590 GET K$:POKE 214,16:PRINT
600 PRINT TAB(25);"TIME: ";TIS$
610 IF (PEEK(56320) AND 16)=0 THEN FR=1:GOTO 770
620 IF K$="" THEN 590
630 IF K$<>"M" THEN 760
640 IF F3 THEN 670
650 POKE 214,12:PRINT:PRINT "YOU DON'T HAVE THE KEY."
660 GOTO 590
670 IF F2 THEN 700
680 POKE 214,12:PRINT
690 PRINT "YOU DON'T HAVE THE EVIDENCE.":GOTO 590
700 ENS=TIS$:PRINT CHR$(147);CHR$(142);CHR$(154)
710 FOR I=1 TO 100:POKE V+33,INT(RND(1)*10)
720 PRINT "CONGRATULATIONS! ";:NEXT I:POKE V+33,0
730 PRINT:PRINT

```


ARCADE GAME

```

740 PRINT "YOU MADE IT IN A TIME OF ";EN$;"!"
750 PRINT:PRINT:GOTO 1280
760 FR=VAL(K$):IF FR<1 OR FR>3 THEN 590
770 FOR I=0 TO 7:POKE V+I,XY(I):POKE SL+I,XY(I)
780 NEXT I
790 IF F1 THEN FOR I=2 TO 7:POKE V+I,XY(I):POKE SL+I,XY(I):NEXT I:F1=0
800 POKE V+21,0:POKE V+31,0:POKE V+30,0:POKE SI,0
810 CR=152+FR:IF CR=155 THEN CR=156
820 FOR I=40 TO 42:POKE V+I,FR+3:NEXT I
830 PRINT CHR$(19);CHR$(147);CHR$(14);
840 FOR I=0 TO 20:PRINT CHR$(CR);
850 IF I>4 AND I<16 THEN PRINT FA$;BS(I,FR);FB$;:GOTO 870
860 PRINT BS(I,FR);
870 NEXT I:PRINT CHR$(211);"UBLEVEL";FR:POKE V+21,15
880 POKE V+30,0:POKE V+31,0:SYS RT:SYS DR
890 IF (PEEK(V+30) AND 1)=1 THEN 1200
900 SYS DR:SYS DR:IF PEEK(M)<3 THEN 1130
910 IF PEEK(V+31) AND 1<>1 THEN 1140
920 SYS DR:SYS DR:PD=PEEK(DX)
930 IF (PEEK(V+16) AND 1)=1 THEN PD=PD+255
940 RO=INT((PEEK(DY)-50)/8)+1:IF PEEK(M)=4 THEN CO=INT((PD-24)/8):GOTO 960
950 CO=INT((PD-24)/8)+3
960 Y=PEEK(SB+CO+40*RO):SYS DR:SYS DR
970 IF Y=32 THEN 1130
980 I=1
990 IF Y=F%(I,1,FR) THEN 1020
1000 SYS DR:I=I+1:IF I=7 THEN 1200
1010 GOTO 990
1020 SYS DR:SYS DR:POKE 214,22:PRINT:PRINT TAB(13);BL$
1030 SYS DR:POKE 214,22:PRINT:PRINT TAB(13);
1040 SYS DR:PRINT CHR$(201);"T'S ";CM$(F%(I,2,FR));
1050 SYS RT:IF PEEK(M)>2 THEN 1050
1060 SYS DR:SYS DR:POKE 214,22:PRINT:PRINT TAB(13);BL$
1070 SYS DR:POKE V+31,0

```

```

1080 IF F%(I,2,FR)<>1 THEN 1100
1090 F1=1:FR=INT(RND(1)*2)+2:GOTO 790
1100 SYS DR:IF F%(I,2,FR)=2 THEN F2=1
1110 SYS DR:IF F%(I,2,FR)=3 THEN F3=1
1120 SYS DR:F%(I,2,FR)=0:GOTO 1140
1130 IF (PEEK(V+31) AND 1)=1 THEN 1200
1140 SYS RT:SYS DR:IF RND(1)<.95 THEN 880
1150 Z=INT(RND(1)*3)+1:Q=INT(RND(1)*3)
1160 SYS RT:SYS DR
1170 POKE D2,D%(FR,Z,2):POKE D1,D%(FR,Z,1)
1180 SYS 49700:SYS RT:SYS DR
1190 SYS RT:SYS DR:PRINT DC$(Q):GOTO 880
1200 RO=INT((PEEK(DY)-50)/8)+2
1210 CO=INT((PEEK(DX)-24)/8)+1:T=(SB+CO+40*RO)
1220 G1=PEEK(T-1):G2=PEEK(T)
1230 G3=PEEK(T+1):G4=PEEK(T+40)
1240 IF (PEEK(V+31) AND 1)=1 AND (G1=95 OR G2=95 OR G3=95 OR G4=95) THEN 510
1250 FOR I=1 TO 50:POKE V+39,INT(RND(1)*15)+1:NEXT I
1260 POKE V+21,0:PRINT CHR$(147);CHR$(142)
1270 PRINT "SORRY, YOU WERE ";CHR$(18);"VAPORIZED!"
1280 PRINT "PRESS <FIRE> TO PLAY AGAIN,"
1290 PRINT "OR <SPACE BAR> TO QUIT."
1300 IF (PEEK(56320) AND 16)=0 THEN 430
1310 GET AS:IF AS=CHR$(32) THEN GOSUB 3000:END
1320 GOTO 1300
2000 READ D:IF D<256 THEN 2040
2010 IF CK=D THEN DL=DL+10:PRINT ". ";:GOTO 2000
2020 GOSUB 3000
2030 PRINT:PRINT "DATA ERROR IN LINE ";DL:STOP
2040 CK=CK+D:RETURN
3000 POKE 56576,(PEEK(56576) OR 3)
3010 POKE 648,4:PRINT CHR$(147);CHR$(154);CHR$(142)
3020 POKE V+32,14:POKE V+33,6:RETURN
4000 DATA 35,105,94,102,233,160
4010 DATA NOTHING.,A TRAPDOOR!,THE EVIDENCE!
4020 DATA THE KEY!,DIRTY SOCKS.

```

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4030 DATA 161,17,157,161,17,157,161,32,17,157,1037
 4040 DATA 32,17,157,32,34,5,17,13,31,12,17,5,17,1426
 4050 DATA 13,21,13,12,5,16,12,28,5,0,127,0,0,127,1805
 4060 DATA 0,1,255,192,0,128,128,1,182,192,1,128,3013
 4070 DATA 192,0,201,128,0,99,0,1,255,192,2,0,32,4115
 4080 DATA 2,227,160,2,162,160,2,162,160,2,162,5316
 4090 DATA 160,3,162,224,2,34,32,2,62,32,0,34,0,6063
 4100 DATA 0,34,0,1,227,192,0,0,0,0,0,62,32,1,226,6838
 4110 DATA 0,0,2,0,0,3,192,0,0,0,0,2,62,0,0,35,7134
 4120 DATA 192,0,32,0,1,224,0,0,0,0,0,0,127,0,0,7710
 4130 DATA 127,0,1,255,192,0,128,128,1,182,192,8916
 4140 DATA 1,128,192,0,201,128,0,99,0,1,255,255,10176
 4150 DATA 2,0,36,2,227,252,2,162,0,2,162,0,2,162,11187
 4160 DATA 0,3,162,0,3,162,0,3,162,0,3,162,0,3,11520
 4170 DATA 0,1,227,192,0,0,0,0,0,127,0,0,127,0,12194
 4180 DATA 1,255,192,0,128,128,1,182,192,1,128,13402
 4190 DATA 192,0,201,128,0,99,0,255,255,192,36,14760
 4200 DATA 0,32,63,227,160,0,34,160,0,34,160,0,15630
 4210 DATA 34,160,0,34,224,0,34,32,0,62,32,0,34,16276
 4220 DATA 0,0,34,0,1,227,192,0,0,0,0,0,254,0,1,16985
 4230 DATA 255,0,3,147,128,3,147,128,1,255,0,0,18052
 4240 DATA 198,0,0,108,0,0,56,0,0,56,0,124,0,18594
 4250 DATA 0,254,0,1,131,0,0,198,0,0,125,96,32,19431
 4260 DATA 18,146,176,173,189,174,127,166,171,179,20950
 4270 DATA 126,166,177,118,35,169,178,3,6,1,2,38,21969
 4280 DATA 9,1,3,1,1,3,38,1,1,3,1,1,3,38,1,1,3,22078
 4290 DATA 1,1,3,38,1,1,9,6,1,2,8,20,1,2,4,3,3,22182
 4300 DATA 6,1,2,12,9,1,3,1,6,1,1,3,8,1,1,3,7,1,22249
 4310 DATA 1,3,14,13,1,1,4,1,3,2,5,1,3,6,1,1,3,22312
 4320 DATA 1,11,1,3,5,1,1,3,1,14,2,3,11,13,1,1,22384
 4330 DATA 4,1,3,2,5,1,3,6,4,1,19,1,5,1,3,7,1,1,22452
 4340 DATA 3,1,14,2,3,11,15,1,1,4,1,3,2,5,1,3,6,22528
 4350 DATA 4,1,19,1,5,1,3,7,1,1,3,1,14,2,3,9,1,22604
 4360 DATA 1,3,1,13,1,1,4,1,3,2,5,1,3,6,4,1,19,22673
 4370 DATA 1,5,1,3,7,1,1,3,12,1,1,3,1,15,1,1,4,22734
 4380 DATA 1,3,2,5,1,3,6,4,1,19,1,5,1,3,7,12,1,22809
 4390 DATA 2,9,20,1,2,2,8,1,3,1,15,1,1,4,1,3,2,22885

4400 DATA 5,1,3,6,1,1,3,7,1,1,4,1,3,2,5,1,19,1,22950
 4410 DATA 3,6,1,1,3,4,12,1,1,3,8,7,1,2,3,9,1,3,23019
 4420 DATA 3,1,1,4,1,3,2,5,1,19,1,3,11,9,1,1,18,23103
 4430 DATA 1,3,15,1,1,4,1,3,2,5,1,19,1,3,11,8,1,23183
 4440 DATA 1,3,16,1,1,4,1,3,2,5,1,19,1,3,11,10,23265
 4450 DATA 1,1,3,16,1,1,4,1,3,2,5,1,19,1,3,6,1,23334
 4460 DATA 1,3,4,10,7,1,2,12,8,1,3,3,7,1,2,3,3,23405
 4470 DATA 3,2,3,8,1,3,4,3,1,1,3,38,1,1,3,1,1,3,23485
 4480 DATA 38,1,1,3,1,1,3,38,1,1,5,7,1,2,15,10,23613
 4490 DATA 7,2,16,8,1,7,6,1,2,12,9,1,3,6,1,2,23700
 4500 DATA 13,9,1,14,1,1,3,1,4,1,3,2,5,1,3,13,1,23776
 4510 DATA 1,3,9,19,1,4,1,3,2,5,1,3,1,1,1,14,1,23846
 4520 DATA 1,3,1,4,1,3,2,5,1,3,13,1,1,3,9,19,1,23917
 4530 DATA 4,1,3,2,5,1,3,1,1,1,14,1,1,1,1,4,1,3,23967
 4540 DATA 2,5,1,3,13,1,1,3,9,19,1,4,1,3,2,5,1,24041
 4550 DATA 3,1,1,1,17,1,1,3,1,4,1,3,2,5,1,3,9,1,24099
 4560 DATA 1,3,3,1,1,18,1,3,8,19,1,4,1,3,2,5,1,24174
 4570 DATA 3,1,1,1,7,1,1,3,12,1,1,3,3,1,1,3,13,24230
 4580 DATA 1,1,11,12,1,2,5,3,3,2,4,13,1,3,3,12,24307
 4590 DATA 1,2,4,3,3,2,6,13,1,9,1,1,3,12,1,1,3,24373
 4600 DATA 3,1,1,3,8,14,4,3,1,1,16,1,1,3,1,4,24439
 4610 DATA 1,3,2,19,1,5,1,3,6,11,1,3,1,1,1,3,24504
 4620 DATA 1,1,3,10,14,2,3,1,1,1,10,1,1,3,1,4,1,24562
 4630 DATA 3,2,19,1,5,1,3,23,14,2,3,1,1,1,10,1,24652
 4640 DATA 1,3,1,4,1,3,2,19,1,5,1,3,23,14,2,3,1,24739
 4650 DATA 1,1,10,1,1,3,1,4,1,3,2,19,1,5,1,3,23,24819
 4660 DATA 14,2,3,1,1,1,7,7,1,2,12,8,1,3,3,7,1,24893
 4670 DATA 2,13,8,1,13,6,1,2,7,9,1,3,3,6,1,2,1,24972
 4680 DATA 3,3,2,3,9,1,3,3,6,1,2,6,9,1,9,1,1,18,25053
 4690 DATA 1,3,10,1,1,3,7,1,1,3,9,11,1,1,1,7,1,25115
 4700 DATA 1,3,11,1,1,3,7,1,1,3,10,1,1,7,1,1,3,25171
 4710 DATA 11,1,1,3,7,1,1,3,10,1,1,11,1,1,3,7,1,25235
 4720 DATA 1,3,3,1,1,3,7,1,1,3,3,1,1,3,6,1,1,11,25286
 4730 DATA 1,1,3,7,7,1,2,3,13,1,3,7,12,1,2,3,8,25361
 4740 DATA 1,3,6,1,1,8,1,1,3,11,1,1,3,7,1,1,15,25426
 4750 DATA 1,3,9,1,1,22,1,1,3,1,4,1,3,2,19,1,5,25504

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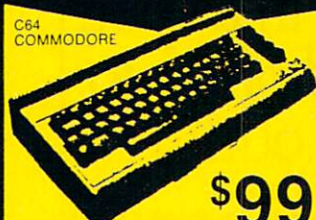
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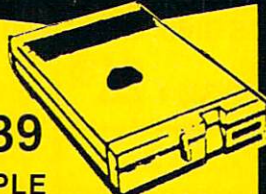
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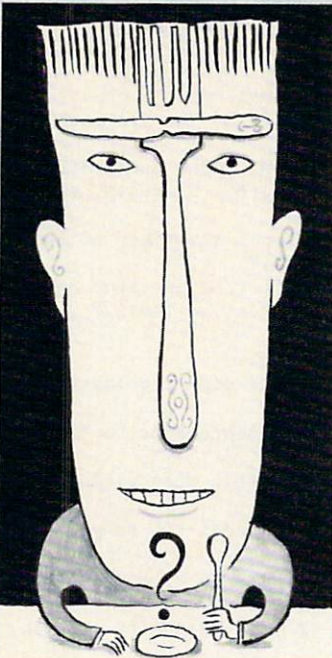


4760 DATA 1,3,7,1,1,3,4,4,1,3,2,5,1,3,1,1,1,15,25561
4770 DATA 1,3,5,19,1,4,1,3,2,5,1,3,1,1,1,19,1,25632
4780 DATA 1,3,1,4,1,3,2,19,1,5,1,3,12,4,1,3,2,25698
4790 DATA 5,1,3,1,1,1,3,6,19,1,4,1,3,2,5,1,3,1,25759
4800 DATA 1,1,19,1,1,3,1,4,1,3,2,19,1,5,1,3,12,25837
4810 DATA 4,1,3,2,5,1,3,1,1,1,3,6,19,1,4,1,3,2,25898
4820 DATA 5,1,3,1,1,1,19,1,1,3,1,4,1,3,2,19,1,25965
4830 DATA 5,1,3,12,4,1,3,2,5,1,3,1,1,1,3,6,19,26036
4840 DATA 1,4,1,3,2,5,1,3,1,1,1,7,1,1,3,11,1,1,26084
4850 DATA 3,7,1,1,3,10,1,1,9,7,1,2,11,16,1,2,1,26161
4860 DATA 3,3,2,3,16,1,2,10,8,1,168,190,48,70,26686
4870 DATA 174,164,251,198,174,220,199,172,219,28457
4880 DATA 199,24,32,240,255,96,173,2,199,141,0,29818
4890 DATA 2,173,209,199,141,1,2,173,0,220,160,31098
4900 DATA 0,162,0,74,176,1,136,74,176,1,200,74,32172
4910 DATA 176,1,202,74,176,1,232,74,142,217,199,33666
4920 DATA 140,218,199,176,43,173,217,199,201,1,35233
4930 DATA 2,16,169,3,141,248,135,169,0,141,218,199,39611
4940 DATA 199,141,217,199,76,214,192,201,255,2,38171
4950 DATA 16,169,4,141,248,135,169,0,141,218,199,39611
4960 DATA 141,217,199,76,214,192,173,217,199,2,41241
4970 DATA 13,173,218,199,2,8,169,0,141,248,135,42547
4980 DATA 76,214,192,173,219,199,2,13,169,1,141,43946
4990 DATA 219,199,169,1,141,248,135,76,146,192,45472
5000 DATA 169,0,141,219,199,169,99,141,248,135,46992
5010 DATA 173,217,199,201,255,2,206,2,199,76,48528
5020 DATA 166,192,201,1,2,3,238,2,199,173,218,49923
5030 DATA 199,201,255,2,6,206,209,199,76,186,192,51654
5040 DATA 201,1,2,3,238,209,199,173,2,199,2,11,52894
5050 DATA 173,16,2,9,1,141,16,2,76,214,192,201,53937
5060 DATA 255,2,8,173,16,2,41,12,141,16,2,76,217,54898
5070 DATA 192,173,210,199,141,99,2,173,211,199,56497
5080 DATA 141,3,2,173,212,199,141,4,2,173,213,57760
5090 DATA 199,141,5,2,173,214,199,141,6,2,173,59015
5100 DATA 215,199,141,7,2,173,211,199,201,70,2,60435
5110 DATA 6,238,210,199,76,17,193,201,184,2,3,61764
5120 DATA 206,210,199,173,210,199,201,40,2,6,206,63416
5130 DATA 211,199,76,37,193,201,164,2,3,238,211,64951
5140 DATA 199,173,213,199,201,70,2,9,238,212,199,66666
5150 DATA 32,144,193,76,63,193,201,184,2,6,206,67966
5160 DATA 212,199,32,144,193,173,212,199,201,174,69705
5170 DATA 2,6,206,213,199,76,83,193,201,52,2,3,70941
5180 DATA 238,213,199,173,215,199,201,198,2,9,72588
5190 DATA 238,214,199,32,175,193,76,109,193,201,74218
5200 DATA 56,2,6,206,214,199,32,175,193,173,214,75688
5210 DATA 199,201,66,2,13,173,16,2,41,8,240,6,76655
5220 DATA 206,215,199,76,143,193,201,24,2,10,173,78097
5230 DATA 16,2,41,8,2,3,238,215,199,96,173,212,79302
5240 DATA 199,2,11,173,16,2,9,100,141,16,2,76,80049
5250 DATA 203,193,201,255,2,39,173,16,2,41,233,81407
5260 DATA 141,16,2,76,203,193,173,214,199,2,11,82637
5270 DATA 173,16,2,9,232,141,16,2,76,203,193,201,83901
5280 DATA 255,2,8,173,16,2,41,101,141,16,2,96,84754,0

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NUTRITION

BY KAREN KANE AND STEVEN C.M. CHEN



"In the face of nutritional ignorance, myths and downright quackery have gained a strong foothold," says Jane Brody, nutrition columnist for *The New York Times* in *Jane Brody's Nutrition Book* (Bantam Books, 1982). The book offers a no-nonsense approach to sound nutrition and suggests that people be aware of "nutritional hogwash."

November is "Good Nutrition Month," which is intended to make people aware of the sound nutritional principles and foods that promote healthier and longer lives.

Nutrition is the second program in FAMILY COMPUTING'S Health and Safety Series.

IBM PC & compatibles (80-column version)/Nutrition

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome/Printer Card, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/128K RAM, 80-column monitor, and Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. (IBM PCjr owners with 64K RAM should use the 40-column version.) It should also work on many other PC compatibles.

