

How COMPUTE! Readers Use Their Computers

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Special Games Issue

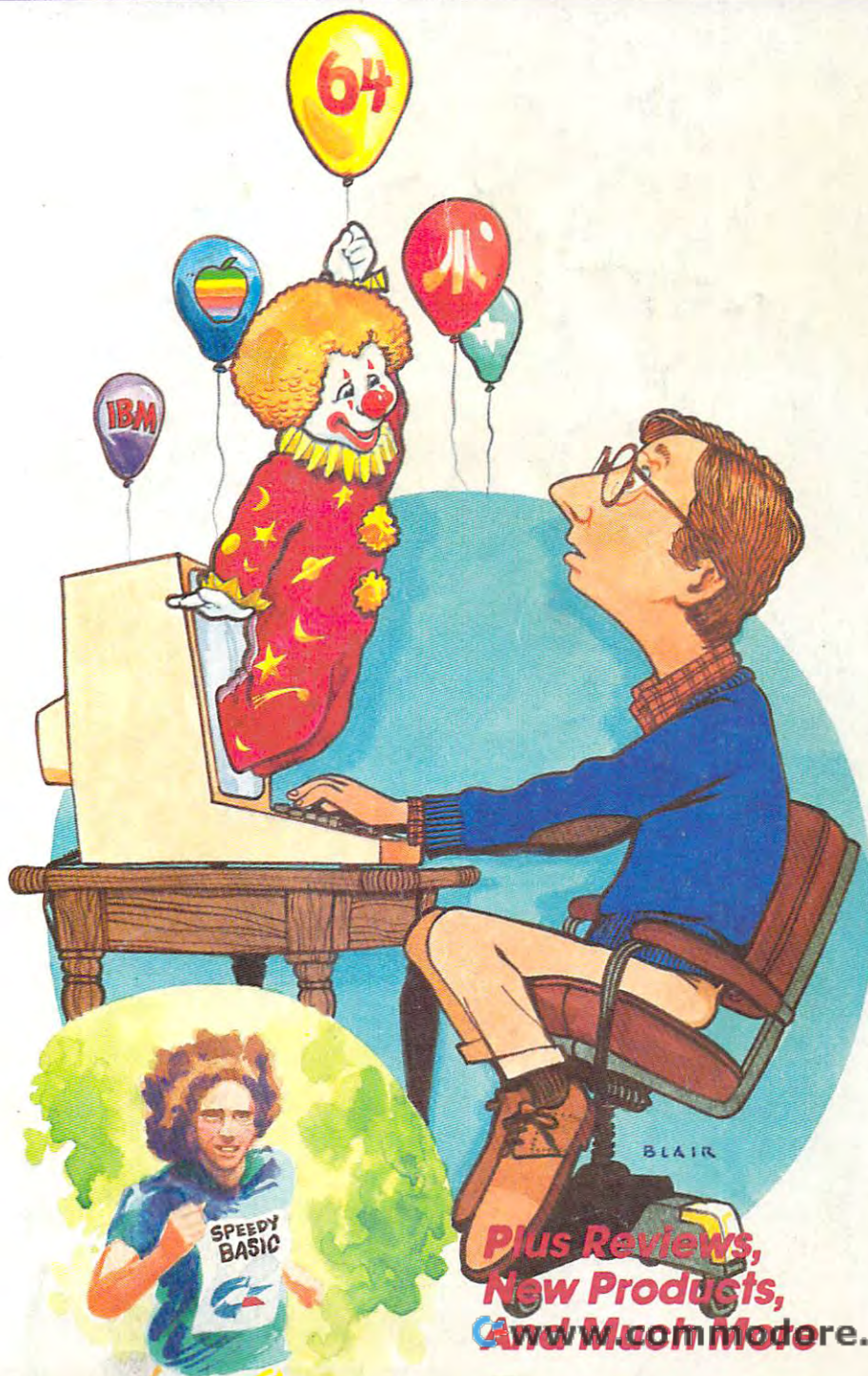
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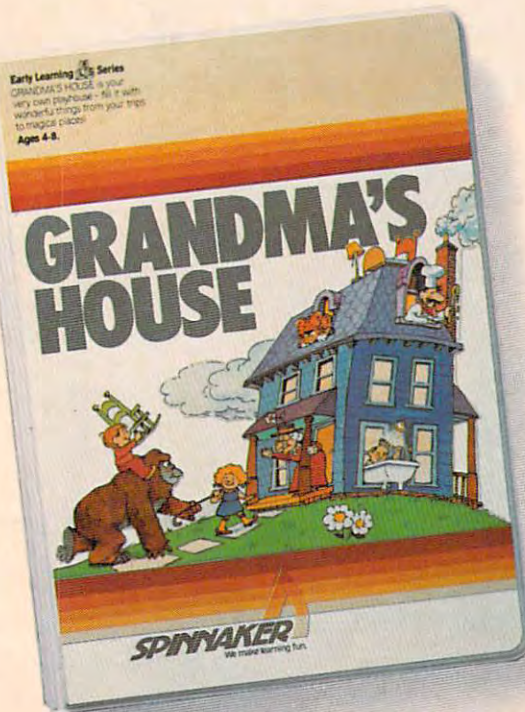
So if you're looking for a line of learning games that are as much fun to play as they are to buy, consider Spinnaker Games. They're compatible with **Apple, Atari, IBM PC, PCjr, Commodore 64, Coleco Adam** and parents who don't mind their kids having fun while they learn.



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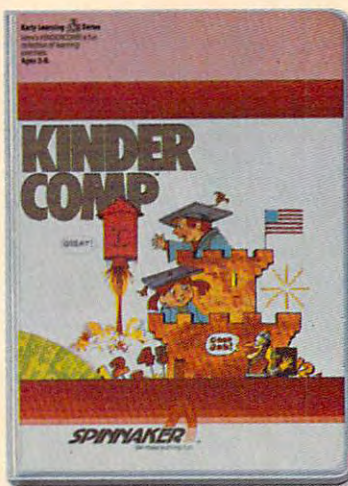
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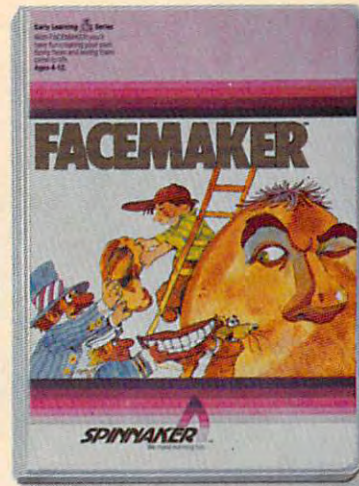
All in all, FRACTION FEVER encourages kids to learn as much as they can about fractions—just for the fun of it!



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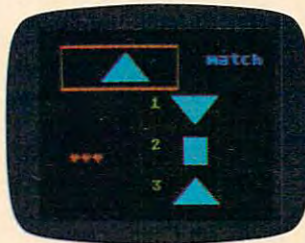
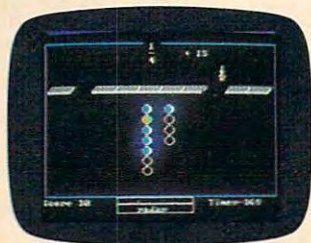
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EDITOR'S NOTES

Rumor has it that Commodore will introduce a new computer (the 264) at the Winter Consumer Electronics Show in January. The unit is expected to be compatible with the 64, and is not intended as a replacement for either the VIC-20 or Commodore 64. Price is expected to come in well under \$500.

The year ahead... We've decided to make some fearless predictions for 1984. 1983 was to be the year of the home computer, and though we feel great progress was made, we're not convinced it's happened yet. We'll give '83 half credit, and project the rest into 1984. First the wrap-up. This past year saw Atari fall from its position of shared leadership to become a more distant runner-up; Texas Instruments withdrew completely from the highly competitive low-end computer scene; Coleco, in great fanfare, launched and stumbled, all at the same time; Commodore greatly increased market share in the midst of controversial quality assurance and delivery problems; and Apple continued to do an excellent job of completely ignoring the low-end market. IBM came through just in time with PCjr to make all the rumor mongers honest, at least if you're willing to wait for delivery.

On this note, the fearless forecast... PCjr's won't really be available in quantity until April or May. Coleco's Adam will be redesigned and substantially modified by June, with additional price increases required. Texas Instruments will reconsider its decision to cease production of the 99. PCjr will soon have an optional keyboard with a "standard" key set. By year end, we'll have at least one system that's 16 bit, 128K RAM, with extended color, sound, and graphics capabilities for less than \$500. Commodore will have the low-end market to itself until one or two Japanese firms begin to duplicate Commodore's success and the price wars will begin again. Apple will continue to successfully ignore the low-end market. At least one company will introduce a PCjr look-alike for half the price. And finally, a "real" forecast: COMPUTE! will continue to grow. Later in the year, we'll look back at these fearless forecasts and keep you posted.

Random News: As of December 16, COMPUTE! Books has six titles on the B. Dalton National Best Seller List of computer titles. We're quite gratified that six of the twenty titles are ours. You TI owners will also be pleased to note that we have several new TI titles to be re-

leased during the spring. By the way, press run for this issue of COMPUTE! is 510,000. We're finally hitting that half million mark in issues printed. We broke the 100,000 barrier in the fall of 1982.

A Correction: In the January "Readers' Feedback," we goofed in our response regarding the differences between the VIC modem 1600 and the new Commodore 1650 modem. We said that the 1650 would only be usable with the 64 because it plugs into the expansion port. Wrong. It plugs into the user port on both the VIC and 64 and does, in fact, work with both. To compound our indiscretion, we said that the 1600 tele-terminal software is not compatible with the 1650. Wrong (in part). The terminal software for the 1600 doesn't support the auto-dial/auto-answer features of the 1650. Otherwise it is compatible.



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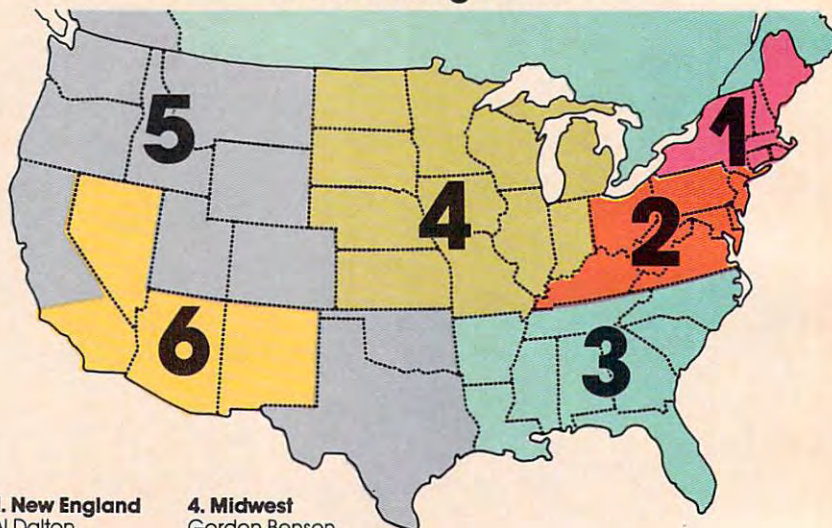
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READERS' FEEDBACK

The Editors and Readers of COMPUTE!

Making Cents

It's unfortunate that most versions of BASIC don't print zero decimal values. For example, if you have a result like \$23.00, the decimal point and zeros are not printed. When you are working with dollar values and want the cents printed, here's a handy one-line routine which you can insert into your program.

```
V$=STR$(X+.001):V$=LEFT$(V$,LEN(V$)-1)
```

For example, if your program computes a value of 23 for the numeric variable X, .001 will be added. Then the result of 23.001 is converted into a string, V\$. The string is then redefined, minus the rightmost character, 1. Now, instead of printing the numeric value X, you print the string representation V\$, and your number will be printed with two decimal places.

Chuck Emerson-Henry

Gummy VIC Keys

I have had a VIC-20 and accessories for about 15 months. It has been satisfactory until recently. Now the key contacts appear to be getting "gummy" and keys will not print without excess pressure or repeated attempts.

Is there any way to clean the key contacts or is this the end of life for VIC-20? I have always stored the VIC-20 under a dust cover in a dry place.

Howard M. Bollinger

Since your warranty has expired, you may want to open up the case to remove and clean the keyboard. You could also try removing the keycaps and spraying TV tuner cleaner into the contacts. Rubbing alcohol may serve in a pinch. Whatever you do, be certain that the power cable is unplugged from the electrical outlet. If all else fails, you will have to take your VIC-20 to a Commodore service technician to get it cleaned.

CP/M And The 64

I have recently purchased a Commodore 64. My primary reason for the purchase was to obtain a system that would offer computer instruction for my children while providing me with a system for business and word processing applications. However, having read countless reviews and

similar articles pertaining to the 64, it appears that its design seriously limits this. Can the Commodore 64 really be used with CP/M software that is readily available? Can the 64 support a printer for truly professional-looking word processing for business applications? Is this system truly flexible for such personal business applications, or is it really just an expanded memory system for enhanced games?

If the Commodore 64 can, in fact, use widely available CP/M software, would it not be to my advantage to standardize on this for all future software and hardware decisions?

C. W. Walker

The Commodore CP/M cartridge does permit the 64 to run the popular CP/M operating system. The cartridge contains a Z80 microprocessor, and the package includes a disk containing the CP/M Operating System. There are a few obstacles, however. First, there is almost no CP/M software yet available in Commodore 1541 format. There are thousands of CP/M programs, but there is no one standard for disk format. Just having CP/M capability does not mean you can insert a CP/M disk and expect to use it. Another limitation of Commodore CP/M is that it does not support 80 columns, whereas most screen-oriented CP/M programs require an 80-column screen. A third drawback to Commodore CP/M is the speed of the 1541 disk drive. While adequate for loading and saving programs or data files, the relatively slow speed of the 1541 (as compared to disk drives on most CP/M systems) might handicap a disk-intensive operating system such as CP/M.

Nevertheless, the Commodore 64 is an impressive machine—even without the CP/M capability. Many powerful programs have been written in Commodore BASIC or 6502/6510 machine language, such as dBASE II, the Last One, and VisiCalc. There are also many professional word processing packages, and interfaces for almost any printer on the market—including letter-quality daisy wheel printers. The 64 can also be considerably less expensive than an equivalent CP/M business machine, depending on your application. And there is plenty of good PET/CBM business software that is easily converted or will run under the PET Emulator.

Expand My Atari 400 Or Buy XL?

I own an Atari 400 and am thinking of expanding

Computers may be the world's best spellers, but they're the world's worst spelling teachers.

Or at least they used to be. Until Chatterbee.

Chatterbee is a unique piece of home computer software that not only makes teaching possible, it makes learning fun. For little people. And big people, too.

If that sounds like something you've never heard of before, you're right. You haven't. Because Chatterbee



does something that no other spelling software can do.

Talk.

It's equipped with a customized version of the S.A.M. speech synthesizer,

developed by Don't Ask for Tronix to provide voice output.

Instead of drawing pictures, scrambling words, beating around the bush or playing "Hangman," Chatterbee teaches spelling the sensible, old-fashioned way.

Each word is spoken, then

put in a contextual sentence. Just like a spelling bee. With one important difference.

Since there's no classroom, there's no pressure. And no embarrassment.

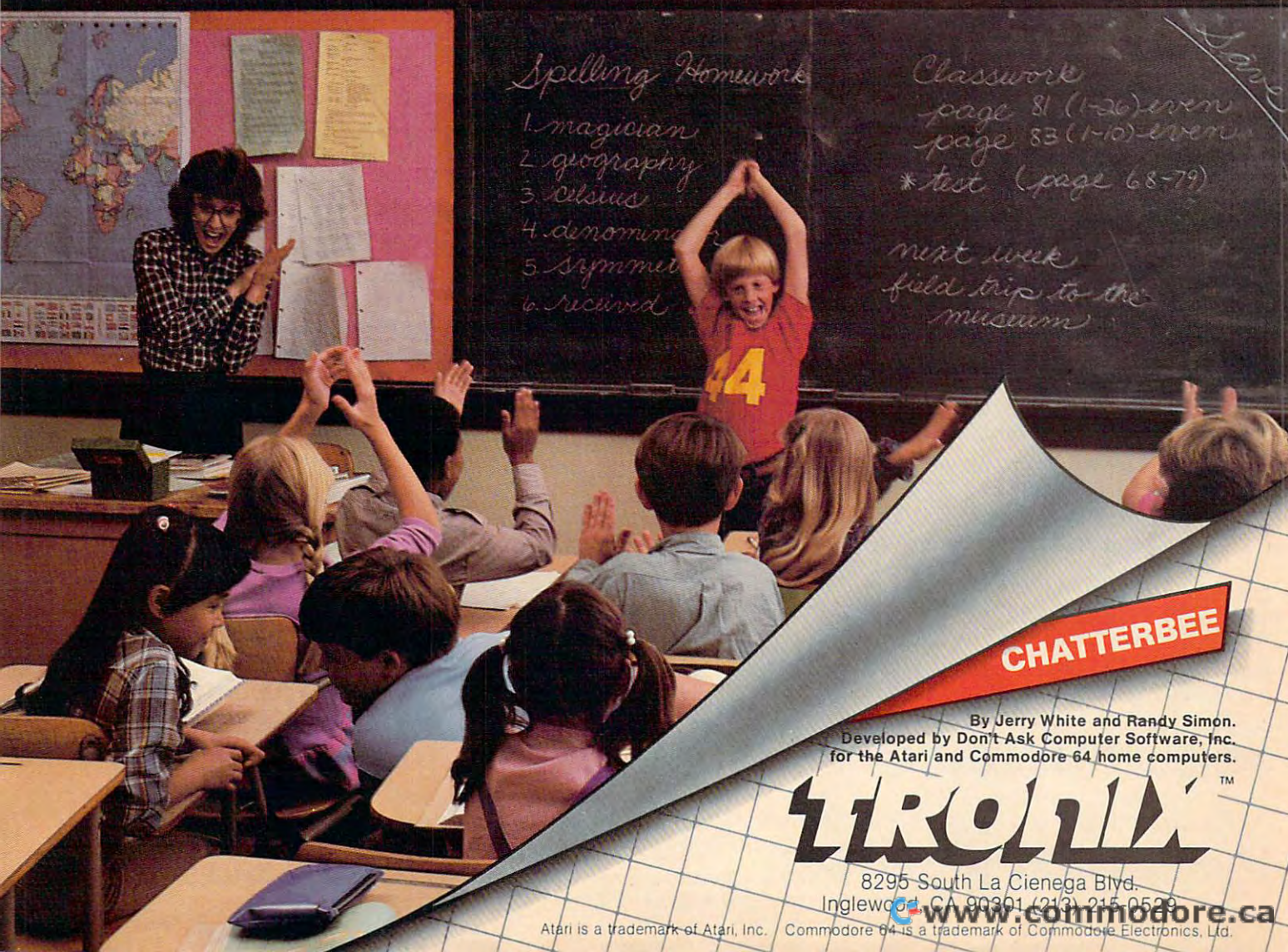
Each of the 2500 words have been selected from current educational literature. And there's an internal scoring system that automatically places each player at the right level of difficulty and challenge.

The external scoring system rewards success and turns the whole thing into a game, complete with music.

Chatterbee. The spelling bee without the sting.

Hear today, spell tomorrow.

Cc Dd Ee Ff Gg Hh Ii Jj Kk Ll Mm Nn Oo Pp Qq Rr Ss Tt Uu Vv Ww Xx Yy Zz



CHATTERBEE

By Jerry White and Randy Simon.
Developed by Don't Ask Computer Software, Inc.
for the Atari and Commodore 64 home computers.

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its memory to 64K. Would I be better off buying one of Atari's new models that come with 64K, or a memory expansion board? I've read that the 800XL and the other new computers have an extra interface. How important is this interface?

A. Katz

Before you do anything, you should make sure you really need the 64K. Almost no Atari programs use more than 48K, and most will run with 40K or 32K, even with a disk drive. You may be able to get quite a bargain on a 32K or 48K memory expansion board.

If you want future compatibility with the new XL computers, you should consider buying an XL, since there is no way to fully upgrade an Atari 400 to the specifications of even the Atari 600 XL. The interface you speak of is one reason. It allows direct access to the internal circuitry of the new XL computers, permitting hardware add-ons (in the way that the Apple II does). It is only a potential, though. There are currently no cards to support the expansion slot, and Atari has said that it will only minimally support the expansion port. Further support will have to come from third-party add-on products.

Screen POKes On Expanded VIC

I own a VIC with a 16K expander. Recently, I typed in a program. When I ran the program, I got a syntax error in line 5033, a POKE statement. So, I LISTed 5033 and found that one of the numbers had been replaced by a strange graphics character. I corrected it and LISTed the line again to verify that it was corrected. It was. Yet, when I ran the program again, I found that the same thing had happened in line 5030. I went through this a number of times.

After a while, I just started deleting those lines that showed up with syntax errors. After deleting six or eight lines, the message came: SYNTAX ERROR IN LINE 28527. I didn't even have a 28527 in my program. I LISTed 28527 and got half a screen full of graphics.

Do you have any idea what could be causing this? Could there be something wrong with my computer or expander? I have POKed that location before (not in this program) with no difficulty.

Dick Berti

Jim Butterfield replies:

The usual reason that programs start to change mysteriously is that they contain errors which make them change themselves. On the VIC, this is often caused by misplaced screen POKes. Commodore's documentation doesn't make it clear how the screen can move around on a memory-expanded machine.

On an unexpanded VIC, your BASIC program would start at memory address 4097 and go up from there. You don't need to know that; but the program must go somewhere, and that's the place. The "screen

memory" is located at address 7680 and up. The manual mentions this, since a number of users like to POKE information to the screen. More on this in a moment.

You've expanded your VIC with 16K memory, and the above addresses shift around. Obviously, you can't still start BASIC at 4097 and have the screen at 7680—if you did, there would be no extra space for BASIC and your extra memory would be wasted. So the system automatically does a flip. It puts the screen memory at 4096, and starts the BASIC program at 4609. Now your BASIC program can occupy memory all the way up to 24575 and you'll have lots of room for big programs.

Most of the time you don't need to know all this. You can just type in your program and everything will be taken care of for you. But there's a possible catch.

Suppose you have a program written to POKE information to the screen of a small VIC. The manual tells us that screen memory is at addresses 7680 up to about 8185, and that's what the POKE statements use; you may have commands such as POKE 7680,1. And suppose you type this program into your 16K expanded machine. The program still says POKE 7680,1—but the screen isn't there any more!

The small problem is that the screen doesn't get its information. The big problem is this—7680 now contains part of your program. When you say RUN, the POKE command changes memory—not the screen, but part of the program itself.

If you know about the problem, you can carefully go through the program lines, spot any location where there is a POKE to addresses in the range of 7680 to 8185, and subtract 3584 from each address. That's about the best way to permanently solve the problem.

Most programs are written for the minimum 5K VIC. Look carefully for screen POKes when you adapt them to your expanded machine.

Insert A Disk With Power Off?

Could you give me the reasons why some programs on disk tell you to insert the disk before turning on the drive and others warn you that doing this may harm the disk? For example, *Zork* says to turn on the drive before inserting the disk (so does the Percom manual), but *Dark Crystal* says to insert the disk, then turn on the drive.

C. Weintraub

It is usually inadvisable to turn disk drives on or off with a disk inserted. There is a chance that, when you turn on the disk drive, there will be a momentary surge of power to the read/write head. This is not too likely, but if it happens, a portion of your disk could be erased. Some systems, such as the Apple II, require that the disk be present in the drive when you turn on the system (the disk drive is powered by the computer).

For the Atari system in particular, you should turn on the disk drive first, insert the disk, then turn

Your ship has just come in.



Aboard the S.S. Slipshod, things are getting a little out of hand.

It seems that the navigator mistook an iceberg for Pittsburgh. With predictable results.

Soon, every state-room on the ship will have an ocean view.

But never fear, 'cause Captain Clutch is here.

He'll stoke the boilers to keep the game afloat, lead the passengers to the life-boats and rescue a few bars of gold along the way.

Why, you ask, doesn't the courageous Captain simply pocket the gold and row off into the sunset?

Because our Captain is above that sort of thing, that's why. And besides, the game won't let him.

By the way, how long can you tread water?

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on your computer. This will cause the disk to boot (load and run automatically). If you turn on the computer and drive without a disk in the drive, the computer will keep trying to read the nonexistent disk until you insert a bootable disk.

Will The VICmodem Work With PET And 64?

I have a VICmodem. I was wondering what would happen if I plugged the modem into a 64 or Commodore PET. If it wouldn't work, what are the differences between the VIC's User Port and the others?

Seth Major

The VICmodem will work with either the VIC-20 or the Commodore 64. The User Ports of these two computers are nearly identical. The PET/CBM series computers have a User Port also, and that port has the same edge connector as the VIC and 64. The bottom row of pins (A-N) has essentially the same configuration on all Commodore products. However, the top row of pins (1-12) is totally different on the PET/CBM. Also, the VIC and 64 have routines in their operating system ROMs which support serial communication through the User Port. The PET/CBM does not support in ROM any type of communication through its User Port. The VICmodem cannot be used with PET/CBM models.

Whiz Kids And The Real World

I have an Atari 800 computer and I wanted to know if I could connect my 800 with other computers to make one big system. I would also like to make a computer system that would be able to talk and do many programs like they do on the show Whiz Kids.

David Smith

The TV show Whiz Kids is sometimes unrealistic. One episode had them turning on the sprinkler system in an effort to escape a room they had been locked into (of course the room had a computer terminal in it). There seemed to be no concern that the water cascading from the ceiling would almost instantly short out the terminal they were using.

Nevertheless, the show does feature current technology and trends. With a telephone modem and terminal software, you can call up other computers and exchange information. There are many small bulletin boards which distribute information and even free programs. You can also subscribe to information utilities, such as The Source and CompuServe. With a telephone and a modem, most computers can communicate with each other.

You can also buy a speech synthesizer, such as the Alien Group's VoiceBox, SAM from Don't Ask Soft-

ware, or the Votrax Type 'n Talk. These devices let you program your computer to talk, but do not give the computer any capability for real conversation. Even the most advanced artificial intelligence experts haven't solved that problem yet.

TI-99/4A Disk Drives

Is there any company that makes a TI-99/4A disk drive that does not require accessories?

Eric Chet

TI, in fact, manufactures a "stand-alone" disk drive which has a built-in disk controller, and thus doesn't require the Peripheral Expansion System. This particular drive actually costs a little more than the disk controller card and the disk drive which are housed in the Peripheral Expansion System. If you are thinking of later expanding your system, you may want to spend the difference on the Peripheral Expansion System since TI no longer manufactures any other peripherals which work independently of this unit.

VIC-20 Static

I own a VIC-20. I use it on a black-and-white television. No matter how much fine-tuning I do, I can't get sound other than static. Is there any way this can be corrected? I have the RF Box without any adjusting screw inside.

Chris Nelson

Could be a bad RF modulator. Try another.

64 Lockup Bug

I am having a problem with my Commodore 64 which occurs when I use the DEL key to edit a BASIC program. While I am deleting, the program that I am working on RUNs! Even if I try to use the RUN/STOP key, it keeps going. Then, when it gets to an INPUT statement, the computer will not accept any keys. When I hit a key, even RETURN, nothing happens. The cursor just stays still and blinks.

R. Kasturi

You are describing the infamous 64 keyboard lockup bug. It occurs when you enter a long line at the bottom of the screen, then back up to edit it. There is no way to recover from this lockup short of shutting your machine off, then on again. If you scroll your line up before you try to DEL any characters, there should be no problem, as this lockup will only occur at the very bottom of the screen.

De Re Atari Error

Attention! Anyone owning De Re Atari, I have found an error in it. In the section on Display List

Sports Illustrated Sports Special

microcomputer news

Tuesday, April 1

Four exciting sports games from Avalon Hill

Colts romp over Dolphins, 24-7

Last night's sensational gridiron duel proved there are no underdogs in Avalon Hill's **Computer Football Strategy**.

The Colts ran in the first Miami punt and then capitalized on a Dolphin fumble to jump out to a quick 14-0 lead.



Early in the 1st qtr. with Colts in possession
ATARI SCREEN

Dropped passes, penalties, fumbles... all took their toll in the exciting contest in the home of Ogie Pincikowski, newest armchair quarterback. Says Ogie with some satisfaction, "It's the next best thing to being out on the gridiron itself!"

In Avalon Hill's **Computer Football Strategy** you pit your skills as play caller against the computer or go head-to-head with a live opponent.

Atari® Home Computers 32K Disk (joystick required); Commodore 64® Disk; IBM® PC 64K Disk; TRS-80® 32K Disk and 32K Cassette for Models I/III/IV; Commodore 64® Cassette & Atari® Home Computers Cassette. All Diskettes \$21; Cassettes \$16.

Marciano to spar Ali

Tomorrow night's 15 round **Computer Title Bout** matchup between two of professional boxing's greatest fighters promises to be historic in all senses of the word.

This "Match from the Past", as the bout has been dubbed, is slated to begin at 9pm in the basement of Marvin "Max" Maxwell's house on the outskirts of Baltimore. States Max, "I've always wondered if the incredible boxing skills of Ali could stand up to the sledgehammer fists of the Brockton Blockbuster."

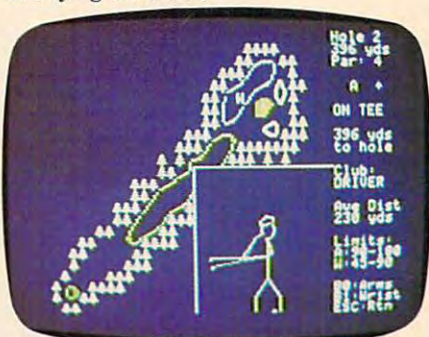
Avalon Hill's **Computer Titlebout** will factor in dozens of variables in deciding the ultimate winner, round by grueling round.

Adds Max, "The game gives you the statistics of hundreds of contenders, and lets you do the pairing up. In fact, you can even create your own fighter. **Computer Title Bout** is a fast-moving game for two players, or solitaire against yourself."

Atari Home Computers 48K Disk for \$30.

Tournament Golf a hole-in-one

"Sixteen feet to the hole and a steep break to the left." Harvey Hornbuster carefully considered his predicament. The entire match had come down to this last putt. Sink it and he's a hero; miss it and he'll be buying the drinks.



Hornbuster teeing off on second hole

Carefully, with a steady hand and just the right twist to the wrists, Harvey took his putt. Looking over his shoulders at the video screen, the other members of his foursome held their breath and stared as the ball steadily approached the hole and then disappeared. A perfect putt!!

Tournament Golf brings you all the tense excitement of a real day out on the links right in your own home. Hooks, slices, muffs, traps, water hazards and rough... it's all there and more, including two challenging 18 hole championship golf courses.

Apple Home computers 48K Disk for \$30. Joystick/Paddles required.

Upstart Cubs Take AH Series in 6

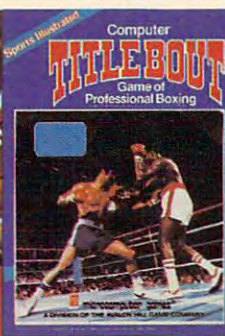
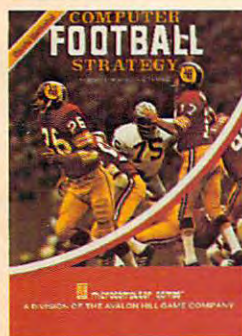
Chicago's stunning victory yesterday in the living room of **Computer Statis Pro Baseball's** AH-League manager Milton Mousehouse didn't surprise the team's owner, Fred Smith. Commented Smith after the victory, "It was just sound management. My lineup selection, pitcher choices and timely substitutions carried me through."

Trailing 4 to 1 going into the ninth inning, the Cubs' bats finally came alive as they pounded in 5 runs to win the game, and the championship, 6 to 4. A good showing for Fred's cubs, especially after dropping the first two games to the defending champions, the Baltimore Orioles.

Added Milton, "Avalon Hill's **Computer Statis Pro Baseball** places you in charge of your favorite ballclub. Your decisions can make an also-ran into a pennant winner. You don't play against the computer. You can, however, play against yourself and have the computer do all the bookkeeping. It will even supply you with a printout of the box-scores after each game, if you have a printer."

Of course, you can also do as Milton and his friends did and organize a league of your own, capping it off with your own championship series. **Computer Statis Pro Baseball** puts you in the dugout, so to speak, especially with Milton's wife Mortina supplying the hot dogs!

Apple Home Computers 48K Disk for \$35; TRS-80 Mods. I/III/IV: 16K Cassette \$25 & 32K Disk \$35.



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Challenge yo

Make beautiful music. Everyone loves music. And anyone who has ever hummed a tune can write one, now. Scarborough has taken the universal language of music and developed a software program that makes it fun and easy to write songs for budding composers of any age.

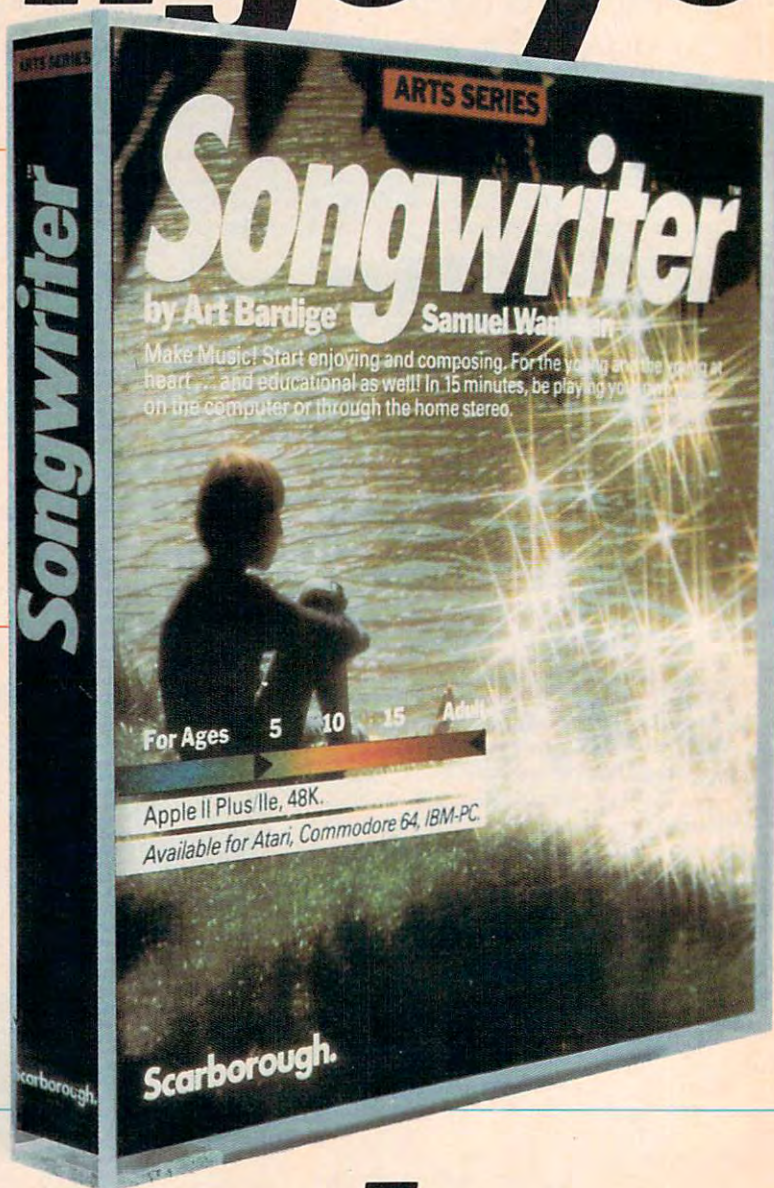
Even those who don't recognize a single note can be composing songs in 15 minutes. Simulated piano roll graphics and on-screen commands serve as a guide every step of the way — from scales and rhythm to more complex musical forms and theory.

With Songwriter, composing songs is as simple as "do-re-mi." Write a song, change, delete or add a note, change tempo and teach the computer to repeat musical motifs. Even save compositions to play back through the computer or your home stereo. For added fun, there is also a library of 28 popular songs to listen to and experiment with, as well as a series of educational activities for adults and children.

Songwriter is like a word processor for music that will bring the whole family back to the computer, again and again — because Songwriter encourages experimentation and makes the whole process fun. Isn't that why you bought a personal computer in the first place?

Every kid has a song in his heart. (So does the "kid" in every parent!) Help yours express it with Songwriter.

Available for Apple®, Atari®, Commodore 64™ and IBM-PC® \$39.95



The Scarborough

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ur creativity.

Be quick on the draw. PictureWriter is magic! Create any shape or pattern, instantly. Fill areas with glowing colors and even hear pictures set to music.

PictureWriter brings out the artist in anyone. With this program, your child can create his or her own picture gallery and watch the computer redraw the pictures like magic on the screen. PictureWriter also includes a library of masterpieces by other "picture writers" that can be colored, edited and redrawn.

