SoftSide™

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Your BASIC Software Magazine • VOLUME III • NUMBER FIVE • FEBRUARY 1981

Miner
. . . Can You Succeed Where Others Failed?

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FAMOUS SAYINGS HANGMAN
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THE DATA BASE . . . Print Formatting

PLUS! Hiding Your Code, The Doubler Uncovered, Understanding the CLEAR Command, and much more.

APL

by Phelps Gates

Now a high-level, scientific programming language for the home computer that doesn't cost $200 or $300. The power of this language is in its strong mathematical operations, especially with regard to matrices and vectors. Programs requiring matrix multiplication or other matrix problem solving that would require hours of programming time in BASIC are solved quickly and with minimal effort in APL.

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FEATURES

APL-80 on disk contains the following features:)SAVE and)LOAD workspace on disk;)COPY other workspaces into current ones; Return to DOS for directory or commands without losing your workspace; Send output to lineprinter; Five workspaces of lessons included; Sequential and random files; 15 digit precision; Monadic and dyadic transposition; Easy editing within FUNCTION lines; Latent expression (FUNCTION can "come up running" when loaded); Tracing of function execution; Real-time clock; User-control of random link; Workspace is 25587 bytes (in 48K machine); Arrays may have up to 63 dimensions.

COMMANDS APL-80

APL-80 supports the following commands; Absolute value, add, and, assign, branch, catenate, ceiling, chr$/asc, circular, combinatorial, comment, compress, deal, decode, divide, drop, encode, equal, expand, exponential, factorial, floor, format, grade down, grade up, greater, greater/equal, index generator, indexing, index of, inner product, label, less, less/equal, logarithm, maximum, member, minimum, multiply, nand, negate, nor, not, not equal, or, outer product, peek, poke, quad, quote quad, random, ravel, reciprocal, reduction, reshape, residue, reverse, rotate, scan, shape, sign, system, subtract, take, transposition.

SPECIFICATIONS

Minimum system requirements: 32K disk system (48K recommended) includes APL-80, Five workshapes of lessons, instruction manual.

Price ..... $39.95 on disk

Reduced feature: 16K Level II tape version, no lessons.
Transpositions, format, and inner product not implemented. Reduced domain for some functions, 6 digit accuracy.

Price ..... $14.95 on cassette

APL: An Interactive Approach

Price ..... $16.95 ($3.00 shipping charge)

LIMITATIONS

Due to the absence of the special APL character set on the TRS-80™, APL-80 uses shifted letters to represent the various APL characters.
In addition to the keyboard limitations, lamination, domino, and matrix inverse are not implemented but can be derived with user-defined functions.
Multiple specifications must be split into two statements unless the left-hand assignment is to a quad. This also applies to implied multiple specifications.
Reduction and reshape (p) are not permitted for empty arguments; the argument of add/drop may not be scalar; empty indices are not permitted.
A quad (q) can't be typed in response to a quad (nor can the name of a function which itself gets input from a quad). Quote-quad (m) is permitted.
No more than 32 user functions can be defined in a single workspace and a function may not contain more than 255 lines.
A comment (c) must occupy a separate line: a comment can't follow a function statement on the same line.
In the tape version, arrays are limited to five (5) dimensions.