```
10 READ IC,QC,FF,CC,EC
20 DIM AS(QC),CMS(CC),EMS(EC),FMS(QC),IMS(IC),QMS(QC)
30 CT=0:SPS=CHR$(32):READ TTS
40 SW=80:KEY OFF
50 FOR L=1 TO IC:READ IMS(L):NEXT L
60 FOR L=1 TO QC:READ QMS(L),AS(L)
70 IF AS(L)="F" AND FF THEN READ FMS(L)
```

To help celebrate good nutrition, try this month's health and safety quiz to test how much you really know about some basic nutrition principles.

Nutrition presents 12 questions that address some general food facts. Respond to each question by pressing the "T" (true) or "F" (false) key. A counter keeps track of the number of correct responses and presents your score when the program is completed. Be sure to retake the quiz if you do not answer all 12 questions correctly. And once you do get a perfect score, investigate further. There are many more interesting facts about the nutritive value of food and how the human body reacts to the foods we eat.

If you typed in last month's *Fire Safety* quiz, you need only delete the DATA statements (lines 8000-9230 for IBM PC, Apple, Tandy Color Computer, Macintosh, and Model III versions; and lines 8000-9500 for Atari and C 64 versions) and replace them with the new DATA statements. We have also added versions for the TI-99/4A and Adam computers.

If you're interested in developing an improved diet that is more healthful, but still practical for your lifestyle, our Nutrition program may be a place to start.

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HEALTH AND SAFETY QUIZ

```

80 NEXT L:FOR L=1 TO CC:READ C$(L):NEXT L
90 READ R$:FOR L=1 TO EC:READ E$(L):NEXT L
100 GOSUB 1000:IF IC>1 THEN PF=-1 ELSE PF=0
110 C=1:M$=I$(1):GOSUB 2000:GOSUB 3000
120 FOR L=1 TO QC:GOSUB 1000:M$=Q$(L)
130 GOSUB 2000:PRINT:PRINT "<T>true or <F>false? ";
140 GOSUB 5000:IF K$<>"T" AND K$<>"F" THEN 140
150 PRINT K$:PRINT:PRINT:PRINT
160 IF K$=A$(L) THEN M$=C$(INT(RND*CC)+1):GOSUB 6000:
CT=CT+1:GOTO 200
170 PRINT "Sorry, the correct answer is ";A$(L);"."
180 FOR S=1 TO 3:SOUND 500,6:SOUND 800,5:NEXT S
190 IF A$(L)="F" AND FF THEN PRINT:M$=F$(L):GOSUB 200
0
200 GOSUB 3000:NEXT L:CLS
210 PRINT "You had";CT;"correct out of";STR$(QC);"."
220 PRINT:IF CT=QC THEN M$=R$:GOSUB 2000:END
230 FOR L=1 TO EC:M$=E$(L):GOSUB 2000:NEXT L
240 PRINT:PRINT "Would you like to try again?";
250 GOSUB 5000:IF K$<>"Y" AND K$<>"N" THEN 250
260 IF K$="Y" THEN CT=0:GOTO 100 ELSE END
1000 CLS:COLOR 0,12:LOCATE 1,(SW-LEN(TT$))/2
1010 PRINT TT$:COLOR 2,0:PRINT:RETURN
2000 IF LEN(M$)>SW THEN 2040
2010 IF NOT PF THEN N$=M$:GOSUB 4000:RETURN
2020 C=C+1:M$=M$+SP$+SP$+I$(C):IF C=IC THEN PF=0
2030 GOTO 2000
2040 Y=SW+1:Z=1:FOR X=Y TO 2 STEP -1
2050 IF MID$(M$,X,1)=SP$ THEN Z=0:Y=X:X=2
2060 NEXT X:N$=LEFT$(M$,Y-1):GOSUB 4000
2070 M$=RIGHT$(M$,LEN(M$)-Y+Z):GOTO 2000
3000 M$="PRESS <SPACE BAR> TO CONTINUE."
3010 LOCATE 23,1:GOSUB 6000
3020 IF INKEY$<>" " THEN 3020 ELSE RETURN
4000 IF LEN(N$)=SW THEN PRINT N$;:RETURN
4010 PRINT N$:RETURN
5000 K$=INKEY$:IF K$="" THEN 5000
5010 K=ASC(K$):K$=CHR$(K-(K>96)*(K<123)*32):RETURN

```

```

6000 PRINT TAB((SW-LEN(M$))/2);M$:RETURN
8000 DATA 3,12,-1,4,1,NUTRITION
9000 DATA NUTRITION is a True/False quiz that tests yo
ur knowledge of basic food facts.
9010 DATA "The more you know about foods and their nut
rients, the more likely you are to practice good nutri
tion."
9020 DATA Answer the following questions by pressing <
T> if the statement is true or <F> if the statement is
not true.
9030 DATA "1. The four basic food groups are meats, fr
uits and vegetables, bread and cereal products, and da
irly products.",T
9040 DATA 2. It is important to get a variety of foods
from each food group every day.,T
9050 DATA 3. Milk provides more nutritive value per se
rving than any other naturally existing food.,T
9060 DATA 4. Sugar is a fat.,F
9070 DATA Sugar is a carbohydrate.
9080 DATA 5. Carbohydrates are the body's primary sour
ce of energy.,T
9090 DATA 6. Cooking a fresh vegetable adds to its nut
ritional value.,F
9100 DATA Uncooked vegetables contain more vitamins th
an cooked vegetables.
9110 DATA 7. It is not possible to get too many vitam
ins.,F
9120 DATA "Fat-soluble vitamins (A, D, E, and K) can b
uild up to toxic levels if taken in excess."
9130 DATA 8. A calorie is a unit of measuring energy.,
T
9140 DATA 9. One hundred calories from an apple has th
e same fuel value as 100 calories of peanut butter.,T
9150 DATA 10. Skipping breakfast is a good way to cut
calories.,F
9160 DATA Breakfast is the most important meal of the
day.
9170 DATA 11. Protein is the most important component
of the human diet.,F
9180 DATA "Water is. We need about one liter for ever
y 1,000 calories we eat."
9190 DATA "12. Vitamin D, necessary for strong bones a
nd teeth, can be depleted from exposure to the sun.",F
9200 DATA Sunlight is one of our main sources of vitam
in D.
9210 DATA Fantastic!,Good Thinking!,Great!,Wonderful!
9220 DATA You have an excellent sense of good nutritio
n!
9230 DATA You could stand to learn a little more about
nutrition.


```

Apple II series/Nutrition

```

10 READ IC,QC,FF,CC,EC
20 DIM A$(QC),C$(CC),E$(EC),F$(QC),I$(IC),Q$(QC)
30 SW = 40
40 CT = 0:SP$ = CHR$(32)
50 READ TT$:FOR L = 1 TO IC:READ I$(L):NEXT L
60 FOR L = 1 TO QC:READ Q$(L),A$(L)
70 IF A$(L) = "F" AND FF THEN READ F$(L)
80 NEXT L:FOR L = 1 TO CC:READ C$(L):NEXT L
90 READ R$:FOR L = 1 TO EC:READ E$(L):NEXT L
100 GOSUB 1000:PF = 0:IF IC > 1 THEN PF = 1
110 C = 1:M$ = I$(1):GOSUB 2000:GOSUB 3000
120 FOR L = 1 TO QC:GOSUB 1000:M$ = Q$(L)
130 GOSUB 2000:PRINT:PRINT "<T>TRUE OR <F>FALSE? ";
140 GOSUB 5000:IF K$ <> "T" AND K$ <> "F" THEN 140
150 PRINT K$:PRINT:PRINT:PRINT
160 IF K$ = A$(L) THEN M$ = C$(INT(RND(1)*CC)+1):GOSU
B 6000:CT = CT+1:GOTO 210
170 PRINT "SORRY, THE CORRECT ANSWER IS ";A$(L);"."
180 FOR S = 1 TO 3:PRINT CHR$(7);:FOR D = 1 TO 20
190 NEXT D:PRINT CHR$(7);:NEXT S
200 IF A$(L) = "F" AND FF THEN PRINT:M$ = F$(L):GOSUB
2000

```



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```

210 GOSUB 3000:NEXT L:HOME
220 PRINT "YOU HAD ";CT;" CORRECT OUT OF ";QC;"."
230 PRINT:IF CT = QC THEN MS = RMS:GOSUB 2000:END
240 FOR L = 1 TO EC:MS = EMS(L):GOSUB 2000:NEXT L
250 PRINT:PRINT "WOULD YOU LIKE TO TRY AGAIN? ";
260 GOSUB 5000:IF K$ <> "Y" AND K$ <> "N" THEN 260
270 IF K$ = "Y" THEN CT = 0:GOTO 100
280 END
1000 HOME:INVERSE:HTAB (SW-LEN(TT$))/2
1010 PRINT TT$:NORMAL:PRINT:RETURN
2000 IF LEN(MS) > SW THEN 2050
2010 IF NOT PF THEN NS = MS:GOSUB 4000:RETURN
2020 C = C+1:MS = MS+SP$+SP$+IMS(C)
2030 IF C = IC THEN PF = 0
2040 GOTO 2000
2050 Y = SW+1:Z = 1:FOR X = Y TO 2 STEP -1
2060 IF MID$(MS,X,1) = SP$ THEN Z = 0:Y = X:X = 2
2070 NEXT X:NS = LEFT$(MS,Y-1):GOSUB 4000
2080 MS = RIGHT$(MS,LEN(MS)-Y+Z):GOTO 2000
3000 MS = "PRESS <SPACE BAR> TO CONTINUE."
3010 VTAB 23:HTAB 1:GOSUB 6000
3020 GOSUB 5000:ON K <> 32 GOTO 3020:RETURN
4000 IF LEN(NS) = SW THEN PRINT NS:RETURN
4010 PRINT NS:RETURN
5000 GET K$:K = ASC(K$):IF K = 3 THEN PRINT:END
5010 K$ = CHR$(K-(K > 96)*(K < 123)*32):RETURN
6000 PRINT TAB((SW-LEN(MS))/2);MS:RETURN

```

After you have typed in the above lines, add the DATA statements (lines 8000-9230) from the IBM PC 80-column version.

Atari 400/800, 600/800XL, & 130XE/Nutrition

```

10 READ IC,QC,FF,CC,EC,SL
20 DIM A$(QC),CMS(C$(SL)),EMS(EC*SL),FMS(QC*SL)
30 DIM IMS(IC*SL),K$(1),MS(SL),NS(SL),Q$(1)
40 DIM QMS(QC*SL),RMS(SL),SP$(1),TT$(40),X$(SL)
50 DIM Y$(SL),Z$(SL)
60 SS=PEEK(82):POKE 82,0:OPEN #1,4,0,"K:"
70 CT=0:SP$=CHR$(32):Q$=CHR$(34):READ TT$
80 FOR L=1 TO IC:GOSUB 1000:IMS(SL*SL+1)=X$:NEXT L
90 FOR L=1 TO QC:GOSUB 1000
100 QMS(L*SL+1)=X$:READ X$:A$(L,L)=X$
110 IF A$(L,L)="F" AND FF THEN GOSUB 1000:FMS(L*SL+1)=X$
120 NEXT L:FOR L=1 TO CC:GOSUB 1000
130 CMS(L*SL+1)=X$:NEXT L:READ RMS
140 FOR L=1 TO EC:GOSUB 1000:EMS(L*SL+1)=X$:NEXT L
150 GOSUB 2000:PF=0:IF IC>1 THEN PF=-1
160 C=1:MS=IMS(1,ASC(IMS(SL))):GOSUB 3000:GOSUB 4000
170 FOR L=1 TO QC:GOSUB 2000
180 MS=QMS(L*SL+1,L*SL-(SL-ASC(QMS(L*SL))))
190 GOSUB 3000:PRINT:PRINT "<T>true or <F>alse? ";
200 GOSUB 6000:IF K$<>"T" AND K$<>"F" THEN 200
210 PRINT K$:PRINT:PRINT:PRINT
220 IF K$=A$(L,L) THEN X=INT(RND(0)*CC)+1:MS=CMS(X*SL+1,X*SL-(SL-ASC(CMS(X*SL)))):GOSUB 7000:CT=CT+1:GOTO 260
230 PRINT "Sorry, the correct answer is ";A$(L,L);"."
240 FOR S=15 TO 0 STEP -1:SOUND 1,10,12,S:NEXT S
250 IF A$(L,L)="F" AND FF THEN PRINT:MS=FMS(L*SL+1,L*SL-(SL-ASC(FMS(L*SL)))):GOSUB 3000
260 GOSUB 4000:NEXT L:PRINT CHR$(125);
270 PRINT "You had ";CT;" correct out of ";STR$(QC);"."
280 PRINT:IF CT=QC THEN MS=RMS:GOSUB 3000:END
290 FOR L=1 TO EC:MS=EMS(L*SL+1,L*SL-(SL-ASC(EMS(L*SL)))):GOSUB 3000:NEXT L
300 PRINT:PRINT "Would you like to try again?";
310 GOSUB 6000:IF K$<>"Y" AND K$<>"N" THEN 310
320 IF K$="Y" THEN CT=0:GOTO 150
330 POKE 82,SS:END
1000 Y$="":F=0