Like all Scarborough programs, PictureWriter encourages experimentation and continually challenges the child to explore new avenues. And all the while, PictureWriter subtly develops the child's familiarity with the fundamentals of step by step computer programming.

Getting started is simple. The built-in tutorial zips the artist into the program quickly and keeps him or her creatively occupied for hours.

The possibilities are endless with PictureWriter. In fact, children find it so captivating that parents will probably want to doodle with it, too. And why not?

You can't stay an adult forever.

**Available for Apple® \$39.95
(Soon, Atari®)**



ough System.

You'll grow with us.

Interrupts, page 5-3, there is an example listed in both BASIC and machine language. As it stands, the BASIC program does not work. The problem lies in the data. Simply change the number 141 in line 70 to 142. I arrived at this by hand-assembling and comparing my results with the data. As listed, the STX is STA.

Neil Goldman

Serial Vs. Parallel Printer For The Atari 800

I have an Atari 800 and I am planning to upgrade my system with a disk drive and printer. What is the difference between serial and parallel printer interfaces, and which do I need for the Atari? Is there any advantage, one over the other?

W. E. Westervelt

Serial printers receive information one bit at a time, while parallel printers can receive up to eight bits (one byte) simultaneously, making them faster. Parallel printers are more common, and often easier to interface with a computer. Serial printers require that you set up and specify values such as baud rate, word size, and stop bits, whereas parallel printers all operate according to standardized rules.

Parallel printers are usually cheaper than serial printers; serial is often an option. For your Atari 800, you can use a printer with either the Centronics parallel or RS-232C serial standard, but in either case you need to buy the 850 Interface module, which supplies the necessary conversions for the Atari's nonstandard serial port and the physical connections for the cables. Most software is set up to work with a parallel printer, however, so this may be the best choice. The newest Atari printers attach directly to the nonstandard serial port, eliminating the need for an interface.

Reading Commodore Files With The Kernal

How can I get data off my disk drive via the serial bus? Doing this in BASIC takes too much time. I am aware of the Kernal and its routines ACPTR, TALK, TKSA.

I have tried opening the disk for a read with BASIC, then I SYS to a small machine language program using the above statements. Unfortunately, I only get a string of shifted G's instead of the sequential file I want. I followed the reference manual closely, but still no luck.

Steven A. Bailey

Jim Butterfield replies:

The only Kernal subroutines you need to use for reading from files are:

CHKIN—\$FFC6—connect input;
GETIN—\$FFE4—get a character;

CLRCHN—\$FFCC—clear input to default (keyboard)

Don't forget to read ST (\$96 on PET/CBM, \$90 on VIC/64) to detect end of file. Try the following sample program for reading a file to the screen:

```
100 DATA 162,1,32,198,255
110 DATA 32,228,255,32,210,255,166
120 DATA 144:REM(FOR VIC/64; USE 150 FOR
    {SPACE}PET/CBM)
130 DATA 240,246,32,204,255,96
140 FOR J=828 TO 846
150 READ X:POKE J,X
160 NEXT J
170 INPUT "NAME OF FILE";N$
180 OPEN 1,8,2,N$
190 SYS 828
200 CLOSE 1
```

This is a very simple program, of course, but it will help you see how simple use of the three subroutines can do the job.

Simulating Motion On The Apple

How does the Apple IIe simulate motion without sprites?

Ray Karter

There are a number of ways to simulate motion on the Apple. One way is to repetitively print and erase a character as you move it about the screen. But the smoothest way to simulate motion on the Apple is to use a page-flipping scheme. This is accomplished by alternately switching between two graphics screens upon which two shapes have been drawn. While one screen is being viewed, the shape is redrawn on the second screen in another position. The position chosen depends upon the direction you wish to move the figure. After the second figure has been drawn, you can change certain memory locations (known as switches) to view the second screen. As you might imagine, this technique can also be used for animating figures. For more on this, see Leslie Grimm's "Animating Applesoft Graphics" in COMPUTE!, December 1981.

More On Commodore Double-spaced Listings

Regarding Double-spaced Listings On Commodore Printers ("Readers' Feedback," November 1983), line 15 contains a potential trouble spot. AD is likely to be greater than 32767 in the 64 (unlike PET); hence AD AND 255 may be an illegal quantity. The line should be:

```
15 POKE 55,AD-256*INT(AD/256)
```

There is a simpler way to double-space on Commodore printers—send a line feed:

```
OPEN 131,4:CMD131:LIST:PRINT#131:CLOSE131
[RETURN]
```

A file number in the range 128-255 sends a

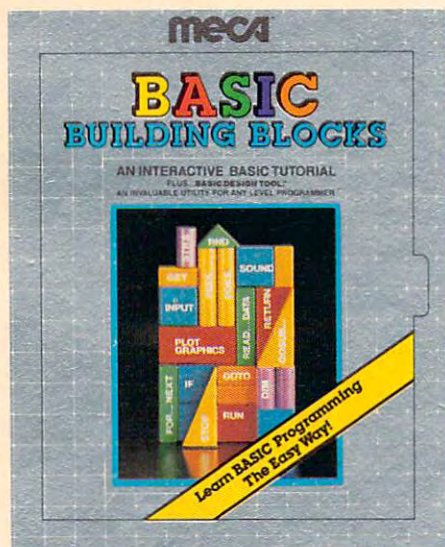
"How MECA experts taught us more Basic in one hour than we learned in 12 hours from a book."

"BASIC BUILDING BLOCKS™ lets us interact with our computer and learn at our own pace. Dad says it's so easy to use, it even eliminates the need for him to read the manual. You should see all the programs Mom has written by herself. I like it because it really gets into the fun of the computer...fast. BASIC BUILDING BLOCKS is like having personal computer experts in our house."

My
Dad

My
Mom

Me



- A unique, challenging and entertaining introduction to BASIC programming.
- Consumer testing shows that 9 out of 10 people didn't even need the manual.
- BASIC commands fully demonstrated, including disk access, sound and graphics.
- Over 60 sample programs executing so you can see how BASIC commands work, learn program structure and flow of control.
- Innovative program design for freedom of movement anywhere in the tutorial. This lets you test sample programs at your own pace until you understand how they work.
- Actually encourages you to write and test your own programs.
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line feed in addition to a carriage return, which causes double-spacing.

Elizabeth Deal

Another reader, Frederick L. Knapp, writes that the *Commodore 64 Programmer's Reference Guide*, on page 65, advises that "file numbers over 128 were really designed for other uses so it's good practice to use only numbers below 127 for file numbers."

Use of the CMD command is, indeed, a simpler approach to double-spaced listings. (The PRINT# and CLOSE commands are included to tidy things up.) Commodore's cautionary note about the use of file numbers greater than 127 is intended to help you avoid generating an extra line feed, which might cause problems in tape or disk storage and telecommunications applications. Use of the higher file numbers for double-spacing is an exception to this rule.

Several readers have offered improvements to the published programs, and we have incorporated their suggestions into the revised listings below. These short BASIC Loader programs for the VIC and 64 POKE a machine language program into memory. They are wedged into the Kernal, where they check each output character to see if it is a carriage return. If not, the routine is skipped. If a carriage return is encountered, a second carriage return is sent to the output device to provide double-spacing. While the direct approach is simpler, the wedge routine has the advantage of allowing you to choose single- or double-spacing with a SYS statement in your own programs.

VIC Version

```
10 PRINT"{DOWN} TO START: SYS885" :rem 82
20 PRINT"{DOWN} TO STOP, PRESS" :rem 230
30 PRINT" RUN-STOP/RESTORE" :rem 239
50 FORA=885TO908:READB:POKEA,B:NEXT
:rem 220
885 DATA 169,128,141,38,3,169,3,141
:rem 203
893 DATA 39,3,96,201,13,208,5,32
:rem 43
901 DATA 122,242,169,13,76,122,242,0
:rem 227
```

64 Version

```
10 PRINT"{CLR}{DOWN} TO START, SYS679"
:rem 216
```

```
20 PRINT"{DOWN} TO STOP, PRESS RUN-STOP/R
ESTORE" :rem 161
50 FORA=679TO701:READB:POKEA,B:NEXT
:rem 212
679 DATA 169,178,141,38,3,169,2,141,39,3,
96,201,13,208,5,32,202,241,169,13
:rem 72
699 DATA 76,202,241
:rem 178
```

Assemblers For VIC And PET

I own a VIC-20 and have access to a PET. I am working with machine language, and have two questions:

1. I know how to access the PET monitor. Does it have a built-in assembler and disassembler, and if so, how do you use them?
2. I have Tinymon for my VIC-20. Does Tinymon have a built-in assembler and disassembler?

Barry Courtois

Commodore PETs have built-in monitors with six functions: load, save, display registers, display memory, execute program, and exit to BASIC. Jim Butterfield's "Tinymon" program offers those same functions to the VIC since it has no built-in monitor.

To add assembly and disassembly functions, you need one of the monitor extension programs such as Supermon or Micromon. Supermon for PET was published in COMPUTE! in the December 1981 issue; VIC Micromon (November 1982); Supermon 64 (January 1983).

Cassette Music For The 64?

On the Atari, some of the programs can load an introductory program and play music directly from the cassette to the TV. Is there any way that this can be accomplished with the 64?

Tim Coughlin

The Atari cassette system is stereo—it uses one track for data, the other for sound. There is a direct link between the audio track and the television (or other sound output). The 64 uses a different, monaural cassette technique. There is no way to play sound directly through the TV speaker. Theoretically, sound can be digitized from the cassette unit, but the technique uses far too much memory. It is possible to feed in an audio signal (say from an external cassette recorder) into the SID chip, where it could be filtered and mixed with the other voices. There is no way to simulate the Atari method, however.

COMPUTE! welcomes questions, comments, or solutions to issues raised in this column. Write to: Readers' Feedback, COMPUTE! Magazine, P.O. Box 5406, Greensboro, NC 27403. COMPUTE! reserves the right to edit or abridge published letters.



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Dear Mickey,

Believe it or not, this letter is being typed by our new daisywheel!! I'm thrilled to announce that the quality of its characters has met our highest expectations.

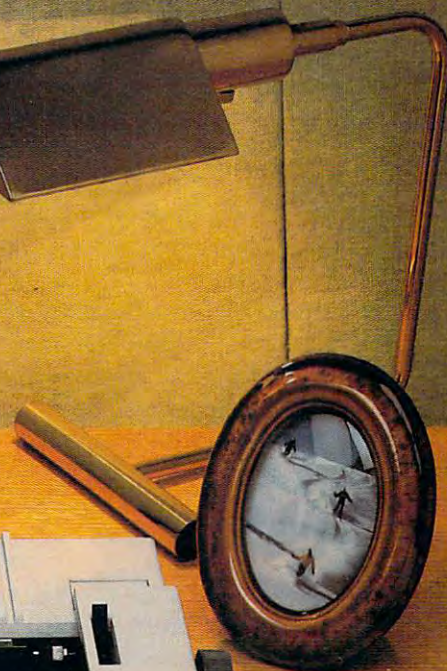
She's now called PowerType, and she's loud and ready to go!

As you certainly know, this has been a pet project of mine and it's so exciting to see the actual finished product live up to my imagination. It sounds crazy, but I guess I almost feel like a proud father.

Kind regards to Alan and John and tell them to make room on their shelves! We'll be sending PowerType and literature early next week.

And remember, with PowerType, she's not the way it goes. (Sorry, I'd better stick to sleepwalking.)

All my love,



Computers And Society

David D. Thornburg, Associate Editor

Personal Computers And The Arts

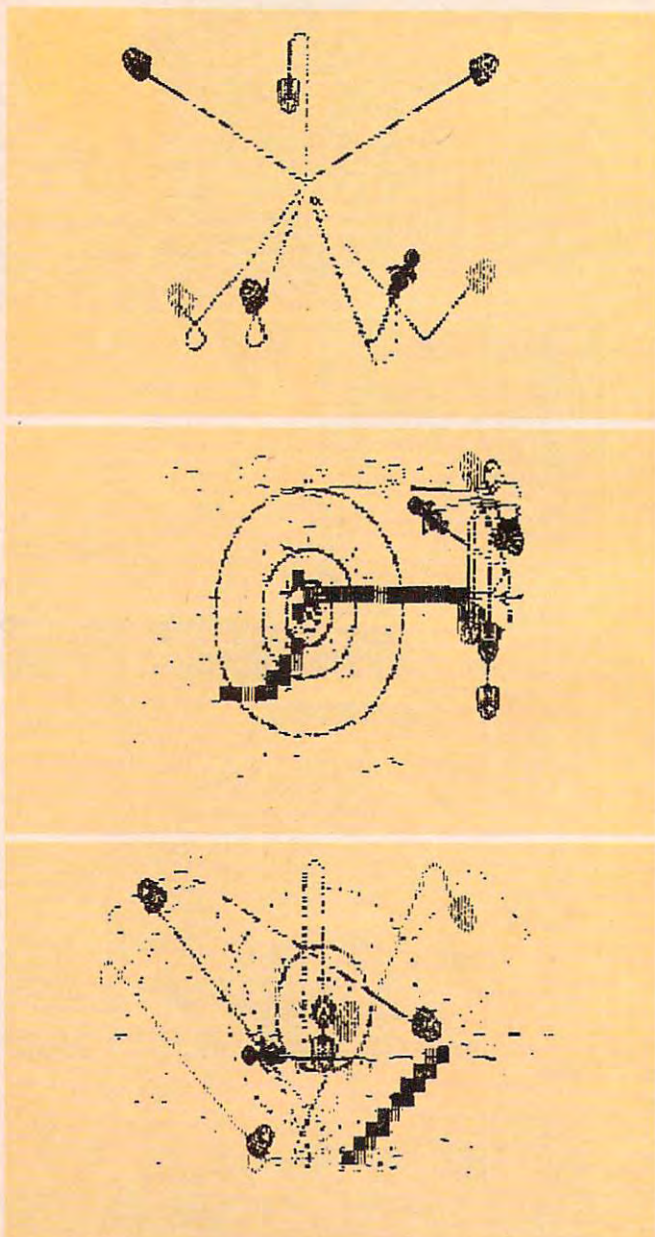
Last month we explored the exciting world of computers in the fine arts that was opened to us by Dale Peterson in his delightful book *Genesis II*. Most of the work described by Dale related to experiments on large computer systems. But, just as the pioneers may have developed interesting tools for the exploration of creative ideas on large computers, today's practitioners are bringing these same tools to personal computers.

Let's look at three products this month. Each can be viewed on several levels. There is an obvious (and marketable) level, and there are other levels, much more subtle and yet more powerful, that can only be seen when the product comes home and is used for a while.

Moondust

I don't know Jaron Lanier's background, but he is a game designer who is also a fine computer artist. He created an "action game" called *Moondust* (published by Creative Software) that is, in reality, a synthesized artistic experience involving diaphanous colors and mellifluous sounds. The *game* aspect of *Moondust* involves planting on the screen a seed that you must drag your players over. As your players cross the seed, colors are spread out on the screen. If you can drag colors to the center of the screen, you get many points for your effort. Because the images are moving all the time anyway, it takes awhile to discover just how your joystick controls the player's motion.

During play, the screen is filled with abstract color patterns that gradually dissolve and merge in many delightful and unpredictable ways. The accompanying music appears somewhat random, but is always melodic—never harsh. The nature of the music changes as you move the joystick, so both sound and graphics are responsive to, but not totally controlled by, the user's actions."





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You'll find out what planet you're on.

What the fuss is all about.

Why you're involved.

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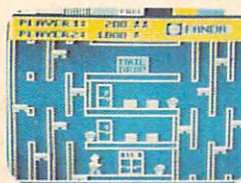
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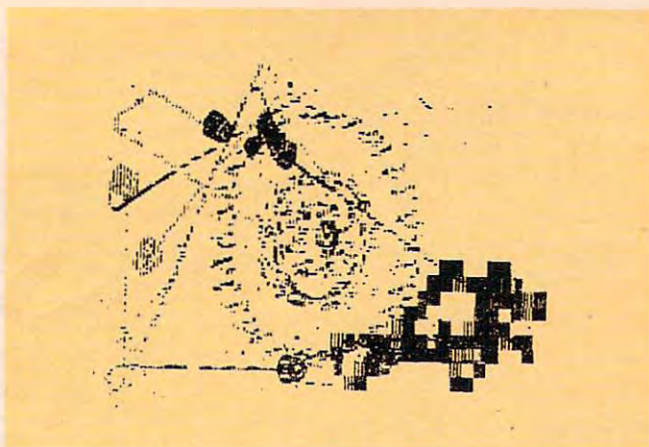


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Because of the "art" nature of this game, there is even a playing mode in which there is no scoring—you play the game purely for the aesthetic experience.

In an era that gives us games for such "pleasant" topics as nuclear war (for example, *Missile Command*), it is refreshing to see a game that appeals purely to our deep human sensitivity to artistic expression.

There is a problem with products of this sort, however. Games like *Moondust* don't have the instantaneous brand-name appeal of the commercially hyped products. As a result, innovative products tend to be seen only by people with a bent for exploring the unknown. *Moondust* deserves a wider audience than that because it is an experience that everyone can enjoy on several levels.

An Adventurous Word Processor

Anyone who has walked past the children's section of a bookstore lately has probably noticed the great popularity of a literary form called interactive fiction. In these books, the reader takes the role of a main character. As the book proceeds, the character has to make several decisions. Based on each decision, the reader is directed to turn to a page where the story continues on a new path dictated by this choice. These books can be read over again, with the reader making different choices along the way.

While not pretending to be great literature, these books capture the hearts and minds of the young, and probably are beneficial in improving comprehension skills (you can't make an intelligent choice if you don't understand what you just read).

Since the idea of "branching" is common to computer systems, it was only mildly surprising (but no less delightful) to see that the "make your own adventure" idiom had been translated to the computer by Scholastic in their disk-based *Microzine*. The Scholastic stories are called "Twist-A-Plot" adventures, and they provide all the flex-

ibility and excitement of their printed counterparts.

And yet, as nice as Twist-A-Plot is, I wanted to see a "make your own adventure adventure"—a word processor that lets you create your own adventure stories from scratch.

Fortunately, I wasn't alone.

George Brackett and Scholastic have now developed a product called *Story Tree* that lets anyone write their own adventures with branches at all the right places:

"Just as you start to open the door, you hear a muffled scream ...

The choices are:

- Turn around and run.
- Open the door and walk inside."

Story Tree is not only a fine word processor, but it also encourages children's creativity by allowing them to develop a story in several directions at once.

Rather than stumble over the direction a story should take, *Story Tree* users can follow several branches to their hearts' content. Finished stories can be printed out (complete with page numbers and instructions for all the branches). But even more exciting than this is that *Story Tree* allows the user to write stories in which various branches can be chosen by chance. The weighting among various branches (for example, 20 percent for branch A and 80 percent for branch B) is set by the user and, when the story is later read, the computer will make choices automatically based on the likelihood for each branch. If a story using chance is printed out, the user is told to roll a die to determine which page should be read next.

Aside from the obvious and intended application of *Story Tree*, this program offers a wealth of other applications, many of which are yet to be discovered.

I have created a random limerick generator using *Story Tree*, and it can be easily used by teachers to create CAI materials. For example, a question can be asked. Depending on the choice made for the answer, the user will be automatically directed to review material or to the next phase of the program.

So, in creating a tool whose roots lie in a popular literary form for youngsters, George Brackett and Scholastic have given us a word processor that is also an authoring language whose uses probably transcend the dreams of its designer.

PILOT As A Discovery Tool

The book *Genesis II* explored the computer as a tool for creation in the visual, auditory, literary, and recreational arts. Of all the computer languages that encourage experimentation in each of these areas, few exceed the capabilities of Atari PILOT. But, as we all know, a language can be

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*Game Manufacturers Association, 1981

greatly enhanced by a book that gives examples of activities that act as springboards for our own discoveries. *ATARI PILOT Activities and Games* by Herb Kohl, Ted Kahn, and Dale Disharoon (Reston Publishing Co.) is one such book. The authors have created a balanced book that explores all facets of Atari PILOT, not just to teach it, but to use it to explore other topics. In discussing creation in the written word, for example, they provide a PILOT-based version of Eliza, a programmed "Psychiatrist" first written by Joe Weizenbaum at MIT many years ago. This program is an example of an empty interaction. The computer asks questions and seems to be responding in a personal way to the user's problems when, in fact, it is responding mechanically, unthinkingly. In other activities, the authors explore the creation of stunning visual patterns, the creation of musical scores, and the creation of games.

This book is far more than a source of programs, however, as it opens the door to a free-form discovery-mode exploration on the part of the user. The reader is constantly being encouraged to think about what is going on. I was flattered to find that some of my favorites, such as "Twenty Questions" (see this column, September 1981) were included.

But my favorite PILOT program in this book

is an activity called "Metagame." The function of this program is to help the reader define a game of his or her invention. While it does not write the game for the user, the program does help clarify some of the issues confronting a game designer.

I have always liked PILOT as a language, and the facility with which Kohl, Kahn, and Disharoon were able to incorporate PILOT activities in such a wide range of applications merely strengthens my regard for it. ©

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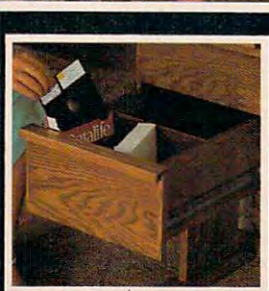
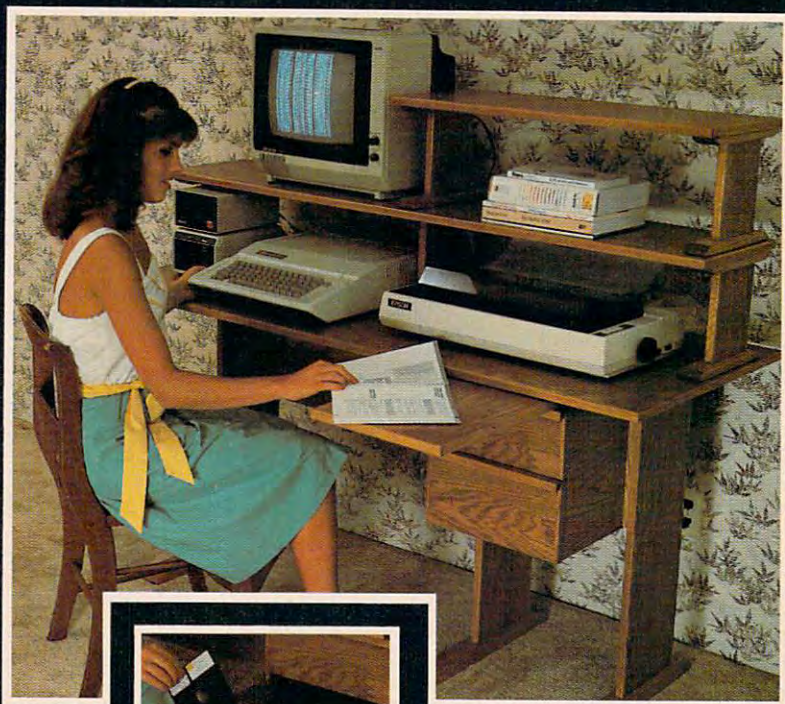
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How COMPUTE! Readers Use Their Computers

Bernie Ghiselin

"What can you do with a home computer?" In December 1982, COMPUTE! published its first reader survey on the many uses computer owners were discovering for this new creative tool. Now, over a year later, we learn that COMPUTE! subscribers are extending their computing skills to even more diverse applications, from Sunday School classes to robotics.

Sid Roberts has become a prisoner of the silicon society and has no idea how it happened. Or even why.

"I'm afraid the proper term is *hooked*," he says, sounding like someone admitting to an addiction.

One day in early December 1982, Roberts was somewhere above the clouds, on board a plane headed from Youngstown, Ohio, to Florida. To pass the time, he opened an in-flight magazine to an article about the Apple computer. "It sounded like something I ought to know more about."

That led to more articles. Then whole books. Not simply about this computer or that, but about the whole digital, binary, algorithmic way of knowing and creating. "I am a constantly curious individual," he says.

Sid Roberts did not understand all he read. But never mind.

In late January 1983 he bought a Commodore 64—and a disk drive, a printer, and a modem. "Two weeks after I bought it, the dealer went out of business." But that made no difference either.

Here He Is, Beguiled

More articles. More books. He spends countless hours at the terminal. Trying this program. Trying that. Experimenting. Fiddling around. "If two days go by and I haven't touched the keyboard, I begin to get withdrawal symptoms."

Now, Sid Roberts is no pinball wizard clutching a handful of quarters, his nose pressed against the damp windows waiting for the game room to open on Saturday morning.

He is a professor of American history at Youngstown State University. He has published on the political uses of power and the role of businessmen as reformers in politics. He is active in civic projects. His wife, Patricia, is a lawyer.

Yet here he is, beguiled by nearly \$1,000 in microcomputer gadgetry that so far hasn't made one practical contribution to his life.

For example, Roberts is an avid gardener. But the computer hasn't made him a better gardener. Nor does he use word processing for academic papers. Since he has access to the university's mainframe computer, he has explored using the computer as a teaching tool. But the university said no; the computer science students need the mainframe. So Roberts went back home. He is working on a program for grading his classes. Does he need the program? Not really.

"I'm not doing anything any quicker than I could with paper and pencil."

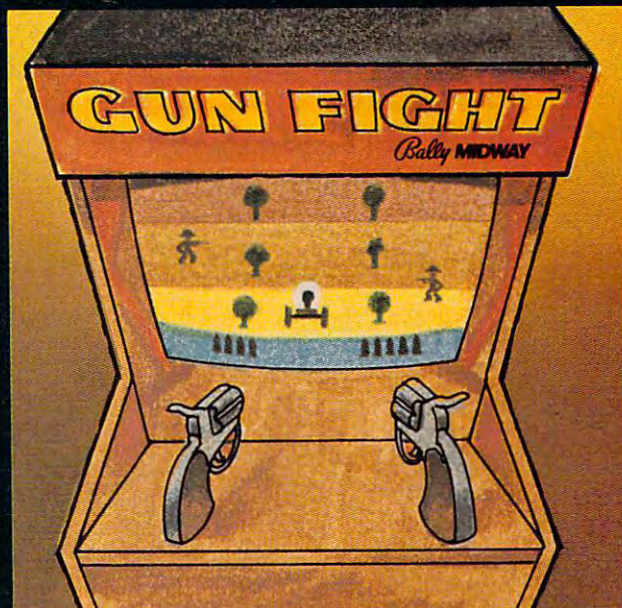
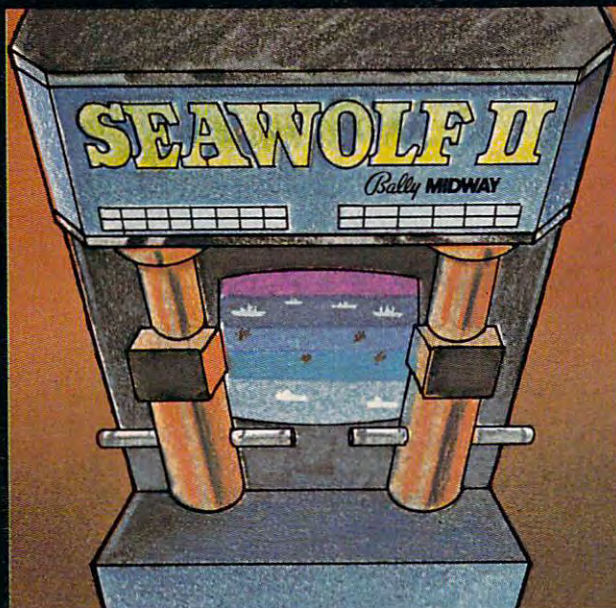
Yet he continues to fiddle about, experiment, and read. He not only joined, but even helped to form, a Commodore 64 users group which at first met in his home. "It's kind of like open heart surgery. You want to tell others it's not as bad as they imagine."

Despite his frustrations, Roberts has no intention of chucking the whole thing. "I am absolutely fascinated by the concept of computing, the mental process. It turns me on."

A Major Phenomenon

"I am not thinking in terms of the utilitarian. I am still interested in the process," he said one evening in early October. "I am like many, many people driven by a sense of curiosity. It's difficult to ex-

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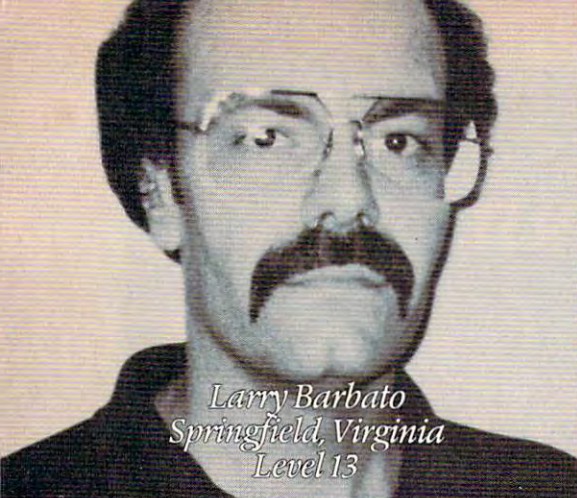


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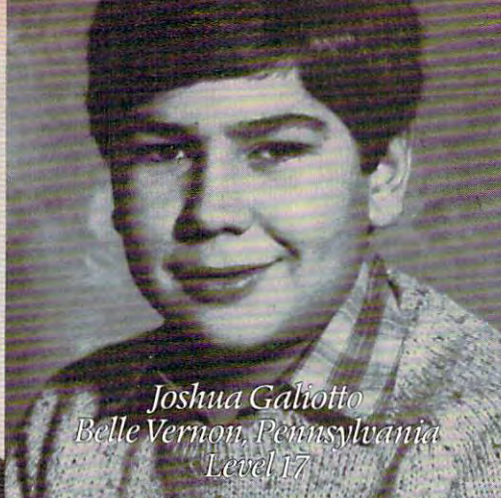
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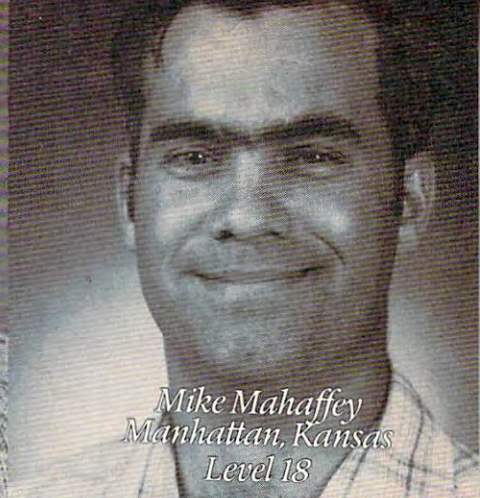
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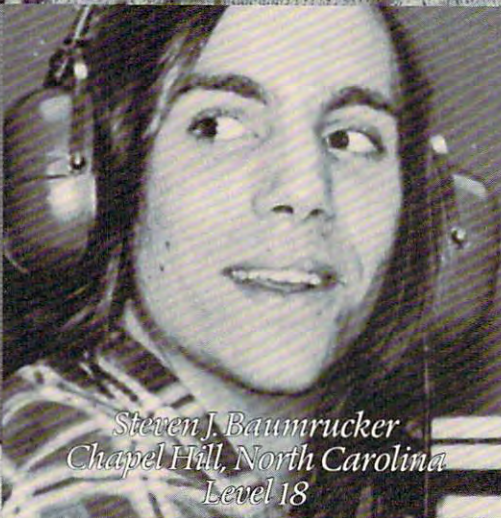
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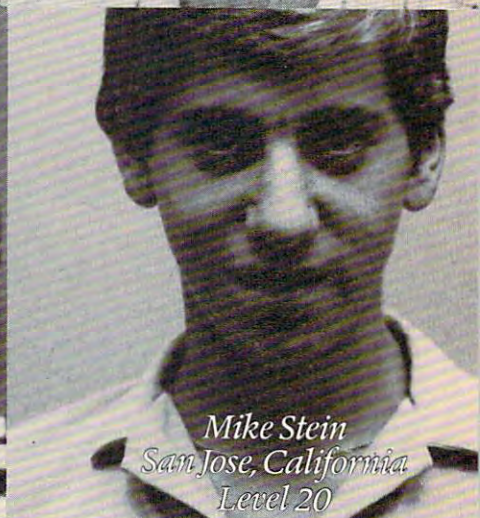
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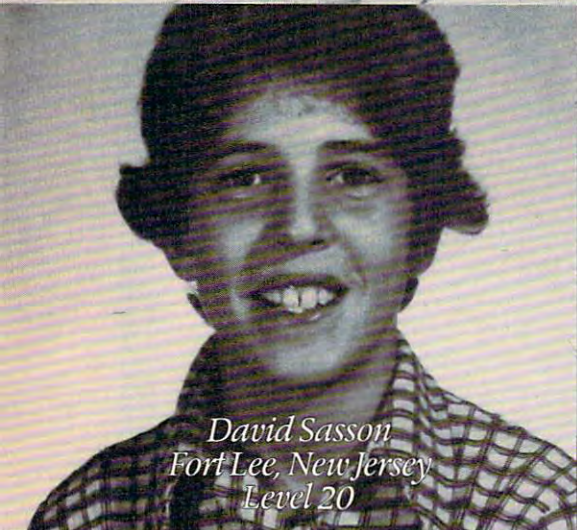
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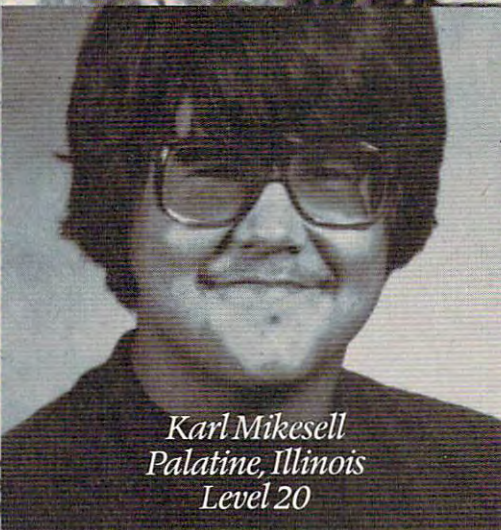
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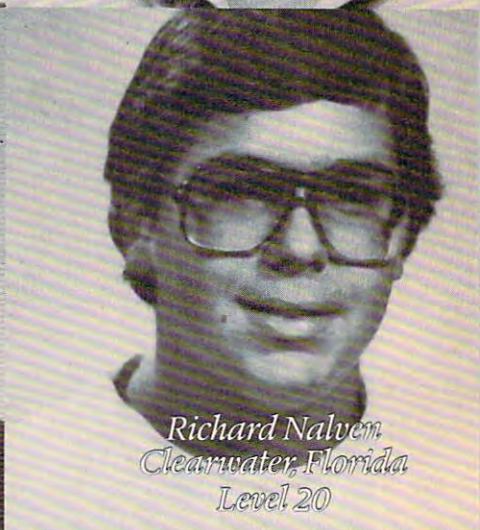
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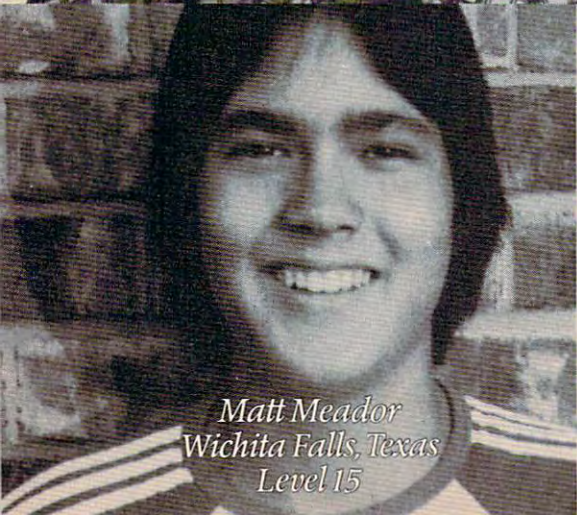
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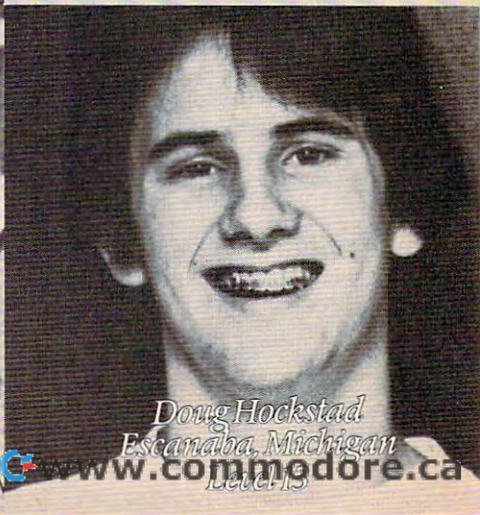
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plain to you.