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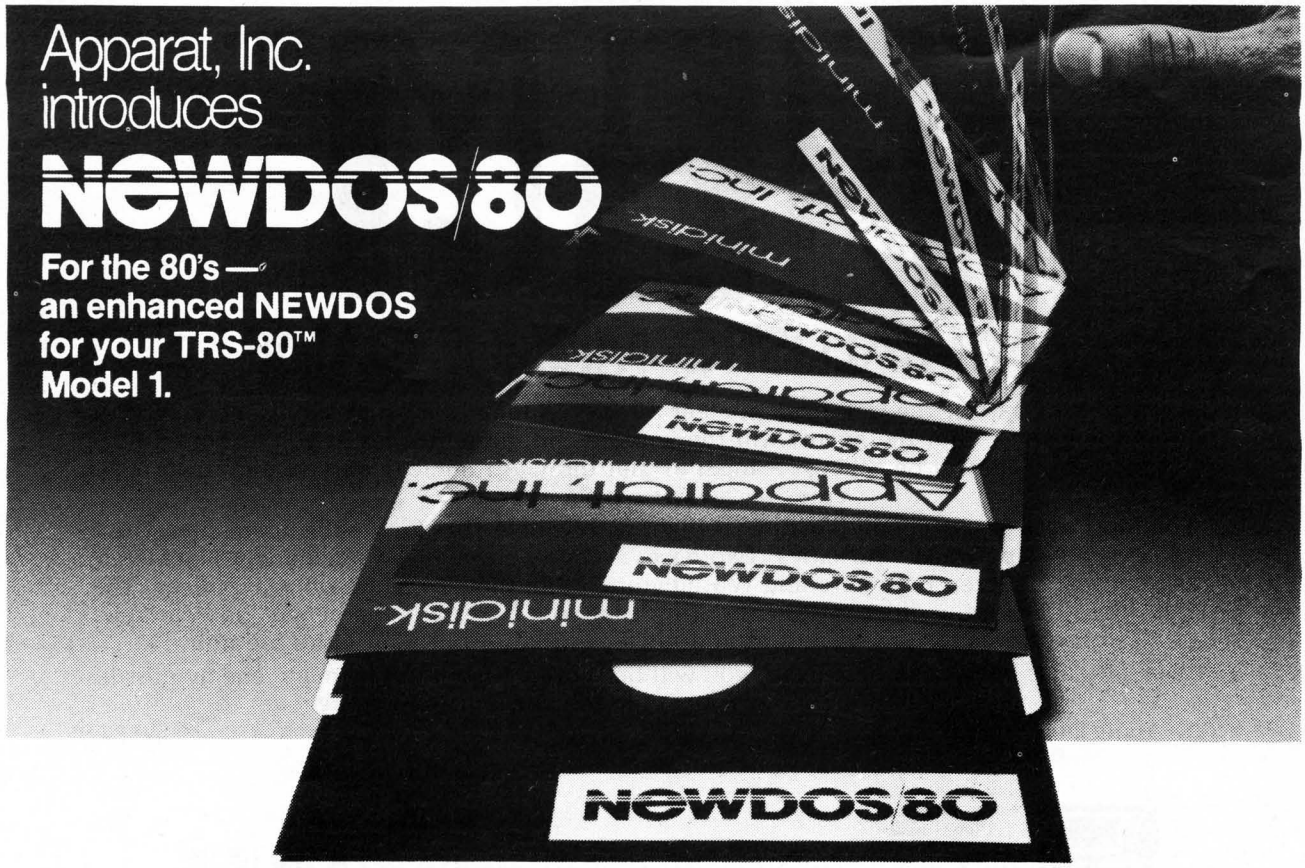

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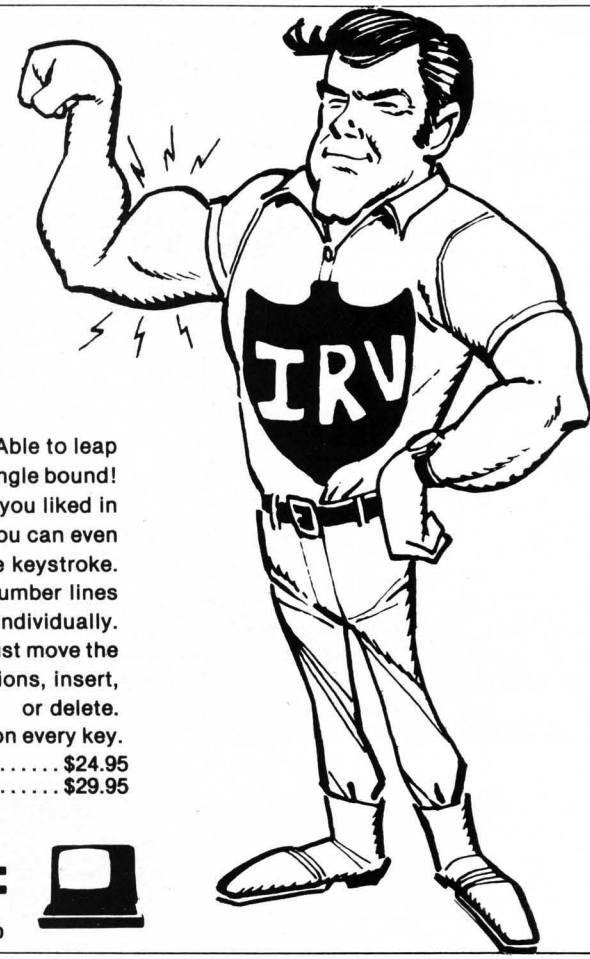