```

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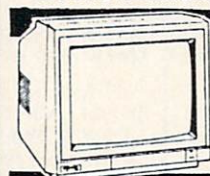
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```

1010 READ X$:LX=LEN(X$):LY=LEN(Y$):YS(LEN(Y$)+1)=X$
1020 IF X$(1,1)=Q$ THEN X$=Y$(2+LY):Y$(LY+1)=X$:F=1:IF
Y$(LEN(Y$))<>Q$ THEN Y$(LEN(Y$)+1)=",":GOTO 1010
1030 IF F AND Y$(LEN(Y$))=Q$ THEN Y$=Y$(1,LEN(Y$)-1):G
OTO 1050
1040 IF F THEN Y$(LEN(Y$)+1)=",":GOTO 1010
1050 IF Y$(LEN(Y$))="+" THEN Y$=Y$(1,LEN(Y$)-1):F=0:G
OTO 1010
1060 X$=Y$:X$(SL)=CHR$(LEN(Y$)):RETURN
2000 GRAPHICS 0:POSITION (40-LEN(TTS))/2-1,0
2010 PRINT TTS:PRINT:RETURN
3000 IF LEN(M$)>40 THEN 3060
3010 IF NOT PF THEN N$=M$:GOSUB 5000:RETURN
3020 C=C+1:X=LEN(M$):M$(X+1)=SP$:M$(X+2)=SP$
3030 M$(X+3)=IM$(C*SL-SL+1,C*SL-(SL-ASC(IM$(C*SL))))
3040 IF C=IC THEN TH=PF=0
3050 GOTO 3000
3060 Y=41:Z=1:FOR X=Y TO 2 STEP -1
3070 IF M$(X,X)=SP$ THEN Z=0:Y=X:X=2
3080 NEXT X:N$=M$(1,Y-1):GOSUB 5000
3090 M$=M$(Y+1):GOTO 3000
4000 M$="PRESS <SPACE BAR> TO CONTINUE."
4010 POSITION 0,22:POKE 752,1:GOSUB 7000:POKE 752,0
4020 GET #1,INKEY:IF INKEY<>32 THEN 4020
4030 RETURN
5000 IF LEN(N$)=40 THEN PRINT N$:RETURN
5010 PRINT N$:RETURN
6000 GET #1,K
6010 K$=CHR$(K-(K>96)*(K<123)*32):RETURN
7000 POKE 85,(40-LEN(M$))/2:PRINT M$:RETURN
8000 DATA 2,12,-1,4,1,255,NUTRITION
9000 DATA NUTRITION IS A TRUE/FALSE QUIZ THAT TESTS +
9010 DATA YOUR KNOWLEDGE OF BASIC FOOD FACTS.
9020 DATA THE MORE YOU KNOW ABOUT FOODS AND THEIR +
9030 DATA "NUTRIENTS, THE MORE LIKELY YOU ARE TO +"
9040 DATA PRACTICE GOOD NUTRITION. ANSWER THE +
9050 DATA FOLLOWING QUESTIONS BY PRESSING <T> IF THE +
9060 DATA STATEMENT IS TRUE OR <F> IF THE STATEMENT +

```

```

9070 DATA IS NOT TRUE.
9080 DATA "1. THE FOUR BASIC FOOD GROUPS ARE MEATS, +"
9090 DATA "FRUITS AND VEGETABLES, BREAD AND CEREAL +"
9100 DATA "PRODUCTS, AND DAIRY PRODUCTS.",T
9110 DATA 2. IT IS IMPORTANT TO GET A VARIETY OF +
9120 DATA FOODS FROM EACH FOOD GROUP EVERY DAY.,T
9130 DATA 3. MILK PROVIDES MORE NUTRITIVE VALUE PER +
9140 DATA SERVING THAN ANY OTHER NATURALLY EXISTING +
9150 DATA FOOD.,T
9160 DATA 4. SUGAR IS A FAT.,F
9170 DATA SUGAR IS A CARBOHYDRATE.
9180 DATA 5. CARBOHYDRATES ARE THE BODY'S PRIMARY +
9190 DATA SOURCE OF ENERGY.,T
9200 DATA 6. COOKING A FRESH VEGETABLE ADDS TO ITS +
9210 DATA NUTRITIONAL VALUE.,F
9220 DATA UNCOOKED VEGETABLES CONTAIN MORE VITAMINS +
9230 DATA THAN COOKED VEGETABLES.
9240 DATA 7. IT IS NOT POSSIBLE TO GET TOO MANY +
9250 DATA VITAMINS.,F
9260 DATA "FAT-SOLUBLE VITAMINS (A, D, E, AND K) CAN +"
9270 DATA BUILD UP TO TOXIC LEVELS IF TAKEN IN +
9280 DATA EXCESS.
9290 DATA 8. A CALORIE IS A UNIT OF MEASURING +
9300 DATA ENERGY.,T
9310 DATA 9. ONE HUNDRED CALORIES FROM AN APPLE HAS +
9320 DATA THE SAME FUEL VALUE AS 100 CALORIES OF +
9330 DATA PEANUT BUTTER.,T
9340 DATA 10. SKIPPING BREAKFAST IS A GOOD WAY TO +
9350 DATA CUT CALORIES.,F
9360 DATA BREAKFAST IS THE MOST IMPORTANT MEAL OF +
9370 DATA THE DAY.
9380 DATA 11. PROTEIN IS THE MOST IMPORTANT +
9390 DATA COMPONENT OF THE HUMAN DIET.,F
9400 DATA WATER IS. WE NEED ABOUT ONE LITER FOR +
9410 DATA "EVERY 1,000 CALORIES WE EAT."
9420 DATA "12. VITAMIN D, NECESSARY FOR STRONG +"
9430 DATA "BONES AND TEETH, CAN BE DEPLETED FROM +"
9440 DATA EXPOSURE TO THE SUN.,F

```

CIRCLE READER SERVICE 39

CIRCLE READER SERVICE 22

CIRCLE READER SERVICE 77

9450 DATA SUNLIGHT IS ONE OF OUR MAIN SOURCES OF +
 9460 DATA VITAMIN D.
 9470 DATA FANTASTIC!,GOOD THINKING!,GREAT!,WONDERFUL!
 9480 DATA YOU HAVE AN EXCELLENT SENSE OF GOOD NUTRITION!
 9490 DATA YOU COULD STAND TO LEARN A LITTLE +
 9500 DATA MORE ABOUT NUTRITION.

Commodore 64 & 128 (C 64 mode)/Nutrition

```
10 READ IC,QC,FF,CC,EC
20 DIM A$(QC),CMS(CC),EMS(EC),FMS(QC),IMS(IC),QMS(QC)
30 CT=0:SPS=CHRS(32)
40 READ TTS:FOR L=1 TO IC:GOSUB 1000:IMS(L)=XS:NEXT L
50 FOR L=1 TO QC:GOSUB 1000:QMS(L)=XS
60 GOSUB 1000:AS(L)=XS
70 IF A$(L)="F" AND FF THEN GOSUB 1000:FMS(L)=XS
80 NEXT L:FOR L=1 TO CC:READ CMS(L):NEXT L
90 GOSUB 1000:RMS=XS
100 FOR L=1 TO EC:GOSUB 1000:EMS(L)=XS:NEXT L
110 GOSUB 2000:PF=0:IF IC>1 THEN PF=-1:GOTO 120
120 C=1:MS=IMS(1):GOSUB 3000:GOSUB 4000
130 FOR L=1 TO QC:GOSUB 2000:MS=QMS(L)
140 GOSUB 3000:PRINT " <T>RUE OR <F>ALSE? ";
150 GOSUB 6000:IF K$<>"T" AND K$<>"F" THEN 150
160 PRINT K$:PRINT:PRINT
170 IF K$=A$(L) THEN MS=CMS((RND(1)*CC)+1):PRINT:GOSUB
7000:CT=CT+1:GOTO 200
180 PRINT "SORRY, THE CORRECT ANSWER IS ";A$(L);"."
190 IF A$(L)="F" AND FF THEN PRINT:MS=FMS(L):GOSUB 300
0
200 GOSUB 4000:NEXT L:PRINT CHR$(147);
210 PRINT "YOU HAD";CT;"CORRECT OUT OF ";STR$(QC);"."
220 PRINT:IF CT=QC THEN MS=RMS:GOSUB 3000:END
230 FOR L=1 TO EC:MS=EMS(L):GOSUB 3000:NEXT L
240 PRINT:PRINT "WOULD YOU LIKE TO TRY AGAIN?";
```

```
250 GOSUB 6000:IF K$<>"Y" AND K$<>"N" THEN 250
260 IF K$="Y" THEN CT=0:GOTO 110
270 END
1000 XS=""
1010 READ SS:IF RIGHTS(SS,1)="+ " THEN XS=XS+LEFT$(SS,L
EN(SS)-1):GOTO 1010
1020 XS=XS+SS:RETURN
2000 PRINT CHR$(147);CHRS(5);TAB(20-LEN(TTS)/2);TTS
2010 PRINT CHR$(154):RETURN
3000 IF LEN(MS)>40 THEN 3040
3010 IF NOT PF THEN NS=MS:GOSUB 5000:RETURN
3020 C=C+1:MS=MS+SPS+SPS+IMS(C):IF C=IC THEN PF=0
3030 GOTO 3000
3040 Y=41:Z=1:FOR X=Y TO 2 STEP -1
3050 IF MIDS(MS,X,1)=SPS THEN Z=0:Y=X:X=2
3060 NEXT X:NS=LEFT$(MS,Y-1):GOSUB 5000
3070 MS=RIGHT$(MS,LEN(MS)-Y+Z):GOTO 3000
4000 MS="PRESS <SPACE BAR> TO CONTINUE."
4010 POKE 214,22:PRINT:GOSUB 7000
4020 GET K$:IF K$<>SPS THEN 4020
4030 RETURN
5000 IF LEN(NS)=40 THEN PRINT NS:RETURN
5010 PRINT NS:RETURN
6000 GET K$:IF K$="" THEN 6000
6010 K=ASC(K$):K$=CHRS(K-(K/96)*(K/123)*32):RETURN
7000 PRINT TAB(20-LEN(MS)/2);MS:RETURN
```

After you have typed in the above lines, add the DATA statements (lines 8000-9500) from the Atari version.

Tandy Color Computer/Nutrition

```
10 CLEAR 3000:READ IC,QC,FF,CC,EC
20 DIM A$(QC),CMS(CC),EMS(EC),FMS(QC),IMS(IC),QMS(QC)
30 SW=32
40 CT=0:SPS=CHRS(32)
50 READ TTS:FOR L=1 TO IC:READ IMS(L):NEXT L
60 FOR L=1 TO QC:READ QMS(L),A$(L)
```

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```

70 IF A$(L)="F" AND FF THEN READ FMS(L)
80 NEXT L:FOR L=1 TO CC:READ CMS(L):NEXT L
90 READ RMS:FOR L=1 TO EC:READ EMS(L):NEXT L
100 GOSUB 1000:IF IC>1 THEN PF=-1 ELSE PF=0
110 C=1:M$=IMS(1):GOSUB 2000:GOSUB 3000
120 FOR L=1 TO QC:GOSUB 1000:M$=QMS(L)
130 GOSUB 2000:PRINT:PRINT "<T>RUE OR <F>ALSE? ";
140 GOSUB 5000:IF K$<>"T" AND K$<>"F" THEN 140
150 PRINT K$:PRINT
160 IF K$=A$(L) THEN M$=CMS(RND(CC)):GOSUB 6000:CT=CT
+1:GOTO 200
170 PRINT "SORRY, THE CORRECT ANSWER IS ";A$(L);"."
180 FOR S=1 TO 3:SOUND 150,3:SOUND 100,2:NEXT S
190 IF A$(L)="F" AND FF THEN PRINT:M$=FMS(L):GOSUB 20
00
200 GOSUB 3000:NEXT L:CLS
210 PRINT "YOU HAD";CT;"CORRECT OUT OF";STR$(QC);"."
220 PRINT:IF CT=QC THEN M$=RMS:GOSUB 2000:END
230 FOR L=1 TO EC:M$=EMS(L):GOSUB 2000:NEXT L
240 PRINT:PRINT "WOULD YOU LIKE TO TRY AGAIN?";
250 GOSUB 5000:IF K$<>"Y" AND K$<>"N" THEN 250
260 IF K$="Y" THEN CT=0:GOTO 100 ELSE END
1000 CLS:PRINT$(SW-LEN(TTS))/2,TTS:RETURN
2000 IF LEN(M$)>SW THEN 2040
2010 IF NOT PF THEN N$=M$:GOSUB 4000:RETURN
2020 C=C+1:M$=M$+SP$+SP$+IMS(C):IF C=IC THEN PF=0
2030 GOTO 2000
2040 Y=SW+1:Z=1:FOR X=Y TO 2 STEP -1
2050 IF MID$(M$,X,1)=SP$ THEN Z=0:Y=X:X=2
2060 NEXT X:N$=LEFT$(M$,Y-1):GOSUB 4000
2070 M$=RIGHT$(M$,LEN(M$)-Y+Z):GOTO 2000
3000 M$="PRESS <SPACE BAR> TO CONTINUE."
3010 PRINT$(SW+15,"");GOSUB 6000
3020 K$=INKEY$:IF K$<>SP$ THEN 3020 ELSE RETURN
4000 IF LEN(N$)=SW THEN PRINT N$;RETURN
4010 PRINT N$:RETURN
5000 K$=INKEY$:IF K$="" THEN 5000
5010 K=ASC(K$):K$=CHR$(K-(K>96)*(K<123)*32):RETURN
6000 PRINT TAB((SW-LEN(M$))/2);M$;RETURN

```

After you have typed in the above lines, add the DATA statements (lines 8000-9230) from the IBM PC 80-column version.

TI-99/4A w/TI Extended BASIC/Nutrition

```

10 DIM A$(12),CMS(4),EMS(1),FMS(12),IMS(3),QMS(12)
20 READ IC,QC,FF,CC,EC
30 CT=0 :: SP$=CHR$(32):: READ TTS
40 SW=28
50 FOR L=1 TO IC :: READ IMS(L):: NEXT L
60 FOR L=1 TO QC :: READ QMS(L),A$(L)
70 IF A$(L)="F" AND FF THEN READ FMS(L)
80 NEXT L :: FOR L=1 TO CC :: READ CMS(L):: NEXT L
90 READ RMS :: FOR L=1 TO EC :: READ EMS(L):: NEXT L
100 GOSUB 1000 :: IF IC>1 THEN PF=-1 ELSE PF=0
110 C=1 :: M$=IMS(1):: GOSUB 2000 :: GOSUB 3000
120 FOR L=1 TO QC :: GOSUB 1000 :: M$=QMS(L)
130 GOSUB 2000 :: PRINT :: PRINT "<T>true or <F>alse? "
;
140 GOSUB 5000 :: IF K$<>"T" AND K$<>"F" THEN 140
150 PRINT K$ :: PRINT :: PRINT :: PRINT
160 IF K$=A$(L) THEN M$=CMS(INT(RND*CC)+1):: GOSUB 6000
:: CT=CT+1 :: GOTO 200
170 PRINT "Sorry, the correct answer is ";A$(L);"."
180 FOR S=1 TO 3 :: CALL SOUND(200,300,3):: CALL SOUND
(200,600,3):: NEXT S
190 IF A$(L)="F" AND FF THEN PRINT :: M$=FMS(L):: GOSU
B 2000
200 GOSUB 3000 :: NEXT L :: CALL CLEAR
210 PRINT "You had";CT;"correct out of ";STR$(QC);"."
220 PRINT :: IF CT=QC THEN M$=RMS :: GOSUB 2000 :: END
230 FOR L=1 TO EC :: M$=EMS(L):: GOSUB 2000 :: NEXT L
240 PRINT :: PRINT "Would you like to try again?";
250 GOSUB 5000 :: IF K$<>"Y" AND K$<>"N" THEN 250
260 IF K$="Y" THEN CT=0 :: GOTO 100 ELSE END

```

```

1000 CALL CLEAR :: M$=TTS :: GOSUB 6000
1010 PRINT :: PRINT :: RETURN
2000 IF LEN(M$)>SW THEN 2040
2010 IF NOT PF THEN N$=M$ :: GOSUB 4000 :: RETURN
2020 C=C+1 :: M$=M$+SP$+SP$+IMS(C):: IF C=IC THEN PF=0
2030 GOTO 2000
2040 Y=SW+1 :: Z=1 :: FOR X=Y TO 2 STEP -1
2050 IF SEG$(M$,X,1)=SP$ THEN Z=0 :: Y=X :: X=2
2060 NEXT X :: N$=SEG$(M$,1,Y-1):: GOSUB 4000
2070 M$=SEG$(M$,Y-Z+1,LEN(M$)):: GOTO 2000
3000 M$="Press <SPACE BAR>."
3010 PRINT :: PRINT :: GOSUB 6000
3020 CALL KEY(3,K,S):: IF K>32 THEN 3020 ELSE RETURN
4000 IF LEN(N$)=SW THEN PRINT N$;:: RETURN
4010 PRINT N$ :: RETURN
5000 CALL KEY(3,K,S):: IF S=0 THEN 5000
5010 K$=CHR$(K):: RETURN
6000 PRINT TAB((SW-LEN(M$))/2);M$ :: RETURN

```

After you have typed in the above lines, add the DATA statements (lines 8000-9230) from the IBM PC 80-column version.