"I have not bought programs because I'm not interested in using the computer to achieve a specific goal. I am interested in using the computer to learn about computers. It's impossible to be a professor in an American university and be oblivious to a major phenomenon."

Roberts shares a certain passion for exploration with many COMPUTE! subscribers.

Throughout October, more than 80 subscribers in 35 states were contacted by phone and asked, mainly, "Why did you buy a computer for your home? What do you do with it?"

In response to this rather presumptuous inquiry, many subscribers laughed and said, "That's a good question," implying they weren't at all sure. ("I know what you're asking and I don't know," said Glenn Haycraft of Omaha.) And then, following this awkward opening, they would list almost as many uses for a computer as there are people to ask.

Chris Hales of Orem, Utah, a masonry contractor, has developed an inventory spreadsheet. Ruth Fritz of Trumbull, Connecticut, a realtor, uses a computer for property management, keeping track of rents, taxes, and such. Robert Sperling of Woodmere, New York, uses a computer for his hobby, buying and selling antique cameras that can sometimes fetch \$8,000 apiece. Like many others, Mike Komar of Wantagh, New York, uses a computer for weight watching. And he's doing pretty well—he's lost 20 pounds.

Like many ham operators, Don Etters of Chester, South Carolina, plans to build an interface between his radio and his computer to translate Morse code into readable English. And Joseph Lepore of West Palm Beach, Florida, a construction salesman, is working on a program to match any dwelling against the state energy code. His program shows a builder the maximum heat load in a house built any of eight ways. "They get a worst case condition," said Lepore.

The list goes on. Subscribers are using microcomputers to handicap the horses, predict the World Series, and plot ballistics, pigeon races, and chess moves. There are countless college students accessing university mainframes and law students using word processing for their course outlines.

Two Main Groups

In general, COMPUTE! subscribers fall into two groups: those who know programming, know what they want and can put their computers right to work. And those like Sid Roberts who feel "this is something I ought to know more about." So they charge off to the local community college to take a course in BASIC and even start into machine language.

Not To Probe The Mysteries Of Refrigeration

In one way or another, Sid Roberts' experiences seem to be shared by many subscribers. They want something more than an ordinary appliance. They don't buy a refrigerator to probe the mysteries of refrigeration. Nor when they buy a TV do they care how J.R. Ewing gets from Dallas into their living room. But when they buy a microcomputer, something happens. They are not content to be passive consumers. They want to be the creators, the programmers. They want to see the genie behind the cursor.

Take Harvey Peters, 28, an auto mechanic in Havelock, Washington, who had no immediate need for a computer nor any knowledge of programming. He bought a VIC-20, took a class, and began teaching himself to program. For the last six months he has been working on an algorithm for character recognition. He wants to teach his computer how to read from an optical camera that uses RAM memory. "I've gotten a fabulous education for what I've put out," he said. "It's gotta be good for something."

Over and over, with only minor variations, COMPUTE! subscribers repeated the same reason for buying. "Why? That's a good question," said David Ficklen of Fort Worth, a machinist. "Because of the challenge. Just to learn about it." Neil Godfrey of Mesa, Arizona, a systems analyst, could chime right in: "Just the curiosity aspect of it," he said. "Just to get into the computer world," said Joel Johnson of Memphis, a psychologist. "So I can be as smart as my 8-year-old paperboy," said Mark Nowlin of Ponca City, Oklahoma.

There is, of course, something other than normal curiosity.

If COMPUTE! subscribers are characteristic, people buy home computers because they see the stagecoach of technology pulling out. They don't want their children abandoned in some educational or professional ghost town. This motive to buy runs through the list, regardless of age, education, or profession. "They need the exposure," said M. J. Plavetsky of Laurel, Maryland. "I feel wherever they go there'll be computers clicking away in the background."

You Won't Be Able To Dig A Ditch

James Marinelli of Norfolk, Arkansas, says he's so busy running a tavern he hasn't had time to learn. But that doesn't matter. The main reason he bought a computer was "so my daughter won't be lost in the world." His daughter, Cindy Mae, is 1.

Brian McGrath of Greenfield, Massachusetts, is somewhat in the same boat. He can't use his Atari 800 in his work. But his children, Tara, 9, Sean, 8, and Brendan, 6, sure can, for writing and



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spelling. His wife, Ann, does the programming. "I don't think you'll be able to dig a ditch in 20 years without a computer," said McGrath.

Ken Blohowiak of Green Bay, Wisconsin, has owned a computer for a year "for my son, first, he's eight, second his mother and third, me," he said. As things turned out, his son, Sean, is the big user. "He does mostly math with it, now has a spelling program. We only have two games. It's not really a game toy for us."

Games were never given as a main reason for buying a home computer. Except for Paul Gallaher, 30, of Chandler, Arizona, who majored in computer science and took masters level work in simulation and visual displays. "I must admit," he said, "my largest motivation is the games. I've always been involved with graphics and computers."

Gallaher's skill with graphics led to teaching his daughter, Dawn, now 3, how to recognize musical notes. He uses color graphics on his VIC-20 and toy xylophone. Dawn has not only learned to associate notes with particular colors; she has also begun learning numbers, pushing the key she needs to get the color she likes. "She only spends ten minutes at a time," Gallaher said, "but she's getting a lot out of the time. I've had her ask for advanced games."

And Gallaher has found other uses. Through a program designed to calculate the true interest on loans and mortgages, Gallaher realized an automobile dealer was less than straightforward on terms for a new car. Gallaher went to another dealer.

Wait. An infant girl asking for advanced computer games? What's going on? Apparently the Sid Roberts syndrome isn't reserved for adults.

Indeed, the kids are gobbling up all the software that parents will buy. For three things: games, programming, and the three R's.

Crystals In A Cave

"I got down on my knees" and begged for a computer, said Toby Applegate, 13, of Ridgeway, Virginia. "I am definitely hooked on the computer." He spends about ten hours a week at the keyboard, either programming his own games or checking his math and algebra homework. "It's made understanding variables a lot easier," he said. "I hope it brings up my grade." His ambition? To write a program good enough to sell.

Mark Unger, 15, of Massapequa Park, New York, is one step ahead of Applegate. He's written a game called "Diver." The object is to swim into a cave, dive down, and retrieve a whole bunch of rare crystals scattered here and there. To do all this, of course, without drowning. "It's basically a maze game," said Mark, "but I thought of it myself." Time needed to write the program? Two weeks.

Mrs. Debbie Olson of Omaha said that when the computer arrived last Christmas, "it was strictly entertainment." Her younger children wanted videogames. But then her son, Robert, 14, rather took over. Not only is he teaching the other kids how to use a computer, he's trying to convert Commodore 64 language for use in a TI-99. "We had to limit him for a while," said Mrs. Olson. "He was spending that much time. He wasn't going outside or anything. Wasn't playing with his friends."

Last Christmas Paul Eitel, 14, of Circleville, Ohio, received a TI-99. He wanted a computer to make his own games. But it was also for school work. And what happened? "I've learned to spell a lot better," he says. Spelling was always a problem; out of 100 students in a spelling bee, Eitel would be the 13th eliminated. After a little help from the computer, he says, "I'm getting 100's on the weekly spelling test."

Royce Osborne of Cedar Rapids, Iowa, said microcomputers, first at school and then at home, made all the difference to his son, Jim, 14. "Before, you used to have to beat him over the head to go to school. Now, he doesn't want to come home."

If the students are doing well, so are the teachers.

Paul Fitzgerald works with emotionally disturbed children at a residential treatment center in West Haven, Connecticut. He has been teaching basic computer literacy and has found that whatever their handicaps, these youngsters have no fear of computers.

"A few can write fairly simple programs," said Fitzgerald. "Nothing real complicated yet, but they keep coming back for more. It thrills me to write a program and get it to do what they want. For some, it's just another arcade game. But it turned out they're all plenty bright."

With his TI-99, Michael Slane of Toledo has found a better way to teach his eighth graders about the Civil War. He's set up the lessons in the form of a football game and divides the class into teams. "As long as you keep answering correctly, you keep the ball," he said. If students talk during the game, their team loses yardage. "That's the only way you can play or you lose control," he said. "There's no doubt they've learned something from it."

That great numbers of young people, from toddlers to teenagers, should develop the Sid Roberts syndrome is no mystery to Bruce Keith of Union Lake, Michigan. "They can approach these things with a totally open mind," said Keith. "It's not overwhelming. They get far more out of it than I ever will."

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sells home interiors and uses their Atari for book-keeping and managing files. It has not only helped their son, Jerry, 10, with his spelling, but "it has improved my chess game," Keith says. "It really is a creative experience. It's like having your garden in your back yard turn out good."

But for squeezing the last byte from a home computer, perhaps few families top James and Deedee Hatch of Belleville, Illinois. Not only is their computer used practically every night, but they even take it to church on Sunday mornings. "It's drastically changed our life," he said.

Hatch is a meteorologist with the Air Force and bought a Commodore en masse with everyone else at his shop, for the group discount. Hatch wanted to crunch some numbers at home. Big numbers. In fact, for eight months Hatch has been trying to develop a new technique for meteorological analysis using Bezier equations. The object is "to find a better way of meteorological analysis by use of the small computer."

The Bezier process is explicit and describes an overall area by temperatures at selected points, whether at the surface or at pressure level. Then the analyst lays a grid over this surface to make a forecast. "An implicit operation has to be done a number of times," said Hatch. "With Bezier, given a scattered field of observations, one overall reading can be made."

At the moment, Hatch is bogged down. "My maximum effort is in the three-dimensional graphics package. And so far as I know, nobody makes a three-dimensional graphics package for the Commodore."

While Hatch waits for the software, his daughters, Susan, 8, and Stephanie, 10, are using the computer for games or to practice long division. Both have taken a summer course offered by the city of Belleville at \$50 each. They learned about the structure of arrays using Apple plotting commands.

In addition, the Commodore has practically become an employee of the First Baptist Church of Belleville, where Hatch is a deacon. It prints labels for the church newsletter and stewardship campaign, writes the deacon notes, and organizes the church budget. On Sundays the computer can be found at Sunday School teaching the Bible. The object is to win "jewels" by answering questions. "The first guy to get 15 jewels, an angel appears," says Hatch. "Its wings are flapping. It talks like a cartoon character. It's used for all ages." Finally, whenever honor is to be given, the dot matrix printer will make a certificate with hearts around the borders.

Not Much TV Anymore

"What's really changed," said Hatch, "is the time we used to watch TV we now spend the time out

here" where the computer has been set up, in a laundry area off the kitchen. "My wife works on arts and crafts and I work on my computer."

Has Hatch extracted the last possible bit from his Commodore? Not at all. "We haven't begun to scratch the surface on the capability of the machine," he said.

Of course, Hatch is atypical. He has 17 years of programming experience and does not have to hunt and peck. But a similar pattern is found generally: Once the computer gets in the door, things change. It begins to kick out the TV and take over.

Why does Sharon McWilliams of Riva, Maryland, have two computers at home? "I have three sons. It saves trouble," she said. While her sons take one Atari for a program predicting the World Series, Ms. McWilliams uses another Atari for her job as a lab technician. "It started out as fun and sort of incorporated into our lives."

At the home of Jonathan Bruns in Broken Arrow, Oklahoma, the computer is so popular that "we kind of have arguments over who uses the machine first," he says. It's time for a second computer, perhaps an Atari. "If we have games, I never have time for my software," which includes figuring his taxes.

The compulsion to compute apparently resides not only in Youngstown, Ohio, but everywhere. Actually, it isn't necessary to look any further than Don Goldsmith of Hale, Michigan, whose appetite for the arcane seems limitless.

The Atari Super Thermostat

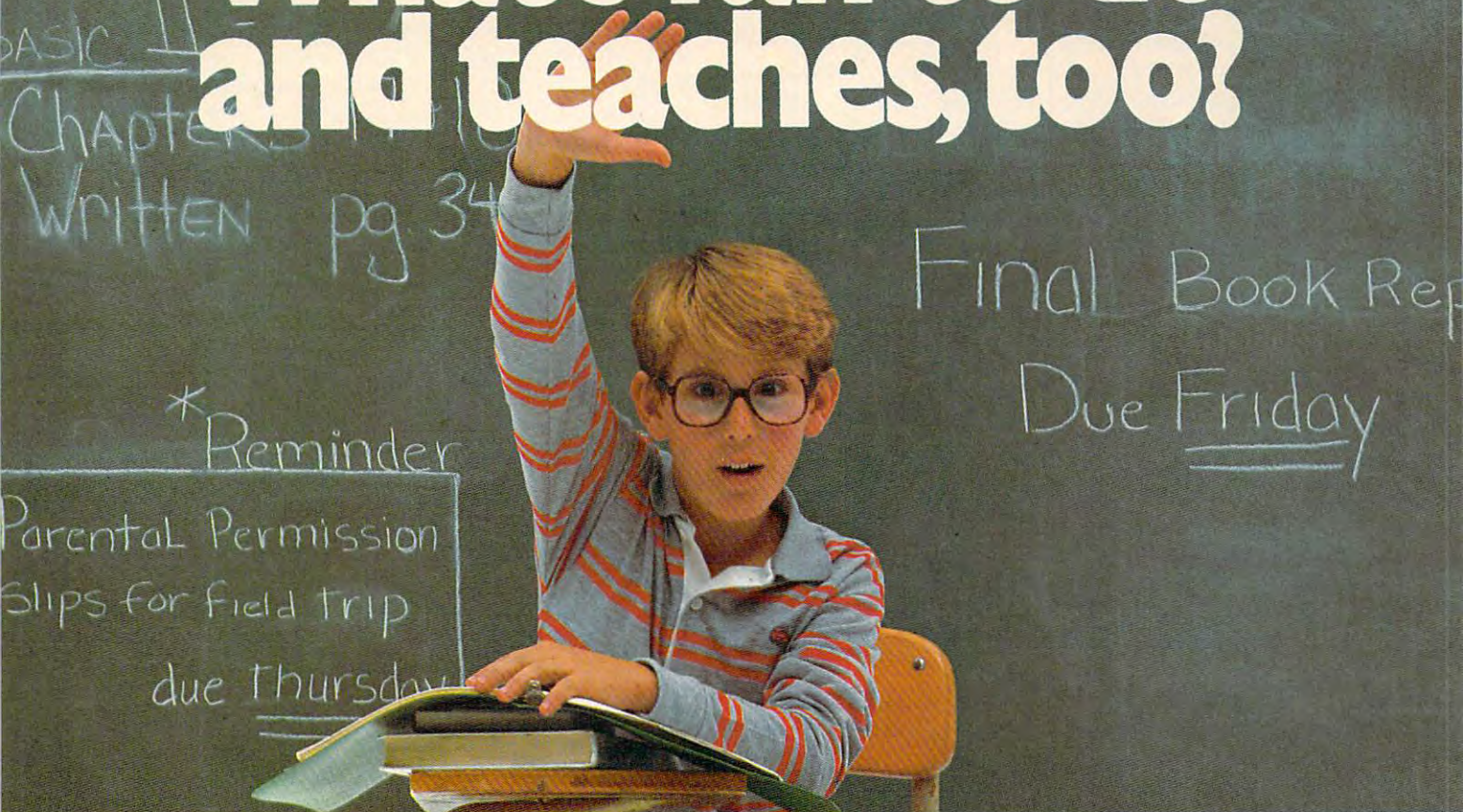
For several months Goldsmith, a customer engineer with Perkin-Elmer Company, has been blocking out a program that would turn his Atari 800 into a complex thermostat. He plans to use the joystick ports which sense switch closure. Each port has four digital inputs, two triggers, and two analogue devices. "In one port you've got a whole lot of potential for doing things," said Goldsmith. His scheme is to install a device at each port, perhaps a varistor or photo transistor, that reads heat resistance levels.

"You can plug in direct or put a chip in between," he added. "You then write a program that interprets this calibration. Depending on how big your system is, you can put the devices at each joystick port. You can have it so it can sense the variation from one end of the screen to the other, the resistance movement."

"You can monitor the efficiency of your house. If you find it's pumping the same amount of heat, but not holding it, then you can look for the leak."

"If it sees the temperature shooting way up in a solar panel, and the temperature coming down, it would conclude there is a blockage some

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place," said Goldsmith. "It might print a message on the screen, or start a motor, or maybe close shutters when it senses the sun is going down in order to hold the heat."

Now, anyone might think that a process control program of such complexity would be quite enough for one computer buff. But Goldsmith, 38, who's been dabbling in electronics since the sixth grade ("I started out being able to do nothing but play *Star Raiders*") has found something else for his computer—robots.

Radio Shack has introduced a robot arm that can be run by a home computer. Goldsmith is fascinated. "I just want to do some robotics work. I don't think it's an impossible job at all.

"It sits on a base with two joystick controls, a bending elbow, a wrist, a squeeze device. You've got to put some sensors on the arms to sense the movements."

Once he got it working, he concedes, the robot arm might be no more practical than a demonstration device or a game. "If nothing else, I can get some PR points with my boss," Goldsmith added. "It looks like it's going to be a real fun project."

Almost all COMPUTE! subscribers believe the home computer movement will grow. The direction is unanimously toward more learning, more involvement, more uses.

The Silicon Society

"I think it depends on the documentation they get together," said Hatch. "There has to be development of a noncomputer jargon so people can program comfortably. The documentation is relatively hard to understand." At his church, he says, he is sometimes approached by members who ask: "We want a computer. Can you tell us why?"

Goldsmith is inclined to agree. "I think it has a potential for being a labor-saving device. It depends on how the technology progresses. Not everybody in the world wants to learn how to program. We're going to have to get to more turnkey systems—be more user-friendly."

Others are downright bullish.

"The coming age is computers," said Sharon McWilliams. "The money and jobs are in computers. That's the way I see things."

And Thomas Townsend, a systems coordinator for a large insurance company in Omaha, said we haven't seen anything yet. "By 1990, close to 80 or 90 percent of all homes will have some computer," he said. "Close to 35 percent will be tied in to some network. To buy groceries, go to the store. All ready for you. Pay bills. Find check balances. They talk about the cashless, checkless society. I think it's gonna be the silicon society."

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What Makes A Good Game?

Charles Brannon, Program Editor
Kathy Yakal, Editorial Assistant

You know what games you like. You may not always know why you like them, but that why is just one of the many things software designers have to consider when they're creating a game.

Remember the television show *American Bandstand*? After a new song was played, Dick Clark asked someone from the audience to rate it. If the song had a good beat and was easy to dance to, it usually got high scores.

The popularity of videogames, like songs, often depends on the quality of several elements. A song may have a good beat and be easy to dance to, but its lyrics may be poorly written. Or maybe there's a beautiful instrumental solo at the end that would have sounded much better at the beginning.

Selling Power

Lists of best-selling software can indicate what videogames have widespread appeal. But a game doesn't have to be on a best-seller list to be considered good. Some very good games may never be seen by more than a handful of people, and some games that really don't have much quality can sell thousands of copies.

When the arcade game *Dragon's Lair* was introduced in the fall of 1983, people lined up to play it, perhaps due to its cartoon-type laser disk graphics. "I don't think it depends on technology, though," says Alex Leavens, of Dynamic Software Designs. "I think it has more to do with the color of socks that people are wearing this year. It's a random kind of thing."

Style Is Essential

Randomness aside, Leavens emphasizes that the programmer's individual technique affects a game's success. "You don't necessarily have to have the most original game idea in the world. There are only so many original ideas," he says.

"You do have to execute it with style.

"There's nothing wrong with working a certain genre. I don't even mind a good clone. But with any game you do, you should put effort and creativity in your genre. You need to take more time thinking about what you can do with the game play idea."

Leavens, who has written several games for home videogame systems, recently cowrote *Boing* with Shirley Russell, published by first Star Software. Though it's a *Q-Bert* look-alike, Leavens emphasizes that the playfield is quite different. "Using imagination and creativity, you can take a game that's already been done and give it a new look and feel."

Telling Tales

Every game has a story line, and you're involved in it, competing with either the computer or another player. Whether you're playing checkers or saving Earth, it's a game. You're trying to win, or at least to avoid destruction.

A justifiable story line is important too, according to Leavens. "You're trying to create a small universe within the game itself," he says. "People want to get involved with the story."

John Garcia, programmer of the Apple version of *Zaxxon*, agrees. "You have to have a good concept, and good concepts are difficult to come by," he says. "Playing a videogame can be like watching a movie, if you've got interesting characters and a good story."

That's not always simple. "What's easy to do on a computer is not subtle," says Garcia. "Blowing up things is easy. But adding the human element to a story line enhances the game."

Looking For More Depth

A few years back, arcade games had timers on them. No matter how well you did, you had to stop when your time ran out. That upset the best players because they could have beaten the machine if they hadn't been stopped.

Arcade games don't have timers anymore. You may have to spend a lot of time to do it, but

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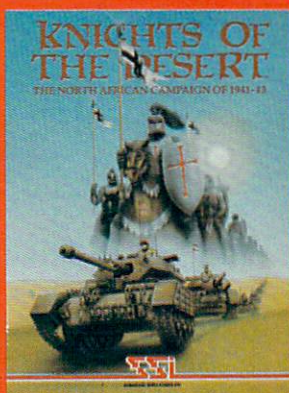
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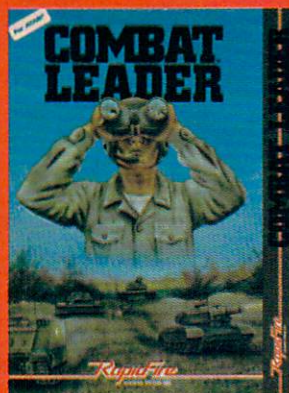
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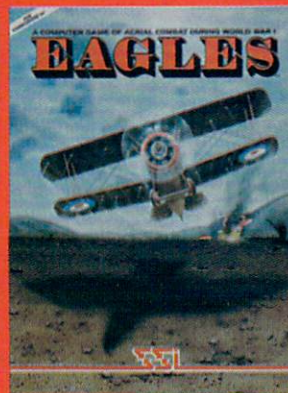
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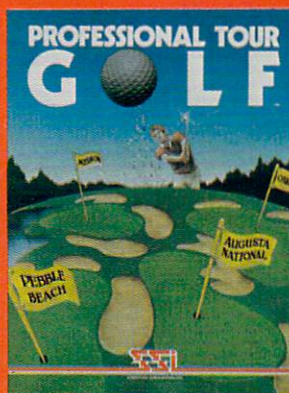
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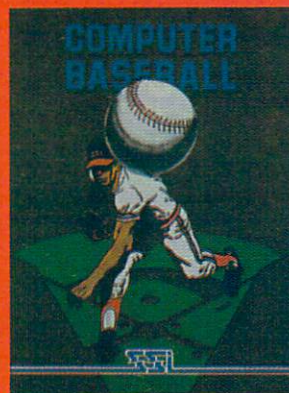
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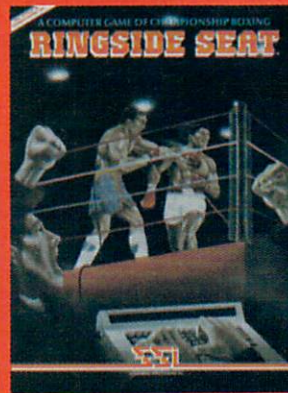
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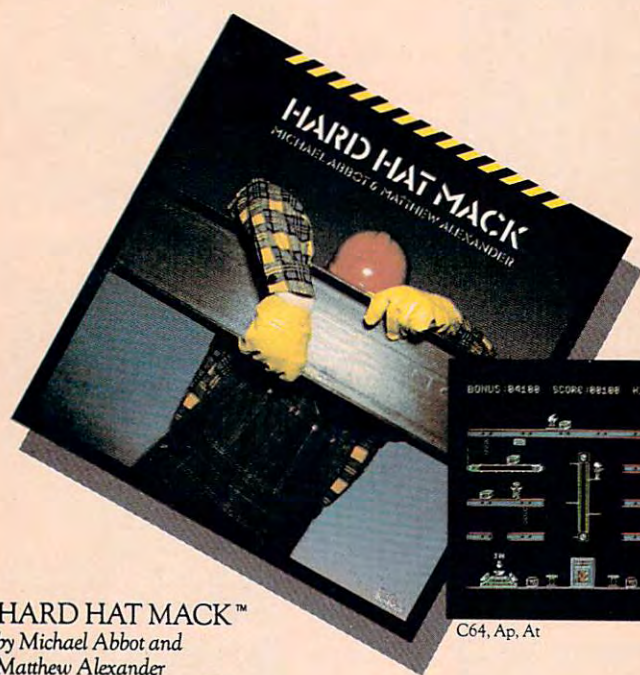
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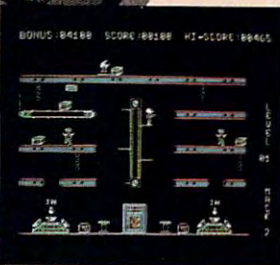
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Matthew Alexander

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"If you put Hard Hat Mack in the ring with all other games on the market, it would win most bouts in the opening seconds of the first round. It's that good."

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C64, Ap, At



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now you can at least try to beat the machine. We tend to classify good players as the ones who can play the longest. If you're good enough, you can play forever.

But a good game should try to get at what people do well, not turn people into robots. Some people are looking for a richer experience. They want games that make use of the computer's power, not just take away quarters. Games like *Zork*, by Infocom's Marc Blank. Text adventures are a kind of gaming that you won't find in arcades.

Using Capabilities

"Adventure games appeal to the more sophisticated buyers that this industry is seeing these days," says Bob Safir, a product evaluator for software distributor Softsel. "A game that understands and lets you use compound sentences is exciting.

"Games have to go beyond the expected, to challenge more than a player's hand-eye coordination. Computers can do that. Business software takes advantage of the computer's power. You have integrated packages for business that perform several functions. Why not games that do the same thing?"

"One of the things that computers do well is make millions of calculations," says Alex Leavens. "A good programmer should take advantage of that."

Finding A Center

Graphics illustrate a game's story line. From the rather crude visual display of Atari's venerable *Pong*, all the way up to state-of-the-art laser disk technology, graphics have played a major role in the success of videogames.

Where you start in designing a program may have something to do with the quality of the finished product. There is some debate about whether you should design a game around its graphics, or the graphics around the game.

In some games, graphics aren't intrinsic to the game itself. Those games may be visually appealing and make your computer look impressive, but the graphics are extraneous. Their contribution to the game is almost an afterthought.

In other games, like *Q-Bert*, the graphics are the game. Careful attention is paid to shading and dimensions and color. This kind of three-dimensional effect, though not true 3-D, is quite impressive. In the future, many games will likely have a similar look.

An Elusive Element

"Graphics are real nice, but there has to be more than good graphics in a game," says Datasoft's Garcia. "Primarily, it's playability that makes a good game."

Playability is a term many people use when

they rank the elements of a good videogame. What does it mean?

"Playability means that a game is responsive, that it has a good feel," says Garcia. "*Choplifter* is a good example. It looks good but it also plays well. A good game will embody both."

Micro D, a software distributor, values a game's playability highly. "Perhaps most important to us is playability; that is, how the game interacts with the user, and how easy it is to use," says Jim Hafer, a product evaluator for Micro D.

An Audible Difference

Sound is another largely untapped resource, according to Garcia, "I think sound can contribute a lot to a game," he says. "Some game designers are bringing in sound specialists to work on games.

"But sound hardware is really not very sophisticated. The next generation of computers will have better sound chips."

Bob Safir looks carefully at what sound a game is already using. "When we're evaluating the sound on a game, it's important that the program uses the hardware capabilities to their fullest," he says. "How the sound is integrated with the play of the game is also very important."

Variety And Complexity

Another element of a good videogame is constant challenge. Multiscreen games like *Donkey Kong* interest their players by having several levels of skill. And within each screen, there are often a number of levels to climb.

"Multiple levels will appeal to a wider age group," says Softsel's Safir. "The more screens, the more variety. But we have to watch for the entry level of a game. If it's too difficult at the start, players give up easily.

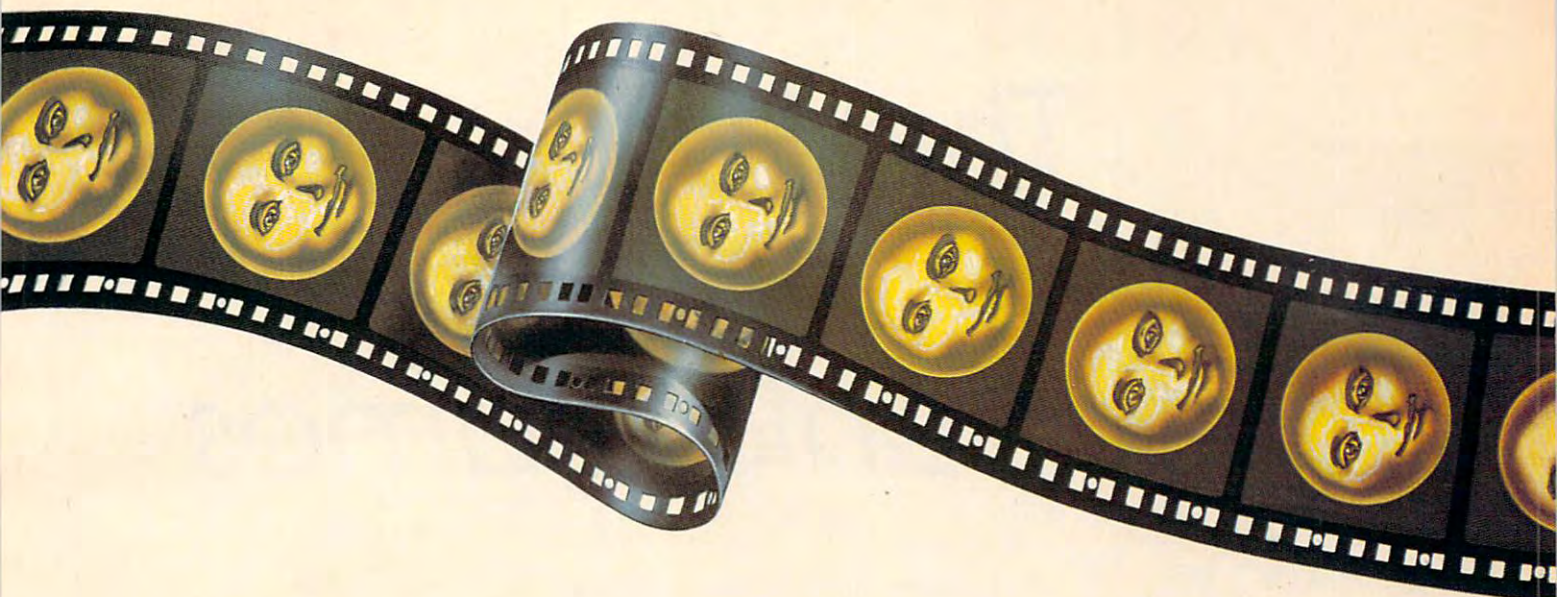
"The same goes for the end of a game. But whether or not you can beat the game is no longer the bottom line. It's the quality of play that's important."

Complexity is another factor. "Simple games don't make it anymore," says Jim Hafer. "You don't want to be able to master a game in two minutes or you won't want to play."

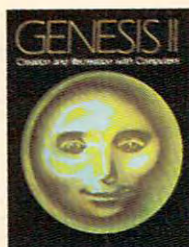
No Limits

A videogame can be very technically complex, yet lack appeal because player involvement is limited. "*Dragon's Lair* is a very impressive game visually, but I don't think laser disk technology is the wave of the future," says Alex Leavens. "There's no creativity in it right now. It just allows you yes or no answers.

"No matter how gorgeous they look, video disks have a technical limit. Videogames have no limit. They allow the player a much wider kind of decision. That's one of the greatest things about videogames. You can do whatever you want." ©



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The Future Of Electronic Games

Kathy Yakal, Editorial Assistant

Think how much videogames have improved in the past five years. Better graphics capabilities, inexpensive hardware, and hundreds of talented programmers have done a lot to advance state-of-the-art home video entertainment. COMPUTE! asked some of those programmers to outline their ideas about what the future holds for electronic games.

When predicting the future of any creative industry, there are two types of evolution to keep in mind: technological advancement and artistic theory. "The primary thing I would emphasize is artistic development, as opposed to technological," says Chris Crawford, head of the Games Research Group at Atari. "I've read many articles on the subject that are just technical extrapolations. In essence, they take the present and magnify it. But history is not a process of amplification.

"Look at the way television has changed over the last 30 years. We've seen lots of technical developments, but the real advances have been artistic."

Languages And Teams

Creating a videogame is an involved process. The programmer spends weeks, often months, on the design of the game, its characters, and action.

"We cannot keep writing games in machine language, sweating every byte," says Crawford. "I think the next few years will see a race between two processes. I don't know which of these two will develop.

"The first is better languages. The concept of higher level languages—that would let us concen-

trate more on the game itself and less on the technical aspects—is exciting. But high-level languages waste a lot of memory. It may be that we'll have computers so powerful that we can afford to waste that memory."

The second potential trend involves creative teams, groups of five or six people who work together creating different elements of a game. "The artistic teams so far have failed to achieve the unity that's necessary," says Crawford. "Creative people have big egos. That's a necessity. The only way you can really create glorious things is to be able to reject less-than-glorious things.

"Look at how long it took movie studios to become smooth-running operations. Now you have a team of experts, each of whom has their own area of expertise. Because the artists have clearly defined roles, it works."

Can You Imagine A Movie With No People In It?

The answer to creating videogames that will appeal to a wider variety of people is simple, Crawford believes. "It's people, not things," he says. "Those are the magic words. If you look at games right now, they're all about things. There are never real people in them. But can you imagine a movie with no people in it? A book?"

The reason for that, says Crawford, is that things are easier to work with. "What we need is games that focus on human beings, on relationships. Programmers will be creating artificial personalities, characters with which the player can interact.

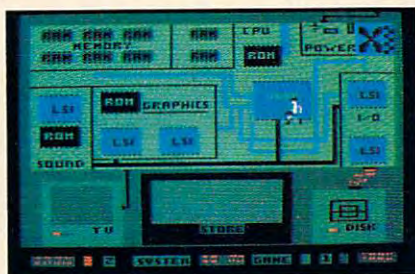
"Games of this type will break into a larger

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What if

you could get small enough to crawl inside your computer and see how all that stuff really works?



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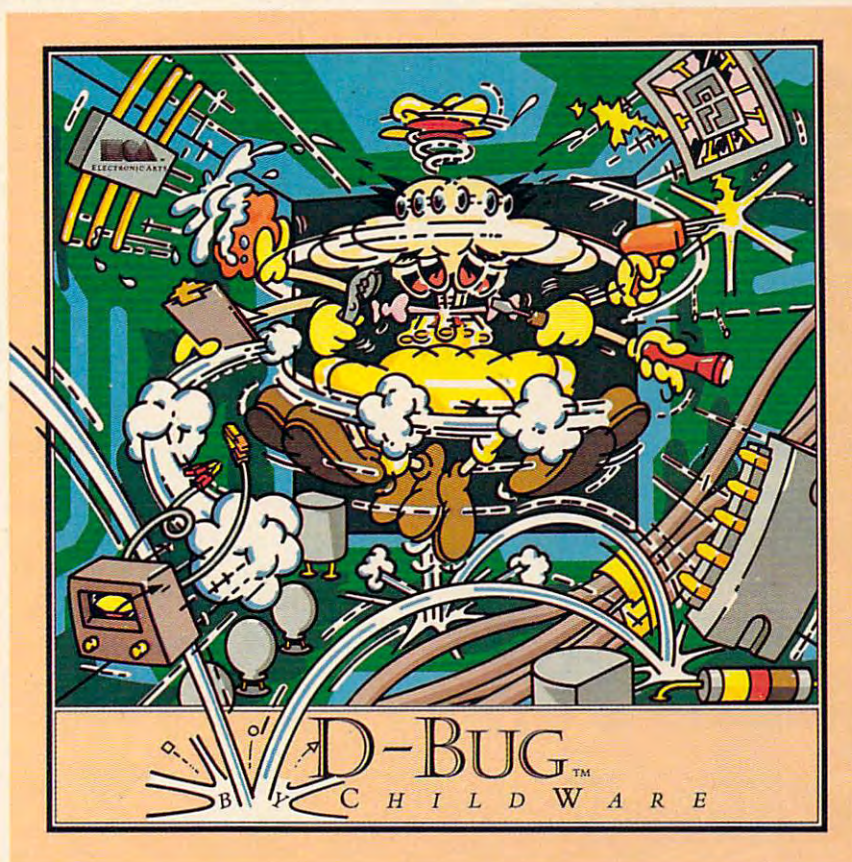
Expert help is available in the form of a strange character named Charlie Fixit. He's got a way of making you small enough to get inside the machine. But being inside is yet another game. There are stray charges to duck, static to avoid, and all sorts of intriguing devices to explore before you can get everything back into working order.

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marketplace. I'm convinced that it's the wave of the future."