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ARTICLES

PROGRAMS

HEAVY STUFF

DEPARTMENTS

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APPLE


ATARI


PET

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EDITORIAL

by Dave Albert

I am something of an innocent, a total novice wandering lost amid the twisted paths of binary logic and hexadecimal perception. Mention machine code to me and I envision a computer pounding away at a telegraph key, with a room full of enemy computers trying their hardest to intercept the message and crack the code... At first, I thought Green Screen was the defensive line of the Seattle Seahawks, now I have one of my own at home (a screen, not a linebacker).

Of course, that means I must have a computer at home. I do. I, too, have been seduced by the almighty pixel, entranced by the marvels of CPUs and the floppy diskette. Ostensibly I purchased the little sucker for the word processing capabilities, complete with requisite lineprinter and disk drive. But I've recently discovered that there is one member of my household that enjoys the computer far more than I do: Sally, my kitten.

As far as Sally is concerned, my S-80 is (pardon the expression) the bee's knees. There are, of course, fringe benefits as far as she can tell, such as the paper roll holder on the printer, which is ideal for scratching her head, and the ribbon cables which she bats about with reckless abandon. But her true throb, her main squeeze, is the keyboard itself. She looks upon the keyboard as a kitty obstacle course, not unlike running through a field of old tires. The monitor screen is the perfect wall, challenging to climb and great for developing her pectorals. The flashing cursor inherent to "Super Script" (the word processor I currently prefer) is a source of endless facination, second only to her guerrilla activities.

The guerrilla activities tend less to subversion than to outright sabotage. She has mastered the art of bombing a file just prior to my saving it. This is usually accomplished by waiting until she sees me getting ready to hit the BREAK key, and then, pouncing on the keyboard with paws outstretched to land on the "@" and "D" and "C" keys simultaneously. When the "Delete para Y or N?" message appears, a leisurely stretch and yet another paw lands on the "Y" key. Then, she makes tracks while I look for a cleaver.

If that doesn't work, she rubs against my leg in a seeming show of affection until she has garnered enough static electricity to crunch the entire disk. Mata Hari could have taken lessons from Sally. Her favorite tactic, however, is pretty straightforward. She just dances on the keys when I'm not looking. The result is that my articles and letters come out with paragrapsh that run like this:

m,adnsjfhdgbdvb..unklejvio-s;yfhwdbfenksbyjshvosdhvkjds-bvsbvkjxhv
vjbkbvJBhv;/cshvjdwbfgkdhfgkd hfjkdhf dsjhjdshdb.

She doesn't always manage to end them with a period, but she's learning.

There is a serious side to this anecdote: Microcomputers can be a lot of things to a lot of people. And that is both good and bad, as are most things in this life. Would that life were simpler and things were one or the other, good OR bad, but such is not the case. For some, the micro is naught but a wonderful toy, something to play games on. For others, it is a useful tool to store business records on, or to edit and write with. To others still, the micro is an obsession, be it from a favorable perspective or from one of hatred and fear. I must confess to having subscribed to the latter dynamic for some time, but I am overcoming that. Nevertheless, like my predecessor here at **SoftSide**, Mark Pelczarski, I still have some doubts and misgivings.

Unlike Mark, my doubting stems from the what I see as compression and alteration of language. It is a similar fear to the one expressed by critics of television when that medium first emerged. The

continued to page 72

Settle for More from Your TRS-80

BASIC Compiler. With TRS-80 BASIC Compiler, your Level II BASIC programs will run at record speeds! Compiled programs execute an average of 3-10 times faster than programs run under Level II. Make extensive use of integer operations, and get speeds 20-30 times faster than the interpreter.

Best of all, BASIC Compiler does it with BASIC, the language you already know. By compiling the same source code that your current BASIC interprets, BASIC Compiler adds speed with a minimum of effort.

And you get more BASIC features to program with, since features of Microsoft's Version 5.0 BASIC Interpreter are included in the package. Features like the WHILE . . .WEND statement, long variable names, variable length records, and the CALL statement make programming easier. An exclusive BASIC Compiler feature lets you call FORTRAN and machine language subroutines much more easily than in Level II.

Simply type in and debug your program as usual, using the BASIC interpreter. Then enter a command line telling the computer what to compile and what options to use.