MODIFICATIONS FOR OTHER COMPUTERS

Adam/Nutrition

Use the Apple version, except change line 30 to read as follows:

```
30 SW=31
```

IBM PC & compatibles (40-column version)/Nutrition

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/ColorGraphics Monitor Adapter, w/Disk BASIC D2.00 or Advanced BASIC A2.00, IBM PCjr w/Cartridge BASIC J1.00, Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. It should also work on many other PC compatibles.

Use the IBM PC 80-column version, except change line 40 to read as follows:

```
40 SW=40:KEY OFF
```

Macintosh w/Microsoft BASIC 2.0 or 2.1/Nutrition

Use the IBM PC 80-column version, except change lines 40, 1000, and 1010 to read as follows:

```

40 SW=84:CALL TEXTFONT(4):CALL TEXTSIZE(9):WINDOW 1,TT
$,0,38)-(527,338):WIDTH 85
1000 CLS:PRINT
1010 RETURN

```

Tandy Models III & 4 (Model III mode)/Nutrition

Use the Color Computer version with the following alteration. Delete line 180. Also, change line 30 to read as follows:

```
30 SW=64
```




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This Month!!

GAME STRATEGY, page 108
MICROTONES, page 112
CONTEST, page 114

Sing Along
with Musical
Round Page 112

Edited by Bernadette Grey

K-POWER

FOR THE COMPUTER GENERATION

How Computers Have Changed Your Life



These K-POWER Readers Responded to the "How Computers Have Changed My Life Contest" in the July Issue—and Won!!!

From top: Daniel Abbey, Jean Goldstein, Jessica Grilli, and Richard Savacool

needed someone who did. I quickly volunteered. When teaching the other students in our eighth-grade computer club how to program, we ran into a few technical difficulties. With the help of the trusty old BASIC manual, we were able to resolve most of them. Anyway, I know he appreciated my help, because at our school's awards ceremony, he presented me with a plaque for my assistance."—RICHARD SAVACOO, 14, Nichols, New York.

RUNNERS-UP (WON \$10 EACH)

"My Daddy thought that I should send this letter and tell you how the computer has affected my life. I'm only 2 years old, but I have already begun to use the computer. I have two programs of my own. Daddy thinks they're educational but I think they're fun. Mommy and Daddy both use the computer for business, teaching chores, and they also play games. I think the computer has helped me because I can say my numbers up to 15. I can also say my alphabet."—DANIEL ABBEY, 2, Sanford, Michigan

"After reading about computers being used in rehabilitation programs for brain-damaged patients, I thought that certain computer programs could also be beneficial for geriatric patients. Following some investigation, I decided to buy a Commodore 64, a disk drive, and an Okimate 10 color printer. With the addition of a variety of software, I have conducted many successful activities for the elderly residents in the nursing home where I am employed as a nurse. Owning a computer has also changed my home and volunteer life, since I use it for typing reports, creating files, and de-

signing flyers, cards, and certificates."—JEAN GOLDSTEIN, 58, Norwood, Massachusetts

"I never learned to play a musical instrument, although music has always been a joy to me. It takes years to learn how to play a piano or violin, and I don't have the time to learn. However, with my first computer (TI-99/4A), I learned all of the parameters of music and started composing my own songs. This continued with the Atari 600XL and 800XL. Now I can compose classical music or even church hymns. Two years ago, I couldn't play a melody on a violin. With the computer, I can have three and four instruments playing in harmony and counterpoint!"—TOM SIMMONS, 49, Sarasota, Florida.

"Computers have changed my life by letting me get extra credit in school and extra money at home. At school, I typed reports and helped a class of kindergarten children learn how to use a computer. I played lots of educational games with them. At home, I have typed and designed graphics for relatives and friends. I have taught my mom and brother how to use our computer. I have even created some games of my own."—JESSICA GRILLI, 12, San Ramon, California.

"A computer has allowed me to keep my full-time job as a librarian in Canada, while pursuing my doctoral degree in Florida, using a modem and a computer. It is saving me at least \$100,000, which I would have lost in wages, tuition, and housing if I were pursuing a Ph.D. the conventional way here in Toronto."—MARK MERRYWEATHER, 33, Toronto, Ontario, Canada.

GRAND-PRIZE WINNER (WON \$25)

"Knowing how to use a computer certainly came in handy when my math teacher, Mr. Sergi, decided to organize a computer club. He didn't know much about computers and

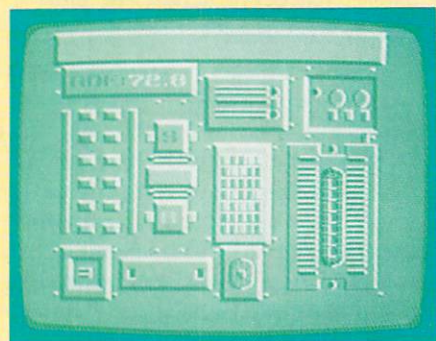
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Mindscape. Arcade/flight simulation. Your mission: You play Johnny "Jimbo-Baby" McGibbits, who must fly his Gizmo helicopter behind enemy lines and photograph secret documents in order to save the world. (Hints and game are for C 64.)

✦ In the first mission, the setting for the Automatic Direction Finder (ADF) is always 72.8.

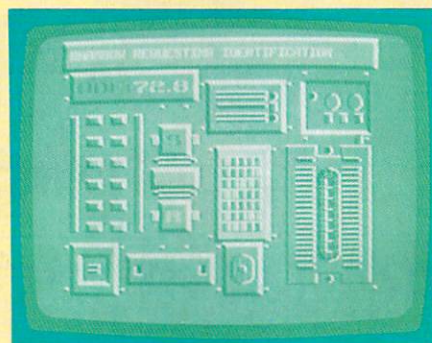


Don't get lost!

✦ When you see an airplane while airborne, go immediately into communications mode and request the pilot's identification. If you don't, you'll receive no hint as to his identity.

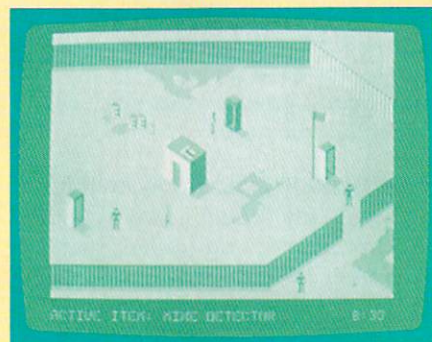
✦ A sample of friendly names includes Haymish, Whipple, Dweezil, Gomer, Naples, Gizmo. A sample of

enemy/crazy names includes Buzz, Weasle, and Boomer.



Remember: Request I.D.'s.

✦ In order to reach the target for the first mission, you should fly at a maximum speed of 450. If you



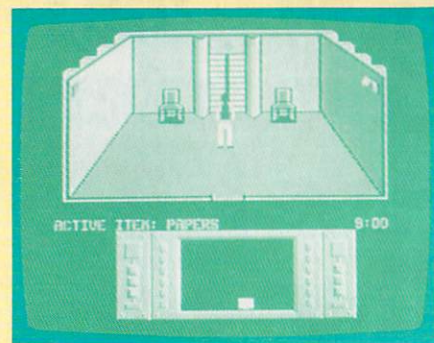
Use spray guns sparingly.

engage the Turbo (which uses no fuel), you'll reach the target with enough fuel to land safely.

✦ Whisper mode need only be used when you're less than 200 feet above the target. If you don't use this mode, you'll be caught upon landing.

✦ The easiest way to kill the enemy jets is with guns. Rockets are too slow and you only have four of them.

✦ Always have your guns ready. If the enemy fires at you, immediately use the appropriate defensive ac-



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tion—chaff or flares—and then ready the guns again. It's better to play defensively and avoid getting hit. (Only fire if there are no oncoming missiles.) However, if the enemy is not letting you get a shot in with your guns, fire a rocket and then continue defending yourself. —DAMIAN ROSKILL, 19, Amherst, Massachusetts

Q & A

In King's Quest II (Sierra On-Line), what's the purpose of the cloth in the bottle that King Neptune gives you?

—JOHN OSTROM, 15, Amarillo, Texas

It can be used to cover the bird's cage in Hagatha's cave. If you cover it with the cloth, you'll be able to take the cage out of the cave without angering Hagatha.

In King's Quest (Sierra On-Line), where is the magic mirror?—MANY

READERS ASKED THIS QUESTION.

It is both underground and underwater.

In King's Quest, where do I plant the magic beans?—SHAWN DEURIES, 11, Park Forest, Illinois

You plant them on the right side of the woodcutter's hut.

In Mask of the Sun (Broderbund), where do I find the jade bowl?—BRANDON FRANKLIN, 15, Wichita, Kansas

In the altar room, search the platform, and you'll find a hidden door. Go through it, and you'll find the jade bowl.

In Enchanter (Infocom), how do I climb the spiral staircase?—MIKE REZABEK, 13, Otho, Iowa

You must first cast KULCAD on the staircase.

In Zork III (Infocom), how do I get the crown jewels?—BRIAN SZYMANEK, 12, Omaha, Nebraska

You must push the gold machine into the jewel room, set the dial to 776, and push the button. Take the ring and wait until the guards leave.

Then go to the museum, hide the ring under the seat, set the dial to 948, and push the button.

In Ultima III (Origin Systems), where can I find the Mark of the Snake?

—HAO NGO, 11, Bakersfield, California

The Mark of the Snake can be found on the bottom level of the dungeon on the large island east of the mainland.

In Ultima III, how do I get past the Snake?—SHAWN LIDDICK, 15, Ocean Grove, New Jersey

You must have the Mark of the Snake. You must then sail to the Snake, and when you are directly under it, yell the word you learned from the Circle of Light. ➔

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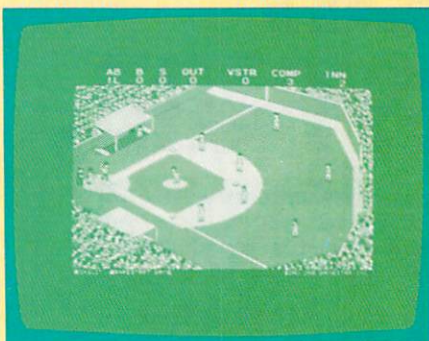
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We'll Give You Tomorrow.

CHAMPIONSHIP STAR LEAGUE

Gamestar (Macintosh). Arcade/Sports Simulation. Your mission: Choose your pitcher and your lineup, and try to beat the computer or another human opponent.



🔑 Carefully watch each ball pitched. After a while, you should be able to tell if a pitch is a ball or a strike.

🔑 Sometimes, it's easy to steal second base against the computer. Have your runner on first take a step or a step-and-a-half lead. The pitcher will throw to first a few times to try to pick you off. Make sure this doesn't happen. If he pitches a high or low slow-moving pitch, run to second as soon as it leaves his hand. If he doesn't, don't steal. You should beat the throw every time.

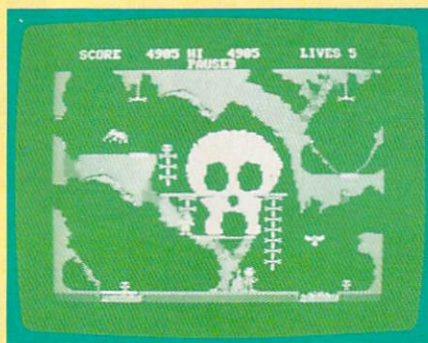
🔑 After every pitch, no matter what base you're on, you should run. If the pitch is a ball or a strike, run back to base. If the ball is hit, keep running. Even if the ball is caught, you will have plenty of time to run back because the computer will throw to the base ahead of you.

🔑 Catching fly balls is one of the hardest plays to make. The best

way to do it is to watch the shadow of the ball and try to meet it. If you aren't sure, always overestimate it so that the ball will not drop behind you.—DAMIAN ROSKILL, 19, Amherst, Massachusetts; DAVID LANGENDOEN, 18, Charlottesville, Virginia

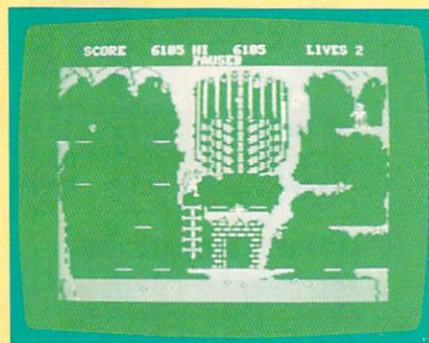
THE GOONIES

Datasoft (Apple). Arcade/skill. Your mission: Search the caves for One-Eyed Willy's Pirate Ship and get his treasure to pay the mortgage on your family's home. (Note: Additional hints for The Goonies appeared in K-POWER in the May 1986 issue.)



🔑 Screen five: As soon as you can, move your goonies down two ladders and as far left as you can. This is one of the few spots where you are safe from the birds. Then move one of them as far right as possible, down the long ladder, and as far left as possible. He or she is safe here. Then, using the top Goonie, push as many eggs as possible (the skulls) down to the bottom Goonie. Move the top Goonie onto the trampoline, and bounce twice to grab the chain. The bottom Goonie can now push the skulls to the right wall, stacking them up to form a lad-

der. When you have five skulls stacked, you can climb to the exit. The second Goonie will have to jump the lava pit.



🔑 Screen six: The droplets in the center of the screen determine when the platforms will disappear. Time your moves carefully. Also, the lava pool in the lower right-hand corner is barely small enough to jump across.—TETSUJI GOTANDA, 14, San Diego, California

We need a few good hints! Help K-POWER readers be all that they can be by sending us hints for your favorite games. We have all the Zork and Ultima III hints we can handle, but we'll gladly publish and pay \$10 for hints we've not heard of. Send them to Hint Hotline, c/o K-POWER, 730 Broadway, New York, NY 10003. Hints will not be considered for publication unless accompanied by full name (no aliases, please), address, telephone number, and date of birth. Stumped gamers can send in their questions to the same address. We'll try to answer them in upcoming issues. (Note: The computer systems listed in parentheses indicate the computer versions the hints work for.)

Software Scoop

Software designers from Infocom (Cambridge, Massachusetts; [800] 262-6868) are forging into new territories with a mystery intended for female players. Nancy Drew-like Moonmist is a gothic mystery set in a haunted castle. Moonmist has four variations that you can solve: Each story has a different guilty party, more hidden treasures, and new

hiding places. Moonmist is available for Amiga, Apple II series, Atari, C 64/128, and IBM for \$40 . . . A new science-fiction adventure to satisfy the spaciness in all of us is Breakers from Broderbund Software (San Rafael, California; [415] 479-1170). Breakers takes place on the planet Borg, where you must break up a smuggling ring, free the enslaved, and restore order. This text adventure costs \$40-\$45 and is available

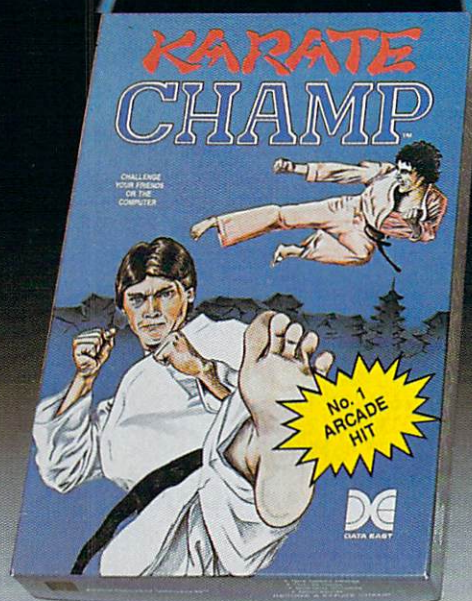
for the Apple II series, Atari ST, C 64/128, and IBM PC and compatibles . . . The high-flying gang at Accolade (Cupertino, California; [408] 466-5757) has recently released Ace of Aces, a World War II combat simulation that puts you in the cockpit of the famed British RAF "Mosquito" fighter bomber. It's packed with strategy, pressure, and confrontations. Ace of Aces costs \$30 and is available for Commodore 64/128.