Atari Program Exchange recently released a game by Crawford called *Excalibur* for the Atari 800. In it, the player takes on the role of King Arthur, who is trying to unify England. "You don't just run around England hacking people up," says Crawford. "The emphasis is on interpersonal relationships between Arthur and the other characters, on values like loyalty, credibility, and prestige."

Crawford finds it difficult to categorize this game. "You can't call it an adventure game or a war game," he says. "It's a new genre. I think I've pushed way out into new frontiers with it."

No Back-seat Picassos

In the coming years, advanced programming techniques may make it easier to create games, but this does not mean that anyone will be able to program a good game. "The designer must thoroughly understand the medium," says Crawford. "You can't have someone just coming up with an idea for a game and then have someone else program it. A properly designed game will retain its own unity."

"The greatest artists were all masters of their media. Can you imagine someone like Picasso visualizing a painting and then directing someone else to paint it by saying, 'Oh, put a little splotch of red there, and maybe some yellow over there...'? You can't be a good back-seat game designer any more than you could be a back-seat Picasso."

Sound Improvements

Though sound hardware for electronic games is not very sophisticated right now, it can have a great effect on the impact of future games. "Games today are graphics-intensive and sound-poor. But sound has great emotional power. It reaches straight into people's guts," says Crawford. "Graphics are more cognitive."

"The problem lies in how we're going to use it. Right now, we put little snippets of sound in games. We have learned to use it as auditory feedback. A good sound system requires a lot of memory. The short-term solution to better sound in games would be getting more memory into our computers."

"But I think the day will come when we have a sound track for a game, like we do for movies. Sound will be more integrated into the game."



Chris Crawford

More Time Means More Depth

Games that deal with human relationships, as Crawford foresees, will necessarily take more time to play than current games. "I think games in the home are going to get much longer," he says.

"In the past we have offered people *thrills, action!* That makes for a very fast game. It only takes about ten seconds to blow something up. But character development takes time, and, in the future, you'll be developing relationships with people in games. This will create a richer experience for the player. I look forward to the day when playing a videogame is like reading a book."

Greater Capabilities

Another recent innovative game is *Pinball Construction Set*. Its author, Bill Budge, formed his own company and sold programs for a few years. He now designs games for Electronic Arts.

Though his first designs were basically conversions of arcade games, he feels that people are tiring of those. "Arcades are gradually going to lose their appeal," he says. "Home computer games are getting a lot more involved. There are some real powerful computers coming along, with more memory and more powerful microprocessors."

"Business users have defined what they need computers for. The home user is more vague—he doesn't really know what he wants yet. I think we'll be seeing entertainment software that is more flexible and intelligent."

Putting The Game First

Graphics have a long way to go, according to Budge. "The only thing we have at this point is sprites, and that's very limited. You've got computers whose architecture is very dependent on the sophistication of the graphics chips. Within ten years, you'll have chips that are capable of generating almost TV-quality video."

Sound, Budge believes, will be as important as graphics in games of the future. "I think sound will get better faster than graphics," he says. "We're not even close to the theoretical limits."

As graphics and sound improve, it will not be difficult for anyone to program whatever they want to see in a game. Does that mean people like Budge will be out of a job?

"The name of the game is knowing what



Bill Budge

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to write," he says. "When it's possible for everyone to program, the game itself, the concept, will become the most important thing. The guy with the vision is going to do well."

The Human Element

Budge believes that people need to feel a greater sense of interaction with a computer, and that programmers will have to be sensitive to that. "Right now, if you're a graphics wizard, you have

"There must be 'hooks' in games that address people's minds. The human mind is always demanding at every level, not just visually, but also emotionally and mentally."

a license to write software," he says. "There's a tendency now to make things easy for the programmer, but harder for the user."

Videogames that involve more human interaction will appeal to women. "There's a trend toward games that are more open," says Budge. "It's not just the young boys in schools that feel like they own the computer anymore. It's important to have some women come along who are software superstars."

"It's difficult to think of real interaction with the computer, and to program games that involve it. It's much easier to blow up the alien than to talk to it. I'd rather build things."

Planning Ahead

Fernando Herrera thinks about the future of electronic games every time he sits down at a computer to work on a game. "To make a game successful today, you have to think about what people will want tomorrow," he says. "Every game has to be a little more sophisticated without taking out the fun."

Herrera wrote his first program, *My First Alphabet*, to help teach his visually impaired son, Steve, to read. That educational game won the first Atari Star Award in 1982. Herrera gave up his career in architecture to devote his time to writing software and managing a computer store. He is now the head of design and engineering for his own company, First Star Software.

True Graphics

"In the next few years, people will be demanding more and more realism in graphics," says Herrera. "Games are already stepping from the gadget stage to being real games."

"Graphics have to get better. The earliest graphics were made by using little dots to form pictures. But how many different kinds of monsters can you make with eight dots? People get tired of seeing it. Now we are passing through the stage of cartoon-type graphics, with more realistic ships and creatures and other kinds of things. If we look farther down the road, we will be getting to the stage where we see a kind of movie scene in a game."

Challenging The Intellect

There is a scene in Herrera's game, *Astrochase*, where a spaceman walks out of his house to board the spaceship that will carry him off to fight aliens. As he walks out to his ship, he turns around and waves to his home and family. Though the graphics and fast action in that game might be enough to satisfy most videogame players, Herrera believes little human touches like these will become increasingly important to people.

"There must be 'hooks' in games that address people's minds," says Herrera. "The human mind is always demanding at every level, not just visually, but also emotionally and mentally."

"When you lose a game, it should be a miscalculation of your mind, not your hand. The way many games are now, you keep playing because you get angry with yourself. The game programmers have to make you believe it was your fault. I think we will stop seeing games that, when you lose, you are overwhelmed."

Stretching Different Muscles

Herrera does not mean that games in the future will be easier to beat than they are now. "After you have lost and you come back for more, you have to be able to find more. You want to be able to make better decisions, to correct your mistakes," he says.

"It's like the game tick-tack-toe. After you've found that little secret that lets you win every game, you stop playing because it's not fun anymore. But if you could find a new way to win, you would keep playing. Games are evolving to the point where they are a challenge of the mind, not of the joysticks."

No Bad Guys

Herrera bristles at the question of violence in future electronic games. "There is no violence in videogames," he says. "Violence, I believe, is one of those arguments against something new. There are two kinds of people—those who move ahead with the times, and those who resist them."

"If you kill a million aliens, that doesn't mean you're a murderer. I don't think videogames are affecting children in a bad way. The computer is the most positive device we have today. Especially compared to television, where you don't have to



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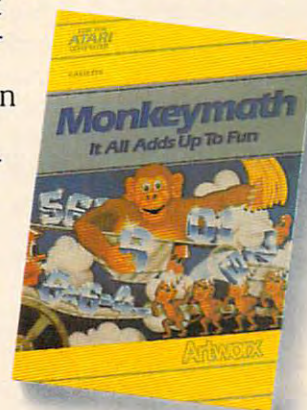
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take an active part."

The positive effects of a computer do not come from strictly educational software, Herrera believes. "Good video-games teach kids how to make decisions, how to analyze things. Violence in games should not be used as an argument against them. Cars actually kill thousands of people every year. Should we ban cars?"



A Long Way To Go Fernando Herrera

Stretching the capabilities of existing computers to their absolute limit is a programmer's responsibility, according to Herrera. "But the computers we have today are very far from what we will have," he says. "Things like telephones and stereos are at the point where they do what we want them to do. Computers are not.

"You still have to do a lot of work to use a computer. You have to hook everything up, turn everything on, load things. These things are still totally unknown to many people.

"The computer has not yet become an extension of you, like the TV has. We will someday be as familiar with computers as we are with the telephone now. And you won't need to know about things like RAM, ROM, and K. You'll probably have an antenna on your roof that can tune you in to a kind of megafile."

Moving Toward Movies

Herrera's prediction that video-games will resemble minimovies in the future is shared by many game designers. One of them is Jon Conrad, a graphic designer who worked on the new arcade game *Bouncer*. "The marketplace up to now has not been involving designers. You generally have one person that writes the program, both technically and artistically," he says.

"In the future, it's going to be like producing a small film. You'll have a writer, director, animator, and art director, all involved in producing one video-game."

Bouncer was produced by such a team. The game has four different scenes, with many characters and possible scenarios in

each scene. Its high-resolution graphics (512 × 384) create visual effects that are some of the most sophisticated that this industry has seen.

"It's not so much that we're using a new technology as just a more powerful one," says Ulrich Newman, vice president of Entertainment Sciences. "Our architecture lends itself to a more high-level approach to programming."

Allowing More Freedom

Though the technology may not be new, *Bouncer* utilizes the capabilities of existing hardware more than most other arcade games. "What we've done is build a very high-powered computer system" says Newman. "The program takes up two megabytes of memory. There are four processors used to manipulate data. The screen itself requires a lot of processing power. Each screen has 200,000 pixels."

Creating a character in a videogame usually requires the programmer to do a lot of technical manipulation. "Our system does all the grunt work," says Newman. "The data structure allows the designers to specify all attributes of a desired figure. Then the hardware takes over and actually creates the program."

What this means for the finished product is more movement, more interaction, bigger characters, and higher-resolution graphics. It also means that game designers don't have to spend as much time with the technicalities of creating a game, and can work just on those things that affect the actual play of the game. "You're freer to do things than you've ever been before," says Newman. "About 50 percent of a programmer's time right now is spent in doing things that are redundant. We should get that burden off him."



Bouncer, a new arcade game from Entertainment Sciences, contains 500 unique images.

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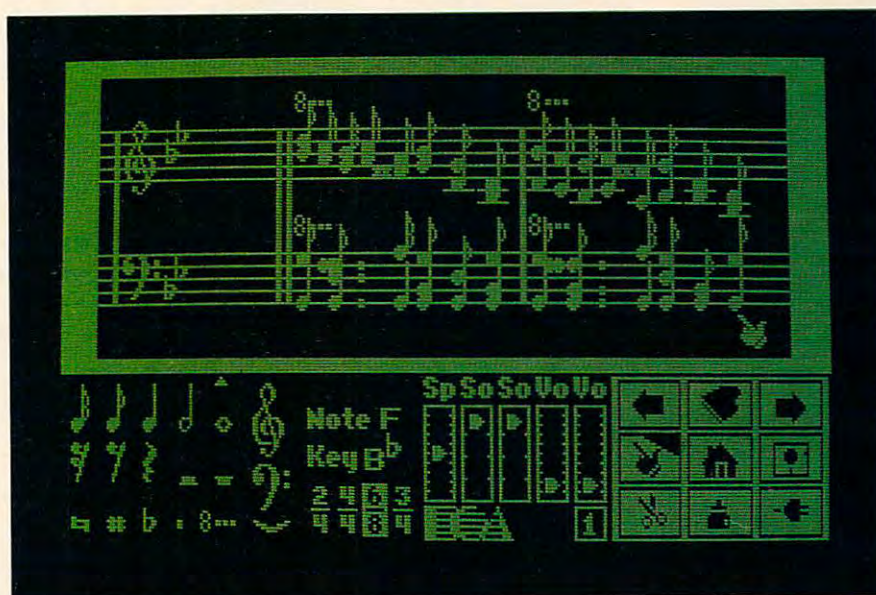
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to the little piano in the lower right and listen, because you'll hear the whole thing played back.

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the scissors to cut out whole measures, then use the glue pot to paste them in somewhere else. Got a printer? Great. Print the score out and show it off to your friends.

But what if you're not up to writing your own stuff yet? No problem. There are twelve pieces of music already in here, from rock 'n roll to baroque. They're fun to listen to, and even more fun to change. (Apologies to Mozart.)

The point is, the possibilities are endless. But if you're still skeptical, visit your nearest Electronic Arts dealer and do the one thing guaranteed to send you home with a Music Construction Set in tow.

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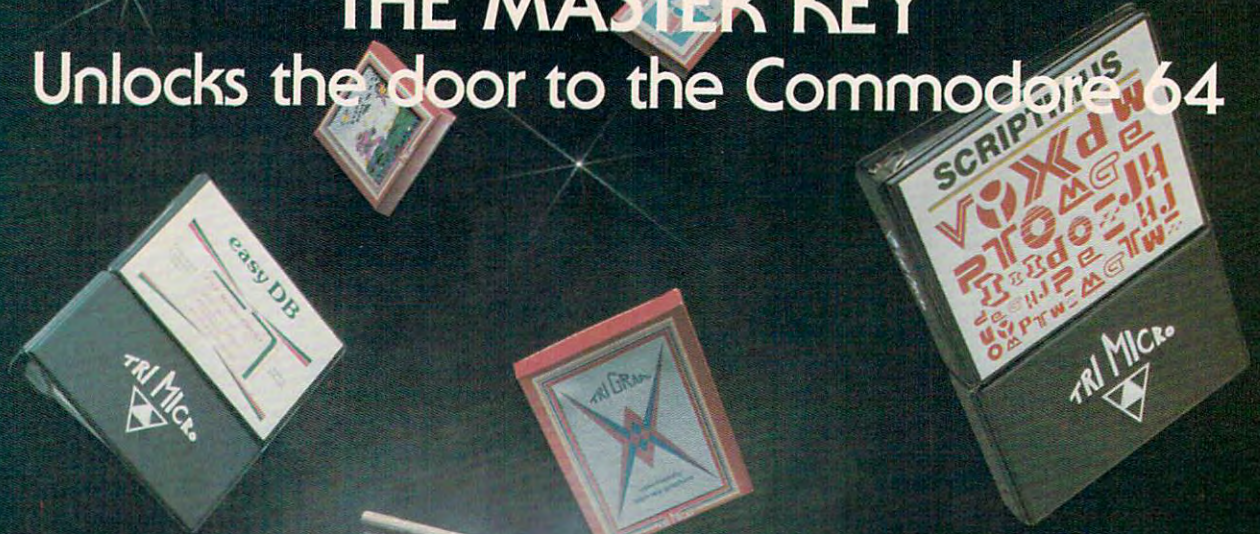

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More Depth On The Horizon

Newman doesn't believe a technology like this will be available on home computers for at least two or three years. "Even then, it will only be in a top-of-the-line machine," he says. "But the basic concept of what we're doing now, the premise of setting XY coordinates and letting the system handle the pixels, is being used now in home systems."

Not only will the quality of videogames improve greatly in the next few years, Newman believes, but also the methods used in getting them into your computer will be different. "I think downloading games over the phone lines will be very popular," he says. "It's far superior to spending 30 or 40 dollars on a cartridge that you may not use that often. If done properly, the phone-game concept can work."

Another trend that Newman foresees is interactive games, games where two computers are hooked together and individuals can play against each other. "When you do that, the game becomes a playing field," he says. "You're playing against a person, not a computer."

If these software designers are representative of the videogame industry's evolution, it appears that we've only scratched the surface of the potential power of videogames. Richer, more intense gaming is on the way. ©

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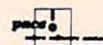
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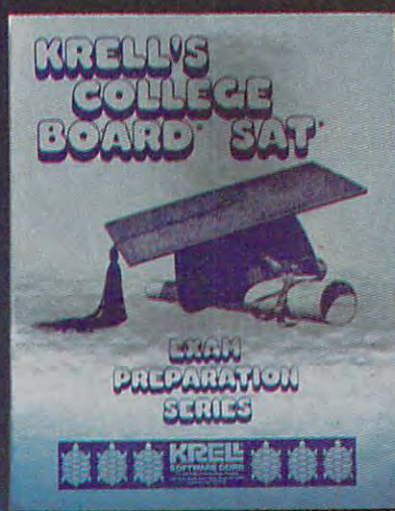
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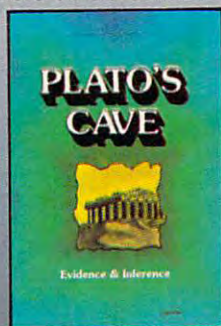
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CIRCUS

Craig Setera

You don't have to run away to join the circus. Here's your chance to be Head Clown and pop clouds of balloons by catapulting your fellow clowns all around the big top. Originally written for the unexpanded VIC; versions also are included for 64, Atari, and TI-99/4A. Joystick required for the VIC, 64, and Atari.

The circus has closed for the evening. It's your job to help the clowns remove the cloud of balloons from the ceiling of the big top, by catapulting them into the air so they can pop all the brightly colored spheres. But a prankster has released one balloon filled with laughing gas. If one of the clowns pops the laughing gas balloon, he's out of the game. Even a clown can't bounce and pop and giggle at the same time.

When the laughing gas balloon is yellow, it's safe to pop, and you are awarded 250 points. But if it's black, watch out. Each row of balloons has a different point value. The blue (bottom) row is worth 50 points, the green (middle) row is worth 75 points, and the red (top) row has a point value of 100.

Whenever you catch a clown on your board, you get 5 points. An extra man is awarded for every 2000 points.

To start the game, press the fire button on the joystick. As you play, you will notice a block moving left to right below the balloons. This block will cause your clown to rebound in the direction from which he came. There also are two platforms, one on each side, that keep the clown within reach of your teeter board. The platforms can be thought of as constructed with upside-down trap doors. When a clown lands on top, he will bounce back, but if he hits the bottom, he will pass through.

"Circus" is a two-part program for the unexpanded VIC. The first program contains the custom character data and play instructions. When it

is finished running, it will NEW itself, so be sure to SAVE it before you RUN it. The second program contains the game. You must LOAD and RUN the second program after running the first program, because the first program sets up the special graphics characters for the second program.

Program 1: Circus, VIC Loader

```
20 PRINT "{CLR}{8 DOWN}{8 SPACES}{RED}C
   {CYN}I{PUR}R{GRN}C{BLU}U{RED}S{BLK}":C
   =0
30 PRINT "{DOWN}{3 RIGHT}PLEASE HOLD ON...
   ":GOTO500000
40 GOSUB1000
45 POKE36869,255
50 PRINT "{CLR}{11 DOWN}{8 RIGHT}{BLK}CIRC
   US"
60 PRINT "{HOME}{9 DOWN}{6 RIGHT}#####
   #":PRINT "{3 DOWN}{6 RIGHT}#####"
70 PRINT "{HOME}{10 DOWN}{6 RIGHT}#{DOWN}
   {LEFT}#{DOWN}{LEFT}#{2 UP}{8 RIGHT}#
   {DOWN}{LEFT}#{DOWN}{LEFT}#"
80 GOSUB2000
85 FORI=1TO3:FORP=1TO7:S=P
90 FORI=38604TO38614:POKEI,S
100 S=S+1:IFS=1THENS=2
110 IFS>7THENS=0
120 NEXT
130 FORI=38635TO38679STEP22:POKEI,S
140 S=S+1:IFS=1THENS=2
150 IFS>7THENS=0
160 NEXT
170 FORI=38702TO38692STEP-1:POKEI,S
180 S=S+1:IFS=1THENS=2
190 IFS>7THENS=0
200 NEXT
210 FORI=38670TO38626STEP-22:POKEI,S
220 S=S+1:IFS=1THENS=2
230 IFS>7THENS=0
240 NEXT
250 NEXTP,T
252 GOSUB1000:PRINT "{CLR}{9 DOWN}";
253 POKE36869,240:PRINT "{RIGHT}INSTRUCTIO
   NS (Y/N)?":GOSUB2000
254 GETA$:IFA$=""THEN254
255 IFA$="Y"THEN260
```


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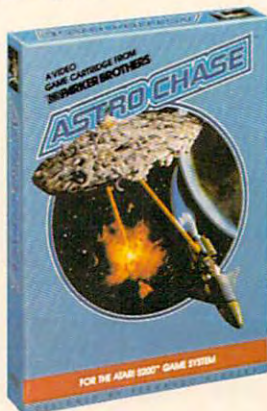
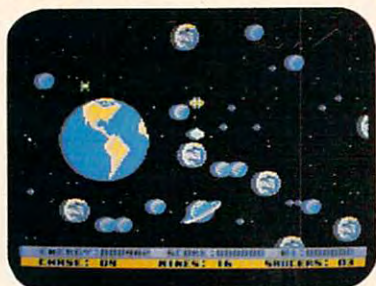
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```

256 IFA$="N"THEN990
257 GOTO254
260 GOSUB1000
270 PRINTCHR$(14);"{CLR}{DOWN}THIS IS THE
    GAME OF{3 SPACES}CIRCUS."
280 PRINT"{DOWN}THE OBJECT OF THE GAMEIS
    {SPACE}TO POF ALL OF THE{2 SPACES}BAL
    LOONS."
290 PRINT"{DOWN}THIS IS ACCOMPLISHED
    {2 SPACES}BY MOVING THE JOYSTICKLEFT
    {SPACE}AND RIGHT TO{5 SPACES}CATCH ";
300 PRINT"THE MAN.":PRINT"{DOWN}WHEN THE
    {SPACE}GAME STARTS{2 SPACES}PRESS THE
    FIRE BUTTON TO START."
310 PRINT"{HOME}{20 DOWN}{RVS}PRESS ANY K
    EY"
320 GOSUB2000
330 GETA$:IFA$=""THEN330
340 GOSUB1000
350 PRINT"{CLR}{DOWN}ALL CHECKERBOARD
    {6 SPACES}BLOCKS BOUNCE YOUR MANBACK.
    "
360 PRINT"{DOWN}AN EXTRA MAN WILL BE
    {2 SPACES}AWARDED FOR EVERY 2000POINT
    S."
370 PRINT"{DOWN}THE MOVING BLOCK WILL ALS
    O BOUNCE YOUR MAN."
380 PRINT"{HOME}{22 DOWN}{RVS}PRESS ANY K
    EY{OFF}"
385 GOSUB2000
390 GETA$:IFA$=""THEN390
400 GOSUB1000
410 PRINT"{CLR}{DOWN}BE CAREFUL OF THE OU
    T OF COLOR BALLOON IN"
420 PRINT"THE TOP ROW.{2 SPACES}WHEN
    {4 SPACES}THIS BALLOON IS BLACK IT WI
    LL BLOW UP"
430 PRINT"IN YOUR MAN'S FACE.{3 SPACES}WH
    EN THIS BALLOON IS{2 SPACES}YELLOW, I
    T WILL GIVE"
440 PRINT"YOU 250 POINTS."
940 PRINT"{2 DOWN}GOOD{SHIFT-SPACE}LUCK!!
    !"
950 PRINT"{HOME}{22 DOWN}{RVS}PRESS ANY K
    EY{OFF}"
960 GOSUB2000
970 GETA$:IFA$=""THEN970
980 GOSUB1000:PRINT"{CLR}":GOSUB2000
990 SYS64802
1000 FORI=46TO0STEP-2:POKE36883,I:FORT=1T
    O40:NEXT:NEXT:RETURN
2000 FORI=0TO46STEP2:POKE36883,I:FORT=1TO
    40:NEXT:NEXT:RETURN
50000 X=PEEK(56)-2:POKE52,X:POKE56,X:POKE
    51,PEEK(55):CLR
50010 CS=256*PEEK(52)+PEEK(51)
50020 FORI=CSTOCS+511:POKEI,PEEK(I+32768-
    CS):NEXT
50030 READX:IFX=-1THEN40
50040 FORI=XTOX+7:READJ:POKEI,J:NEXT
50050 GOTO50030
50090 DATA7448,28,62,47,63,63,126,96,0
50091 DATA7456,58,58,18,124,16,56,68,68
50092 DATA7464,128,64,32,16,24,28,38,37
50093 DATA7472,128,64,32,16,8,4,2,1
50094 DATA7480,1,2,4,8,24,56,100,164
50095 DATA7488,1,2,4,8,16,32,64,128
50096 DATA7496,0,0,0,255,24,24,36,36
50097 DATA7504,0,0,0,255,0,0,0,0
50098 DATA7512,170,85,170,85,170,85,170,8
    5

```

```

50099 DATA7520,255,255,255,255,255,255,25
    5,255
50100 DATA7528,170,85,170,85,170,85,170,8
    5
50101 DATA-1

```

Program 2: Circus, VIC Main Program

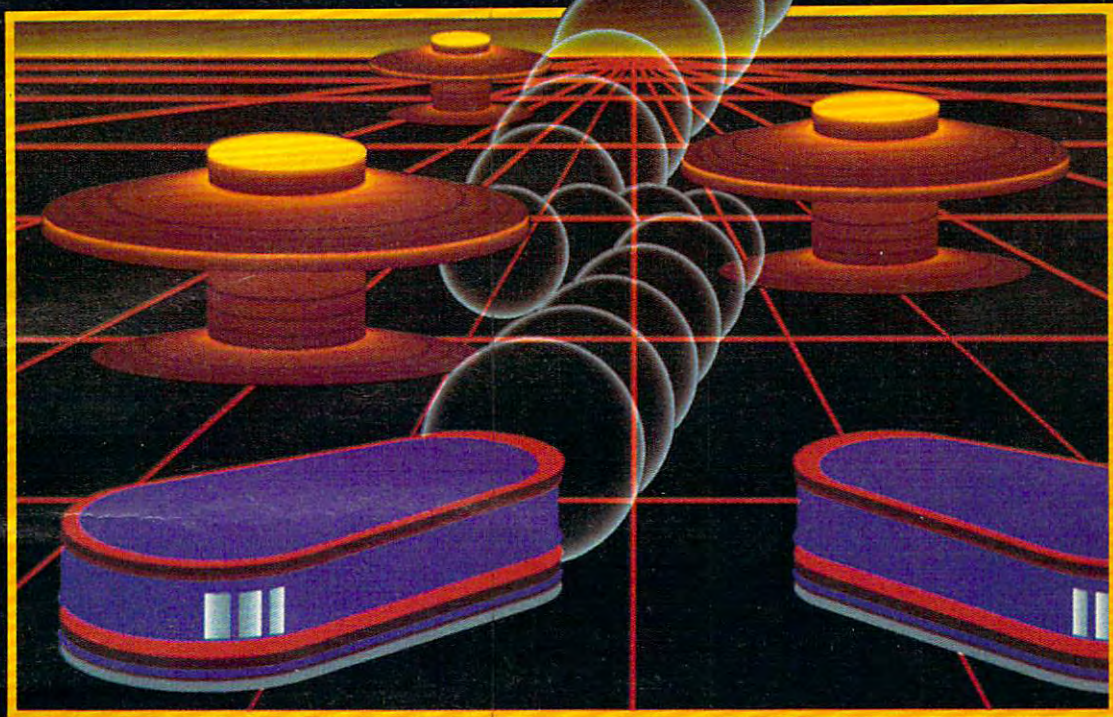
```

0 POKE56,28
1 CLR:S=7834:EX=1:L=3:SC=0:DD=37154:P1=37
    151:P2=37152:POKE36878,15:CL=30720
3 TC$="$ ${19 SPACES})*"
4 TB$(1)="$ &{22 SPACES}%${21 SPACES}& "
5 TB$(2)="{3 SPACES}({19 SPACES}$'
    {20 SPACES}({2 SPACES}"
6 SS$="{9 RIGHT}{3 SPACES}{18 RIGHT}
    {5 SPACES}{19 RIGHT} "
7 SC$="{9 RIGHT}{GRN}###{18 RIGHT}{BLU}##
    ###{19 RIGHT}$"
8 POKE36869,255:T(1)=38:T(2)=40:GP$="
    {HOME}{18 DOWN}"
10 PRINT"{CLR}{2 DOWN}{RED}#####
    #####{GRN}#####{3 SPACES}#####
    ###{BLU}#####{5 SPACES}#####
    {BLK}"
12 FORI=16TO1STEP-1:PRINT"{HOME}{3 DOWN}"
    ;:FORT=1TOI:PRINT"{DOWN}";:NEXT:PRINTS
    C$
14 FORY=1TO75:NEXT:PRINT"{HOME}{3 DOWN}";
    ;:FORT=1TOI:PRINT"{DOWN}";:NEXT:PRINTSS
    $
15 NEXT
16 PRINT"{CLR}{2 DOWN}{RED}#####
    #####{GRN}#####
    {BLU}#####{BLK}"
17 PRINT"{HOME}{DOWN}+++++++"
    ++"
18 PRINT"{HOME}{21 DOWN},,,,,,,,,,
    ,,,,,,";
19 TT=1:D=-1:AO=22:MP=7800:MC=38520:TP=9:
    BA=66:Z=0
20 W=INT(RND(1)*21)+7724
21 PRINTGP$:TAB(TP);TB$(TT)
22 PRINT"{HOME}{16 DOWN}-----{12 SPACES}-
    ----"
23 PRINT"{HOME} SCORE=";SC:PRINT"{HOME}
    {14 RIGHT}LIFE=";L
24 POKEMP,36:POKEMC,0
25 GOSUB88:IFFBTHEN27
26 GOTO25
27 GOSUB88:U=INT(RND(1)*10)
29 IFZ=0ANDU>8THENZ=7:GOTO31
30 IFZ=7ANDU>7THENZ=0:GOTO31
31 IFPEEK(W)=35THENPOKEW+CL,Z
32 OS=S:S=S+1:IFS>7855THENS=7834
33 POKEOS,32:POKES,43:POKES+CL,0
34 IFJ0THENTP=TP+1:IFTP>16THENTP=16
35 IFJ2THENTP=TP-1:IFTP<0THENTP=0
36 PRINTGP$:TAB(TP);TB$(TT)
37 IFD=-1THEN40
38 IFD=1THEN49
39 GOTO37
40 OP=MP:MP=MP+AO:MC=MP+CL:PM=PEEK(MP)
41 IF(OP-7679)/22=INT((OP-7679)/22)ANDAO=
    23THENMP=MP-22:PM=PEEK(MP):MC=MP+CL
42 IFPM=32THEN48
43 IFPM=35THENGOSUB67:GOTO48
44 IFPM=T(TT)THEN56
45 IFPM=43ORPM=45THENMP=OP:D=1:AO=INT(RND
    (1)*3)+21:GOTO27
46 L=L-1:IFL<=0THEN77
47 GOTO16

```


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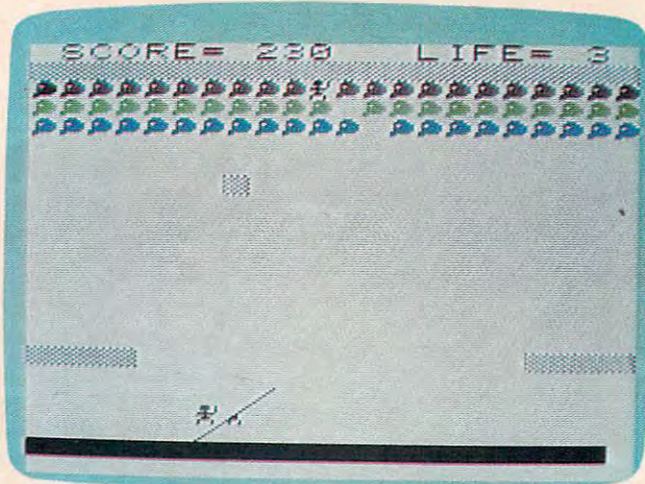
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The man on the seesaw tries to knock out balloons in the VIC version of "Circus."

```

48 POKEOP,32:POKEMP,36:POKEMC,0:GOTO27
49 OP=MP:MP=MP-AO:MC=MP+30720:PM=PEEK(MP)
50 IF(OP-7680)/40=INT((OP-7680)/40)ANDAO=
23THENMP=MP+22:PM=PEEK(MP):MC=MP+CL
51 IFPM=32THEN55
52 IFPM=35THEND=-1:GOSUB67:GOTO55
53 IFPM=45THENPOKEOP,32:MP=MP-AO:MC=MP+CL
54 IFPM=43THENMP=OP:D=-1:AO=INT(RND(1)*3)
+21:GOTO27
55 POKEOP,32:POKEMP,36:POKEMC,0:GOTO27
56 SC=SC+5:POKEOP,32:PRINTGP$;
57 PRINTTAB(TP);SPC(48)" "
58 POKE36876,140:FORT=1TO100:NEXT:POKE368
76,0
59 PRINTGP$;TAB(TP);TC$
60 IFTT=1THENMP=8057+TP:MC=MP+CL
61 IFTT=2THENMP=8055+TP:MC=MP+CL
62 TT=TT+1:IFTT>2THENTT=1
64 D=1:PRINTGP$;TAB(TP);TB$(TT):AO=INT(RN
D(1)*3)+21
66 PRINT"{HOME} SCORE=";SC:PRINT"{HOME}
{14 RIGHT}LIFE=";L:GOTO27
67 POKE36877,140:FORT=1TO50:NEXT:POKE3687
7,0
68 IFMP=WANDC=0THENL=L-1:GOTO16
69 IFMP=WANDC=7THENS=SC+250:GOTO73
70 IFMP>7723ANDMP<7746THENS=SC+100
71 IFMP>7745ANDMP<7768THENS=SC+75
72 IFMP>7767ANDMP<7790THENS=SC+50
73 IFSC>EX*2000THENL=L+1:EX=EX+1
74 BA=BA-1:IFBA=1THEN16
75 AO=INT(RND(1)*3)+21
76 PRINT"{HOME} SCORE=";SC:PRINT"{HOME}
{14 RIGHT}LIFE=";L:RETURN
77 G$=" G A M E {3 SPACES}O V E R"
78 FORI=2TO19STEP2
79 PRINT"{HOME}{7 DOWN}";TAB(I);MID$(G$,I
,1)
80 FORT=1TO100:NEXT:NEXT:FORI=1TO250:NEXT
82 PRINT"PRESS THE FIRE BUTTON TO PLAY AG
AIN"
83 PRINT"PUSH THE JOYSTICK DOWN TO END"
84 GOSUB88
85 IFFBTHENRUN
86 IFJ1THENPRINT"{CLR}":POKE36869,240:END
87 GOTO84
88 POKEDD,127:P=PEEK(P2)AND128:J0=-(P=0):
POKEDD,255:P=PEEK(P1):FB=-(PAND32)=0)

```

```

89 J1=-(PAND8)=0):J2=-(PAND16)=0):J3=-(
(PAND4)=0):RETURN

```

BEGINNING PROGRAMMERS

If you're new to computing, please read "How To Type COMPUTE!'s Programs" and "A Beginner's Guide To Typing In Programs."

Program 3: Circus, 64 Version

```

1 GOTO800
2 POKE53280,6:POKE53281,1
5 S=1304:EX=1:L=3:SC=0:SO=54272
10 POKESO+24,15:POKESO+5,17:POKESO+6,241:
POKESO,100
20 TC=27:POKE251,112:POKE831,0:POKE832,0:
POKE829,20
30 TB(1)=112
40 TB(2)=197
50 SS$="{19 RIGHT}{3 SPACES}{DOWN}
{4 LEFT}{5 SPACES}{DOWN}{3 LEFT} "
60 SC$="{19 RIGHT}{GRN}###{DOWN}{4 LEFT}
{BLU}#####{DOWN}{3 LEFT}$"
70 POKE53272,(PEEK(53272)AND240)+12
80 T(1)=38:T(2)=40
90 PRINT"{CLR}{2 DOWN}{RED}#####
#####";
91 PRINT"{GRN}#####
{3 SPACES}#####";
92 PRINT"{BLU}#####
{5 SPACES}#####";
100 FORI=16TO1STEP-1
110 PRINT"{HOME}{3 DOWN}";:FORT=1TOI:PRIN
T"{DOWN}";:NEXT:PRINTSC$
120 FORY=1TO75:NEXT
130 PRINT"{HOME}{3 DOWN}";:FORT=1TOI:PRIN
T"{DOWN}";:NEXT:PRINTSS$
140 NEXT
150 PRINT"{CLR}{2 DOWN}{RED}#####
#####";
151 PRINT"{GRN}#####
#####";
152 PRINT"{BLU}#####
#####";
160 PRINT"{HOME}{DOWN}+++++
+++++"
170 PRINT"{HOME}{23 DOWN},,,,,,
,,,,,
";
180 TT=1:D=-1:AO=40:MP=1244:MC=55516:TP=1
9:BA=121:Z=0:POKE834,TP
185 W=INT(RND(1)*39)+1104
190 POKE251,TB(TT):SYS49152
200 PRINT"{HOME}{16 DOWN}-----
{26 SPACES}-----"
210 PRINT"{HOME}{6 SPACES}SCORE=";SC:PRIN
T"{HOME}{25 RIGHT}LIFE=";L
220 POKEMP,36:POKEMC,0
230 GOSUB750:IFFBTHEN240
235 GOTO230
240 U=INT(RND(1)*10)
244 IFZ=0ANDU>8THENZ=7:GOTO248
246 IFZ=7ANDU>7THENZ=0:GOTO248
248 IFPEEK(W)=35THENPOKEW+SO,Z
290 POKE251,TB(TT):SYS49434:TP=PEEK(834)
310 IFD=-1THEN330
320 IFD=1THEN410
325 GOTO310
330 OP=MP:MP=MP+AO:MC=MP+SO:PM=PEEK(MP)

```


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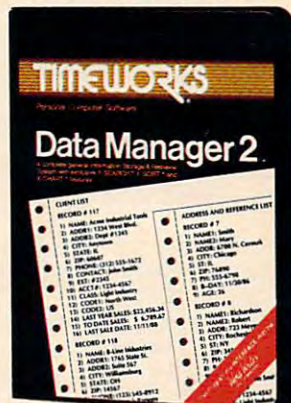
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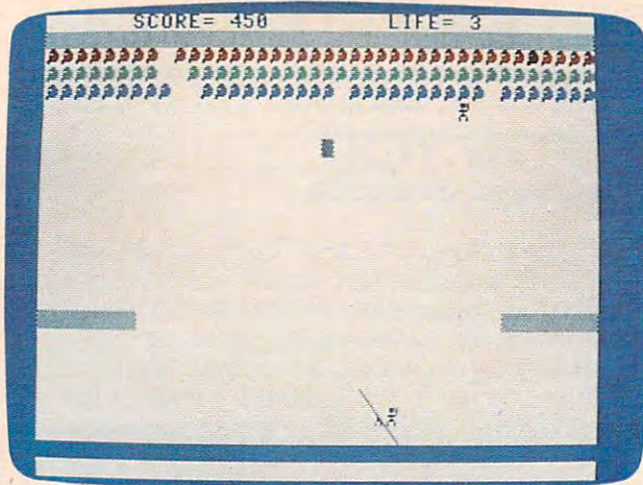
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"Circus," 64 version.

```

335 IF((OP-1023)/40=INT((OP-1023)/40))AND
    AO=41 THEN MP=MP-40:PM=PEEK(MP):MC=MP+S
    O
340 IFPM=32 THEN 406
350 IFPM=35 THEN GOSUB 560:GOTO 406
370 IFPM=T(TT) THEN 460
380 IFPM=43 OR PM=45 THEN MP=OP:D=1:AO=INT(RN
    D(1)*3)+39:GOTO 240
400 L=L-1:IFL<=0 THEN 630
404 GOTO 150
406 POKEOP,32:POKEMP,36:POKEMC,0:GOTO 240
410 OP=MP:MP=MP-AO:MC=MP+SO:PM=PEEK(MP)
415 IF((OP-1024)/40=INT((OP-1024)/40))AND
    AO=41 THEN MP=MP+40:PM=PEEK(MP):MC=MP+S
    O
420 IFPM=32 THEN 450
430 IFPM=35 THEN D=-1:GOSUB 560:GOTO 450
435 IFPM=45 THEN POKEOP,32:MP=MP-AO:MC=MP+S
    O
440 IFPM=43 THEN MP=OP:D=-1:AO=INT(RND(1)*3
    )+39:GOTO 240
450 POKEOP,32:POKEMP,36:POKEMC,0:GOTO 240
460 SC=SC+5:POKEOP,32
480 POKESO+1,10:POKESO+4,33
490 POKE251,TC:SYS49152
500 POKESO+4,32:IFTT=1 THEN MP=1787+TP:MC=M
    P+SO
510 IFTT=2 THEN MP=1785+TP:MC=MP+SO
520 TT=TT+1:IFTT>2 THEN TT=1
530 D=1
540 POKE251,TB(TT):SYS49152
550 AO=INT(RND(1)*3)+39
555 PRINT"{HOME}{6 SPACES}SCORE=";SC:PRIN
    T"{HOME}{25 RIGHT}LIFE=";L:GOTO 240
560 POKESO+1,10:POKESO+4,129:FORI=1 TO 10:N
    EXT:POKESO+4,128
563 IFMP=WANDC=0 THEN L=L-1:GOTO 150
566 IFMP=WANDC=7 THEN SC=SC+250:GOTO 600
570 IFMP>1103 AND MP<1144 THEN SC=SC+100
580 IFMP>1143 AND MP<1184 THEN SC=SC+75
590 IFMP>1183 AND MP<1224 THEN SC=SC+50
600 IFSC>EX*200 THEN L=L+1:EX=EX+1
605 BA=BA-1:IFBA=1 THEN 150
610 AO=INT(RND(1)*3)+39
620 PRINT"{HOME}{6 SPACES}SCORE=";SC:PRIN
    T"{HOME}{25 RIGHT}LIFE=";L:RETURN
630 GS=" G A M E{3 SPACES}O V E R"
640 FORI=2 TO 19 STEP 2
650 PRINT"{HOME}{9 DOWN}";TAB(I*2-1);MID$
    (GS,I,1)
660 FORI=1 TO 100:NEXT:NEXT
670 FORI=1 TO 250:NEXT
680 PRINT"{2 SPACES}PRESS THE FIRE BUTTON
    TO PLAY AGAIN"
690 PRINT"{5 SPACES}PUSH THE JOYSTICK DOW
    N TO END"
700 GOSUB 750
710 IFFB THEN CLR:GOTO 2
720 IFJ1 THEN SYS2048:END
730 GOTO 700
750 P=PEEK(56320)AND 15
760 J1=-(P=13)
770 FB=-(PEEK(56320)AND 16)=0:RETURN
800 POKE53280,6:POKE53281,1

810 PRINT"{CLR}{12 DOWN}{17 SPACES}{RED}C
    {CYN}I{PUR}R{GRN}C{BLU}U{RED}S{BLK}":
    C=0
820 PRINT"{DOWN}{12 SPACES}PLEASE HOLD ON
    ..":GOTO 1310
830 GOSUB 10000:POKE53272,(PEEK(53272)AND 2
    40)+12
840 PRINT"{CLR}{12 DOWN}{17 RIGHT}{BLK}CI
    RCUS"
850 PRINT"{HOME}{10 DOWN}{15 RIGHT}#####
    ####"
855 PRINT"{3 DOWN}{15 RIGHT}#####"
860 PRINT"{HOME}{11 DOWN}{15 RIGHT}#
    {DOWN}{LEFT}#{DOWN}{LEFT}#{2 UP}
    {8 RIGHT}#{DOWN}{LEFT}#{DOWN}{LEFT}#"
880 FORI=1 TO 3:FORP=1 TO 7:S=P
890 FORI=55711 TO 55720:POKEI,S
900 S=S+1:IFS=1 THEN S=2
910 IFS>7 THEN S=0
920 NEXT
930 FORI=55760 TO 55840 STEP 40:POKEI,S
940 S=S+1:IFS=1 THEN S=2
950 IFS>7 THEN S=0
960 NEXT
970 FORI=55880 TO 55871 STEP -1:POKEI,S
980 S=S+1:IFS=1 THEN S=2
990 IFS>7 THEN S=0
1000 NEXT
1010 FORI=55831 TO 55751 STEP -40:POKEI,S
1020 S=S+1:IFS=1 THEN S=2
1030 IFS>7 THEN S=0
1040 NEXT
1050 NEXT P,T
1060 POKE53272,21:PRINT"{CLR}{12 DOWN}";
1070 PRINT"{5 SPACES}DO YOU WANT INSTRUCT
    IONS?(Y/N)"
1080 GETA$:IFA$="" THEN 1080
1090 IFA$="Y" THEN 1120
1100 IFA$="N" THEN 1500
1110 GOTO 1080
1120 PRINTCHR$(14);"{CLR}{DOWN}THIS IS TH
    E GAME OF CIRCUS."
1130 PRINT"{DOWN}THE OBJECT OF THE GAME I
    S TO POP ALL OF THE BALLOONS."
1140 PRINT"{DOWN}THIS IS ACCOMPLISHED BY
    {SPACE}MOVING THE"
1145 PRINT"JOYSTICK LEFT AND RIGHT TO CAT
    CH THE"
1150 PRINT"MAN.":PRINT"{DOWN}WHEN THE GAM
    E STARTS PRESS THE FIRE{4 SPACES}
    {SHIFT-SPACE}BUTTON";
1155 PRINT"TO START PLAYING."
1160 PRINT"{HOME}{20 DOWN}{RVS}PRESS ANY
    {SPACE}KEY"
1170 GETA$:IFA$="" THEN 1170

```


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64, Atari, And TI-99/4A Version Notes For Circus

Patrick Parrish, Programming Supervisor

In "Circus," you must pop the balloons at the top of the tent. On the Commodore 64 and the Atari, two clowns assist you in this task. Using a springboard positioned horizontally with your joystick (joystick #2 on the 64, joystick #1 on the Atari), alternately catapult one and then the other clown into the rows of balloons. On the TI-99/4A (with Extended BASIC), a clown is vaulted to the top of the tent by a trampoline which you wheel about with the < and > keys.

Points are awarded based on the number and location of the balloons you pop. The balloons nearest you are worth 50 points, those in the second row from you give 75 points, and those furthest from you are worth 100 points.

But, in the top row, is a balloon filled with laughing gas. When this balloon is yellow, it is safe to pop. If you succeed you are awarded 250 points. However, if this balloon is black (or green on the Atari) and you try to pop it, look out! A clown is lost, and the tent is once again filled with balloons. On the TI-

99/4A, you lose a clown, but no more balloons appear at this point. In any case, you are given three clowns when the game begins, and you receive an additional clown for every 2000 points.

A Touch Of Havoc

Catapulting the clown to the top of the tent is a real art on the 64 and the Atari. You must catch the clown at the very end of the springboard and hope for the best. By contrast, on the TI-99/4A you have some measure of control over the clown. You'll find that your clown will assume a different direction, depending on where he strikes the trampoline.

To add a little havoc to the game, two platforms which spring the clowns at different angles have been added. On the 64 and Atari, a block also moves across the tent near the first row of balloons which will send the clown flying off in another direction if he should strike it. On the TI-99/4A, instead of a block, three pigeons, formed from sprites, fly across the tent. These pigeons won't collide with your clown, but they will surely distract you.

```

1180 PRINT"{CLR}{DOWN}ALL CHECKERBOARD BL
OCKS BOUNCE YOUR MAN BACK."
1190 PRINT"{DOWN}AN EXTRA MAN WILL BE AWA
RDED FOR EVERY{2 SPACES}2000 POINTS."
1200 PRINT"{DOWN}THE MOVING BLOCK WILL AL
SO BOUNCE YOUR{2 SPACES}MAN."
1210 PRINT"{HOME}{22 DOWN}{RVS}PRESS ANY
{SPACE}KEY{OFF}"
1220 GETA$:IFA$=""THEN1220
1230 PRINT"{CLR}{DOWN}YOU MUST BE CAREFUL
OF THE OUT OF COLOR BALLOON ON THE
{SPACE}TOP ROW."
1240 PRINT"{DOWN}WHEN THIS BALLOON IS BLA
CK IT WILL BLOW"
1250 PRINT"UP IN YOUR MAN'S FACE, WHEN TH
IS BALLOON IS YELLOW IT WILL GIVE ";
1260 PRINT"YOU 250 POINTS"
1270 PRINT"{2 DOWN}GOOD{SHIFT-SPACE}LUCK!
!!"
1280 PRINT"{HOME}{22 DOWN}{RVS}PRESS ANY
{SPACE}KEY{OFF}"
1290 GETA$:IFA$=""THEN1290
1300 GOTO1500
1310 POKE52,48:POKE56,48:CLR
1320 CS=12288:POKE56334,PEEK(56334)AND254
:POKE1,PEEK(1)AND251
1330 FORI=CS+511:POKEI,PEEK(I+40960):
NEXT
1340 POKE1,PEEK(1)OR4:POKE56334,PEEK(5633
4)OR1
1360 FORI=CS+35*8TOCS+46*8-1:READJ:POKEI,
J:A=A+J:NEXT
1365 IF A<>6897 THEN PRINT"ERROR IN DATA
{SPACE}IN LINES 1380-1480":END
1370 GOTO830
1380 DATA28,62,47,63,63,126,96,0
1390 DATA58,58,18,124,16,56,68,68
1400 DATA128,64,32,16,24,28,38,37
1410 DATA128,64,32,16,8,4,2,1
1420 DATA1,2,4,8,24,56,100,164
1430 DATA1,2,4,8,16,32,64,128
1440 DATA0,0,0,255,24,24,36,36
1450 DATA0,0,0,255,0,0,0,0
1460 DATA170,85,170,85,170,85,170,85
1470 DATA255,255,255,255,255,255,255,255
1480 DATA170,85,170,85,170,85,170,85
1500 PRINT"{CLR}":PRINTCHR$(17):GOTO2
10000 I=49152
10010 READA:IFA=256THENGOTO10025
10020 POKEI,A:I=I+1:C=C+A:GOTO 10010
10025 IFC<>21810THENPRINT"ERROR IN DATA L
INES 10030-10580":END
10026 RETURN
10030 DATA 172,66,3,174,61,3,24
10040 DATA 32,240,255,169,192,133,252
10050 DATA 160,0,177,251,32,210,255
10060 DATA 200,192,85,208,246,96,32
10070 DATA 36,32,36,32,32,32,32
10080 DATA 32,32,32,32,32,32,32
10090 DATA 32,32,32,32,32,32,32
10100 DATA 32,32,32,32,32,32,32

```


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```

380 IF PM=43 OR PM=45 THEN MY=0Y:MX=
    OX:D=1:A0=INT(RND(1)*3)-1:GOTO 2
    40
400 L=L-1:IF L<=0 THEN 630
404 GOTO 150
406 COLOR 32:PLOT OX,OY:COLOR 4:PLOT
    MX,MY:GOTO 240
410 OX=MX:OY=MY:MX=MX+A0:MY=MY-D:IF
    MX<0 THEN MX=19
411 IF MX>19 THEN MX=0
415 LOCATE MX,MY,PM
420 IF PM=32 OR PM=0 THEN 450
430 IF PM=3 OR PM=35 OR PM=99 OR PM=
    131 OR PM=163 THEN D=-1:GOSUB 56
    0
435 IF PM=45 THEN COLOR 32:PLOT OX,O
    Y:MX=MX+A0:MY=MY-D:IF MX<0 THEN
    MX=19
437 IF PM=45 AND MX>19 THEN MX=0
440 IF PM=43 THEN MX=OX:MY=OY:D=-1:A
    0=INT(RND(1)*3)-1:GOTO 240
450 COLOR 32:PLOT OX,OY:COLOR 4:PLOT
    MX,MY:GOTO 240
460 SC=SC+5:COLOR 0:PLOT OX,OY
480 SOUND 0,200,10,15:FOR I=1 TO 20:
    NEXT I:SOUND 0,0,0,0
490 POSITION TP,19: ? #6;TC$
500 IF TT=1 THEN MX=TP+3:MY=19
510 IF TT=2 THEN MX=TP+1:MY=19
520 TT=TT+1:IF TT>2 THEN TT=1
530 D=1
538 IF TT=1 THEN TD$=TB$:GOTO 540
539 TD$=TA$
540 POSITION TP,19: ? #6;TD$
550 A0=INT(RND(1)*3)-1
555 POSITION 0,0: ? #6;"score(DOWN)";
    SC:POSITION 13,0: ? #6;"TIME";L
556 GOTO 240
560 SOUND 0,200,12,15:FOR I=1 TO 20:
    NEXT I:SOUND 0,0,0,0
563 IF MX=W AND MY=2 AND PM=3 THEN L
    =L-1:GOTO 150
566 IF MX=W AND PM=35 AND MY=2 THEN
    SC=SC+250:GOTO 600
570 IF MY=2 THEN SC=SC+100
580 IF MY=3 THEN SC=SC+75
590 IF MY=4 THEN SC=SC+50
600 IF SC>EX*2000 THEN L=L+1:EX=EX+1
605 BA=BA-1:IF BA=1 THEN 150
610 A0=INT(RND(1)*3)-1
620 POSITION 0,0: ? #6;"score(DOWN)";
    SC:POSITION 13,0: ? #6;"TIME";L
625 RETURN
630 G$=" G A M E(3 SPACES)O V E R"
640 FOR I=2 TO 18 STEP 2
650 POSITION I-1,11: ? #6;CHR$(ASC(G$
    (I)))
660 FOR T=1 TO 50:NEXT T:NEXT I
670 FOR I=1 TO 250:NEXT I
680 PRINT #6;"(3 SPACES)PRESS THE FI
    RE(3 SPACES)BUTTON TO PLAY AGAIN
    ";
690 PRINT #6;" PUSH THE JOYSTICK
    (6 SPACES)DOWN TO END(5 SPACES)";
    ;
710 IF STRIG(0)=0 THEN GOTO 5
720 IF STICK(0)=13 THEN GRAPHICS 0:E
    ND
730 GOTO 710
800 POKE 82,0
830 GOSUB 1300
835 GRAPHICS 17:POKE 756,CHSET/256
840 FOR J=1 TO 12

```

```

850 POSITION 5,9: ? #6;"#0#0#0#0#"
855 POSITION 5,10: ? #6;"(8 SPACES)#
    "
856 POSITION 5,11: ? #6;"# CIRCUS #"
857 POSITION 5,12: ? #6;"(8 SPACES)#
    "
860 POSITION 5,13: ? #6;"#0#0#0#0#"
900 FOR I=1 TO 20:NEXT I
950 POSITION 5,9: ? #6;"#0#0#0#0#"
955 POSITION 5,10: ? #6;"#(8 SPACES)#
    "
956 POSITION 5,11: ? #6;"(8 SPACES)#"
957 POSITION 5,12: ? #6;"#(8 SPACES)#
    "
960 POSITION 5,13: ? #6;"#0#0#0#0#"
1000 FOR I=1 TO 20:NEXT I
1010 NEXT J
1060 GRAPHICS 17
1070 POSITION 0,11:PRINT #6;"
    (5 SPACES)DO YOU WANT
    (5 SPACES)INSTRUCTIONS?(Y/N)"
1080 A=PEEK(764)
1090 IF A=43 THEN 1120
1100 IF A=35 THEN 5
1110 GOTO 1080
1120 GRAPHICS 17:PRINT #6;"THIS IS T
    HE GAME OF CIRCUS."
1130 PRINT #6;"THE OBJECT OF THE
    (3 SPACES)GAME IS TO POP ALL O
    F THE BALLOONS."
1140 PRINT #6;"THIS IS ACCOMPLISHEDB
    Y MOVING THE"
1145 PRINT #6;"JOYSTICK LEFT AND
    (3 SPACES)RIGHT TO CATCH THE"
1150 PRINT #6;"MAN.":PRINT #6;"WHEN
    THE GAME STARTSPRESS THE fire
    (6 SPACES)BUTTON";
1155 PRINT #6;" TO START(5 SPACES)PL
    AYING."
1159 POSITION 3,20
1160 PRINT #6;"PRESS ANY KEY"
1169 POKE 764,255
1170 IF PEEK(764)=255 THEN 1170
1171 GRAPHICS 17
1180 PRINT #6;"ALL CHECKER-BOARD
    (3 SPACES)BLOCKS BOUNCE YOUR M
    AN BACK."
1190 PRINT #6;"AN EXTRA MAN WILL BEA
    Warded FOR EVERY(3 SPACES)2000
    POINTS."
1200 PRINT #6;"THE MOVING BLOCK
    (4 SPACES)WILL ALSO BOUNCE
    (4 SPACES)YOUR MAN."
1209 POSITION 3,20
1210 PRINT #6;"PRESS ANY KEY"
1219 POKE 764,255
1220 IF PEEK(764)=255 THEN 1220
1221 GRAPHICS 17
1230 PRINT #6;"YOU MUST BE CAREFUL O
    F THE OUT OF COLOR BALLOON ON T
    HE TOP ROW."
1240 PRINT #6;"WHEN THIS BALLOON ISG
    REEN IT WILL BLOW"
1250 PRINT #6;"UP IN YOUR MAN'S
    (4 SPACES)FACE, WHEN THIS
    (5 SPACES)BALLOON IS YELLOW ITW
    ILL GIVE";
1260 PRINT #6;" YOU 250(3 SPACES)POI
    NTS"
1270 PRINT #6;"GOOD LUCK!!!"
1279 POSITION 3,20
1280 PRINT #6;"PRESS ANY KEY"
1289 POKE 764,255

```



```

1290 IF PEEK(764)=255 THEN 1290
1291 GRAPHICS 0
1295 GOTO 5
1300 DIM T(2),TA$(120),TB$(120),TC$(120),TD$(120),G$(25)
1301 IF PEEK(106)=155 THEN CHSET=(PEEK(106)+1)*256:GRAPHICS 17:POKE 756,CHSET/256:RETURN
1305 POKE 106,PEEK(106)-5:GRAPHICS 17
1307 POSITION 5,5: ? #6;"redefining"
1308 POSITION 5,10: ? #6;"CHARACTERS"
1309 POSITION 4,15: ? #6;"PLEASE WAIT"
1310 CHSET=(PEEK(106)+1)*256
1315 POKE 756,CHSET/256
1320 FOR X=0 TO 1023:POKE CHSET+X,PEEK(57344+X):NEXT X
1330 FOR I=24 TO 111:READ X:POKE CHSET+I,X:NEXT I
1370 RETURN
1380 DATA 28,62,47,63,63,126,96,0
1390 DATA 58,58,18,124,16,56,68,68
1400 DATA 128,64,32,16,24,28,38,37
1410 DATA 128,64,32,16,8,4,2,1
1420 DATA 1,2,4,8,24,56,100,164
1430 DATA 1,2,4,8,16,32,64,128
1440 DATA 0,0,0,255,24,24,36,36
1450 DATA 0,0,0,255,0,0,0,0
1460 DATA 170,85,170,85,170,85,170,85
1470 DATA 255,255,255,255,255,255,255,255
1480 DATA 170,85,170,85,170,85,170,85

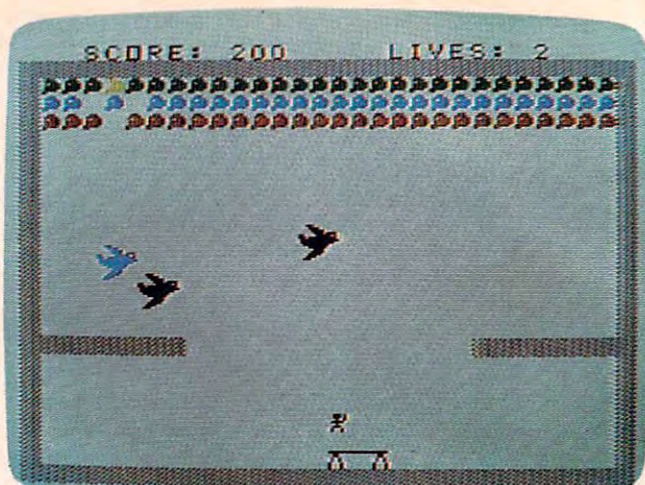
```

Program 5: Circus, TI-99/4A Version

```

10 DIM D1(20),E(20):: RANDOMIZE ::
GOTO 110
20 REM BOING!
30 FOR VOL=1 TO 30 STEP 6 :: CALL SOUND(-50,VOL+110,VOL):: NEXT VOL
:: RETURN
40 REM SCORE
50 CALL HCHAR(ROW+DY,COL+DX,32):: CALL SOUND(10,-5,1):: SC=SC+(H=120)*-50+(H=112)*-75+(H=104)*-100+((H=128)*(M1=1)*250):: BAL=BAL+1
60 IF BAL=84 THEN 150
70 IF (M1=0)*(H=128) THEN GOSUB 820
ELSE DISPLAY AT(1,10):STR$(SC);
80 M1=INT(RND*2):: IF M1=1 THEN CALL COLOR(13,11,1)ELSE CALL COLOR(13,2,1)
90 IF (SC>(2000*VAR)) THEN LIFE=LIFE+2 :: VAR=VAR+1 :: G1=1 :: GOSUB 820 :: G1=0
100 RETURN
110 GOSUB 430
120 G$=" abc "
130 VAR=1 :: SC=0
140 LIFE=3 :: V(0)=-1 :: V(1)=0 :: V(2)=1
150 Y=23 :: X=13 :: COL=16 :: BAL=0 :: CALL CLEAR :: CALL SCREEN(15)
160 M1=INT(RND*2):: IF M1=1 THEN CALL COLOR(13,11,1)ELSE CALL COLOR(13,2,1)
170 CALL HCHAR(2,2,100,30):: CALL HCHAR(24,2,102,30):: CALL VCHAR(3,2,101,21):: CALL VCHAR(3,31,1

```



A flock of birds provides a distraction in the TI version of "Circus."

```

01,21)
180 CALL HCHAR(3,3,104,28):: CALL HCHAR(4,3,112,28):: CALL HCHAR(5,3,120,13):: CALL HCHAR(5,19,120,12)
190 DISPLAY AT(1,3):"SCORE:";SC;TAB(18);"LIVES:";LIFE
200 CALL HCHAR(17,3,103,7):: CALL HCHAR(17,24,103,7)
210 DISPLAY AT(Y,X):G$
220 CALL MAGNIFY(3):: FOR T=1 TO 3 :: CALL SPRITE(#T,136,2+RND*12,RND*90+50,120,0,RND*20+10):: NEXT T
230 F=RND*27+3 :: CALL HCHAR(3,F,128)
240 FOR I=19 TO 5 STEP -1 :: CALL HCHAR(I+2,COL,32,3):: CALL HCHAR(I+1,COL,32,3):: CALL HCHAR(I,COL,120,3):: CALL HCHAR(I+1,17,96):: NEXT I
250 DISPLAY AT(8,4):"PRESS ANY KEY TO START"
260 CALL KEY(0,K,S):: IF S=0 THEN 260
270 FOR G5=4 TO 27 :: CALL HCHAR(8,G5,32):: FOR J1=1 TO 10 :: NEXT J1 :: NEXT G5
280 ROW=6 :: COL=COL+1 :: DY=1 :: DX=0
290 CALL KEY(0,K,S):: IF (K<>44)*(K<>46) THEN 320
300 X=X+(K=44)+SGN(24-X)*(K=46)*-1
310 DISPLAY AT(23,X):G$
320 CALL GCHAR(ROW+DY,COL+DX,H):: IF H=32 THEN 400
330 IF H=101 THEN CALL HCHAR(ROW,COL,32):: DX=-DX :: GOTO 290
340 IF (H=103)*(DY=-1) THEN CALL HCHAR(ROW,COL,32):: ROW=ROW-2 :: CALL GCHAR(ROW,COL+2*DX,H):: COL=COL+2*DX+SGN(DX)*(H=101):: GOT 0 320
350 IF (H=100)+((H=103)*(DY=1)) THEN DY=-DY :: DX=V(INT(RND*3)):: GOSUB 30 :: GOTO 320

```



```

360 IF (H>96)*(H<100) THEN DX=V(H-97)
      : DY=-DY :: GOSUB 30 :: GOTO
      400
370 IF (H=102) THEN GOSUB 820
380 IF ((H=104)+(H=112)+(H=120)+(H=
      128))*(FL=1) THEN GOSUB 50 :: GO
      TO 290
390 IF (H=104)+(H=112)+(H=120)+(H=1
      28) THEN GOSUB 50 :: DY=1 :: GOT
      O 290
400 CALL HCHAR(ROW,COL,32):: ROW=RO
      W+DY :: COL=COL+DX
410 CALL HCHAR(ROW,COL,96)
420 GOTO 290
430 FOR I=0 TO 3 :: CALL CHAR(104+I
      *8,"1C3E2F3F3F7E6000"):: NEXT I
440 CALL COLOR(10,7,1):: CALL COLOR
      (11,13,1):: CALL COLOR(12,5,1)
450 FOR I=96 TO 99 :: READ A$ :: CA
      LL CHAR(I,A$):: NEXT I
460 DATA 3A3A127C10384444,FF3030484
      8848484,FF00000000000000
470 DATA FF0C0C1212121212121212
480 CALL CHAR(136,"1C0F0703C1EF7F7F
      3F0F03070F1E38000000C0DEFAFEFF
      CF0E0C0C0800000000")
490 FOR I=100 TO 103 :: CALL CHAR(I
      ,"AA55AA55AA55AA55"):: NEXT I
500 FOR T=1 TO 20 :: READ D1(T),E(T
      ):: NEXT T
510 DATA 200,523,200,494,100,466,10
      0,494,100,466,100,440,200,415,2
      00,392,200,370,200,392
520 DATA 200,440,200,392,100,370,10
      0,392,100,370,100,349,200,330,2
      00,311,200,294,200,311
530 F=1 :: F1=7 :: F2=13 :: F3=5 ::
      T=14
540 CALL CLEAR :: CALL SCREEN(15)
550 DISPLAY AT(8,10):"hp*hp*hp*hp" :
      : DISPLAY AT(9,10):"p
      {8 SPACES}x" :: DISPLAY AT(10,1
      0):"h CIRCUS p"
560 DISPLAY AT(11,10):"x{8 SPACES}h
      " :: DISPLAY AT(12,10):"hp*hp*hp
      *hp"
570 FOR R=1 TO 20 :: CALL COLOR(10,
      F1,F,11,F2,F,12,F3,F)
580 T=F1 :: F1=F2 :: F2=F3 :: F3=T
      :: CALL SOUND(D1(R),E(R),2):: N
      EXT R
590 DISPLAY AT(22,3):"INSTRUCTIONS
      (Y/N)?" :: ACCEPT AT(22,23)VALI
      DATE("YN"):A$
600 IF A$="N" THEN RETURN
610 CALL CLEAR :: PRINT "THIS IS TH
      E GAME OF CIRCUS."
620 PRINT :: PRINT "THE OBJECT OF T
      HE GAME IS"
630 PRINT :: PRINT "TO POP ALL OF T
      HE BALLOONS"
640 PRINT :: PRINT "WITH THE MAN. T
      O CATCH THE"
650 PRINT :: PRINT "MAN, POSITION T
      HE TRAMPOLINE"
660 PRINT :: PRINT "WITH THE '<' AN
      D '>' KEYS."
670 PRINT :: PRINT "ALL BORDERS, BU
      T THE BOTTOM,"
680 PRINT :: PRINT "WILL BOUNCE THE
      MAN BACK."

```

```

690 PRINT :: PRINT :: PRINT "AN EXT
      RA MAN WILL BE AWARDED"
700 PRINT :: PRINT "FOR EVERY 2000
      POINTS." :: PRINT :: PRINT :: P
      RINT "PRESS ANY KEY TO CONTINUE
      "
710 CALL KEY(0,K,S):: IF S=0 THEN 7
      10
720 CALL CLEAR
730 PRINT :: PRINT "BE CAREFUL OF T
      HE BALLOON ON"
740 PRINT :: PRINT "THE TOP ROW WHI
      CH CHANGES"
750 PRINT :: PRINT "COLOR. WHEN THI
      S BALLOON IS" :: PRINT :: PRINT
      "BLACK, IT WILL BLOW UP IN"
760 PRINT :: PRINT "YOUR MAN'S FACE
      . IF IT IS"
770 PRINT :: PRINT "YELLOW, YOU WIL
      L RECEIVE 250"
780 PRINT :: PRINT "POINTS." :: PRI
      NT :: PRINT :: PRINT T
      AB(10);"GOOD LUCK!"
790 PRINT :: PRINT :: PRINT :: PRIN
      T TAB(4);"PRESS ANY KEY TO STAR
      T"
800 CALL KEY(0,K,S):: IF S=0 THEN 8
      00 ELSE RETURN
810 REM LIFE-1
820 LIFE=LIFE-1 :: DISPLAY AT(1,25)
      :STR$(LIFE):: IF LIFE=0 THEN 87
      0
830 IF G1=0 THEN DISPLAY AT(Y,X):"
      {3 SPACES}" :: CALL HCHAR(ROW,C
      OL,32):: ROW=6 :: COL=17 :: DX=0
      :: X=13 :: CALL HCHAR(ROW,COL,9
      6):: DISPLAY AT(Y,X):G$
840 IF G1=1 THEN RETURN
850 CALL KEY(0,K,S):: IF S=0 THEN 8
      50
860 RETURN
870 DISPLAY AT(8,7):"G A M E
      {3 SPACES}O V E R" :: DISPLAY A
      T(11,7):"PLAY AGAIN (Y/N)?"
880 ACCEPT AT(11,25)BEEP VALIDATE("
      YN"):H$ :: IF H$="Y" THEN 130 E
      LSE CALL DELSPRITE(ALL):: CALL
      CLEAR :: STOP

```

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Quatrainment

Sean Puckett

Fast thinking and logic are required for "Quatrainment," as you race the clock and plan your moves to match a master pattern. Originally written for the Atari with 16K; versions also are included for VIC (3K expansion or more), 64 TI-99/4A, Apple, IBM PC, and TRS-80 Color Computer. Joystick required on all versions except TI and PC.

The object of "Quatrainment" is to match a pattern generated by the program, using the fewest moves possible and finishing in the shortest amount of time.

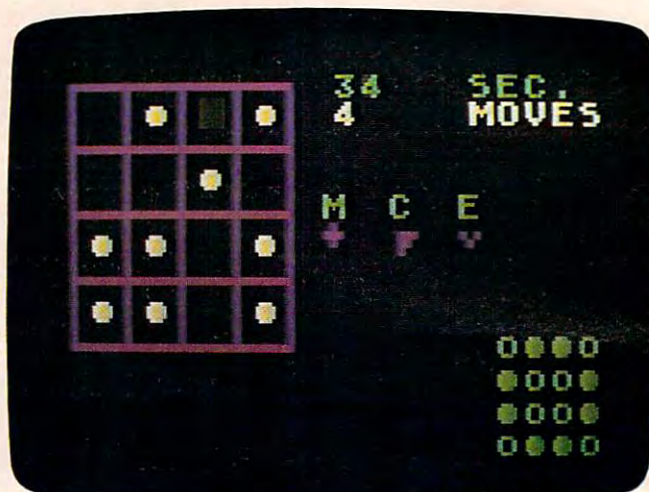
As the game begins, your game board is drawn at the left of the screen, and the master pattern is displayed at the right. A timer and move counter are also displayed.

A cursor appears in one of the squares on the game board. To change your pattern, use the joystick to move the cursor onto the square you want (on the TI and PC, use the arrow keys), then press the joystick button (on the TI, press ENTER; on the PC, press INSERT). Part of your pattern will toggle from on to off, or from off to on, depending on whether you are in the middle, in a corner, or at an edge of the board. The different ways the pattern can change are shown in examples displayed on the screen.

When you match the pattern, your weighted score will be displayed, based on elapsed time and the number of moves you made. The lower your score, the better.