NUMBER ONE ARCADE HITS...

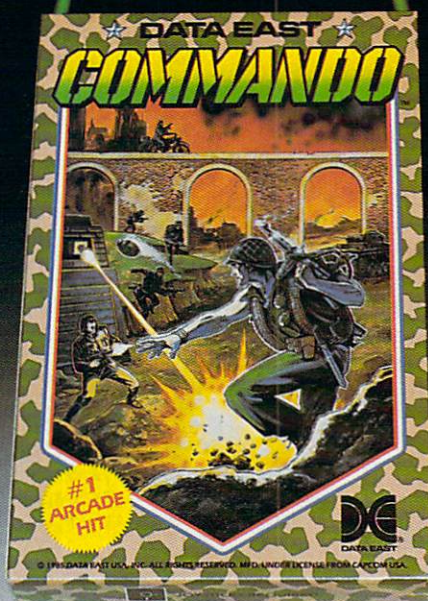


LOOK FOR
tac team
WRESTLING™
ON C-64™/128

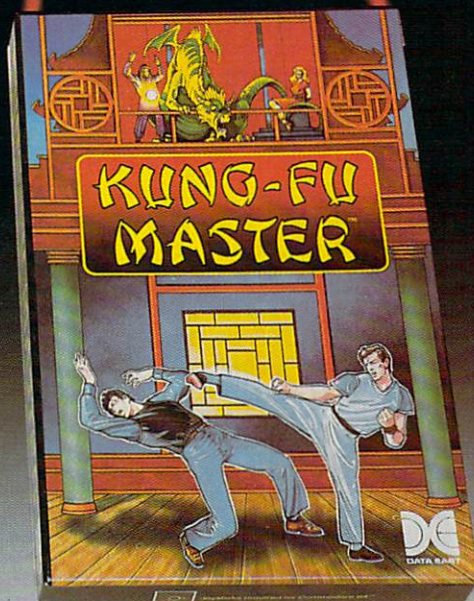
FOR YOUR COMPUTER.



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CIRCLE READER SERVICE 23

DATA EAST USA, INC.
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MUSIC PROGRAMS BY JOEY LATIMER

A MUSICAL ROUND

"Hey, Ho, Nobody Home,
Meat Nor Drink Nor Money
Have I None, Yet Will I Be
Merry."

These are the words to a traditional English musical round, which was first sung back in the 1500's. Still popular around summer campfires and with groups of people on hikes or long bus rides, the rolling melody is produced when one singer or group of singers begins the song. A second group chimes in after the first group sings the word "home," and a third group starts after the second sings the word "home." All three groups continue to sing all of the words of the song and should not lose the three-part rhythm.

To help you get started with "Hey, Ho, Nobody Home," type our *Musical Round* program into your computer and SAVE it; then RUN it. It's fun to sing along with the computer when everyone joins in. A group of voices can hide a weak or scratchy voice and build unusual confidence in normally shy singers. Once you get rolling, think about the medieval lords bellowing "Hey, Ho, Nobody Home" around a stone hearth more than 400 years ago.



```
110 V3(I+1,1)=N:V3(I+1,2)=D
120 NEXT I
130 V1(50,1)=0:V1(50,2)=32
140 V2(26,1)=0:V2(26,2)=16
150 P1=0:P2=0:P3=0:T1=0:T2=0:T3=0
160 SOUND 1,V1(P1,1),10,8
170 SOUND 2,V2(P2,1),10,6
180 SOUND 3,V3(P3,1),10,10
190 FOR DE=1 TO 35:NEXT DE
200 T1=T1+1:T2=T2+1:T3=T3+1
210 IF T1=V1(P1,2) THEN T1=0:P1=P1+1:SOUND 1,0,0,0
220 IF T2=V2(P2,2) THEN T2=0:P2=P2+1:SOUND 2,0,0,0
230 IF T3=V3(P3,2) THEN T3=0:P3=P3+1:SOUND 3,0,0,0
240 IF P1<>51 THEN 160
250 GOTO 150
1000 DATA 60,4,68,4,60,2,60,1,60,1,81,4
1010 DATA 60,2,60,2,53,2,53,2,50,1,50,1,45,1,50,1,53,4
1020 DATA 40,3,45,1,40,3,45,1,40,3
1030 DATA 45,1,40,1,45,1,50,1,53,1
```

COMMODORE 64 & 128/A MUSICAL ROUND

```
10 DIM V1(51,3),V2(26,3),V3(25,3)
20 S=54272
30 POKE 53280,6:POKE 53281,5:PRINT CHR$(147):CHR$(28)
40 POKE 214,10:PRINT:PRINT TAB(8);"-*- A MUSICAL ROUND
   *-*"
50 FOR I=0 TO 24:POKE S+I,0:NEXT I
60 POKE S+5,28:POKE S+6,192:POKE S+12,28
70 POKE S+13,192:POKE S+19,28:POKE S+20,192
80 POKE S+24,15
90 X1=S+4:X2=S+11:X3=S+18
100 V2(0,1)=0:V2(0,2)=0:V2(0,3)=64
110 V3(0,1)=0:V3(0,2)=0:V3(0,3)=80
120 FOR I=0 TO 24:READ N1,N2,D
130 V1(I,1)=N1:V1(I,2)=N2:V1(I,3)=D
140 V1(I+25,1)=N1:V1(I+25,2)=N2:V1(I+25,3)=D
150 V2(I+1,1)=N1:V2(I+1,2)=N2:V2(I+1,3)=D
160 V3(I+1,1)=N1:V3(I+1,2)=N2:V3(I+1,3)=D
170 NEXT I
180 V1(50,1)=0:V1(50,2)=0:V1(50,3)=32
190 V2(26,1)=0:V2(26,2)=0:V2(26,3)=16
200 P1=0:P2=0:P3=0:T1=0:T2=0:T3=0
210 POKE S+1,V1(P1,1):POKE S,V1(P1,2)
220 POKE S+8,V2(P2,1):POKE S+7,V2(P2,2)
230 POKE S+15,V3(P3,1):POKE S+14,V3(P3,2)
240 POKE X1,17:POKE X2,17:POKE X3,17
250 FOR DE=1 TO 35:NEXT DE
260 T1=T1+1:T2=T2+1:T3=T3+1
270 IF T1=V1(P1,3) THEN T1=0:P1=P1+1:POKE X1,16
280 IF T2=V2(P2,3) THEN T2=0:P2=P2+1:POKE X2,16
290 IF T3=V3(P3,3) THEN T3=0:P3=P3+1:POKE X3,16
300 IF P1<>51 THEN 210
310 GOTO 200
1000 DATA 33,135,4,29,223,4,33,135,2,33,135,1,33
1010 DATA 135,1,25,30,4,33,135,2,33,135,2,37,162
1020 DATA 2,37,162,2,39,223,1,39,223,1,44,193,1
1030 DATA 39,223,1,37,162,4,50,60,3,44,193,1,50
1040 DATA 60,3,44,193,1,50,60,3,44,193,1,50,60
1050 DATA 1,44,193,1,39,223,1,37,162,1
```

ATARI 400/800, 600/800XL, & 130XE/ A MUSICAL ROUND

```
10 POKE 752,1:POKE 710,32
20 PRINT CHR$(125):POSITION 8,10
30 PRINT "-*- A MUSICAL ROUND *-*"
40 DIM V1(51,2),V2(26,2),V3(25,2)
50 V2(0,1)=0:V2(0,2)=64
60 V3(0,1)=0:V3(0,2)=80
70 FOR I=0 TO 24:READ N,D
80 V1(I,1)=N:V1(I,2)=D
90 V1(I+25,1)=N:V1(I+25,2)=D
100 V2(I+1,1)=N:V2(I+1,2)=D
```

IBM PCjr & COMPATIBLES/A MUSICAL ROUND

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PCjr w/TV (or monitor w/speaker) and Cartridge BASIC J1.00. Tandy 1000 w/TV (or monitor w/speaker) and GW-BASIC 2.02 version 01.01.00.

```
10 SOUND ON:WIDTH 40:KEY OFF:CLS
20 LOCATE 12,11,0:PRINT "-A MUSICAL ROUND-"
30 READ X$,B$,C1$,C2$:C$=C1$+C2$
40 Y$=RIGHT$(B$,23):Z$=RIGHT$(C$,26)
```


**America's
Bestselling
Naval Simulation!**

Captain's Log... War Date 10.01.44



"Captain's Log, October 1, 1944. 0250 Hours. Fleet submarine USS Hammerhead proceeding Southwest at cruising speed. Our mission: intercept enemy convoy off the coast of Borneo. Disperse and destroy."



"0300 Hours. Two hours until dawn. Radar picks up convoy, escorted by two destroyers. We believe that one of the enemy's valuable cargo ships is part of convoy formation."



"0400 Hours. Lookouts on the bridge. Target identification party reports one cargo ship, 4,000 tons, troopship of 10,250 tons, with two Kaibakan-type escorts. Moving into attack position."

Tandy 1000/IBM PC Jr. screens shown



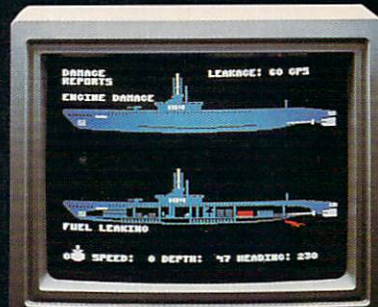
"0500 Hours. Sound General Quarters! Battle stations manned. Preparing for torpedo run. Gauge Panel OK. Periscope OK. Charts and Attack Plot Board OK. All mechanical systems OK."



"0525 Hours. Torpedo rooms report full tubes forward and aft. Battery at full charge for silent running. We hope water temperature will provide thermal barrier to confuse enemy sonar."



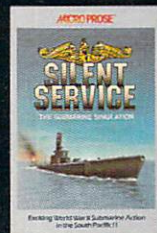
"0600 Hours. We are at final attack position. Convoy moving at 10 knots. Target distance decreasing rapidly... Crash Dive! Escorts have spotted us and are turning to attack! Rig to run silent."



"0700 Hours. Depth charged for one hour. Some minor damage, but repair parties at work. Destroyer propeller noises receding. We'll come to periscope depth for our return punch."



"0715 Hours. Torpedo tubes 1, 2, 3 fired. Two destroyers hit and sinking. One of the enemy's last cargo ships coming into 'scope view — an ideal target position. On my mark... Fire Tube 4! Fire 5!"



"Superb" raves Scott May in *On Line*, "strategic intensity and heart-pounding action have rarely been merged this successfully." *Analog* calls it flatly "the best submarine simulation so far." *Compute* comments "Silent Service's detail is astonishing." Join the more than 150,000 computer skippers who have volunteered for **Silent Service**, the naval action/tactics simulation — from MicroProse.

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Silent Service is available for Commodore 64™ 128™, Amiga™, Apple II family, Atari XL/XE, Atari ST, IBM PC/PC Jr., and Tandy 1000, at a suggested retail price of \$34.95 (Atari ST and Amiga, \$39.95).

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```

50 AS=X$+Y$+Z$+X$+X$+X$:BS=BS+Y$+Y$:CS=CS+Z$+Z$
60 PLAY AS,BS,CS:PLAY "02G1","03C1":GOTO 60
1000 DATA MFT15503C2<B-2>C4C8C8<G2
1010 DATA T155P1P1P1P1P1P1P103C4C4D4D4E-8E-8F8E-8D2
1020 DATA T155P1P1P1P1P1P1P1P1P1
1030 DATA 03G4.F8G4.F8G4.F8G8F8E-8D8

```

MACINTOSH W/MICROSOFT BASIC 2.0 OR 2.1/ A MUSICAL ROUND

```

DIM PH(16,6,2,3),PL(16,3),WAVX(256)
LOCATE 8,24: PRINT "-*- A MUSICAL ROUND -*-"
TEMPO=3.5
FOR L=-128 TO 127:WAVX(L+129)=L:NEXT L
WAVE 1,WAVX:WAVE 2,WAVX:WAVE 3,WAVX
FOR X=1 TO 16:FOR Y=1 TO 3:PL(X,Y)=0:NEXT Y,X
S1=1:S2=7:S3=9:S4=11
FOR GP=1 TO 6
  READ LN:FOR X=1 TO LN
    READ N,D
    PH(S1,X,1,1)=N:PH(S1,X,2,1)=D
    PH(S2,X,1,1)=N:PH(S2,X,2,1)=D
    PH(S3,X,1,2)=N:PH(S3,X,2,2)=D
    PH(S4,X,1,3)=N:PH(S4,X,2,3)=D
  NEXT X
  PL(S1,1)=LN:PL(S2,1)=LN:PL(S3,2)=LN:PL(S4,3)=LN
  IF GP<>6 THEN S1=S1+1:S2=S2+1:S3=S3+1:S4=S4+1
NEXT GP
PLAY:
FOR M=1 TO 16
  SOUND WAIT
  FOR V=1 TO 3
    IF PL(M,V)=0 THEN SOUND 0,8,,V:GOTO NEXTVOICE
    FOR X=1 TO PL(M,V)
      IF X=1 OR PH(M,X,1,V)<>PH(M,X-1,1,V) THEN SOUND PH
      (M,X,1,V),PH(M,X,2,V)*TEMPO,,V:GOTO NEXTNOTE
      SOUND 0,.5,,V:SOUND PH(M,X,1,V),PH(M,X,2,V)*TEMPO-
      .5,,V
    NEXT X
  NEXT V
NEXT M

```