Program 1: Quatrainment, Atari Version

```
1 GRAPHICS 2+16:FOR A=0 TO 10 STEP 2
  :POSITION 0,A:?" #6;"{J}{J}{J}{J}
  {J}{J}{J}{J}{J}{J}{J}{J}{J}{J}
  {J}{J}{J}{J}{J}{J}{J}{J}{J}{J}
  {J}";:NEXT A
2 POKE 708,15:POSITION 4,1:?" #6;"QUA
  TRAINMENT":POKE 712,66
3 S1=50:S2=50:E1=4:E2=6:?" #6:POSITIO
  N 2,8:?" #6;"PRESS S TO {J} START":PO
  KE 764,255
4 FOR A=15 TO 0 STEP -.1:SOUND 0,A*
  15,0,A:SOUND 1,A*15,2,A:NEXT A
5 B=PEEK(709):B=B+16*(B<240)-240*(B>
```

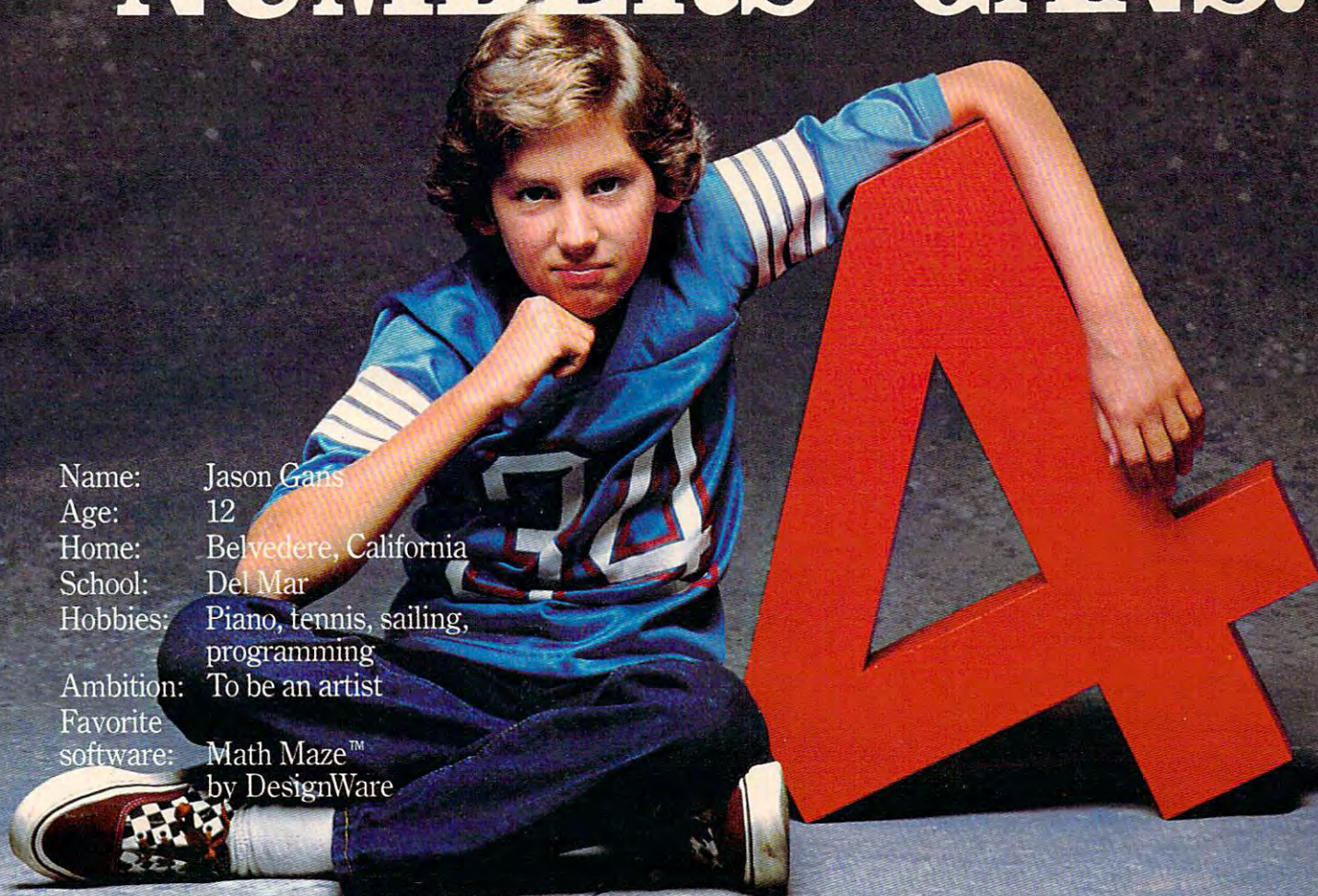


The object of "Quatrainment" is to make the patterns in the two grids match. Atari version.

```
240):POKE 709,B
6 A=PEEK(709):POKE 709,PEEK(710):POK
  E 710,PEEK(711):POKE 711,A:FOR D=1
  TO 50:NEXT D:IF PEEK(764)=255 THE
  N 5
7 FOR A=708 TO 712:B=PEEK(A)
8 IF B>15 THEN B=B-16:POKE A,B:GOTO
  8
9 IF B>0 THEN B=B-1:POKE A,B:GOTO 9
10 NEXT A:GRAPHICS 23:GOSUB 30000:DI
  M B(3,3),M$(100),FL(3,3),D(3,3):T
  EXT=ADR(A$):RESTORE
11 FOR R=0 TO 3:FOR RR=0 TO 3:B(R,RR
  )=(RND(0)>0.5):NEXT RR:NEXT R
12 GOSUB 20060:GOSUB 20020:GOSUB 200
  70
13 CX=0:CY=0:CCX=CX*16+8:CCY=CY*16+7
  :CXX=CCX:CYY=CCY:RESTORE 14
14 DATA 2,6,6,3,9,1,1,7,9,1,1,7,5,8,
  8,4
15 FOR R=0 TO 3:FOR RR=0 TO 3:READ Z
  1:FL(RR,R)=Z1:NEXT RR:NEXT R
16 GOSUB 6000
17 GOSUB 7000
18 XP=120:YP=0:C=2:M$="SEC.":GOSUB 2
  0000:XP=120:YP=7:C=3:M$="MOVES":G
  OSUB 20000
20 Q=STICK(0):Z=USR(TEXT,VV,3,CXX,CY
  Y):VA=32*(1-B(CX,CY))+20*B(CX,CY)
  :CXX=CCX:CYY=CCY:VV=VA
21 IF STRIG(0)=0 THEN GOSUB 5000:MOV
```


THEY CALL HIM "NUMBERS" GANS.

Name: Jason Gans
Age: 12
Home: Belvedere, California
School: Del Mar
Hobbies: Piano, tennis, sailing,
programming
Ambition: To be an artist
Favorite
software: Math Maze™
by DesignWare



"Math Maze is neat because you do more than just add and subtract numbers all the time. You've got to find them first. And then get there before you get caught."

"It's got real good graphics. I can even change the background color. And make the math as challenging as I want."

"There's lots of mazes, too. But the best thing is, I can make up my own. So when my friends come over, I've always got something new."

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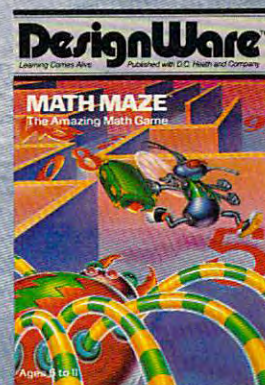
DesignWare programs encourage kids to draw on something they just happen to have an unlimited supply of — imagination!

SPELLING, MATH, OR LANGUAGE Games like *Math Maze*, *Spellicopter™* and *Creature Creator™* inspire youngsters to tap into that fertile idea-field. To actively become part of the program, in effect creating "new" games as they go along. And all the while building up solid skills in the basics. And all the while having a lot of plain old fun.

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As Jason Gans says, "Hey — they don't call me 'Numbers' for nothing, you know!"



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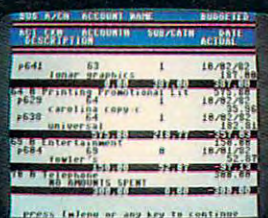
=MOV+1:M#=STR$(MOV):C=3:XP=80:YP=
7:GOSUB 20000
29 IF PEEK(20)>60 THEN POKE 20,0:TIM
E=TIME+1:M#=STR$(TIME):C=2:XP=80:
YP=0:GOSUB 20000:GOSUB 100
30 CX=CX-(Q=11 AND CX>0)+(Q=7 AND CX
<3):CY=CX-(Q=14 AND CY>0)+(Q=13 A
ND CY<3):CCX=16*CX+8:CCY=16*CY+7
40 Z=USR(TEXT,128+VA,2,CCX,CCY)
50 GOTO 20
100 FOR R=0 TO 3:FOR RR=0 TO 3:IF D(
R,RR)<>B(R,RR) THEN POP:POP:RE
TURN
101 NEXT RR:NEXT R:POP
102 FOR A=200 TO 0 STEP -5:FOR B=A T
O A+50 STEP 5:SOUND 0,B,10,15:PO
KE 712,B:NEXT B:NEXT A:SOUND 0,0
,0,0:POKE 712,0
103 M#="SCORE IS: ":SC=INT(TIME/10)*
INT(MOV/5):M#(LEN(M#)+1)=STR$(SC
):XP=0:YP=80:C=2:GOSUB 20000
107 XP=0:YP=80:C=1:M#="PRESS ANY KEY
":GOSUB 20000:POKE 764,255
110 IF PEEK(764)=255 THEN 110
111 RUN
5000 FL=FL(CX,CY)
5002 R=FL:C=1
5003 IF X(R,C)=9 THEN SOUND 0,0,0,0:
GOSUB 20030:RETURN
5004 X1=CX+X(R,C):Y1=CY+Y(R,C)
5005 B(X1,Y1)=1-B(X1,Y1):FOR G=15 TO
0 STEP -2:SOUND 0,50+50*B(X1,Y
1),10,G:NEXT G:C=C+1:GOTO 5003
6000 DATA -1,0,1,0,0,-1,0,1,0,4,0
6001 DATA 0,0,1,0,0,1,2,0,0,2,1,1,4,
0
6002 DATA 0,0,-1,0,0,1,-2,0,0,2,-1,1
,4,0
6003 DATA 0,0,-1,0,0,-1,-2,0,0,-2,-1
,-1,4,0
6004 DATA 0,0,1,0,0,-1,2,0,0,-2,1,-1
,4,0
6005 DATA -1,0,1,0,0,1,4,0
6006 DATA 0,-1,0,1,-1,0,4,0
6007 DATA -1,0,1,0,0,-1,4,0
6008 DATA 0,-1,0,1,1,0,3,0
6009 DIM X(9,9),Y(9,9):RESTORE 6000
6010 FOR R=0 TO 9:FOR RR=0 TO 9:X(R,
RR)=9:Y(R,RR)=9:NEXT RR:NEXT R:
R=1:C=1
6020 READ F,G:IF F=4 THEN R=R+1:C=1:
GOTO 6020
6030 IF F=3 THEN 6050
6040 X(R,C)=F:Y(R,C)=G:C=C+1:GOTO 60
20
6050 P=1:XP=80:YP=40:GOSUB 6090:Z=US
R(TEXT,ASC("M"),2,76,30)
6051 P=2:XP=100:YP=40:GOSUB 6090:Z=U
SR(TEXT,ASC("C"),2,96,30)
6052 P=6:XP=120:YP=40:GOSUB 6090:Z=U
SR(TEXT,ASC("E"),2,116,30)
6090 FOR R=1 TO 9:IF Y(P,R)=9 THEN N
EXT R:RETURN
6091 D=X(P,R)*2+XP:DD=Y(P,R)*2+YP:CO
LOR 1:PLOT D,DD:PLOT D+1,DD:PLO
T D+1,DD+1:PLOT D,DD+1:NEXT R:R
ETURN
7000 DATA 1,1,1,1,1,0,0,1,1,0,0,1,1,
1,1,1
7001 DATA 0,0,0,0,0,1,1,0,0,1,1,0,0,
0,0,0
7002 DATA 0,1,1,0,1,0,0,1,1,0,0,1,0,
1,1,0
7003 DATA 1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1
7004 DATA 1,0,0,1,0,1,1,0,0,1,1,0,1,
0,0,1
7005 RESTORE 7000:S=INT(RND(0)*10+1)
:IF S>1 THEN FOR A=1 TO S*16-16
:READ B:NEXT A
7006 FOR R=0 TO 3:FOR RR=0 TO 3:READ
Z1:D(RR,R)=Z1
7007 Z=USR(TEXT,111-91*Z1,2,RR*8+127
,R*8+63):SOUND 0,Z1*50+50,10,8:
NEXT RR:NEXT R:SOUND 0,0,0,0:RE
TURN
7010 DATA 1,1,1,1,0,0,0,0,0,0,0,0,1,
1,1,1
7011 DATA 0,0,0,1,0,0,0,1,0,0,0,1,0,
0,0,1
7012 DATA 1,0,0,1,0,0,0,0,0,0,0,0,1,
0,0,1
7013 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0
7014 DATA 0,0,0,0,1,0,0,1,1,0,0,1,0,
0,0,0
20000 FOR B=1 TO LEN(M#):Z1=XP+B*8-8
:Z=USR(TEXT,ASC(M#(B)),C,Z1,YP
):NEXT B:RETURN
20020 DATA {0}{R}{W}{R}{W}{R}{W}{R}
{E},! ! ! ! !,{A}{R}{S}{R}{S}
{R}{S}{R}{D},! ! ! ! !,{A}{R}
{S}{R}{S}{R}{S}{R}{D},! ! ! ! !
!,{A}{R}{S}{R}{S}{R}{S}{R}{D},
! ! ! ! !,{Z}{R}{X}{R}{X}{R}
{X}{R}{C}
20021 RESTORE 20020:C=1:FOR R=1 TO 9
:READ M#:YP=R*8-8:XP=0:GOSUB 2
0000:NEXT R
20030 FOR R=0 TO 3:FOR RR=0 TO 3:XP=
R*16+8:YP=RR*16+7:C=3:Z3=32*(1
-B(R,RR))+20*B(R,RR)
20031 Z=USR(TEXT,Z3,C,XP,YP):NEXT RR
:NEXT R
20050 RETURN
20060 FOR A=0 TO 15 STEP 0.1:POKE 71
2,A:NEXT A:POKE 708,0:POKE 709
,0:POKE 710,0:POKE 712,0:RETUR
N
20070 POKE 708,66:POKE 709,216:POKE
710,30:RETURN
20080 FOR A=15 TO 0 STEP -0.1:POKE 7
08,A:NEXT A:RETURN
20090 FOR A=16 TO 30 STEP 0.5:POKE 7
10,A:NEXT A:RETURN
30000 RESTORE 30000:DIM A$(354):FOR
I=0 TO 21:READ X:POKE 1536+I,X
:NEXT I
30001 RESTORE 32500:FOR A=1 TO 354:R
EAD J:A$(A)=CHR$(J):NEXT A:RET
URN
30160 DATA 169,0,133,212,162,8,70,18
6,144,3,24,101,187,106,102,212
,202,208,243,133,213,96
32500 DATA 104,240,10,201,4,240,13,1
70,104,104,202,208,251,169,22,
133,185,76,64
32501 DATA 185,104,133,195,104,201,1
28,144,4,41,127,198,195,170,14
1,22,6,224,96,176
32502 DATA 15,169,64,224,32,144,2,16
9,224,24,109,22,6,141,22,6,104
,104,141,23
32503 DATA 6,104,104,141,24,6,201,4,
144,5,56,233,4,176,247,133,214
,201,0,240

```


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1



2



3



4



5

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Analysis
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```

32504 DATA 7,169,4,56,229,214,133,21
4,78,24,6,78,24,6,6,214,24,104
,104,141
32505 DATA 25,6,133,186,166,87,169,1
0,224,3,240,8,169,20,224,5,240
,2,169,40
32506 DATA 133,207,133,187,165,88,13
3,203,165,89,133,204,32,0,6,24
,173,24,6,101
32507 DATA 203,133,203,144,2,230,204
,24,165,203,101,212,133,203,16
5,204,101,213,133,204
32508 DATA 173,22,6,133,187,169,8,13
3,186,32,0,6,165,212,133,205,1
73,244,2,101
32509 DATA 213,133,206,160,0,162,8,1
69,0,133,209,133,208,177,205,6
9,195,72,104,10
32510 DATA 72,144,8,24,173,23,6,5,20
8,133,208,224,1,240,8,6,208,38
,209,6
32511 DATA 208,38,209,202,208,228,10
4,152,72,160,0,132,215,132,212
,166,214,240,88,56
32512 DATA 38,215,202,208,250,177,20
3,5,215,69,215,145,203,165,215
,73,255,133,215,200
32513 DATA 200,177,203,5,215,69,215,
145,203,166,214,6,209,38,212,2
02,208,249,160,0
32514 DATA 24,177,203,101,212,145,20
3,169,8,56,229,214,170,132,212
,70,208,102,212,202
32515 DATA 208,249,240,2,208,135,160
,2,24,177,203,101,212,145,203,
24,165,208,101,209
32516 DATA 160,1,145,203,24,144,9,16
5,209,145,203,200,165,208,145,
203,104,168,24,165
32517 DATA 203,101,207,133,203,144,2
,230,204,200,192,8,208,206,96

```

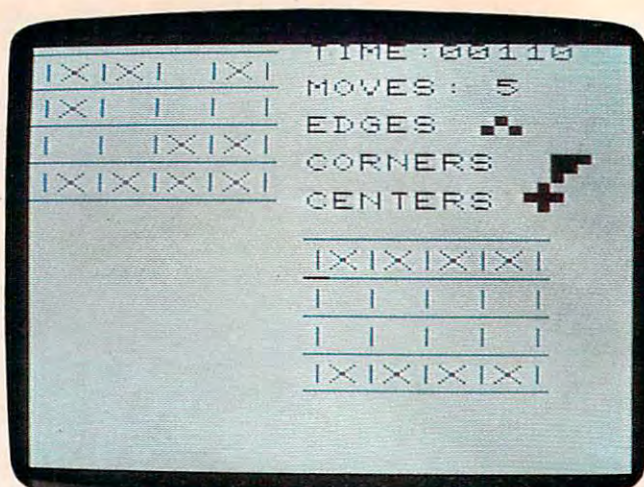
Program 2: Quatrainment, VIC Version (3K Expander, Or Better)

Version by Gregg Peele, Assistant Programming Supervisor

```

8 SR=4*(PEEK(36866)AND128)+64*(PEEK(36869
)AND128):CO=(37888+4*(PEEK(36866)AND128
))-SR
10 PRINT "{CLR}":POKE214,10:PRINT:POKE211,
5:A$="QUATRINMENT":POKE646,0
15 DF=37154:PA=37151:PB=37152
20 FORT=1:TOL=LEN(A$):PRINTMID$(A$,T1,1);F
ORT=1:TO200:NEXT:NEXT:FORT=1:TO500:NEXT
30 RN=16:REMFOR RANDOM INITIAL GRID CHANG
E LINE 30 TO RN=RND(0)*15+1
40 PRINT "{CLR}";TAB(10);"TIME:"
45 PRINT "{2 DOWN}{12 LEFT}MOVES:";MO
50 PRINT "{2 DOWN}{12 LEFT}EDGES {D}
{B}"
53 PRINT "{2 DOWN}{12 LEFT}CORNERS
{2 SPACES}{RVS} {OFF}{V}{DOWN}
{2 LEFT}{V}"
54 PRINT "{DOWN}{12 LEFT}CENTERS {UP}{D}
{DOWN}{LEFT}{RVS}{F}{OFF}{V}"
55 PRINT:POKE214,19:PRINT:POKE211,0:REM
{2 SPACES}PRINT"HIT {RVS}FIRE{OFF} IF
{SPACE}YOU MATCH"
100 GOTO140
110 FORL=1:TO4:FORB=1:TO4:D(L,B)=PEEK(C(L,B
)):NEXTB:NEXTL:RETURN
115 FORT=1:TO500:NEXT

```



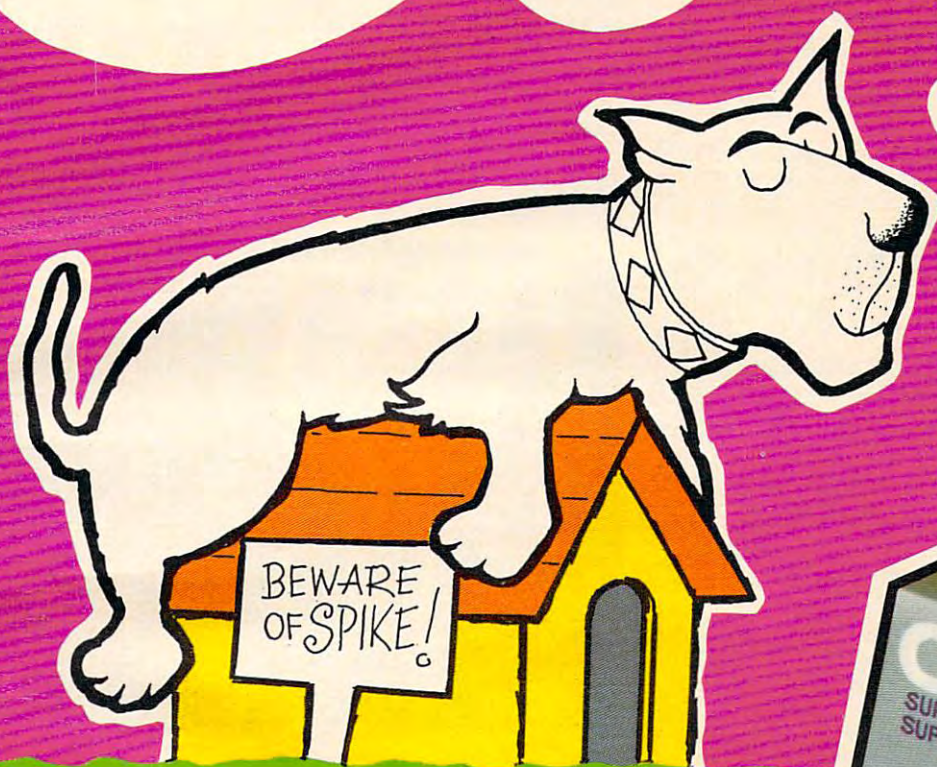
"Quatrainment," VIC version.

```

120 FORL=1:TO4:FORB=1:TO4:IFB(L,B)<>D(L,B)T
HENRETURN
130 NEXT:NEXT:SC=VAL(TI$)/16+MO/5:PRINT"
{HOME}{10 DOWN}":PRINT"{RIGHT}MATCHED
11{2 DOWN}"
135 PRINT" SCORE:";PRINT INT(SC);"{DOWN}"
136 PRINTTAB(5){3 DOWN}AGAIN Y OR N?
137 IFPEEK(197)<>11ANDPEEK(197)<>28THEN13
7
138 IF PEEK(197)=11THENRUN
139 END
140 POKE36879,24
150 FORJ=0:TO8STEP2
160 FORT=SR:TO500STEP22:POKET+J,93
170 POKET+CO+J,6:NEXT:NEXT
180 FORJ=0:TO8STEP2
190 FORT=SR:TO500STEP22:POKET+J*22,67:POKET+CO+
J*22,6
200 NEXT:NEXT
210 FORJ=0:TO8STEP2
215 FORT=SR+230:TO500STEP22:POKET+J
,93
220 POKET+CO+J,6:NEXT:NEXT
225 FORJ=0:TO8STEP2
230 FORT=SR+230:TO500STEP22:POKET+J*22,67:P
OKET+CO+J*22,6
235 NEXT:NEXT
280 FORU=1:TO4:FORV=1:TO4:C(T,U)=SR+207+2*T
+44*U:NEXTT:NEXTU
300 FORT=1:TO4:A(T,1)=SR+21+2*T:A(T,2)=SR+
65+2*T
305 A(T,3)=SR+109+2*T:A(T,4)=SR+153+2*T:N
EXT
310 GOSUB570:X=1:Y=1:GOSUB500
315 TI$="000000"
320 POKEDF,127:GP=PEEK(PB)AND128:JO=-(GP=
0)*4:POKEDF,255:GP=PEEK(PA):IFJOTHEN3
40
321 JO=-(GPAND8)=0)*2:IFJOTHEN340
322 JO=-(GPAND4)=0:IFJOTHEN340
324 JO=-(GPAND16)=0)*3
325 IFJO=0THENJO=5
340 ONJOGOSUB390,410,450,430,470
350 IF-(GPAND32)=0=0THEN375
360 GOSUB910:MO=MO+1
370 GP=PEEK(PA):IF-(GPAND32)=0=1 THEN37
0:GOSUB110:GOSUB120
375 PRINT "{HOME}";TAB(15);RIGHT$(TI$,5);"
{2 DOWN}{4 LEFT}";MO
380 GOTO320

```


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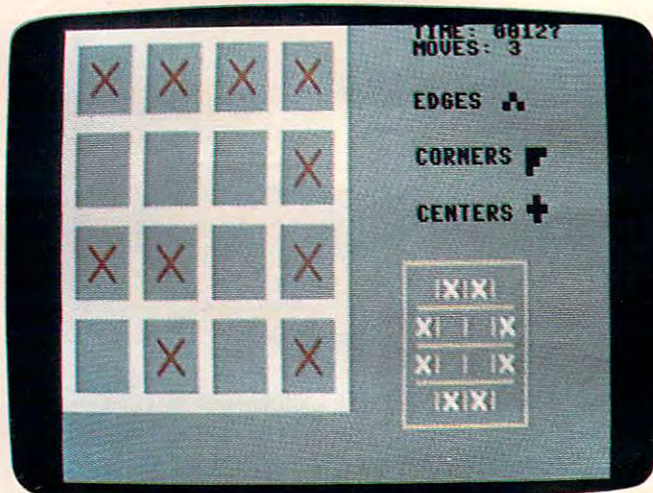
390 IFY-1<=0THEN480
400 Y=Y-1:GOSUB 500:RETURN
410 IFY+1=5THEN480
420 Y=Y+1:GOSUB500:RETURN
430 IFX+1=5THEN480
440 X=X+1:GOSUB500:RETURN
450 IFX-1<=0THEN480
460 X=X-1:GOSUB500:RETURN
470 GOSUB500:RETURN
480 RETURN
490 GOTO320
500 P1=PEEK(A(X,Y))
510 POKEA(X,Y),81
520 POKEA(X,Y)+CO,2:FORT=1TO50:NEXT
530 POKEA(X,Y),P1
535 P1=0
540 GOSUB110:GOSUB120:RETURN
570 WE=INT(RND(0)*8)+1:FORJ=1TOWE*RN:READ
Q:NEXT
580 FORY=1TO4:FORX=1TO4:READQ:IFQ=0THEN600
0
590 GOSUB610
600 NEXTX:NEXTY:GOSUB640:GOSUB680:RETURN
610 POKEA(X,Y),86
620 POKEA(X,Y)+CO,2
630 GOSUB110,120:RETURN
640 FORX=1TO4:FORY=1TO4:B(X,Y)=PEEK(A(X,Y))
))
670 NEXTY:NEXTX:RETURN
680 FORY=1TO4:FORX=1TO4:READP
690 IFPTHENPOKEC(X,Y),86:POKEC(X,Y)+CO,0
700 NEXTX:NEXTY:RETURN
710 DATA1,1,1,1,1,0,0,1,1,0,0,1,1,1,1,1
1
720 DATA0,0,0,0,0,1,1,0,0,1,1,0,0,0,0,0
0
730 DATA0,1,1,0,1,0,0,1,1,0,0,1,0,1,1,0
0
740 DATA1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1
1
750 DATA1,0,0,1,0,1,1,0,0,1,1,0,1,0,0,0
1
760 DATA1,1,1,1,0,0,0,0,0,0,0,0,1,1,1,1
1
770 DATA0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,0
1
775 DATA1,0,0,1,0,0,0,0,0,0,0,0,1,0,0,0
1
780 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
0
790 DATA0,0,0,0,1,0,0,1,1,0,0,1,0,0,0,0
0
800 REM REVERSE
810 POKEA(C,D),118-PEEK(A(C,D))
830 POKEA(C,D)+CO,2
840 P1=0
860 RETURN
870 REM SET DATA POINTER
910 REM{2 SPACES}WHICH ONES{2 SPACES}TO C
HANGE
920 IFX+Y<>2THEN950
930 FORC=2TO3:D=1:GOSUB810:NEXT:FORD=1TO3
:C=1:GOSUB810:NEXT
940 D=2:C=2:GOSUB810:RETURN
950 IF X+Y<>8THEN980
960 FORC=3TO2STEP-1:D=4:GOSUB810:NEXT:FOR
D=4TO2STEP-1:C=4:GOSUB810:NEXT
970 C=3:D=3:GOSUB810:RETURN
980 IF X+Y<>5THEN1020
990 IF X<>4THEN 1020
1000 FORC=3TO2STEP-1:D=1:GOSUB810:NEXT:FO

```

```

RD=1TO3:C=4:GOSUB810:NEXT
1010 C=3:D=2:GOSUB810:RETURN
1020 IFX+Y<>5THEN1060
1030 IFX<>1THEN1060
1040 FORC=2TO3:D=4:GOSUB810:NEXT:FORD=4TO
2STEP-1:C=1:GOSUB810:NEXT
1050 C=2:D=3:GOSUB810:RETURN
1060 REM CHECK EDGES
1070 IF(X>1ANDX<4)AND(Y=1ORY=4)THENC=X-1:
D=Y:GOSUB810:C=X+1:GOSUB810:GOSUB110
0
1080 IF(Y>1ANDY<4)AND(X=1ORX=4)THEND=Y-1:
C=X:GOSUB810:D=Y+1:GOSUB810:GOSUB110
0
1090 GOTO1160
1100 IFY=1THEND=Y+1:C=X:GOSUB810
1110 IFY=4THEND=Y-1:C=X:GOSUB810
1120 IFX=4THENC=X-1:D=Y:GOSUB810
1130 IFX=1THENC=X+1:D=Y:GOSUB810
1140 RETURN
1150 REM CHECK CENTERS
1160 IF (X=1)OR(Y=1)OR(X=4)OR(Y=4)THEN 12
00
1170 D=Y+1:C=X:GOSUB810:C=X-1:D=Y:GOSUB81
0
1180 D=Y-1:C=X:GOSUB810:C=X+1:D=Y:GOSUB81
0
1190 C=X:D=Y:GOSUB810
1200 RETURN

```



"Quatrainment," 64 version.

Program 3: Quatrainment, 64 Version

Version by Gregg Peele, Assistant Programming Supervisor

```

10 PRINT"{CLR}":POKE214,10:PRINT:POKE211,
13:A$="QUATRAINMENT":POKE646,0
20 FORT1=1TOLEN(A$):PRINTMID$(A$,T1,1):F
ORT=1TO200:NEXT:NEXT:FORT=1TO500:NEXT
30 RN=16:REMFOR RANDOM INITIAL GRID CHANG
E LINE 30 TO RN=RND(0)*15+1
40 PRINT"{CLR}";TAB(26);"TIME:"
45 PRINT"{DOWN}{14 LEFT}MOVES:";MO
50 PRINT"{3 DOWN}{14 LEFT}EDGES {D}
{B}"
53 PRINT"{3 DOWN}{14 LEFT}CORNERS {RVS}
{OFF}{V}{DOWN}{2 LEFT}{V}"
54 PRINT"{2 DOWN}{14 LEFT}CENTERS {UP}
{D}{DOWN}{LEFT}{RVS}{F}{OFF}{V}"
100 GOTO140
110 FORL=1TO4:FORB=1TO4:D(L,B)=PEEK(C(L,B
))-9:NEXTB:NEXTL:RETURN

```


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```

115 FORT=1TO500:NEXT
120 FORL=1TO4:FORB=1TO4:IFB(L,B)<>D(L,B)T
HENRETURN
130 NEXT:NEXT:SC=VAL(TI$)/16+MO/5:PRINT"
{CLR}{6 DOWN}"TAB(10)"YOU HAVE MATCHE
D IT!{DOWN}"
135 PRINTTAB(15);"SCORE:";INT(SC);"{DOWN}"
136 PRINTTAB(11);"PLAY AGAIN Y OR N?"
137 IFPEEK(197)<>39ANDPEEK(197)<>25THEN13
7
138 IF PEEK(197)=25THENRUN
139 END
140 CO=54272:POKE53281,12:POKE53280,0
150 FORJ=0TO20STEP5
160 FORT=1024TO1804STEP40:POKET+J,160
170 POKET+54272+J,1:NEXT:NEXT
180 FORJ=0TO20STEP5
190 FORT=1024TO1024+20:POKET+J*40,160:POK
ET+54272+J*40,1
200 NEXT:NEXT
210 POKE 1569,79:POKE1569+CO,7:POKE1577,8
0:POKE1577+CO,7
220 POKE1889,76:POKE1889+54272,7:POKE1897
,122:POKE1897+CO,7
230 FORT=1609TO1849STEP40:POKET,116:POKE
{SPACE}T+CO,7:POKET+8,106:POKET+8+CO,
7:NEXT
240 FORT=1570TO1576:POKET,119:POKET+320,1
11:POKE T+CO,7:POKET+320+CO,7:NEXT
250 FORJ=0TO4STEP2:FORT=1611TO1611+240STE
P40:POKET+J,66:POKET+CO+J,7:NEXT:NEXT
260 FORT=1650TO1650+6:POKET,64:POKET+CO,7
:POKET+80,64:POKET+80+CO,7
270 POKET+160,64:POKET+160+CO,7:NEXT
280 FORU=1TO4:FORT=1TO4:C(T,U)=1528+2*T+8
0*U:NEXTT:NEXTU
290 DATA106,1111,1116,1121
300 FORT=1TO4:READ E:A(T,1)=E:A(T,2)=E+20
0:A(T,3)=E+400:A(T,4)=E+600:NEXT
310 GOSUB570:X=1:Y=1:GOSUB500
315 TI$="000000"
320 JO=15-(PEEK(56320)AND15):IF JO<>1ANDJ
O<>2ANDJO<>4ANDJO<>8THENEND=5:GOTO340
330 D=LOG(JO)/LOG(2)+1
340 ONDGOSUB390,410,450,430,470
350 IF(PEEK(56320)AND16)THEN375
360 GOSUB910:MO=MO+1
370 IF(PEEK(56320)AND16)=0THEN370
375 PRINT"{HOME}";TAB(32);RIGHT$(TI$,5);"
{DOWN}{5 LEFT}";MO
380 GOTO320
390 IFY-1<=0THEN480
400 Y=Y-1:GOSUB 500:RETURN
410 IFY+1=5THEN480
420 Y=Y+1:GOSUB500:RETURN
430 IFX+1=5THEN480
440 X=X+1:GOSUB500:RETURN
450 IFX-1<=0THEN480
460 X=X-1:GOSUB500:RETURN
470 GOSUB500:RETURN
480 RETURN
490 GOTO320
500 P1=PEEK(A(X,Y)):P2=PEEK(A(X,Y)+1):P3=
PEEK(A(X,Y)+40):P4=PEEK(A(X,Y)+41)
510 POKEA(X,Y),213:POKEA(X,Y)+1,201:POKEA
(X,Y)+40,202:POKEA(X,Y)+41,203
520 POKEA(X,Y)+CO,2:POKEA(X,Y)+1+CO,2:POK
EA(X,Y)+40+CO,2:POKEA(X,Y)+41+CO,2
530 POKEA(X,Y),P1:POKEA(X,Y)+1,P2:POKEA(X
,Y)+40,P3:POKEA(X,Y)+41,P4
535 P1=0:P2=0:P3=0:P4=0:GOSUB110:GOSUB120
540 RETURN
570 WE=INT(RND(0)*8)+1:FORJ=1TOWE*RN:READ
Q:NEXT
580 FORY=1TO4:FORX=1TO4:READQ:IFQ=0THEN60
0
590 GOSUB610
600 NEXTX:NEXTY:GOSUB640:GOSUB680:RETURN
610 POKEA(X,Y),77:POKEA(X,Y)+1,78:POKEA(X
,Y)+40,78:POKEA(X,Y)+41,77
620 POKEA(X,Y)+CO,2:POKEA(X,Y)+1+CO,2:POK
EA(X,Y)+40+CO,2:POKEA(X,Y)+41+CO,2
630 RETURN
640 FORX=1TO4:FORY=1TO4:B(X,Y)=PEEK(A(X,Y
))
650 IFB(X,Y)=32THENB(X,Y)=B(X,Y)-9:GOTO67
0
660 B(X,Y)=B(X,Y)
670 NEXTX:NEXTY:RETURN
680 FORT=1TO4:FORX=1TO4:READP
690 IFPTHENPOKEC(X,Y),86:POKEC(X,Y)+CO,1
700 NEXTX:NEXTY:RETURN
710 DATA1,1,1,1,1,0,0,1,1,0,0,1,1,1,1,
1
720 DATA0,0,0,0,0,1,1,0,0,1,1,0,0,0,0,
0
730 DATA0,1,1,0,1,0,0,1,1,0,0,1,0,1,1,
0
740 DATA1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1
750 DATA1,0,0,1,0,1,1,0,0,1,1,0,1,0,0,
1
760 DATA1,1,1,1,0,0,0,0,0,0,0,0,1,1,1,
1
770 DATA0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,
1
775 DATA1,0,0,1,0,0,0,0,0,0,0,0,1,0,0,
1
780 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0
790 DATA0,0,0,0,1,0,0,1,1,0,0,1,0,0,0,
0
800 REM REVERSE
810 POKEA(C,D),109-PEEK(A(C,D)):POKEA(C,D
)+1,110-(PEEK(A(C,D)+1))
820 POKEA(C,D)+40,110-PEEK(A(C,D)+40):POK
EA(C,D)+41,109-PEEK(A(C,D)+41)
830 POKEA(C,D)+CO,2:POKEA(C,D)+1+CO,2
840 POKEA(C,D)+40+CO,2:POKEA(C,D)+41+CO,2
:P1=0:P2=0:P3=0:P4=0
860 RETURN
870 REM SET DATA POINTER
910 REM{2 SPACES}WHICH ONES{2 SPACES}TO C
HANGE
920 IFX+Y<>2THEN950
930 FORC=2TO3:D=1:GOSUB810:NEXT:FORD=1TO3
:C=1:GOSUB810:NEXT
940 D=2:C=2:GOSUB810:RETURN
950 IF X+Y<>8THEN980
960 FORC=3TO2STEP-1:D=4:GOSUB810:NEXT:FOR
D=4TO2STEP-1:C=4:GOSUB810:NEXT
970 C=3:D=3:GOSUB810:RETURN
980 IF X+Y<>5THEN1020
990 IF X<>4THEN 1020
1000 FORC=3TO2STEP-1:D=1:GOSUB810:NEXT:FO
RD=1TO3:C=4:GOSUB810:NEXT
1010 C=3:D=2:GOSUB810:RETURN
1020 IFX+Y<>5THEN1060
1030 IFX<>1THEN1060
1040 FORC=2TO3:D=4:GOSUB810:NEXT:FORD=4TO
2STEP-1:C=1:GOSUB810:NEXT

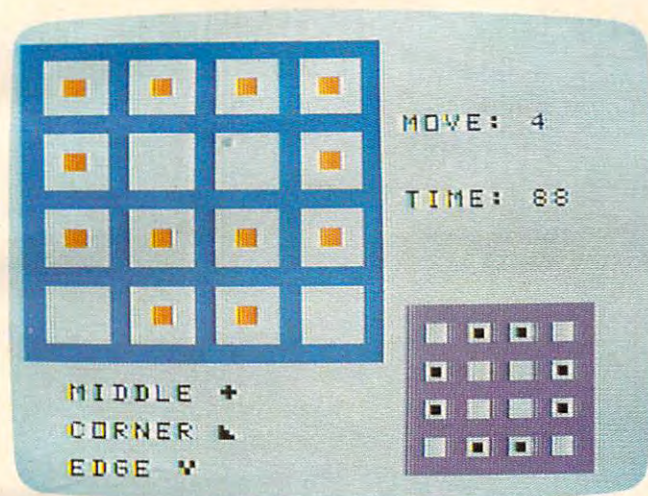
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```

1050 C=2:D=3:GOSUB810:RETURN
1060 REM CHECK EDGES
1070 IF(X>1ANDX<4)AND(Y=1ORY=4)THENC=X-1:
D=Y:GOSUB810:C=X+1:GOSUB810:GOSUB110
0
1080 IF(Y>1ANDY<4)AND(X=1ORX=4)THEND=Y-1:
C=X:GOSUB810:D=Y+1:GOSUB810:GOSUB110
0
1090 GOTO1160
1100 IFY=1THEND=Y+1:C=X:GOSUB810
1110 IFY=4THEND=Y-1:C=X:GOSUB810
1120 IFX=4THENC=X-1:D=Y:GOSUB810
1130 IFX=1THENC=X+1:D=Y:GOSUB810
1140 RETURN
1150 REM CHECK CENTERS
1160 IF (X=1)OR(Y=1)OR(X=4)OR(Y=4)THEN 12
00
1170 D=Y+1:C=X:GOSUB810:C=X-1:D=Y:GOSUB81
0
1180 D=Y-1:C=X:GOSUB810:C=X+1:D=Y:GOSUB81
0
1190 C=X:D=Y:GOSUB810
1200 RETURN
1210 PRINT"YOU WIN "

```



"Quatrainment," TI version.