```

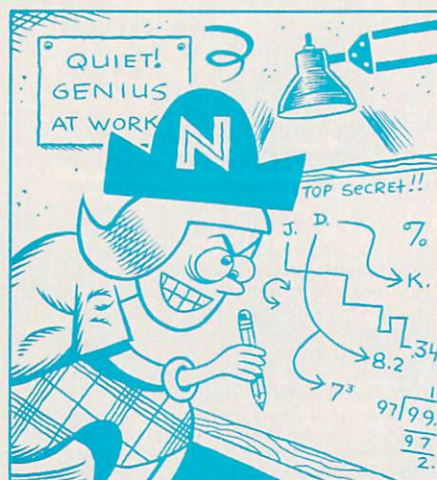
NEXTNOTE:
  NEXT X
NEXTVOICE:
  NEXT V
  SOUND RESUME
  NEXT M
  GOTO PLAY
DATA 2,523,4,466,4,4,523,2,523,1,523,1,392,4
DATA 4,523,2,523,2,587,2,587,2,5,622,1,622,1,698,1
DATA 622,1,587,4,4,784,3,698,1,784,3,698,1
DATA 6,784,3,698,1,784,1,698,1,622,1,587,1

```

M I C R O N O T E S

Yamaha International Corp. (P.O. Box 6600, Buena Park, CA 90622; [714] 522-9011) has several new peripherals and hardware add-ons for its **CX5M Music Computer**. The new products, which include two floppy-disk drives, a dot-impact printer, a two-button mouse, a word processor/300-1200 baud modem package, and a new FM tone generator module, make an already hot music-making computer really come alive. For instance, the PN-101 printer prints musical scores and other musical information, as well as word-processed documents and program listings. And **TeleWord**, the 300/1200-baud modem/word processor module that plugs into the CX 5M, gives you a quick, menu-driven, word-processing program and an internal modem. Another great addition to the CX5M is the **SFG-05 Tone Generator** unit. When used with a MIDI keyboard, it transforms the CX5M into a powerful digital synthesizer with 46 preprogrammed voices. Built-in software allows the CX5M to hook up with other computers and synthesizers.

WACKY AND ZANY HIT GAME IDEA



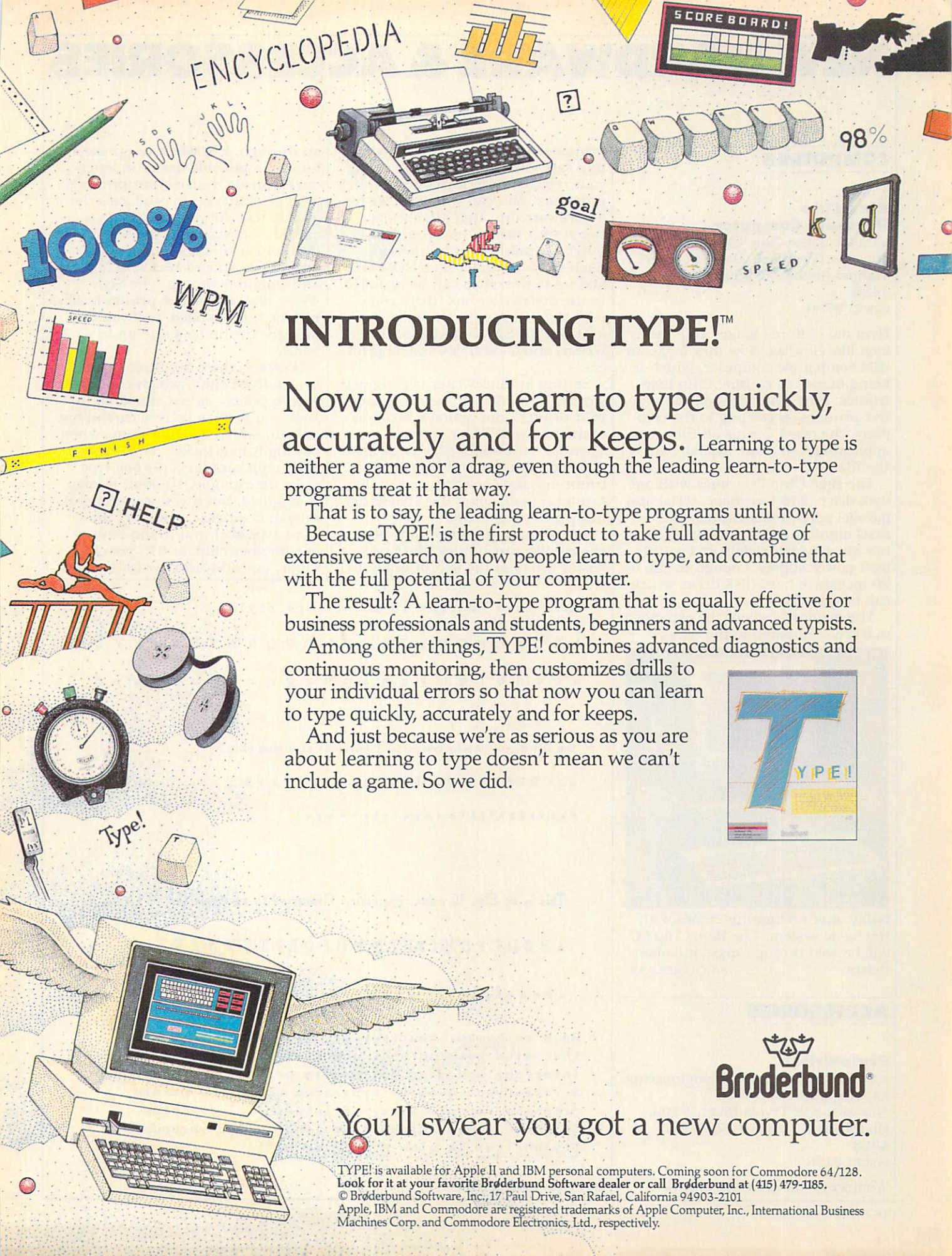
You're a tiny, undefined creature named Rockford, who must collect jewels on your way through many different and dangerous caves. Falling boulders are a constant threat, and exploding fireflies, deadly butterflies, and growing amoebas chase you as you run about digging dirt, ducking death, and collecting diamonds.

So goes the weird and deadly plot of *Boulder Dash* (First Star Software), a hit dig-'em-up number that mesmerized gamers back in 1984. Did you know that some lucky stiffs have the job of thinking up zany computer game plots that include things like deadly butterflies and exploding fireflies? Bet you can do it, too (just for fun).

Tell us about an original, crazy game idea that you think could be a

hit. Jot down the brief game plot and send it, along with this contest entry, to "Wacky and Zany Hit Game Idea," K-POWER, 730 Broadway, New York, NY 10003, by November 21. We'll award \$10 to the three contest respondents who come up with the wildest game ideas. And don't you dare try to cheat by telling us the plot to a game that someone else has already created. The SPECIAL KS know all plots to all games. Good luck!!

Name			
Address			
City	State	Zip	
Telephone			
Birthdate	Sex		
Computer(s) I own			
My hit game idea:			



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NEW HARDWARE & ACCESSORIES

COMPUTERS

Blue Chip Personal Computer

MANUFACTURER: Blue Chip Electronics
ADDRESS: Two West Alameda Drive,
Tempe, Arizona 85282; (602) 961-
1485
PRICE: \$700

Hyundai of Korea makes cars that look like Hondas. Now they make an IBM-compatible computer, which is being marketed by Blue Chip Electronics. Blue Chip also sells dot-matrix printers. According to the company, the new PC runs all the major applications software available for the IBM PC.

The Blue Chip PC comes with one disk drive, 256K memory, serial and parallel ports, monochrome and RGB monitor ports, and MS-DOS. It has six expansion slots and a 130-watt power supply, enough to run a 20-megabyte hard-disk drive, which can be added later.

The memory can only be expanded to 512K, compared to the usual



640K. And no monitor comes with the basic system. The Blue Chip PC will be sold through mass merchandisers.

—NICK SULLIVAN

ACCESSORIES

StyleWriter

MANUFACTURER: Carolina Engineering Laboratories
ADDRESS: 818 Tyvola Road, #109,
Charlotte, NC 28210; (704) 525-
4423
PRICE: \$198

Would you like your dot-matrix

printer to produce letter-quality text in a variety of typefaces while using your regular word processor or other programs? You can with StyleWriter, a hardware unit that attaches between your printer and your computer's parallel or serial interface. Each typeface comes on a ROM chip, and up to five chips can be installed in the StyleWriter box (three come with the main unit). Versions are available for Epson, Okidata, ImageWriter, and C. Itoh dot-matrix printers.

Setting up StyleWriter is extremely simple. First, detach the cable from your printer, and reattach it to one of the two StyleWriter connectors. Then take the supplied cable, attach one end to the second StyleWriter connector and the other end to the printer. Finally, plug the StyleWriter into an electrical outlet.

When you want to use your printer's regular capabilities, the StyleWriter will pass the text or graphics

on through. But when you press a button to put this device in letter-quality mode, it uses your printer's graphics function to produce letter-quality text. All you need to do is embed commands for the StyleWriter into your text, such as `VB` to start and stop boldfaced text or `U` to start and stop underlining. The StyleWriter also works as a printer buffer; 8K worth is supplied, and you can increase the buffer's size up to 128K.

However, there are three caveats. One, a ROM chip—which contains each typeface—is not simple to install; you need to be very careful not to bend any of the chip's pins when placing it in a socket. Two, each ROM chip contains only one type style; for example, 10-point Roman is supplied, but if you want 8-point Roman (a smaller version of the same typeface), you would have to buy another chip (at \$13 per chip). Three, since StyleWriter works with

This is a Courier 10 point type style.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z

This is a Roman 10 point type style. Printed with an Okidata 92.

A B O D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z

This is an Elan 10 point type style. Connected to an Apple IIe.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z

Back to Roman, courtesy of StyleWriter, a box that sits between your computer's parallel or serial interface and your dot matrix printer, to give you a variety of quality typefaces using the printer's graphics capabilities. Printers include Epson, Okidata, Apple ImageWriter, and C. Itoh brands. StyleWriter is also a printer buffer.

Stylewriter struts its stuff.

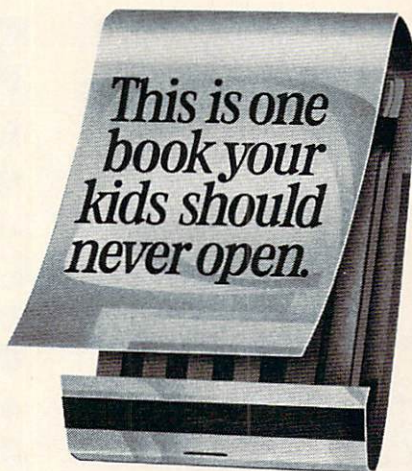
your printer's graphics mode, it's quite slow. You wouldn't want to use StyleWriter for all your printouts, just the special ones. But at least its built-in printer buffer capability lets you continue to work while your printer prints.

On the whole, StyleWriter is an attractive addition to any computer system with one of the dot-matrix printers mentioned above. The print quality is excellent, and except for installing new ROM chips, it's generally easy to use. —DAVID HALLERMAN

TransWarp

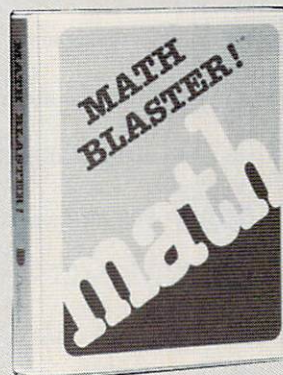
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Printers supported on the Commodore version:
 C.Itoh Prowriter 8510; Commodore VIC-1525 and MPS-801 and 803; EPSON RX, FX, LX, and MX (with Graftrax); Gorilla Banana; Okidata 92, 93, 192, 193, and Okimate 10; Star Gemini 10, 15, and SL10C.

Printers supported on the Apple version:
 Apple Imagewriter and Scribe; C.Itoh Prowriter 8510; EPSON FX-80/100, RX-80/100, and MX-80 (with Graftrax); Okidata 92 and 93; Star Gemini 10 and 15.

Printers supported on the Atari version:
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The TransWarp is hardware at its best; just set a few on/off switches, plug it into a slot, and go. Every program from *Flight Simulator* to *AppleWorks* runs much more quickly. And if you don't want the extra speed (such as with many games), just press the ESCAPE key right after you turn on your computer, and the TransWarp is temporarily deactivated. Highly recommended for those who need a rapid Apple.

—DAVID HALLERMAN

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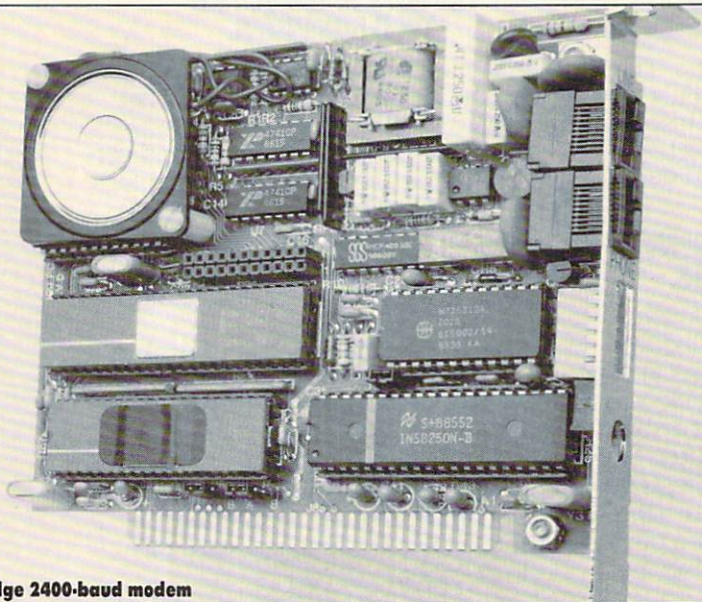
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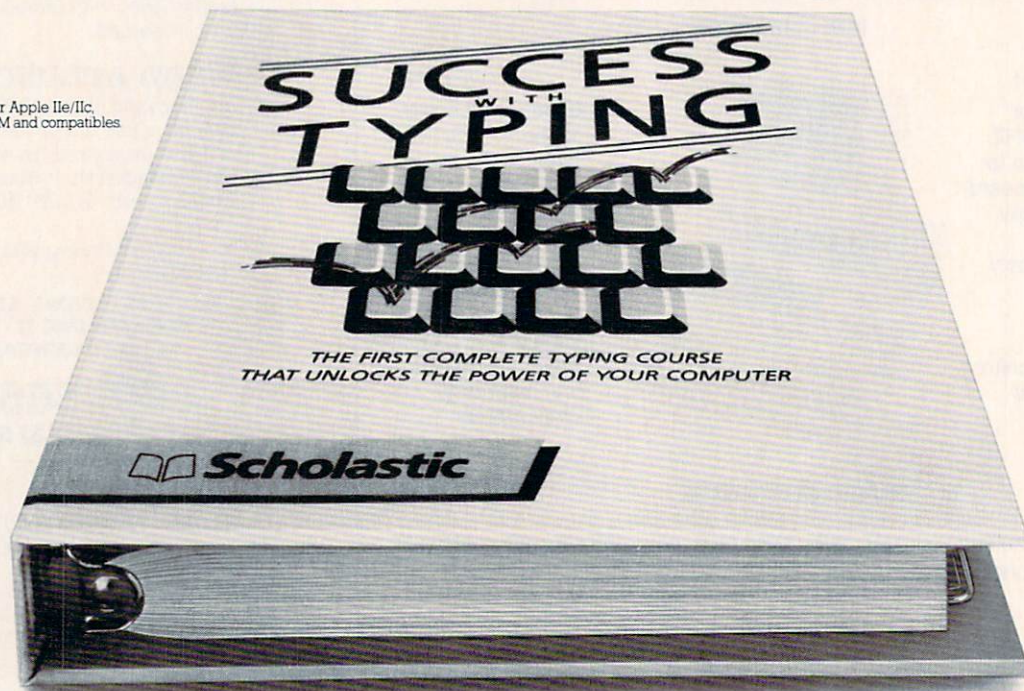
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Here's a rundown of the rating categories and what they mean: **O** = Overall performance, given the limitations and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions and literature that accompany a program. **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users. **PS** = Play system (in the games reviews), the quality of the game design and the game's playability. **GQ** = Graphics quality, also evaluated in light of each particular brand's graphics capabilities. **EU** = Ease of use after the initial learning period, which varies from computer to computer. **V** = Value for money, or how the software measures up to its price.

EDUCATION/FUN LEARNING

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings						
				O	D	EH	GQ	EU	V	
CROSSCOUNTRY USA Didatech Software 943 Boblett Blaine, WA 98230 (604) 299-4435 \$40 ©1985	You're a truck driver assigned to deliver a number of goods to a particular city in the United States in this educational travel simulation. Excellent graphics contribute to the fun.† —FRANK	64K Apple. Color monitor recommended.	Unlimited warranty (defective disks). \$10 for damaged disks.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
THE ELECTRIC CRAYON: FUN ON THE FARM & A B C'S Polarware/Penguin Software 521 Hamilton Geneva, IL 60134 (312) 232-1984 \$15 each ©1986	Two high-tech coloring programs that offer kids (ages 4+) the chance to produce truly striking pictures, to change colors as often as desired, and to print the results in black and white or color. Worthwhile additions. —ELTGROTH	128K Apple IIe/IIc.	60-day warranty. \$5 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
MAKING MUSIC ON MICROS Random House Software 201 E. 50th St. New York, NY 10022 (212) 872-8036 \$70 ©1985	Can you learn BASIC programming and musical composition at the same time? This package tries to combine both, but too much is covered too briefly for most beginners. A unique attempt, though. —MORGENSTERN	Reviewed on Apple. Also for IBM PC/PCjr.* Color graphics card recommended (IBM).	90-day warranty. \$5 for 9 months thereafter. User makes backup.	★ ★	★ ★	★ ★	★ ★	D	★ ★	
STAR MAZE Scott, Foresman, distributed by Mindscape 3444 Dundee Road Northbrook, IL 60062 (312) 480-7667 \$20 ©1985	Studying division is not always fun, but <i>Star Maze</i> lightens learning with three levels of maze games. Answer problems to help Thid, an alien, return to his home planet. Parents will still need to encourage their youngsters, though. For ages 8+. —SUMMERS	Reviewed on C 64/128. Also for Apple.	90-day warranty. \$13 thereafter, or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
SUCCESS WITH TYPING Scholastic Software 730 Broadway New York, NY 10003 (212) 505-3501 \$40 ©1986	A complete touch-typing course presented in 18 lessons; each lesson offers a learning section, a practice section, and a test. Instructions are clear, the graphics excellent.† —FRANK	Reviewed on Apple IIe/IIc. Also for IBM PC/PCjr.* Color graphics card.	60-day warranty. \$10 for 10 months thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★	

RATINGS KEY **O** Overall performance; **D** Documentation; **EH** Error-handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; **N/A** Not applicable; **E** Easy; **A** Average; **D** Difficult; † Longer review follows chart.

*Titles listed for the IBM PC/PCjr will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.



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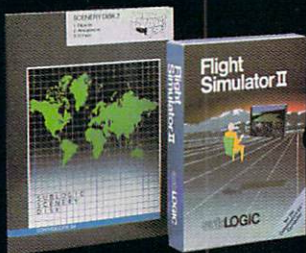
Apple and Atari versions will be released soon. Each disk covers a geographical region of the country in detail, and is very reasonably priced.

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Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings						
				O	D	EH	GQ	EU	V	
AEGIS ANIMATOR Aegis Development Inc. 2210 Wilshire Blvd., #277 Santa Monica, CA 90403 (213) 306-0735 \$140 ©1986	Creating animation with this program is easy—you draw the starting and ending shapes in a sequence, and the computer generates all the shapes in between. Includes two more methods for animation, and a drawing program. —REIFSNYDER	Amiga.	90-day warranty. User makes backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★	
ALLWRITE! Prosoft P.O. Box 560 N. Hollywood, CA 91603 (818) 764-3131 \$200 ©1985	Slick, simple, and comprehensive. Those three words are a good summary of what it's like working with this professional-level word processor. Suitable for novices and oldtimers. —KRENGEL	Tandy Models I/III/4.	90-day warranty. User makes backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	N/A	A	★ ★ ★ ★	
BATTERY PAK Batteries Included 30 Mural St. Richmond Hill, Ontario, L4B 1B5, Canada (416) 881-9941 \$50 ©1985	A complete utility package that offers powerful desk accessories such as an appointment calendar, a 250-page notepad, an auto-dialing function for phone calls, various calculators, and more. Hard to install, but easy to use. —MANCINI	Macintosh.	90-day warranty. User makes backup.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	E	★ ★ ★	