Program 4: Quatrainment, TI-99/4A Version

Version by Patrick Parrish, Programming Supervisor

```

100 GOTO 150
110 FOR I=1 TO LEN(H$)
120 CALL HCHAR(ROW, COL+I, ASC(SEG$(H
$, I, 1)))
130 NEXT I
140 RETURN
150 DIM W(10, 4, 4), MASTER(4, 4), M(4, 4
), U(4, 4)
160 RANDOMIZE
170 GOSUB 2010
180 GOSUB 2150
190 GOSUB 1740
200 GOSUB 1830
210 R=2
220 C=3
230 KHAR=112
240 KHAR=225-KHAR
250 CALL HCHAR(R, C, KHAR)
260 TIME=TIME+1
270 IF TIME<5 THEN 320
280 H$=STR$(INT(TIME/5))
290 FOR I=1 TO LEN(H$)

```

```

300 CALL HCHAR(9, 25+I, ASC(SEG$(H$, I
, 1)))
310 NEXT I
320 CALL KEY(0, K, S)
330 IF S=1 THEN 350
340 GOTO 240
350 CALL HCHAR(R, C, 112)
360 IF K<>69 THEN 390
370 R=R-SGN(R-2)*4
380 GOTO 250
390 IF K<>83 THEN 420
400 C=C-SGN(C-3)*4
410 GOTO 250
420 IF K<>88 THEN 450
430 R=R+SGN(14-R)*4
440 GOTO 250
450 IF K<>68 THEN 480
460 C=C+SGN(15-C)*4
470 GOTO 250
480 IF K<>13 THEN 280
490 MOVE=MOVE+1
500 H$=STR$(MOVE)
510 FOR I=1 TO LEN(H$)
520 CALL HCHAR(5, 25+I, ASC(SEG$(H$, I
, 1)))
530 NEXT I
540 Z=U((R-2)/4, (C-3)/4)
550 ON Z GOTO 560, 670, 780, 890, 1000,
1110, 1180, 1250, 1320
560 CALL GCHAR(R-3, C+1, H)
570 CALL HCHAR(R-3, C+1, D-H)
580 CALL GCHAR(R+1, C-3, H)
590 CALL HCHAR(R+1, C-3, D-H)
600 CALL GCHAR(R+1, C+1, H)
610 CALL HCHAR(R+1, C+1, D-H)
620 CALL GCHAR(R+1, C+5, H)
630 CALL HCHAR(R+1, C+5, D-H)
640 CALL GCHAR(R+5, C+1, H)
650 CALL HCHAR(R+5, C+1, D-H)
660 GOTO 1390
670 FOR I=1 TO 9 STEP 4
680 CALL GCHAR(R+1, C+I, H)
690 CALL HCHAR(R+1, C+I, D-H)
700 NEXT I
710 CALL GCHAR(R+5, C+1, H)
720 CALL HCHAR(R+5, C+1, D-H)
730 CALL GCHAR(R+5, C+5, H)
740 CALL HCHAR(R+5, C+5, D-H)
750 CALL GCHAR(R+9, C+1, H)
760 CALL HCHAR(R+9, C+1, D-H)
770 GOTO 1390
780 FOR I=-1 TO 7 STEP 4
790 CALL GCHAR(R+1, C-I, H)
800 CALL HCHAR(R+1, C-I, D-H)
810 NEXT I
820 CALL GCHAR(R+5, C+1, H)
830 CALL HCHAR(R+5, C+1, D-H)
840 CALL GCHAR(R+5, C-3, H)
850 CALL HCHAR(R+5, C-3, D-H)
860 CALL GCHAR(R+9, C+1, H)
870 CALL HCHAR(R+9, C+1, D-H)
880 GOTO 1390
890 FOR I=-1 TO 7 STEP 4
900 CALL GCHAR(R+1, C-I, H)
910 CALL HCHAR(R+1, C-I, D-H)
920 NEXT I
930 CALL GCHAR(R-3, C+1, H)
940 CALL HCHAR(R-3, C+1, D-H)
950 CALL GCHAR(R-3, C-3, H)
960 CALL HCHAR(R-3, C-3, D-H)
970 CALL GCHAR(R-7, C+1, H)

```



```

980 CALL HCHAR(R-7,C+1,D-H)
990 GOTO 1390
1000 FOR I=1 TO 9 STEP 4
1010 CALL GCHAR(R+1,C+1,H)
1020 CALL HCHAR(R+1,C+1,D-H)
1030 NEXT I
1040 CALL GCHAR(R-3,C+1,H)
1050 CALL HCHAR(R-3,C+1,D-H)
1060 CALL GCHAR(R-3,C+5,H)
1070 CALL HCHAR(R-3,C+5,D-H)
1080 CALL GCHAR(R-7,C+1,H)
1090 CALL HCHAR(R-7,C+1,D-H)
1100 GOTO 1390
1110 CALL GCHAR(R+1,C-3,H)
1120 CALL HCHAR(R+1,C-3,D-H)
1130 CALL GCHAR(R+1,C+5,H)
1140 CALL HCHAR(R+1,C+5,D-H)
1150 CALL GCHAR(R+5,C+1,H)
1160 CALL HCHAR(R+5,C+1,D-H)
1170 GOTO 1390
1180 CALL GCHAR(R-3,C+1,H)
1190 CALL HCHAR(R-3,C+1,D-H)
1200 CALL GCHAR(R+1,C-3,H)
1210 CALL HCHAR(R+1,C-3,D-H)
1220 CALL GCHAR(R+5,C+1,H)
1230 CALL HCHAR(R+5,C+1,D-H)
1240 GOTO 1390
1250 CALL GCHAR(R+1,C-3,H)
1260 CALL HCHAR(R+1,C-3,D-H)
1270 CALL GCHAR(R+1,C+5,H)
1280 CALL HCHAR(R+1,C+5,D-H)
1290 CALL GCHAR(R-3,C+1,H)
1300 CALL HCHAR(R-3,C+1,D-H)
1310 GOTO 1390
1320 CALL GCHAR(R-3,C+1,H)
1330 CALL HCHAR(R-3,C+1,D-H)
1340 CALL GCHAR(R+1,C+5,H)
1350 CALL HCHAR(R+1,C+5,D-H)
1360 CALL GCHAR(R+5,C+1,H)
1370 CALL HCHAR(R+5,C+1,D-H)
1380 REM CHECK WORK VS MASTER GRID
1390 FOR I=0 TO 3
1400 FOR J=0 TO 3
1410 CALL GCHAR(I*4+3,J*4+4,H)
1420 M(I,J)=H-120
1430 FL=0
1440 IF M(I,J)=MASTER(I,J) THEN 1480
1450 I=3
1460 J=3
1470 FL=1
1480 NEXT J
1490 NEXT I
1500 IF FL<>1 THEN 1530
1510 GOTO 230
1520 REM YOU WIN
1530 FOR I=220 TO 880 STEP 30
1540 CALL SOUND(50,I,3)
1550 NEXT I
1560 H$="YOU WIN!"
1570 ROW=11
1580 COL=19
1590 GOSUB 110
1600 SC=INT(TIME/5)*INT(MOVE/5)
1610 H$="SCORE="&STR$(SC)
1620 ROW=12
1630 COL=19
1640 GOSUB 110
1650 H$="AGAIN ?"
1660 ROW=14
1670 COL=19
1680 GOSUB 110
1690 CALL KEY(0,K,S)
1700 IF S=0 THEN 1690
1710 IF (K<>89)*(K<>78) THEN 1690
1720 IF K=89 THEN 180
1730 STOP
1740 FOR I=0 TO 3
1750 FOR J=0 TO 3
1760 RANDOMIZE
1770 Z=INT(RND*2)
1780 M(I,J)=Z
1790 NEXT J
1800 NEXT I
1810 RETURN
1820 REM SET UP WORK GRID
1830 FOR I=0 TO 3
1840 FOR J=0 TO 3
1850 CALL HCHAR(I*4+3,J*4+4,120+M(I,J))
1860 NEXT J
1870 NEXT I
1880 RETURN
1890 READ A,A$
1900 IF A=-1 THEN 1970
1910 CALL CHAR(A,A$)
1920 GOTO 1890
1930 DATA 97,000000000000000000,98,FF
      FFFFFFFFFFFFFFFF,104,FFFFFFFFFFFF
      FFFFFF
1940 DATA 112,000000000000000000,113,
      00003C3C3C3C0000,114,0018187E7
      E181800
1950 DATA 115,0000C0C0F0F0FCFC,116,
      0066666618181800,120,0000000000
      00000000
1960 DATA 121,FFFFFFFFFFFFFFFFFFFF,-1,A
1970 CALL COLOR(9,5,1)
1980 CALL COLOR(10,13,1)
1990 CALL COLOR(12,9,1)
2000 RETURN
2010 CALL CLEAR
2020 CALL SCREEN(10)
2030 PRINT TAB(9);"QUATRAINMENT"
2040 FOR T=1 TO 10
2050 PRINT
2060 NEXT T
2070 PRINT TAB(8);"ENTERING DATA"
2080 PRINT
2090 PRINT TAB(6);"...PLEASE WAIT.."
2100 PRINT
2110 PRINT
2120 GOSUB 1890
2130 GOSUB 2420
2140 RETURN
2150 CALL CLEAR
2160 CALL SCREEN(15)
2170 PRINT TAB(18);"MOVE: 0"
2180 SC=0
2190 TIME=0
2200 MOVE=0
2210 PRINT
2220 PRINT
2230 PRINT
2240 PRINT TAB(18);"TIME: 0"
2250 FOR T=1 TO 9
2260 PRINT
2270 NEXT T
2280 PRINT TAB(2);"MIDDLE ";CHR$(11
4)
2290 PRINT
2300 PRINT TAB(2);"CORNER ";CHR$(11
5)

```



```

2310 PRINT
2320 PRINT TAB(2); "EDGE "; CHR$(116)
2330 FOR I=0 TO 4
2340 CALL HCHAR(I*4+1,2,98,17)
2350 CALL VCHAR(1,I*4+2,98,17)
2360 NEXT I
2370 FOR T=0 TO 4
2380 CALL HCHAR(T*2+15,20,104,9)
2390 CALL VCHAR(16,T*2+20,104,7)
2400 NEXT T
2410 GOTO 2680
2420 FOR K=1 TO 10
2430 FOR I=0 TO 3
2440 FOR J=0 TO 3
2450 READ W(K,I,J)
2460 NEXT J
2470 NEXT I
2480 NEXT K
2490 FOR I=0 TO 3
2500 FOR J=0 TO 3
2510 READ U(I,J)
2520 NEXT J
2530 NEXT I
2540 D=241
2550 RETURN
2560 DATA 1,1,1,1,1,0,0,1,1,0,0,1,1,1,1,1
2570 DATA 0,0,0,0,0,1,1,0,0,1,1,0,0,0,0,0
2580 DATA 0,1,1,0,1,0,0,1,1,0,0,1,0,1,1,0
2590 DATA 1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1
2600 DATA 1,0,0,1,0,1,1,0,0,1,1,0,1,0,0,1
2610 DATA 1,1,1,1,0,0,0,0,0,0,0,0,0,1,1,1
2620 DATA 0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1
2630 DATA 1,0,0,1,0,0,0,0,0,0,0,0,0,1,0,0
2640 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
2650 DATA 0,0,0,0,1,0,0,1,1,0,0,1,0,0,0,0
2660 DATA 2,6,6,3,9,1,1,7,9,1,1,7,5,8,8,4
2670 REM SET UP MASTER GRID
2680 RANDOMIZE
2690 F=INT(RND*10)+1
2700 FOR I=0 TO 3
2710 FOR J=0 TO 3
2720 CALL HCHAR(2*I+16,2*J+21,112+W(F,I,J))
2730 MASTER(I,J)=W(F,I,J)
2740 NEXT J
2750 NEXT I
2760 RETURN

```

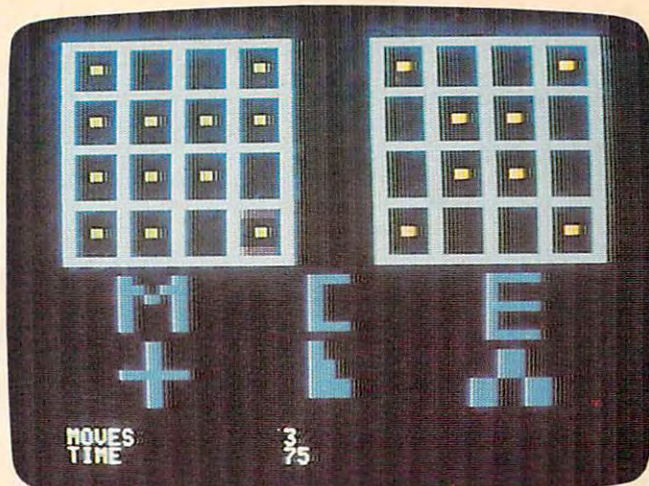
Program 5: Quatrainment, Apple Version

Version by Chris Poer, Editorial Programmer

```

5 TEXT : HOME : FLASH : VTAB 7: HTAB 1
7: PRINT "QUATRINMENT"
10 INVERSE : VTAB 12: HTAB 12: PRINT "
PRESS ANY KEY TO BEGIN": VTAB 7: HTAB
19: GET XX$: NORMAL
20 GOSUB 1000
30 GOSUB 1100
35 GOSUB 1300
50 P1 = INT ( PDL (0) / 64):P2 = INT
( PDL (1) / 64):X = P1 * 4 + 2:Y =

```



"Quatrainment," Apple version.

```

P2 * 6 + 3
60 COLOR= 1: HLIN P1 * 4 + 1,P1 * 4 +
3 AT P2 * 6 + 1: HLIN P1 * 4 + 1,P
1 * 4 + 3 AT P2 * 6 + 5
70 COLOR= 0: HLIN P1 * 4 + 1,P1 * 4 +
3 AT P2 * 6 + 1: HLIN P1 * 4 + 1,P
1 * 4 + 3 AT P2 * 6 + 5
80 IF ( PEEK ( - 16286) > 127 OR PEEK
( - 16287) > 127) THEN GOSUB 1200
: GOSUB 2100:MOV = MOV + 1: VTAB 2
2: HTAB 17: PRINT MOV
90 TC = TC + 1: IF TC > 10 THEN TIME =
TIME + 1:TC = 0: VTAB 23: HTAB 17:
PRINT TIME
100 GOTO 50
1000 GR : COLOR= 6: HLIN 0,16 AT 0: HLIN
24,39 AT 0: HLIN 0,16 AT 6: HLIN 2
4,39 AT 6: HLIN 0,16 AT 12: HLIN 2
4,39 AT 12
1010 HLIN 0,16 AT 18: HLIN 24,39 AT 18
: HLIN 0,16 AT 24: HLIN 24,39 AT 2
4
1020 VLIN 0,24 AT 0: VLIN 0,24 AT 23: VLIN
0,24 AT 4: VLIN 0,24 AT 27: VLIN 0
,24 AT 8: VLIN 0,24 AT 31
1030 VLIN 0,24 AT 12: VLIN 0,24 AT 35:
VLIN 0,24 AT 16: VLIN 0,24 AT 39
1040 RETURN
1100 FOR R = 0 TO 3: FOR RR = 0 TO 3:B
(R,RR) = INT ( RND (1) * 1 + .5):
NEXT : NEXT
1110 COLOR= 12: FOR RR = 0 TO 3: FOR R
= 0 TO 3: IF B(R,RR) = 1 THEN PLOT
RR * 4 + 2,R * 6 + 3
1120 NEXT : NEXT
1130 FOR I = 1 TO 10: FOR C = 0 TO 3: FOR
R = 0 TO 3: READ Z1:E(I,C,R) = Z1:
NEXT : NEXT : NEXT
1140 S = INT ( RND (1) * 10 + 1): FOR
C = 0 TO 3: FOR R = 0 TO 3:D(C,R) =
E(S,C,R): NEXT : NEXT
1150 COLOR= 9: FOR RR = 0 TO 3: FOR R =
0 TO 3: IF D(R,RR) = 1 THEN PLOT
RR * 4 + 25,R * 6 + 3
1160 NEXT : NEXT
1170 FOR A = 1 TO 9: FOR I = 1 TO 6
1180 READ Z1,Z2:X1(A,I) = Z1:Y1(A,I) = Z2
1190 NEXT : NEXT : RETURN
1200 IF (P1 = 1 OR P1 = 2) AND (P2 = 1
OR P2 = 2) THEN A = 1: GOSUB 2000
: RETURN

```



```

1210 IF (P1 = 1 OR P1 = 2) AND P2 = 0 THEN
A = 2: GOSUB 2000: RETURN
1220 IF (P1 = 1 OR P1 = 2) AND P2 = 3 THEN
A = 3: GOSUB 2000: RETURN
1230 IF (P2 = 1 OR P2 = 2) AND P1 = 0 THEN
A = 4: GOSUB 2000: RETURN
1240 IF (P2 = 1 OR P2 = 2) AND P1 = 3 THEN
A = 5: GOSUB 2000: RETURN
1250 IF P1 = 0 AND P2 = 0 THEN A = 6: GOSUB
2000: RETURN
1260 IF P1 = 3 AND P2 = 0 THEN A = 7: GOSUB
2000: RETURN
1270 IF P1 = 3 AND P2 = 3 THEN A = 8: GOSUB
2000: RETURN
1280 A = 9: GOSUB 2000: RETURN
1300 COLOR= 2: VLIN 26,31 AT 4: PLOT 5
,27: PLOT 6,28: PLOT 7,27: VLIN 31
,26 AT 8
1310 VLIN 33,39 AT 6: HLIN 4,8 AT 36
1320 VLIN 26,31 AT 18: HLIN 18,20 AT 2
6: HLIN 18,20 AT 31
1330 VLIN 33,38 AT 18: VLIN 35,38 AT 1
9: VLIN 37,38 AT 20
1340 VLIN 26,31 AT 31: HLIN 31,34 AT 2
6: HLIN 31,34 AT 29: HLIN 31,34 AT
32
1350 VLIN 37,39 AT 30: VLIN 37,39 AT 3
1: HLIN 32,33 AT 36: HLIN 32,33 AT
35: HLIN 32,33 AT 34: VLIN 37,39 AT
34: VLIN 37,39 AT 35
1355 PRINT : PRINT
1360 VTAB 23: PRINT "MOVES";: PRINT ,M
OV: PRINT "TIME";: PRINT ,TIME: RETURN

2000 FOR I = 1 TO 6
2005 IF X1(A,I) = 1 THEN 2030
2010 IF SCRN( X + X1(A,I),Y + Y1(A,I)
) > 0 THEN COLOR= 0: PLOT X + X1(
A,I),Y + Y1(A,I):B((Y - 3 + Y1(A,I)
) / 6,(X - 2 + X1(A,I)) / 4) = 0:
GOTO 2030
2020 COLOR= 12: PLOT X + X1(A,I),Y + Y
1(A,I):B(((Y - 3 + Y1(A,I)) / 6),(
(X - 2 + X1(A,I)) / 4)) = 1
2030 NEXT : RETURN
2100 FOR R = 0 TO 3: FOR RR = 0 TO 3: IF
B(R,RR) < > D(R,RR) THEN RETURN

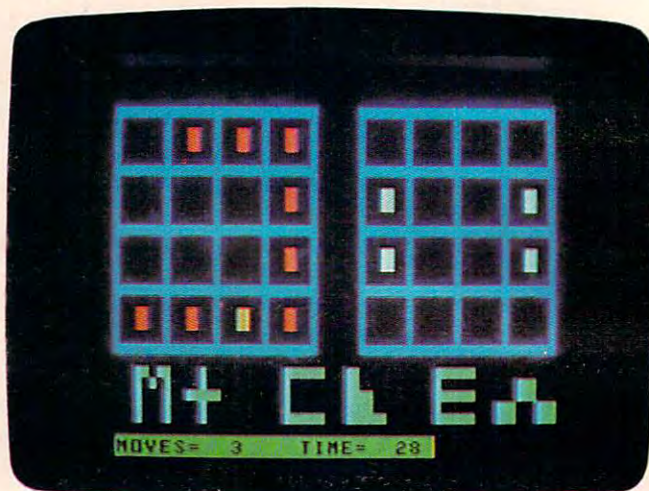
2110 NEXT : NEXT
2120 SC = INT (TIME / 10) * INT (MOV /
5)
2130 TEXT : HOME : VTAB 10: FLASH : HTAB
16: PRINT "YOU HAVE WON": VTAB 13:
HTAB 11: PRINT "YOUR SCORE IS ";S
C; " POINTS"
2140 NORMAL : END
20000 DATA 1,1,1,1,1,0,0,1,1,0,0,1,1,
1,1,1
20010 DATA 0,0,0,0,0,1,1,0,0,1,1,0,0,
0,0,0
20020 DATA 0,1,1,0,1,0,0,1,1,0,0,1,0,
1,1,0
20030 DATA 1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1
20040 DATA 1,0,0,1,0,1,1,0,0,1,1,0,1,
0,0,1
20050 DATA 1,1,1,1,0,0,0,0,0,0,0,0,1,
1,1,1
20060 DATA 0,0,0,1,0,0,0,1,0,0,0,1,0,
0,0,1
20070 DATA 1,0,0,1,0,0,0,0,0,0,0,0,1,
0,0,1

```

```

20080 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0
20090 DATA 0,0,0,0,1,0,0,1,1,0,0,1,0,
0,0,0
20110 DATA 0,0,-4,0,4,0,0,-6,0,6,1,1
20120 DATA 4,0,-4,0,0,6,1,1,1,1,1,1
20130 DATA 4,0,-4,0,0,-6,1,1,1,1,1,1
20140 DATA 4,0,0,-6,0,6,1,1,1,1,1,1
20150 DATA -4,0,0,-6,0,6,1,1,1,1,1,1
20160 DATA 0,0,0,6,0,12,4,0,4,6,8,0
20170 DATA 0,0,0,6,0,12,-4,0,-4,6,-8,
0
20180 DATA 0,0,0,-6,0,-12,-4,0,-4,-6,
-8,0
20190 DATA 0,0,0,-6,0,-12,4,-6,4,0,8,
0

```



"Quattrainment," Color Computer version.

Program 6: Quattrainment, TRS-80 Color Computer Version

Version by Chris Poer, Editorial Programmer

```

1 DIM W(10,3,3),X1(10,6),Y1(10,6),D
(4,4)
5 CLS(0)
10 A$=" T N E M N I A R T A U Q"
12 FOR I=1 TO 25:FOR A=37 TO 61-I:F
OR T=1 TO 15:NEXT T:PRINT@A-1,"
";:PRINT@A,MID$(A$,I,1);:NEXT A:
NEXT I
15 PRINT@294,"HIT ANY KEY TO BEGIN."
;
16 IF INKEY$="" THEN 16 ELSE CLS(0)
20 GOSUB 1000
30 GOSUB 1100
40 GOSUB 1300
50 P1= INT(JOYSTK(0)/16):P2=INT(JOY
STK(1)/16):X=P1*7+3:Y=P2*5+2
60 SET(P1*7+3,P2*5+2,2):SET(P1*7+3,
P2*5+3,2):SET(P1*7+4,P2*5+2,2):S
ET(P1*7+4,P2*5+3,2)
70 IF B(P2,P1)=1 THEN SET(P1*7+3,P2*
5+2,4):SET(P1*7+3,P2*5+3,4):SET(
P1*7+4,P2*5+2,4):SET(P1*7+4,P2*5
+3,4):GOTO90
80 RESET(P1*7+3,P2*5+2):RESET(P1*7+
3,P2*5+3):RESET(P1*7+4,P2*5+2):R
ESET(P1*7+4,P2*5+3)
90 IF PEEK(65280)=254 OR PEEK(65280
)=126 THEN GOSUB 1200:GOSUB 2100
:MOV=MOV+1

```



```

95 TC=TC+1:IF TC=7 THEN TC=0:TIME=T
   IME+1
97 PRINT@448,"MOVES=";MOV;"
   (3 SPACES)TIME=";TIME;
100 GOTO 50
1000 FOR I=0 TO 19:FOR J = 0 TO 28 ST
   EP 7
1010 SET(J,I,3)
1020 NEXTJ:NEXTI
1030 FOR I = 0 TO 28: FOR J = 0 TO
   20 STEP 5
1040 SET(I,J,3)
1050 NEXT J:NEXTI
1060 FOR I = 0 TO 20 : FOR J=35 TO
   63 STEP 7
1070 SET (J,I,3)
1080 NEXT J: NEXT I
1090 FOR I = 35 TO 63: FOR J = 0 TO
   20 STEP 5
1092 SET(I,J,3)
1097 NEXTJ:NEXTI:RETURN
1100 FOR R = 0 TO 3: FOR RR = 0 TO
   3:B(R,RR)=RND(2)-1:NEXT RR:NEX
   T R
1110 FOR R = 0 TO 3: FOR RR = 0 TO
   3: IF B(R,RR)=1 THEN SET(RR*7+
   3,R*5+2,4):SET(RR*7+3,R*5+3,4)
   :SET(RR*7+4,R*5+2,4):SET(RR*7+
   4 ,R*5+3,4)
1120 NEXT RR:NEXT R
1130 FOR I=1 TO 10: FOR C=0 TO 3:FO
   R R=0 TO 3:READ W(I,C,R):NEXT
   R:NEXT C:NEXTI
1140 S=RND(10):FOR R=0 TO 3:FOR RR=
   0 TO 3:D(R,RR)=W(S,R,RR):NEXT
   RR:NEXT R
1150 FOR R=0 TO 3: FOR RR=0 TO 3
1160 IF D(R,RR)=1 THEN SET(RR*7+38,
   R*5+2,5):SET(RR*7+39,R*5+2,5):
   SET(RR*7+38,R*5+3,5):SET(RR*7+
   39,R*5+3,5)
1170 NEXT:NEXT
1175 FOR A=1 TO 9:FORI=1 TO 6:READZ
   1,Z2:X1(A,I)=Z1:Y1(A,I)=Z2:NEX
   T I:NEXTA:RETURN
1200 IF (P1 = 1 OR P1 = 2) AND (P2=
   1 OR P2=2) THEN A=1:GOSUB 2000
   :RETURN
1210 IF (P1 = 1 OR P1 = 2) AND P2=0 T
   HEN A=2:GOSUB2000:RETURN
1220 IF (P1=1 OR P1=2) AND P2=3 THE
   N A=3:GOSUB 2000:RETURN
1230 IF (P2=1 OR P2=2) AND P1=0 THE
   N A=4:GOSUB2000:RETURN
1240 IF (P2=1 OR P2=2) AND P1=3 THE
   N A=5:GOSUB 2000:RETURN
1250 IF P1=0 AND P2=0 THEN A=6:GOSU
   B 2000:RETURN
1260 IF P1=3 AND P2=0 THEN A=7:GOSU
   B 2000:RETURN
1270 IF P1=3 AND P2=3 THEN A=8:GOSU
   B 2000:RETURN
1280 A=9:GOSUB 2000:RETURN
1300 FOR I= 22 TO 26:SET(33,I,6):SE
   T(34,I,6):SET(3,I,6):SET(12,I
   ,6):SET(24,I,6):SET(46,I,6):SE
   T(7,I,6): NEXT I
1310 SET(4,22,6):SET(5,23,6):SET(6,
   22,6)
1320 FOR I=1 TO 5:SET(24+I,22,6):SE
   T(24+I,26,6):SET(46+I,22,6):SE
   T(46+I,24,6):SET(46+I,26,6):SE
   T(9+I,24,6): NEXT I
1330 SET(35,24,6):SET(35,25,6):SET(
   35,26,6):SET(36,24,6):SET(36,2
   5,6):SET(36,26,6):SET(37,26,6)
   :SET(37,26,6)
1340 SET(38,26,6):SET(38,26,6):SET(
   55,26,6):SET(55,25,6):SET(56,2
   6,6):SET(56,25,6)
1350 SET(57,26,6):SET(57,25,6):SET(
   58,24,6):SET(58,23,6):SET(59,2
   4,6):SET(59,23,6):SET(60,24,6)
   :SET(60,23,6)
1360 SET(61,26,6):SET(61,25,6):SET(
   62,26,6):SET(62,25,6):SET(63,2
   6,6):SET(63,25,6)
1370 RETURN
2000 FOR I=1 TO 6
2010 IF X1(A,I)=1 THEN 2040
2020 IF POINT(X+X1(A,I),Y+Y1(A,I))>
   1 THEN RESET(X+X1(A,I)+1,Y+Y1(A,
   I)):RESET(X+X1(A,I)+1,Y+Y1(A,I)
   ):RESET(X+X1(A,I)+1,Y+Y1(A,I)+
   1):RESET(X+X1(A,I)+1,Y+Y1(A,I)
   )+1):B((Y-2+Y1(A,I))/5,(X-3+X1
   (A,I))/7)=0:GOTO 2040
2030 SET(X+X1(A,I),Y+Y1(A,I),4):SET
   (X+X1(A,I)+1,Y+Y1(A,I),4):SET(
   X+X1(A,I),Y+Y1(A,I)+1,4):SET(X
   +X1(A,I)+1,Y+Y1(A,I)+1,4):B((Y
   -2+Y1(A,I))/5,(X-3+X1(A,I))/7)
   =1
2040 NEXT I:RETURN
2100 FOR R=0 TO 3:FOR RR=0 TO 3:IF B(
   R,RR)<>D(R,RR) THEN RETURN
2110 NEXT RR:NEXT R
2120 CLS(1):PRINT@234,"YOU HAVE WON
   ":PRINT@328,"YOUR SCORE IS ";I
   NT(TIME/10)*INT(MOVE/5)
2130 PRINT@392,"PLAY AGAIN (Y/N)";:
   INPUT A$:IF A$="Y"THEN 5
2140 END
20000 DATA 1,1,1,1,1,0,0,1,1,0,0,1,
   1,1,1,1
20010 DATA 0,0,0,0,0,0,1,1,0,0,1,1,0,
   0,0,0
20020 DATA 0,1,1,0,1,0,0,1,1,0,0,1,
   0,1,1,0
20030 DATA 1,1,1,1,1,1,1,1,1,1,1,1,
   1,1,1,1
20040 DATA 1,0,0,1,0,1,1,0,0,1,1,0,
   1,0,0,1
20050 DATA 1,1,1,1,0,0,0,0,0,0,0,0,
   1,1,1,1
20060 DATA 0,0,0,1,0,0,0,1,0,0,0,1,
   0,0,0,1
20070 DATA 1,0,0,1,0,0,0,0,0,0,0,0,
   1,0,0,1
20080 DATA 0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0
20090 DATA 0,0,0,0,1,0,0,1,1,0,0,1,
   0,0,0,0
20100 DATA 0,0,-7,0,7,0,0,-5,0,5,1,
   1
20110 DATA 7,0,-7,0,0,5,1,1,1,1,1,1,
   1
20120 DATA 7,0,-7,0,0,-5,1,1,1,1,1,1,
   1
20130 DATA 7,0,0,-5,0,5,1,1,1,1,1,1,
   1
20140 DATA -7,0,0,-5,0,5,1,1,1,1,1,1,
   1
20160 DATA 0,0,0,5,0,10,7,0,7,5,14,0

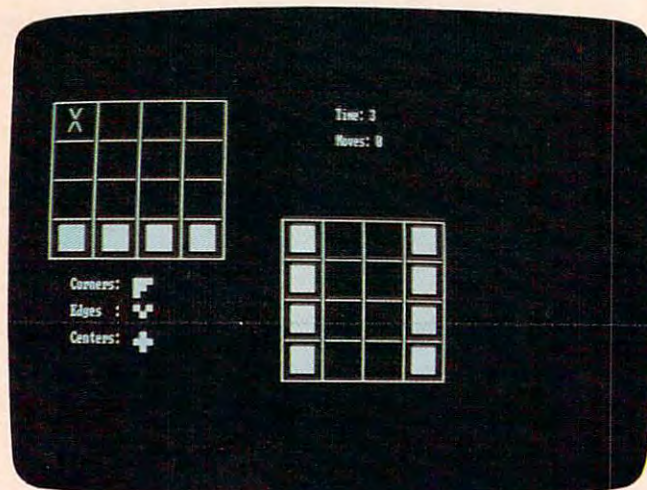
```



```

20170 DATA 0,0,0,5,0,10,-7,0,-7,5,-
      14,0
20180 DATA 0,0,0,-5,0,-10,-7,0,-7,-
      5,-14,0
20190 DATA 0,0,0,-5,0,-10,7,0,7,-5,
      14,0

```



The object of "Quatrainment" is to change the upper grid to match the lower grid. The large X in the IBM version (shown above) designates the base location for changes in the upper grid.

```

10 CLS
20 GOSUB 1000
30 REM ROUTINE TO SETUP SCREEN
40 COLOR 7,0
50 CLS
60 KEY OFF
70 WIDTH 80
80 GOTO 160
90 FOR TR = STY TO STY+12 STEP 3
100 FOR T = STX TO STX+28 : LOCATE T
    R,T : PRINT CHR$(196) : NEXT
110 NEXT TR
120 FOR TR = STX TO STX+28 STEP 7
130 FOR T = STY TO STY+12 : LOCATE T
    ,TR : PRINT CHR$(179) : NEXT
140 NEXT TR
150 RETURN
160 STX = 2 : STY = 2 : GOSUB 90
170 STX = 40 : STY = 11 : GOSUB 90 : Y
    A = 1 : XA = 1
180 LOCATE 2,2:PRINT CHR$(218):LOCATE
    2, 30:PRINT CHR$(191)
190 LOCATE 11,40:PRINT CHR$(218):LOCA
    TE 11,68:PRINT CHR$(191)
200 LOCATE 14,2 :PRINT CHR$(192):LOCA
    TE 14,30:PRINT CHR$(217)
210 LOCATE 23,40:PRINT CHR$(192):LOCA
    TE 23,68:PRINT CHR$(217)
220 FOR T2 = 9 TO 28 STEP 7 : LOCATE
    2,T2 : PRINT CHR$(194) : NEXT
230 FOR T2 = 9 TO 28 STEP 7 : LOCATE
    14,T2 : PRINT CHR$(193) : NEXT
240 FOR T2 = 47 TO 63 STEP 7 : LOCATE
    11,T2 : PRINT CHR$(194) : NEXT
250 FOR T2 = 47 TO 63 STEP 7 : LOCATE
    23,T2 : PRINT CHR$(193) : NEXT
260 REM SET UP ARRAYS FOR THE POSITI
    ONS ON THE FIRST GRID