CLIP ART COLLECTION, VOL. 2 Springboard Software 7808 CreekrIDGE Circle Minneapolis, MN 55435 (612) 944-3915 \$40 ©1986	An add-on package for <i>The Newsroom</i> that offers over 800 new pictures and symbols to help you jazz up a flyer, newsletter, or brochure. Business is the focus of this art. —SOLOMON	Reviewed on 64K Apple. Also for C 64/128, IBM PC/PCjr.*	30-day warranty. \$5 thereafter. \$12 for backup. 30-day money-back guarantee.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	
EXECUTIVE TRAINING WHEELS PractiCorp Int'l, Inc. The Silk Mill 44 Oak Street Newton Upper Falls, MA 02164 (617) 965-9870 \$70 ©1986	A typing and word-processing tutorial complete with word processor. Not only for "executives," but for any beginner (kids, too) whose documents won't exceed 12 pages. This package delivered a lot more than I expected.† —SUMMERS	IBM PC/PCjr.*	90-day warranty. User makes backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★	
FULLPAINT Ann Arbor Softworks, Inc. 308½ S. State St. Ann Arbor, MI 48104 (313) 996-3838 \$100 ©1986	As a replacement for the <i>MacPaint</i> drawing program, <i>FullPaint</i> gives you lots of little improvements, such as four open windows at once and a full-screen mode.† —AKER	512K Macintosh.	90-day warranty. User makes backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★	
HOMEWORD PLUS Sierra On-Line Sierra On-Line Building Coarsegold, CA 93614 (209) 683-6858 \$50 (C 64), \$70 (Apple, IBM) ©1985	This updated, icon-based word processor is full of features that make it suitable for almost every family member and even some professionals. The documentation is superb and the print function is flexible. A best buy. —MORRIS	Reviewed on 128K Apple IIe/IIc. Also for C 64/128, IBM PC/PCjr.* 2nd drive recommended. Mouse optional.	90-day warranty. \$5 thereafter. User makes backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	N/A	E	★ ★ ★ ★	
SUPERCALC 3A Computer Associates Int'l 2195 Fortune Drive San Jose, CA 95131 (408) 942-1727 \$195 ©1985	Does everything you would expect a spreadsheet program to do, and does it gracefully. Also provides additional features that are not just "bells and whistles" but truly useful tools.† —MORGENSTERN	Enhanced 128K Apple IIe/IIc. Separate version available for IBM PC.*	6-month warranty. \$20 thereafter. User makes backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★	
TWIST & SHOUT! Spectre Technologies, Inc. 22458 Ventura Blvd. Woodland Hills, CA 91364 (818) 716-1655 \$35 ©1986	A utility program for printing text sideways down continuous-form paper ("twist") and for making banners ("shout") with almost any dot-matrix printer. It's easy enough to use, but the quality could be better. —MORRIS	IBM PC/PCjr.* Also for any MS-DOS or CP/M computer.	30-day warranty. \$8 thereafter. User makes backup.	★ ★	★ ★	★ ★	N/A	A	★ ★	

RATINGS KEY O Overall performance; D Documentation; EH Error-handling; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart.

*Titles listed for the IBM PC/PCjr will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

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ENTERTAINMENT REVIEWS BY JAMES DELSON

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				O	D	PS	GQ	EU	V
ALIEN Green Valley Publishing/ ShareData, Inc. 7122 Shady Oak Road Eden Prairie, MN 55344 (612) 829-0409 \$7 ©1985	You control the crew of the starship Nostromo in this software version of the popular sci-fi horror movie. Crew members have various personalities, and you must reason with them to win.	C 64/128. Joystick.	Unlimited warranty. User makes backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★
BRIAN BLOODAXE/ REVELATION/QUO VADIS Mindscape, Inc. 3444 Dundee Road Northbrook, IL 60062 (312) 480-7667 \$15 ©1984, 1986	Looking for a good intro to arcade games? Or how about excitement for experienced fans? You'll find both in this collection. Each offers multiscreen mazes with monsters to kill, objects to collect, and puzzles to solve.	C 64/128. Joystick.	90-warranty. \$13 thereafter, or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
A CHRISTMAS ADVENTURE BitCards, Inc. P.O. Box 1289 Champlain, NY 12919 (514) 274-1103 \$28 ©1985, 1986	Santa's missing, and you must find him in this amusing text-graphic adventure. You can add personal references for the recipients, which helps make it a fine gift, too. Fun for adults and kids, ages 7+. —HALLERMAN	Reviewed on 64K Apple. Also for C 64/128.	Sold as is. \$5 for replacement.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
FLOYD THE DROID Radarsoft, dist. by ACK, Inc. 655 John Muir Drive San Francisco, CA 94132 (415) 239-5357 \$20 ©1985	Take joystick in hand to control Floyd, the sewer-cleaning robot. Show the little R2D2-esque droid how to automatically follow set movement patterns and fight against intruders.†	Review on C 64/128. Also for 128K Apple IIe/IIc.	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
MASTER OF MAGIC Mastertronic Int'l, Inc. 7311B Grove Road Frederick, MD 21701 (301) 695-8877 \$10 ©1984	Quick thinking and fast hands combine, as you're an adventurer questing for a magic amulet. You get to explore a maze and fight monsters with weapons and spells.	C 64/128. Joystick optional.	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
NORWAY 1985 Strategic Simulations, Inc. 1046 N. Rengstorff Ave. Mountain View, CA 94043 (415) 964-1353 \$35 ©1985	The hypothetical scenario? A campaign between NATO and Soviet forces for control of Norway. Send in ski-mounted troops and mortars, as you fight guerilla-style to beat the enemy.	Reviewed on Apple IIe/IIc. Also for C 64/128.	30-day warranty. \$10 thereafter, or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★
ORBITER Spectrum HoloByte, Inc. 1050 Walnut, #325 Boulder, CO 80302 (303) 443-0191 \$50 ©1986	While technically masterful, this space-shuttle simulator is not very exciting. Your missions include a satellite launch and retrieval and constructing a space station.	Reviewed on 512K Macintosh. Also for 256K IBM PC/PCjr.* 2nd drive (jr).	30-day warranty. User makes backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
PAUL WHITEHEAD TEACHES CHESS Enlightenment, Inc. 1240 Sanchez St. San Francisco, CA 94114 (415) 641-9131 \$50 ©1986	Takes you from absolute fundamentals to basic and intermediate strategy and tactics. A computer chess opponent with nine play levels is included to test your new-found skills. Suitable for ages 10+.†	Reviewed on C 64/128. Also for Apple, IBM PC/PCjr.*	120-day warranty. \$10 thereafter. \$25 for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
SILENT SERVICE MicroProse Software 120 Lakefront Drive Hunt Valley, MD 21030 (301) 667-1151 \$35-\$45 ©1985	It's World War II, and you're in command of a U.S. sub in the Pacific in this stimulating submarine simulator. Hunt down and sink convoys, while avoiding attacks. A winner.†	Reviewed on C 64/128. Also for Apple, Atari, Atari 520 ST, IBM PC/PCjr.* Tandy 1000. Joystick.	90-day warranty. \$10 thereafter, or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
STAR FLEET I Interstel Corp., dist. by Electronic Arts 1820 Gateway Drive San Mateo, CA 94404 (415) 571-7171 \$40-\$55 ©1983, 1985	The incredible details in this outer space tactical combat game make it one of the most sophisticated games yet. With exciting ship-to-ship combat and a 168-page rulebook. Zowie! For ages 12+.†	Reviewed on IBM PC/PCjr.* Also for Amiga, Apple, Atari, Atari 520ST, C 64/128.	1-year warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★

RATINGS KEY O Overall performance; D Documentation; PS Play system; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart.

*Titles listed for the IBM PC/PCjr will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

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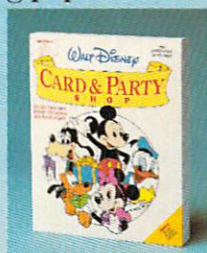


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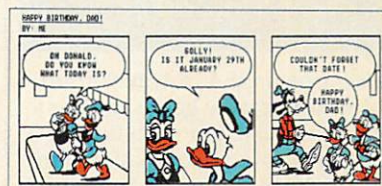


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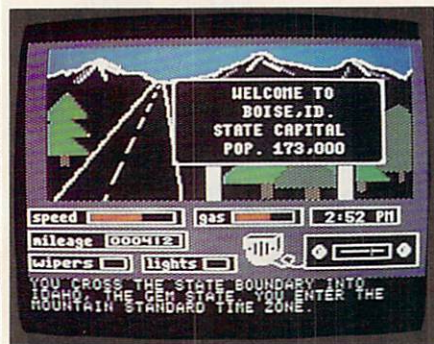
SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 122 for information such as backup policies and addresses of software publishers.

EDUCATION/ FUN LEARNING

Crosscountry USA

HARDWARE REQUIREMENTS: 64K Apple.
PUBLISHER: Didatech Software
PRICE: \$40
PUBLISHER'S SUGGESTED AGES: 10+



In *Crosscountry USA*, a travel-simulation and geography game, you're a truck driver whose job is to deliver various goods to a particular city in the United States. Besides learning a good deal about United States economics and physical geography, you're also forced to make judgments and do some creative problem solving.

All the various goods—such as furniture, hogs, or gold—must be picked up in the cities where they are manufactured, grown, or mined. In order to reach your destination as quickly as possible, you need to figure out the best route to travel. But you also need to make time for eating, sleeping, and buying gas. Be careful when driving, since poor eating and sleeping habits can cause accidents (these never seem to kill anyone, but they do cost time and money). You can save time by speeding, but that increases the probability of accidents or traffic tickets. As you drive, you have to be aware of the weather, too, since conditions vary throughout the country. For example, crossing the Rockies in winter can be very difficult.

To start a game, you are assigned a starting city, the first commodity

to be picked up, and a destination. The truck's dashboard is always visible, which tells you the time of day, your speed, how much gas is left, and so on. Commands are typed in short sentences or simple phrases such as GO NW to drive northwest. A map showing the distances between cities is part of the documentation, as well as a list of commodities and where they're found. Each city's population is shown on-screen as you enter that city, and excellent graphics detail whatever part of the country you're driving through.

With the exception of a few tedious chores such as eating and sleeping (which are time consuming and always the same), we found this program to be fun, informative, and thought provoking. —CATHY FRANK

Success With Typing

HARDWARE REQUIREMENTS: Apple IIe/IIc, IBM PC/PCjr.
PUBLISHER: Scholastic Software
PRICE: \$40
PUBLISHER'S SUGGESTED AGES: 10+

Success With Typing is a complete touch-typing course in 18 lessons. The keys are introduced in a logical and gradual progression, with a graphic display of the keyboard always on-screen. First, the home keys (A, S, D, F, and J, K, L, ;) are presented, next come the other keys that the right index finger types, and so forth.

Each lesson offers both learning and practice sessions and then a test. If you press a wrong key while learning, it does not record; the correct key flashes on the keyboard display instead. The program constantly keeps track of your errors, your speed (in words per minute), and your speed adjusted for errors. Even though you are free to choose the lessons in whatever order you wish, it's strongly recommended that you do them in the proper order. At any stage, you may practice as much as you like, and then take the test whenever you're ready.

Although basically easy to use, *Success With Typing* demands too much disk swapping if you have only one drive. Even with two drives, you have to use all four sides of both program disks. And while the introduction of letters is generally very good, in two cases all of the keys for each index finger are presented at once. Children were frustrated with

that one step, and I was, too.

But those are minor problems, since the instructions are clear and the graphics excellent. Any motivated adult or older child could learn to type with this program—and find the whole experience quite pleasant.

Note: See *Home-School Connection*: "Keys to Computing," in this issue, for a guide to teaching touch-typing.

—CATHY FRANK

HOME BUSINESS & PRODUCTIVITY

Executive Training Wheels

HARDWARE REQUIREMENTS: IBM PC/PCjr.
PUBLISHER: PractiCorp Int'l, Inc.
PRICE: \$70

Executive Training Wheels (ETW) calls itself a "no-nonsense approach to typing and word processing for the executive," but I was suspicious. Could a beginner start the program without help? Would the typing program be effective and the word processor really useful? I doubted it.

I began my review with the instructions for getting started. The manual was written clearly and accurately. When I booted the disk, I was greeted by a self-explanatory menu and on-screen help that made the enclosed command card unnecessary. *ETW* was off to a good start.

Then on to the typing tutorial. Here again, the information was crisp and to the point. A graphic representation of the keyboard appeared on my monitor, with each key flashing as it was typed—a great idea to encourage no-peek touch-typing. The lessons moved along briskly, and the practice test was interesting. If you complete the course, you ought to be able to reach a typing speed of at least 30 words per minute (as the manual suggests).

Just because the typing module was all that it claimed to be didn't mean the word processor would be. I returned to the main menu to select it with my prejudices still intact. However, the word-processing tutorial turned out to be just as effective as the typing lesson had been. The word processor itself allows files of up to 12 pages and includes all of the most important editing commands. A good range of printing options is also included. In fact, the *ETW* word processor lies somewhere

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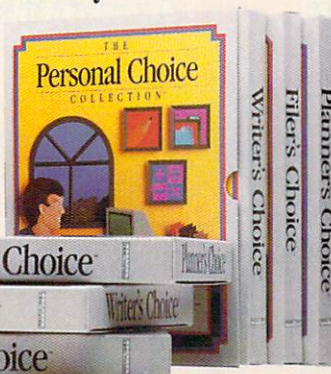
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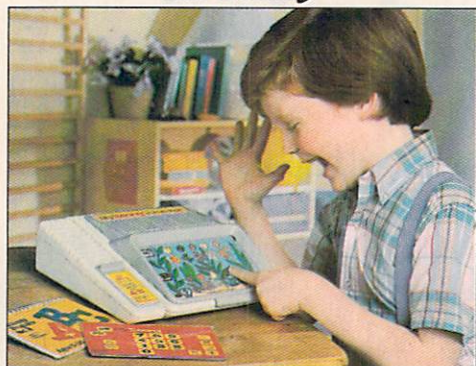


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*Clock sold separately.

CIRCLE READER SERVICE 15

SOFTWARE REVIEWS

between a medium-level word processor (such as PFS:Write) and one designed for beginners (like Bank Street Writer) in power and ease of use.

I finally had to admit defeat and pack up my prejudices. ETW is a great way for anyone who's new to typing or word processing to get started (and not just "executives"—kids, too). Many people won't ever need another word processor.

—TAN A. SUMMERS

FullPaint

HARDWARE REQUIREMENTS: 512K Macintosh.

PUBLISHER: Ann Arbor Softworks, Inc.

PRICE: \$100



Using FullPaint is like running into an old friend who has embarked, with success, on a course of self-improvement. FullPaint is just what its title implies—a fuller-featured version of the MacPaint drawing program. It takes care of some of MacPaint's weak spots and adds a few major improvements as well.

The most obvious improvements involve windows: You can have four open at a time, they have scroll bars for ease in getting around them, and they can be as large as the screen. Shift the tool and pattern palettes to any spot you wish; or, you can remove them from the screen entirely. Even the menu bar can be temporarily removed for a full-screen view.

Two more new items are Rulers and MouseSpot. Rulers—which measure in pixels, picas, inches, or centimeters—appear around the perimeter of the drawing window; as you move the mouse, a line in each ruler lets you know exactly where you are. This lets you draw and place items precisely. MouseSpot is the other aid for accuracy. It gives a constant readout of the mouse's coordinates and even tells you the length of any line you are drawing.

The FullPaint environment is so

familiar, you can forget that you're not in MacPaint. But you'll get a lot of reminders when you start to print. You choose from four printing sizes, from a 50 percent reduction to a 400 percent enlargement. You can also print sections from your picture instead of the whole thing.

There's no doubt that FullPaint is excellent; I haven't touched MacPaint since I got this new program. (MacPaint and FullPaint files are absolutely compatible; you can open pictures from one in the other and vice-versa.) There's only one thing that keeps me from telling you to run out and buy it: There are two more Mac drawing programs coming out soon with even more features (we'll be reviewing them as released). So shop around a little before you get FullPaint, despite its excellence.

—SHARON ZARDETTO AKER

SuperCalc 3a

HARDWARE REQUIREMENTS: Enhanced 128K Apple IIe/IIc.

PUBLISHER: Computer Associates Int'l

PRICE: \$195

Every aspect of the SuperCalc 3a spreadsheet is a textbook illustration of intelligent software design. To begin with, the documentation is superb, from the accurately titled "10 Minutes to SuperCalc 3a" booklet through two quick-reference cards and a hefty manual containing the tutorial User's Guide and a complete reference section. All the writing is clear and free of jargon, with plenty of screen illustrations to show you the way. Whether you're a spreadsheet rookie or a number-crunching veteran, you're in good hands here.

You can handle a lot of data with SuperCalc's 63 columns across and 254 rows down. Built-in mathematical functions include all the standards for business and scientific calculations, plus calendar math functions, logical operations, and several powerful financial functions such as Net Present Value and interest-rate calculations.

This is a very democratic program. If your only goal is keeping track of the household budget, you'll still appreciate some of these advanced features, like the ability to enter dates in the spreadsheet and have the program automatically figure the time elapsed between entries. If, on the other hand, you're running a business, you'll probably find everything

you'll ever need.

The list of features goes on and on. Graphics capabilities let you prepare eight different kinds of charts from your spreadsheet figures, view them on-screen in black and white or 15-color double high-res, then print them out. If you want to get fancy, you can fiddle around with eight typefaces for your labels.

Did I mention that you can print out large spreadsheets sideways? Or how about the ability to transfer *AppleWorks* and *VisiCalc* files into *SuperCalc*? Let's face it—this is a short review for a program that's long on features. At the price, it would be tough to justify for simple home applications, although you can be sure you won't outgrow the program's capabilities as your needs increase. And for professional needs, this is the spreadsheet that makes you think that maybe loyalists are right when they say "Apple II Forever."

—STEVE MORGENSTERN

ENTERTAINMENT

Floyd the Droid

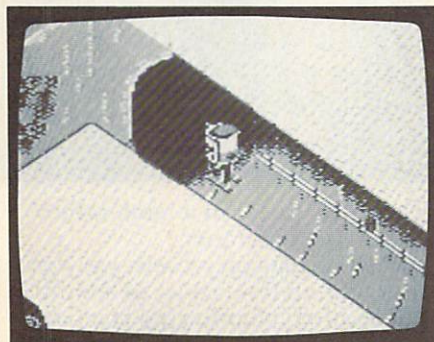
HARDWARE REQUIREMENTS: 128K Apple IIe/IIc, C 64/128.

PUBLISHER: Radarsoft

PRICE: \$20

CRITIC'S SUGGESTED AGES: 10+

Meet Floyd. He's an electronic underground sanitation engineer (that's a sewer-cleaning robot to you). Your object in this game is to program the little R2D2-esque droid to perform the tasks of a modern-day Ed Norton, repairing breaks in the pipes, eliminating obstructions, and



ridding the sewers of vermin.

To this end, you control Floyd by selecting commands from a menu—specific patterns for moving, jumping, ducking, and firing a laser. Then, you string the patterns to-

gether, which creates mini-programs for your robot to follow. You'll want to set up a program to deal with each of the creatures you'll encounter: bats, rats, alligators, and escaped human prisoners. Using the automatic program mode, Floyd will then do what you "wrote" each time he runs into one of the creatures. Semi-automatic and manual-only control modes are also available for those whose tastes run more toward traditional arcade gaming.

The package's main drawback is its documentation, which appears to have been written by someone for whom English is a minor hobby. Mistakes abound, so read carefully until you understand the proper procedures. Even so, *Floyd the Droid* offers much fun as well as an ideal introduction to the logic of programming for children and adults.

Paul Whitehead Teaches Chess

HARDWARE REQUIREMENTS: Apple, C 64/128, IBM PC/PCjr.

PUBLISHER: Enlightenment, Inc.

PRICE: \$50

CRITIC'S SUGGESTED AGES: 10+



Have you ever wanted to match your skills against a computer chess opponent, but didn't because you felt your skills weren't strong enough to make it a fair match? Then you'll want to play with *Paul Whitehead Teaches Chess*. As the name suggests, this program will take you from the absolute fundamentals of the game to basic and intermediate strategy and tactics.

Each step is illustrated by animated graphics, which help you see what happens in a concise, concrete fashion. The program starts off with an explanation of the rules, detailing the board and how each square can be identified by an alpha-numeric code. Each piece is then introduced, and you're shown how it moves and captures other pieces. The rules sec-

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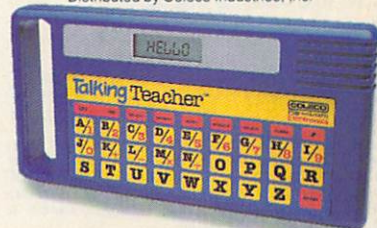
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SOFTWARE REVIEWS

tion concludes with notes on castling, drawn (tied) games, winning through pawn promotion, and the values of the various pieces.

Other sections look at every aspect of the game, from opening principles to the endgame; over 600 different aspects of chess are covered. Explanations are particularly easy to follow, since many of them are interactive. When you feel that you're ready, a computer "coffeehouse" opponent (a simulation of a solid, experienced player) will play against you in this excellent chess program.

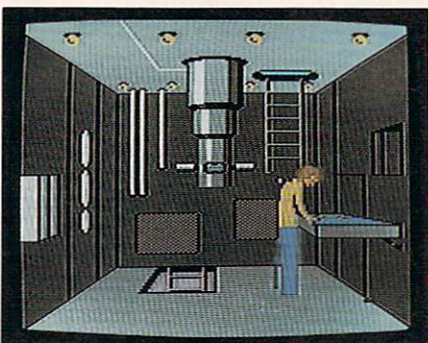
Silent Service

HARDWARE REQUIREMENTS: Apple, Atari, Atari 520ST, C 64/128, IBM PC/PCjr, Tandy 1000.

PUBLISHER: MicroProse Software

PRICE: \$35-\$45

CRITIC'S SUGGESTED AGES: 10+



Though few in number, submarine simulators have been consistently entertaining and challenging. From *Submarine Commander* (Thorn EMI) through *Gato* (Spectrum HoloByte), these games have been favorites among our playtesters.

And now on to *Silent Service*. The time is World War II; the place, somewhere under the Pacific Ocean. As commander of a U.S. Navy submarine, you locate, stalk, and sink enemy convoys, while avoiding detection by their escort ships. Each of the different locations around the ship directs a separate function of your sub, and only through a well-rehearsed routine of interaction among your crew members can you achieve your goals.

The game is an excellent solo program, yet it can also be played by a "crew" of up to four, with each department head handling a function sequentially—fire control, lookout, and steering, while the captain gives the orders. Since *Silent Service* offers hundreds of possible option

combinations (difficulty levels, enemy expertise, etc.), and since it simulates endless convoy actions across the entire South Pacific, this game is not likely to wear thin in the foreseeable future. It's a sure winner for all levels of play.

Star Fleet I

HARDWARE REQUIREMENTS: Amiga, Apple, Atari, Atari 520ST, C 64/128, IBM PC/PCjr.

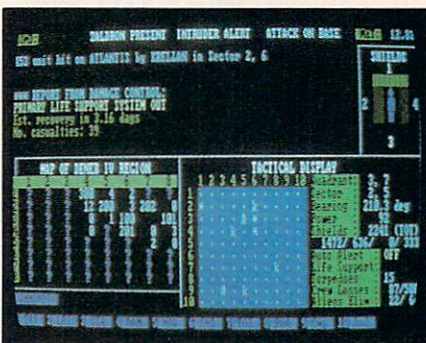
PUBLISHER: Interstel Corp. (formerly Cygnus), distributed by Electronic Arts

PRICE: \$40-\$55

CRITIC'S SUGGESTED AGES: 12+

For those of us who dreamed of becoming starship captains in our misspent youths, there's finally a mightily sophisticated outer space tactical combat simulator that fulfills our wildest fantasies. It's called *Star Fleet I*, and while as challenging as any game we've ever played, it offers even novice star pilots the chance to save the galaxy and make a name for themselves right up there with Jim Kirk, Tom Corbett, and Han Solo.

Your goal is to rid the galaxy of warlike enemy craft, and your weapons are many: photon torpedos, phaser banks, four defensive force shields, a tractor beam for towing vanquished enemies, and deep-space probes for exploring surrounding sectors of the galaxy. There's even a self-destruct mechanism in case you



wish to go out with a bang rather than kneel to tyrants.

With various play levels, you work your way up from cadet to admiral. The exciting ship-to-ship combat routines, as well as dozens of other command functions, are all explained in the two-volume, 168-page rulebook (!?!). It's a long read, but it's worth the effort, since *Star Fleet* is one of the year's best.

—REVIEWS BY JAMES DELSON

NEW PRODUCTS

MANUFACTURER'S ANNOUNCEMENTS

"New Products is a monthly feature consisting of paid announcements. More information about the products can be obtained by circling the corresponding reader service number. For rate information call 212-505-3587. Publisher reserves the right to edit or reject all announcements."

Kraft Systems 2 in 1 Stick

QUICKSTICK, the joystick for the Apple IIc or Macintosh is compatible with all joystick and mouse software. Click a switch, and QUICKSTICK converts the



analog/joystick signal to digital/mouse signal. QUICKSTICK also has two modes of operation, free floating or spring centering. Free-floating (mouse) mode provides quick and accurate icon pull-downs with fingertip control. Spring centering provides three cursor speeds, allowing tasks difficult to accomplish with a mouse. QUICKSTICK, by Kraft Systems, Inc., the alternative to two controls. 619-724-7146.

CIRCLE READER SERVICE 40

Success with Typing

Scholastic Software has just re-

leased SUCCESS WITH TYPING, a complete software touch-typing course for students in grades 6 through 12. Designed as a comprehensive typing program, it also helps students learn the basics of word processing and data base management.

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The program's first ten lessons include technique tips on correct posture and positioning of arms and fingers, practice

typing and tests, and personal diagnostics

Available for the Apple IIe and IIc computers (64K). The home edition of SUCCESS WITH TYPING which contains two double-sided program disks and a Reference Guide lists for \$49.95.

Scholastic Software's SUCCESS WITH TYPING can be ordered through local Scholastic Sales Representatives and dealers. For ordering information, write to: Inquiry Department, Scholastic Inc., P.O. Box 7501, 2931 East McCarty Street, Jefferson City, MO 65102. Scholastic ordering number: (800) 325-6149.

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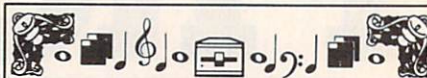
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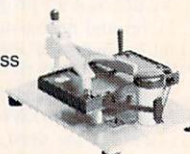
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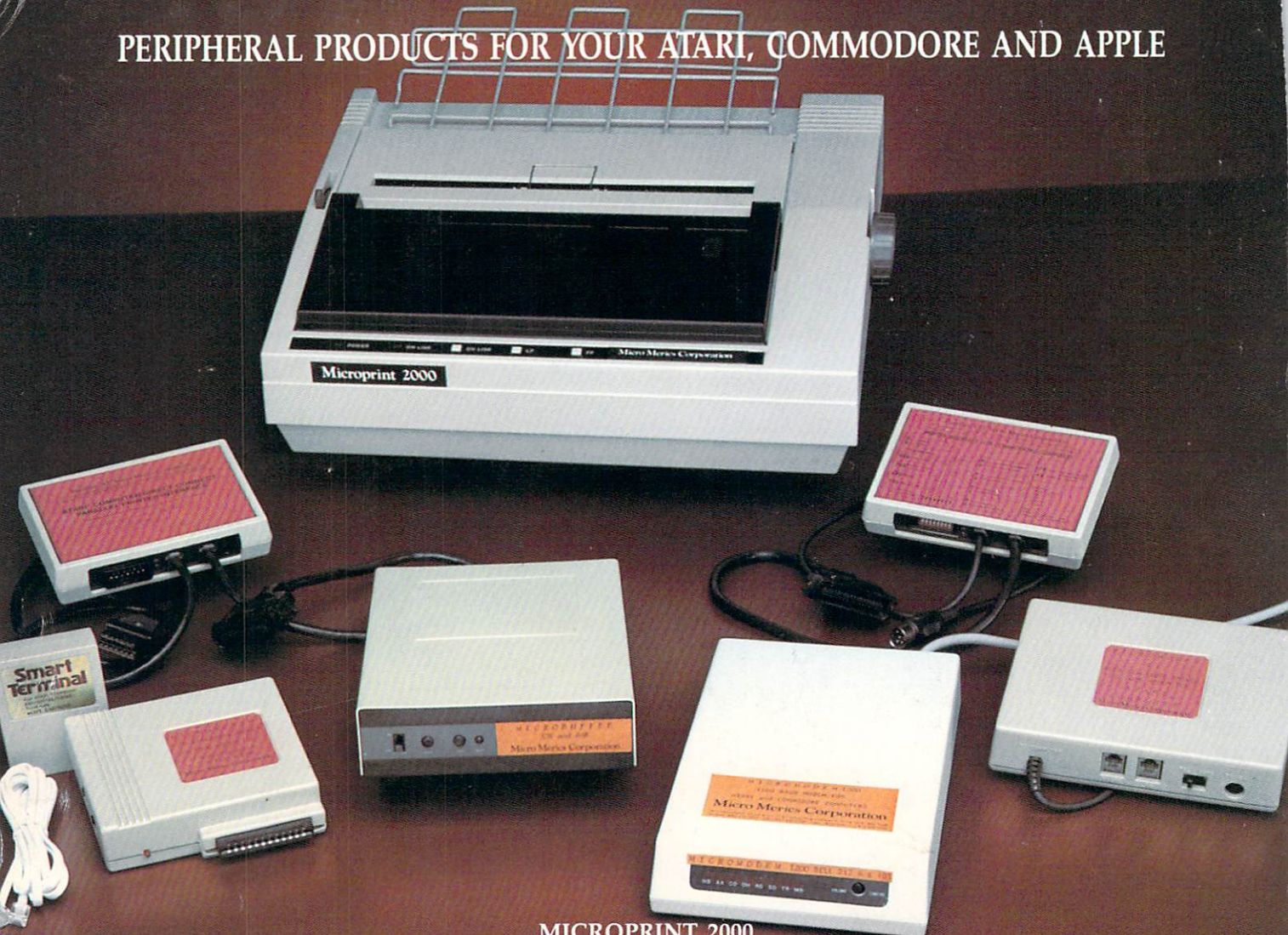
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MICRO MERICS MICROMODEM-CD, like the AT, is a standard 300 baud modem, providing excellent performance and value for any COMMODORE computer user. It connects directly to a standard modular phone cord. It uses the Bell 212A/103 protocol to allow connection to any Hayes or Bell standard modem, and features both auto-dial and auto-answer.

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