```

```

270 DIM AX(4),BX(4),B(4,4)
280 FOR T = 1 TO 4 : READ X : AX(T)
    = X : BX(T) = X +38 : NEXT
290 FOR T = 1 TO 4 : READ Y : AY(T)
    = Y : BY(T) = Y +9 : NEXT
300 DATA 4,11,18,25,3,6,9,12
310 GR$= STRING$(4,219)+CHR$(31)+STRI
    NG$(4,29)+STRING$(4,219)
320 GP$= CHR$(28)+CHR$(92)+CHR$(47)+C
    HR$(31)+CHR$(28)+STRING$(4,29)+CHR$(2
    8)+CHR$(47)+CHR$(92)+CHR$(31)+CHR$(28
    )
330 SP$= STRING$(4,32)+CHR$(31)+STRI
    NG$(4,29)+STRING$(4,32)+STRING$(4,29
    )+CHR$(30)
340 LOCATE 16,6:PRINT"Corners: "+CH
    R$(219)+CHR$(219)+CHR$(223)+STRING$(3
    ,29)+CHR$(31)+CHR$(223)
350 LOCATE 18,6:PRINT"Edges : "+CH
    R$(223)+CHR$(220)+CHR$(223)
360 LOCATE 20,6:PRINT"Centers: "+CHR
    $(220)+CHR$(219)+CHR$(220)+CHR$(29)+C
    HR$(29)+CHR$(31)+CHR$(223)
370 REM set up patterns for gridb
380 I = -32768! : PRINT CHR$(11); "Pr
    ess any key to Start"
390 IF INKEY$ = "" THEN I= I+1:(I=327
    67)* 65535! : GOTO 390
400 RANDOMIZE I :PRINT CHR$(11);"
    " :CL = 0
410 WE = INT (RND(I) *8) +1 :FOR J =
    1 TO WE * 16 :READ Q :NEXT
420 FOR X1 = 1 TO 4 : FOR Y1 = 1 TO
    4 : READ Q : IF Q THEN LOCATE BY(Y1),
    BX(X1):B(X1,Y1) = 1 :PRINT GR$
430 NEXT : NEXT
440 FOR X1 = 1 TO 4 : FOR Y1 = 1 TO
    4 : READ Q : IF Q THEN LOCATE AY(Y1),
    AX(X1):A(X1,Y1) = 1 :PRINT GR$
450 REM use this line for random beg
    inning patterns
460 REM FOR X1 = 1 TO 4 : FOR Y1 = 1
    TO 4 :H= RND (1): Q = -(H>.5): IF Q
    THEN LOCATE AY(Y1),AX(X1):A(X1,Y1) =
    1 :PRINT GR$
470 NEXT : NEXT
480 DATA 1,1,1,1, 1,0,0,1, 1,0,0,1,
    1,1,1,1
490 DATA 0,0,0,0, 0,1,1,0, 0,1,1,0, 0
    ,0,0,0
500 DATA 0,1,1,0, 1,0,0,1, 1,0,0,1, 0
    ,1,1,0
510 DATA 1,1,1,1, 1,1,1,1, 1,1,1,1, 1
    ,1,1,1
520 DATA 1,0,0,1, 0,1,1,0, 0,1,1,0, 1
    ,0,0,1
530 DATA 1,1,1,1,0,0,0,0,0,0,0,1,1,
    1,1
540 DATA 1,0,0,1,0,1,1,0,0,1,1,0,1,0,
    0,1
550 DATA 1,1,1,1, 0,0,0,0, 0,0,0,0,1,
    1,1,1
560 DATA 0,0,0,1, 0,0,0,1, 0,0,0,1,0,
    0,0,1
570 DATA 1,0,0,1, 0,0,0,0,0,0,0,0,1,0
    ,0,1
580 DATA 0,0,0,0, 0,0,0,0,0,0,0,0,0,0
    ,0,0
590 DATA 0,0,0,0, 1,0,0,1,1,0,0,1,0,0
    ,0,0
600 REM cursor movement for board a

```



```

610 LOCATE AY(YA),AX(XA) :PRINT GP#
620 CL = CL+1: IF CL >=83 THEN CL =
0 :KL = KL + 1 :LOCATE 3,50 :PRINT "T
ime:"KL:LOCATE 5,50:PRINT "Moves:"MO
630 E$ = INKEY$: IF E$ = "" THEN 620

```

```

640 IF LEN(E$) = 2 THEN E = ASC(RI
GHT$(E$,1)) ELSE 620
650 IF E = 82 THEN GOSUB 780 : GOSUB
950 :MO = MO + 1 :LOCATE 5,50:PRINT"M
oves:"MO

```

```

660 LOCATE AY(YA),AX(XA):IF A(XA,YA )
=0 THEN PRINT SP$ ELSE PRINT GR$
670 DX = -((-E=75))+(E=77):DY = -((-
(E=72))+(E=80))
680 YA = YA +DY:IF YA =5 THEN YA = YA
-4

```

```

690 IF YA = 0 THEN YA = YA +4
700 XA = XA +DX:IF XA = 5 THEN XA = X
A -4

```

```

710 IF XA = 0 THEN XA = XA +4
720 LOCATE AY(YA),AX(XA):PRINT GP#
730 GOTO 620

```

```

740 REM reverse grid a
750 LOCATE AY(YA),AX(XA):IF A(XA,YA)T
HEN :A(XA,YA)=0:PRINT SP$:RETURN:ELSE
:PRINT GR$:A(XA,YA)=1
760 RETURN

```

```

770 REM where to go
780 IF (XA=YA) AND ((XA=4) OR (XA =1
))THEN 840

```

```

790 IF (XA+YA=5) AND XA * YA = 4 THEN
840

```

```

800 IF (XA>1 AND XA<4) AND (YA=1 OR Y
A=4) THEN 930

```

```

810 IF (YA>1 AND YA<4) AND (XA=1 OR X
A=4) THEN 920

```

```

820 GOTO 940

```

```

830 REM corner

```

```

840 XT=XA:YT = YA :GOSUB 750:IF XA =
1 THEN FOR XA = XT+1 TO XT+2: GOSUB
750 :NEXT :XA = XT

```

```

850 IF YA = 1 THEN FOR YA =YT +1 TO Y
T+2:GOSUB 750 :NEXT :YA = YT

```

```

860 IF XA = 4 THEN FOR XA = XT-2 TO X
T-1 :GOSUB 750 :NEXT:XA =XT

```

```

870 IF YA = 4 THEN FOR YA = YT-2 TO Y
T-1 :GOSUB 750 :NEXT:YA =YT

```

```

880 IF XA =1 THEN XA = XT +1 ELSE XA
= XT-1

```

```

890 IF YA =1 THEN YA = YT +1 ELSE YA
= YT-1

```

```

900 GOSUB 750 :XA = XT :YA = YT :RETU
RN

```

```

910 REM edge

```

```

920 XT=XA:YT=YA:YA= YT-1 :GOSUB 750:
YA = YT+1:GOSUB 750 :YA = YT: XA = XT
+(XT=4) -(XT=1):GOSUB 750:XA=XT:YA =
YT :RETURN

```

```

930 XT=XA:YT=YA: XA = XT-1 :GOSUB 750
:XA = XT+1:GOSUB 750 :XA =XT: YA = YA
+(YA=4) -(YA=1):GOSUB 750:XA=XT:YA =
YT :RETURN

```

```

940 XT = XA : YT = YA: GOSUB 750 : X
A= XT+1 :GOSUB 750:XA = XT-1 :GOSUB 7
50: XA = XT:YA = YT+1:GOSUB 750 : YA
= YT-1:GOSUB 750 :YA = YT :RETURN

```

```

950 FOR T = 1 TO 4 : FOR T1 = 1 TO 4
: IF A(T,T1) <> B(T,T1) THEN T=4:T1=4
:RETURN

```

```

960 NEXT: NEXT

```

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```

970 SC=KL/16+MO/5:LOCATE 7,50:COLOR 3
1: PRINT "YOU WON" :LOCATE 8,50:PRINT
"Score : "INT(SC):COLOR 7:LOCATE 9 ,50
:PRINT"Play again Y or N"

```

```

980 A$ = INKEY$:IF A$= "" THEN 980
990 IF A$ = "Y" THEN RUN ELSE END
1000 LOCATE 13,28:PRINT "Q U A T R A
I N M E N T" :FOR T = 1 TO 5000:NEXT
:CLS
1010 RETURN

```

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COMPUTE!

Gotcha!

Doug Smoak

"Gotcha!" will keep you on the run as you scramble for dollars while avoiding the dread Collector. Originally written for the unexpanded VIC; versions are included for 64 and Atari. Joystick required.

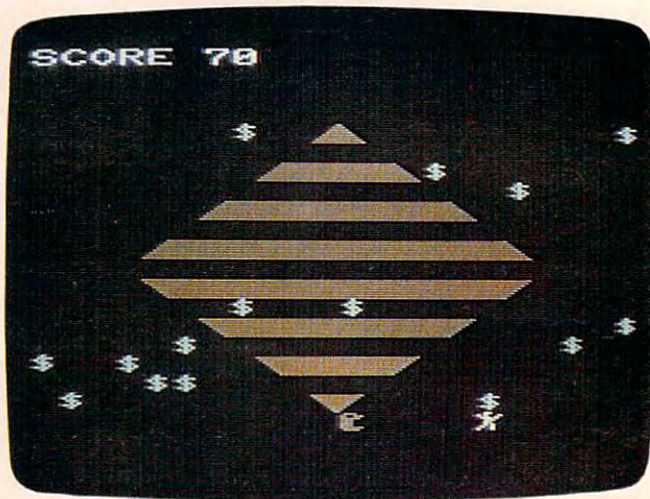
The idea in "Gotcha!" is to get all the money you can lay your hands on, and outwit the Collector while you're at it. But you'd better be quick, because he's not that interested in the money itself. He wants to catch *you*.

You begin the game inside a diamond pattern in the middle of the screen, with the Collector on your heels. Once out of the diamond, you're free to move up, down, and diagonally in your effort to grab the dollars and elude the Collector.

If you get trapped near a side, you can run off the screen and wrap around to the other side, but beware—the Collector knows where you are, and he comes onto the screen headed straight for you. You might not see him in time to escape, and it's Gotcha!

You have the advantage of moving in eight directions, while the Collector only moves in a straight line across the screen. If you survive until all the money is gone, you move on to the next round, where there is more money with a higher score value. The screen changes to a maze after the first round, restricting your movement and making it easier for the Collector to track you down. If you survive 18 rounds (no one ever has), you can retire or play again.

On the 64 version, plug your joystick into Port 2; on the Atari version, use Controller Port 1.



The player tries to gather up dollar signs while avoiding the monster in the VIC version of "Gotcha!"

Program 1: Gotcha!—VIC Version

```
1 GOTO56
2 K=INT(.5+(ME-7767)/44):J=0:ET=K*44+7767
  :CH=-1:E1=2:IFRND(1)<.5THENET=ET-21:CH=
  1:E1=3
3 IFPEEK(ME)=36THENGOSUB50
4 IFPEEK(ET)=36THENIT=IT+1
5 IFME<7702THENME=ME+22
6 IFME>8163THENME=ME-22
7 POKEOM,32:POKEME,M1:POKEME+30720,7
8 IFPEEK(ET)=M1THEN52
9 POKEOT,32:POKEET+30720,2:POKEET,E1
10 IFIT=>(30+RD*10)THENPRINT"{CLR}":RD=RD
  +1:MT=0:OM=0:OT=0:GOTO72
11 POKEDD,127:P=PEEK(P2)AND128:J0=- (P=0)
```


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```

12 POKEDD,255:P=PEEK(P1):J1=-((PAND8)=0):
   J2=-((PAND16)=0):J3=-((PAND4)=0)
13 IFJ0THENDX=1:M1=1
14 IFJ1THENDY=22
15 IFJ2THENDX=-1:M1=0
16 IFJ3THENDY=-22
17 OM=ME:ME=ME+DX+DY:DY=0:DX=0
18 IFME<7702 THENME=ME+22
19 IFME>8164 THENME=ME-22
20 IFPEEK(ME)<>32ANDPEEK(ME)<>36 THENME=OM
21 OT=ET:ET=ET+CH:J=J+1:IFJ=>22 THEN2
22 GOTO3
23 POKE36879,8:PRINT"{CLR}{RVS}{WHT}SCORE
   {OFF}"SC:IFRD=0 THEN41
24 IFRD<19 THENGOTO26
25 POKE36869,240:PRINT"{CLR}YOU MADE IT!!
   !!":GOTO25
26 UR$="E F":UL$="H G"
27 POKE36879,8:PRINT:FORT=1TO10:PRINT"
   {PUR}DDDDDDDDDDDDDDDDDDDDDDDDDDDD":NEXT
28 PRINT"{HOME}{2 DOWN}":OV$="{8 RIGHT}":
   AP$=""
29 FORT=1TO4:PRINTOV$UR$AP$UL$
30 AP$=AP$+"{4 RIGHT}":OV$=OV$+"{2 LEFT}":
   NEXT
31 AP$=AP$+"{4 LEFT}":OV$=OV$+"{2 RIGHT}":
   NEXT
32 FORT=1TO4:PRINTOV$UL$AP$UR$
33 AP$=AP$+"{4 LEFT}":OV$=OV$+"{2 RIGHT}":
   NEXT
34 FORT=1TO30+(RD*10)
35 SP=RND(1)*398+7744
36 IFPEEK(SP)=32 THENPOKESP,36:POKESP+3072
   0,5:GOTO38
37 GOTO35
38 NEXT
39 DD=37154:P1=37151:P2=37152:ME=7932:V=3
   6878:S=36875:IT=0
40 FORT=225TO177STEP-4:POKES,T:FORTT=30TO
   0STEP-1:POKEV,TT/2:NEXTTT:NEXT:GOTO2
41 PRINT"{RED}{HOME}{4 DOWN}{10 SPACES}FH
   "
42 PRINT"{DOWN}{8 SPACES}FDDDDH"
43 PRINT"{DOWN}{6 SPACES}FDDDDDDDDH"
44 PRINT"{DOWN}{4 SPACES}FDDDDDDDDDDDDH"
45 PRINT"{DOWN}{4 SPACES}GDDDDDDDDDDDDDE"
46 PRINT"{DOWN}{6 SPACES}GDDDDDDDDDE"
47 PRINT"{DOWN}{8 SPACES}GDDDDDE"
48 PRINT"{DOWN}{10 SPACES}GE"
49 GOTO34
50 POKES,235:FORT=1TO5:POKEV,3*T:NEXT:POK
   EV,0:IT=IT+1:SC=SC+10*(1+RD)
51 PRINT"{HOME}{RVS}{WHT}SCORE{OFF}"SC:RE
   TURN
52 PRINT"{CLR}{WHT}{RVS}{7 SPACES}GOTCHA!
   !"
53 POKES,0:POKEV,15:FORT=200TO240:POKES-1
   ,T:NEXT:FORT=1TO50:NEXT
54 FORT=240TO126STEP-1:POKES-1,T:NEXT:POK
   EV,0
55 RD=0:OM=0:OT=0:FL=1:GOTO70
56 PRINT"{CLR}{5 RIGHT}{8 DOWN}JUST A MOM
   ENT":POKE56,28:POKE52,28:CLR
57 FORI=0TO511:POKE7168+I,PEEK(32768+I):N
   EXTI
58 READX:IFX<0 THEN65
59 FORI=XTOX+7:READJ:POKEI,J:NEXTI:GOTO58
60 DATA7168,48,18,156,120,24,40,36,34,717
   6,24,81,58,28,24,20,36,68
61 DATA7184,60,230,126,30,30,30,254,124,7
   192,60,103,126,120,120,120,127,62
62 DATA7200,255,255,255,255,255,255,255,2

```

```

55
63 DATA7208,255,254,252,248,240,224,192,1
   28,7216,1,3,7,15,31,63,127,255
64 DATA7224,255,127,63,31,15,7,3,1,7232,1
   28,192,224,240,248,252,254,255,-1
65 POKE36869,255:POKE36879,110:PRINT"
   {YEL}{CLR}{6 DOWN}{7 SPACES}{RVS}GOTCH
   A!!"
66 PRINT"{CLR}{RVS}USING THE JOYSTICK
   {4 SPACES}{DOWN}GATHER AS MUCH MONEY
   {2 SPACES}{DOWN}AS YOU CAN WITHOUT"
67 PRINT"{RVS}{DOWN}BEING GOTTEN BY {OFF}
   {RED}C{RVS}{YEL}."
68 PRINT"{DOWN}{RVS}YOU ARE {OFF}{YEL}A
   {RVS}. THE NUMBER{DOWN} AND VALUE OF T
   HE {GRN}$ {YEL}'S {DOWN} INCREASE WITH
   {SPACE}EACH"
69 PRINT"{RVS}{DOWN}ROUND.":GOTO72
70 PRINT"{RVS}{2 DOWN}SCORE"SC:PRINT"
   {RVS}{DOWN}HIGH"HS:IFSC>HSTHENHS=SC:GO
   SUB78
71 IFRD=0 THENSC=0
72 FORT=1TO500:NEXTT:PRINT"{RVS}{2 DOWN}P
   RESS THE TRIGGER TO":PRINT"{RVS}PLAY";
73 IFFL=1 THENPRINT"{RVS} AGAIN, Q TO QUIT
   "
74 P=PEEK(37151):FB=-((PAND32)=0)
75 IFPEEK(197)=48 THEN POKE198,0:SYS4096
76 IFFB=0 THEN74
77 FL=0:GOTO23
78 FORT=1TO1000:NEXT:FORCT=1TO3:PRINT"
   {RVS}{2 DOWN}{2 SPACES}A NEW HIGH SCOR
   E!!"
79 POKEV,15:FORT=190TO245:POKES-1,T:NEXTT
   :FORTT=1TO200:NEXTTT:POKES-1,0:NEXTCT
80 RETURN

```

BEFORE TYPING...

If you're new to computing, please read "How To Type COMPUTE!'s Programs" and "A Beginner's Guide To Typing In Programs."

Program 2: Gotcha!—64 Version

```

20 POKE56,48:POKE52,48
30 FORI=54272TO54296:POKEI,0:NEXT:POKE542
   96,15:POKE54277,17:POKE54278,136
40 GOTO180
50 K=INT(.5+(ME-1183)/80):J=0:ET=K*80+118
   3:CH=-1:E1=66
51 IFRND(1)<.5 THENET=ET-39:CH=1:E1=67
52 IFPEEK(ME)=36 THENGOSUB1050
53 IFPEEK(ET)=36 THENIT=IT+1
54 IFME<1064 THENME=ME+40
55 IFME>2023 THENME=ME-40
56 POKEOM,32:POKEME,M1:POKEME+54272,7
57 IFPEEK(ET)=M1 THEN1100
58 POKEOT,32:POKEET+54272,2:POKEET,E1
59 IFIT=>(30+RD*20) THENPRINT"{CLR}":RD=RD
   +1:MT=0:OM=0:OT=0:GOTO1510
60 P=PEEK(DD):J1=15-(PAND15)
63 IFJ1=1 THENDY=-40:GOTO74
64 IFJ1=2 THENDY=40:GOTO74
65 IFJ1=4 THENDX=-1:M1=0:GOTO74
66 IFJ1=5 THENDY=-41:M1=0:GOTO74
67 IFJ1=6 THENDY=39:M1=0:GOTO74
68 IFJ1=8 THENDX=1:M1=65:GOTO74
69 IFJ1=9 THENDY=-39:M1=65:GOTO74

```


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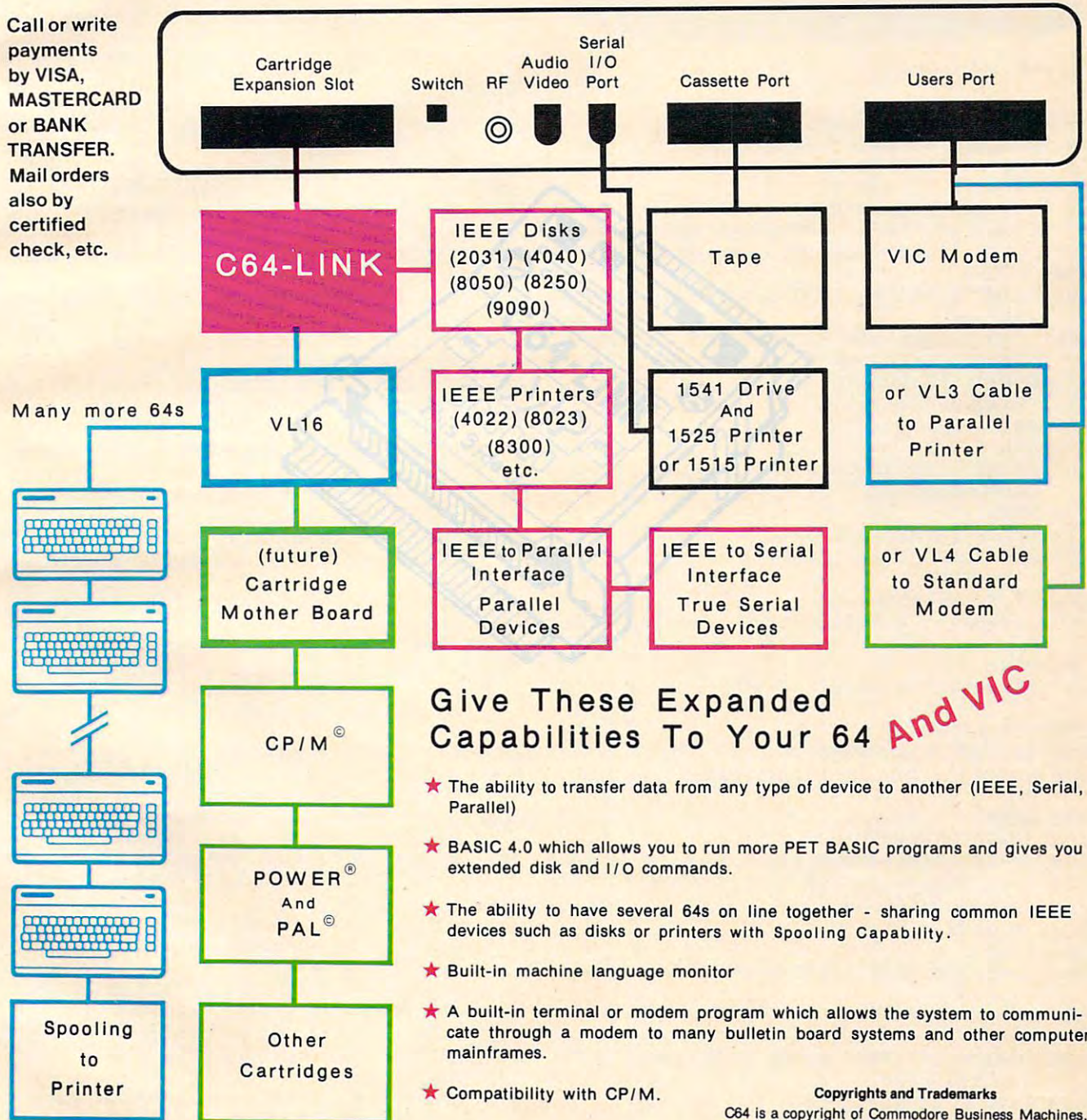
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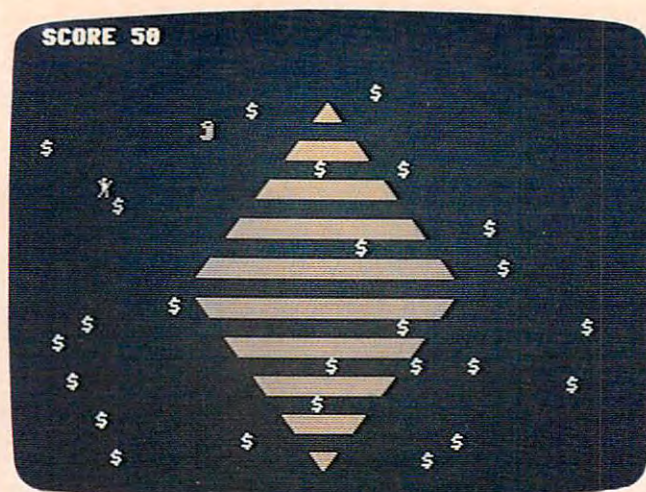
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"Gotcha!" 64 version.

```

70 IFJ1=10THENDY=41:M1=65
74 OM=ME:ME=ME+DX+DY:DY=0:DX=0
80 IFME<1064THENME=ME+40
81 IFME>2023THENME=ME-40
82 IFET>2023THENET=ET-40
85 IFPEEK(ME)<>32ANDPEEK(ME)<>36THENME=OM
180 OT=ET:ET=ET+CH:J=J+1:IFJ=>40THEN50
190 GOTO52
200 PRINT"{CLR}{WHT}SCORE{OFF}"SC:IFRD=0T
HEN1000
201 IFRD>18THENPRINT"{CLR}{RED}{12 DOWN}
{14 RIGHT}YOU MADE IT!!!!":GOTO201
202 UR$="E F":UL$="H G"
210 PRINTCHR$(147)
300 PRINT:PRINT
350 FORT=1TO12
360 PRINT"{CYN}DDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDD"
370 NEXT
372 PRINT"{HOME}{DOWN}"
374 OV$="{17 RIGHT}":AP$=""
375 FORT=1TO5
380 PRINTOV$UR$AP$UL$
385 AP$=AP$+"{4 RIGHT}":OV$=OV$+"{2 LEFT}
"
390 NEXT
395 AP$=AP$+"{4 LEFT}":OV$=OV$+"{2 RIGHT}
"
410 FORT=1TO5
420 PRINTOV$UL$AP$UR$
430 AP$=AP$+"{4 LEFT}":OV$=OV$+"{2 RIGHT}
"
440 NEXT
460 FORT=1TO30+(RD*20)
470 SP=INT(RND(1)*879)+1064
480 IFPEEK(SP)=32THENPOKESP,36:POKESP+542
72,5:GOTO500
490 GOTO470
500 NEXT
505 DD=56320:ME=1562:IT=0:V=54276:HF=5427
3:LF=HF-1
555 POKEV,17:FORT=1TO50:POKEHF,RND(0)*38+
34
600 FORTT=1TO5:POKELF,RND(0)*20+40:NEXTTT
:NEXTT:POKEV,16
609 IFRD>0THENME=ME-80
610 GOTO50
1000 PRINT"{RED}{3 DOWN}{19 RIGHT}FH"
1002 PRINT"{DOWN}{17 RIGHT}FDDDDH"
1004 PRINT"{DOWN}{15 RIGHT}FDDDDDDDDDH"
1006 PRINT"{DOWN}{13 RIGHT}FDDDDDDDDDDDDDDH
"
1008 PRINT"{11 RIGHT}{DOWN}FDDDDDDDDDDDDDD
DDDH"
1010 PRINT"{DOWN}{11 RIGHT}GDDDDDDDDDDDDDD
DDDE"
1011 PRINT"{DOWN}{13 RIGHT}GDDDDDDDDDDDDDE
"
1012 PRINT"{DOWN}{15 RIGHT}GDDDDDDDDDE"
1014 PRINT"{DOWN}{17 RIGHT}GDDDDDE"
1016 PRINT"{DOWN}{19 RIGHT}GE"
1018 GOTO460
1050 POKEV,17:POKEHF,51:FORT=1TO5:POKELF,
2*T:NEXTT:IT=IT+1:SC=SC+10*(1+RD)
1060 POKEV,16:IFRD=0THENPRINT"{HOME}{WHT}
SCORE"SC:RETURN
1065 PRINT"{DOWN}{GRN}SCORE"SC"{2 UP}":RE
TURN
1100 PRINT"{CLR}{WHT}"TAB(17)"GOTCHA!!"
1101 POKEV,17:FORT=40TO75:POKEHF,T:POKELF
,2*T:NEXT:FORT=1TO50:NEXT:POKEV,16
1102 FORT=34TO12STEP-1:POKEHF,T:POKELF,T/
2:NEXT:POKEV,16
1130 FL=1:RD=0:OM=0:OT=0:GOTO1501
1180 POKE53280,15:POKE53281,15:PRINT"
{CLR}{10 DOWN}"TAB(10)"{RED}JUST A M
OMENT PLEASE"
1200 PRINTCHR$(142):POKE52,48:POKE56,48:C
LR
1210 POKE56334,PEEK(56334)AND254:POKE1,PE
EK(1)AND251
1220 FORI=0TO511:POKE12288+I,PEEK(53248+I
):NEXTI:POKE1,PEEK(1)OR4
1225 POKE56334,PEEK(56334)OR1:POKE53272,(
PEEK(53272)AND240)OR12
1230 READX:IFX<0THEN1300
1240 FORI=XTOX+7:READJ:POKEI,J:NEXTI:GOTO
1230
1250 DATA12288,48,18,156,120,24,40,36,34,
12808,24,81,58,28,24,20,36,68
1260 DATA12816,60,230,126,30,30,30,254,12
4,12824,60,103,126,120,120,120,127,6
2
1270 DATA12832,255,255,255,255,255,255,25
5,255
1280 DATA12840,255,254,252,248,240,224,19
2,128,12848,1,3,7,15,31,63,127,255
1290 DATA12856,255,127,63,31,15,7,3,1,128
64,128,192,224,240,248,252,254,255,-
1
1300 POKE53280,0:POKE53281,0
1380 PRINT"{CLR}{WHT}{3 DOWN}{13 RIGHT}**
GOTCHA **{4 DOWN}"
1400 PRINT"{YEL}{RIGHT}USING JOYSTICK #2,
YOU MUST GATHER AS{2 SPACES}"
1401 PRINT"{RIGHT}MUCH OF THE MONEY AS YO
U CAN WITHOUT{DOWN}{4 SPACES}BEING C
AUGHT BY{RED} C."
1402 PRINT"{YEL}{RIGHT}{DOWN}YOU ARE{CYN}
A.{YEL} THE NUMBER AND VALUE OF
{DOWN}{3 SPACES}"
1403 PRINT"{RIGHT}THE {4}$ {YEL}'S INCRE
ASE WITH EACH ROUND.":GOTO1510
1501 PRINT"{2 DOWN}SCORE"SC:PRINT"{DOWN}H
IGH"HS:IFSC>HSTHENHS=SC:GOSUB1550
1505 IFRD=0THENS=0
1510 PRINT"{8}{4 DOWN}{RIGHT}PRESS THE
{SPACE}<TRIGGER> TO PLAY";
1512 IFFL=1THENPRINT"{8}, Q TO QUIT"
1515 P=PEEK(56320):FR=PAND16

```


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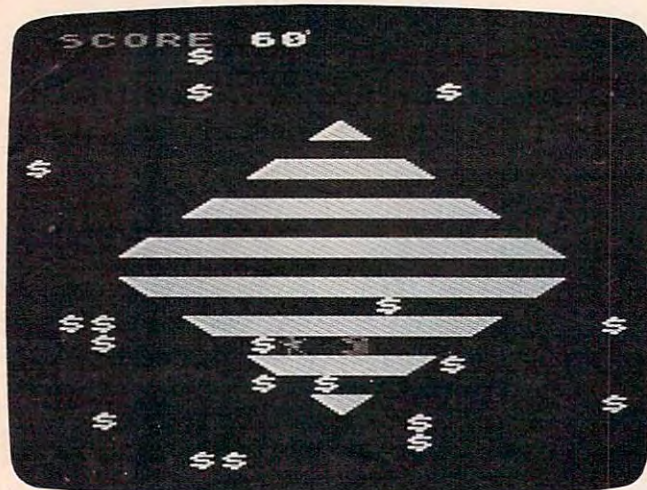
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```

1516 IFPEEK(197)=62THENPOKE198,0:SYS2048
1518 IFFR=16THEN1515
1520 FL=0:GOTO200
1550 FORT=1TO1000:NEXT:FORCT=1TO3:PRINT"
{RED}{10 RIGHT}{2 DOWN}{2 SPACES}A N
EW HIGH SCORE!!":NEXT
1551 POKEV,17:FOR TT=40TO200:POKEHF,TT/2:F
ORI=1TO10:NEXTI:POKELF,TT:NEXTTT
1560 POKEV,16:RETURN

```



"Gotcha!" Atari version.

Program 3: Gotcha!—Atari Version

```

20 GRAPHICS 1+16
30 SCR=PEEK(88)+PEEK(89)*256
40 DIM UR$(30),UL$(30):GOTO 1180
50 K=INT(.5+(ME-SCR-99)/40):J=0:ET=
K*40+SCR+99:CH=-1:E1=199
51 IF RND(0)<.5 THEN ET=ET-19:CH=1:
E1=200
52 IF PEEK(ME)=4 THEN GOSUB 1050
53 IF PEEK(ET)=4 THEN IT=IT+1
54 IF ME<SCR+20 THEN ME=ME+20
55 IF ME>=SCR+460 THEN ME=ME-20
56 POKE OM,0:POKE ME,M1
57 IF PEEK(ET)=M1 THEN 1100
58 IF ET<SCR+20 THEN ET=ET+20
59 POKE OT,0:POKE ET,E1
60 IF IT>=(30+RD*7) THEN ? #6;CHR$(1
25):RD=RD+1:MT=0:OM=0:OT=0:GOTO 1
510
61 M=STICK(0):GOTO 60+M
65 DY=21:GOTO 75
66 DY=-19:GOTO 75
67 DX=1:M1=134:GOTO 75
69 DY=19:GOTO 75
70 DY=-21:GOTO 75
71 DX=-1:M1=133:GOTO 75
73 DY=20:POKE 77,0:GOTO 75
74 DY=-20:POKE 77,0
75 OM=ME:ME=ME+DX+DY:DY=0:DX=0
80 IF ME<SCR+20 THEN ME=ME+20
81 IF ME>=SCR+460 THEN ME=ME-20
85 IF PEEK(ME)<>0 AND PEEK(ME)<>4 TH
EN ME=OM
180 OT=ET:ET=ET+CH:J=J+1:IF J>=20 TH
EN 50
181 IF ET>SCR+460 THEN ET=ET-20
185 IF ET<SCR+20 THEN ET=ET+20
190 FOR I=1 TO 15:NEXT I:GOTO 52
200 ? #6;"{CLEAR}":M1=133:POSITION 1

```

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,0:PRINT #6;"SCORE";" ";SC:IF RD
=0 THEN 1000
201 IF RD>18 THEN POSITION 4,10:PRIN
T #6;"YOU MADE IT!!!":GOTO 201
202 ? #6;CHR$(125):UR$="* "+"UL$="/
-
300 X=0:Y=3
350 FOR T=1 TO 10
360 POSITION X,Y:PRINT #6;"")))))))
)))))"))))"
370 Y=Y+2:NEXT T
372 X=7:Y=5:Z=7:POSITION X,Y:? #6;UR
$;UL$
374 FOR T=1 TO 4:X=X-2:Y=Y+2:IF X<0
THEN 390
375 POSITION X,Y:? #6;UR$:POSITION X
+Z,Y:? #6;UL$
380 Z=Z+4
390 NEXT T:Z=Z-4:X=X+2:POSITION X,Y:
? #6;UL$:POSITION X+Z,Y:? #6;UR$
400 FOR T=1 TO 3:X=X+2:Y=Y+2:Z=Z-4
410 POSITION X,Y:? #6;UL$:POSITION X
+Z,Y:? #6;UR$
450 NEXT T
460 FOR T=1 TO 30+(RD*7)
470 SP=INT(RND(1)*380)+SCR+60
480 IF PEEK(SP)=0 THEN POKE SP,4:GOT
O 500
490 GOTO 470
500 NEXT T
505 ME=SCR+249:IT=0
600 FOR T=29 TO 96 STEP 2:SOUND 0,T,
10,15:FOR TT=0 TO 10:NEXT TT:NEX
T T:SOUND 0,0,0,0
610 GOTO 50
1000 X=9:Y=5:POSITION X,Y:? #6;"+"
1002 POSITION X-2,Y+2:? #6;"")))))/"
1004 POSITION X-4,Y+4:? #6;"")))))))
)/"
1006 POSITION X-6,Y+6:? #6;"")))))))
)))))/"
1011 POSITION X-6,Y+8:? #6;"-")))))))
)))))*"
1012 POSITION X-4,Y+10:? #6;"-")))))))
)))))*"
1014 POSITION X-2,Y+12:? #6;"-")))))))
)))))*"
1016 POSITION X,Y+14:? #6;"-*"
1018 GOSUB 1570:GOTO 505
1050 IT=IT+1:SC=SC+10*(1+RD):SOUND 1
,30,10,15:FOR I=1 TO 5:NEXT I:S
OUND 1,0,0,0
1060 POSITION 1,0:PRINT #6;"SCORE";"
";SC:RETURN
1100 ? #6;CHR$(125):POSITION 6,12:?
#6;"GOTCHA ! !":FL=1
1101 SOUND 0,243,10,15:FOR I=1 TO 15
0
1102 NEXT I:SOUND 0,0,0,0
1130 RD=0:OM=0:OT=0:GOTO 1501
1180 POSITION 0,11:? #6;"JUST A MOMEN
T PLEASE"
1210 ST=(PEEK(106)-8)*256
1220 FOR K=0 TO 511:POKE ST+K,PEEK(5
7344+K):NEXT K:POKE 756,ST/256
1230 READ X:IF X<0 THEN 1300
1240 FOR I=X TO X+7:READ J:POKE I+ST
,J:NEXT I:GOTO 1230
1250 DATA 40,48,18,156,120,24,40,36,
34,48,24,81,58,28,24,20,36,68
1260 DATA 56,60,230,126,30,30,30,254
,124,64,60,103,126,120,120,120,
127,62
1270 DATA 72,255,255,235,255,255,255
,255,255

```