Voila! Highly optimized, Z-80 machine code that your computer executes in a flash! Run it now or save it for later. Your compiled program can be saved on disk for direct execution every time.

Want to market your programs? Compiled versions are ideal for distribution.* You distribute only the object code, not the source, so your genius stays fully protected.

BASIC Compiler runs on your TRS-80 Model I with 48K and disk drive. The package includes BASIC Compiler, linking loader and BASIC library with complete documentation. $195.00.

*Microsoft royalty information for the sale of programs compiled with BASIC Compiler is available from Microsoft.

muMATH Symbolic Math System expands your TRS-80 beyond the limits of numerical evaluation to a much higher level of math sophistication.

Symbolic mathematics is muMATH's power. For the first time, algebra, trigonometry, calculus, integration, differentiation and more can be performed on a system smaller than an IBM 370. And in a fraction of the time you could do them manually.

Yet for all its power, muMATH is simple to use.

To perform a differentiation you could enter: ?DIF (A*X ↑ 3 + SIN(X ↑ 2),X);

In almost no time, the computer would reply with: @2*X*COS(X ↑ 2) + 3*A*X ↑ 2.

Or to add fractions: ?1/3 + 5/6 + 2/5 + 3/7;

The instantaneous answer: 419/210.

Or to perform a more difficult trigonometric expansion you enter: SIN(2*Y)*(4*COS(X)↑3—COS(3*X) + SIN (Y)*(COS(X+Y+#PI) — COS(X—Y));

Just a few seconds later, the computer replies: @4*SIN(Y)*COS(X)*COS(Y).

muMATH has virtually infinite precision with full accuracy up to 611 digits.

If you use math, you'll find countless ways to save time and effort with muMATH. It's a professional tool for engineers and scientists. A learning tool for students at any level from algebra to calculus.

And if you want to expand your capabilities even beyond the standard muMATH, the option is open. muSIMP, the programming language in which muMATH is written, is included in the muMATH package. A superset of the language LISP, muSIMP is designed especially for interactive symbolic mathematics and other artificial intelligence applications.

muMATH and muSIMP were written by The Soft Warehouse, Honolulu, Hawaii. Priced at $74.95, the package includes muMATH, muSIMP and a complete manual. It requires a Model I TRS-80 with 32K and single disk. muMATH for the Apple II Computer will be available later this year.

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INPUT

Dear **SoftSide:**

I'd like to take issue with those individuals who take satisfaction either in putting down other makes of computers than the one they bought, or in complaining that their magazine is being polluted by the inclusion of programs for other machines. Your rebuttal was excellent, but several additional points have occurred to me. It strikes me that the choice of a microcomputer is as subjective as one's choice of anything else, whether it be an automobile, an item of clothing, a kind of music to enjoy, or a brand of beer. The choice is based upon many considerations, not the least of which may have something to do with the individual's level of sophistication, ability to pay, or perhaps the ability to discriminate their real needs. To make a snide remark like "TRaSh-80" is to demonstrate one's ignorance of the contribution to the expansion of (computer) consciousness that the S-80 and other "no-frill" computers have made.

As it is, I have not begun to exploit the computing power of my "TReaSure-80," computing power I couldn't have bought for $50,000 ten years ago. So if you need (or prefer) chrome, racing stripes, colors, whistles, that's fine—enjoy your investment. Just have a little respect for the one who prefers VWs. And instead of casting slurs, generate some good programs for **SoftSide.**

Sincerely yours,
Robert A. Benedict

Dear **SoftSide**:

A friend of mine gave me a copy of your magazine, I found it very good. At school we have two S-80 computers, for one of them we have a disk drive which was defective when we got it. In the magazine that I have are a couple of articles that use sound with the computer, and I was wondering if there is any way to add sound to the computer without buying some kind of synthesizer.

Sincerely yours,
Eric Bierstedt
Platteville, WI

Editors Reply:

Eric, all that is required to get great sound effects is a small amplifier such as that sold by Radio Shack for about $12.00.

Dear **SoftSide**:

Congratulations on the "NEW" **SoftSide**! It promises to be one of the better sources of microcomputer information.

I am, however, also very sad to see the mixing of articles and programs for the three computers in the same publication. I have many of the same feelings expressed by Brian Thompson in the October issue.

The Apple has only been in my life about six months. I have subscribed to every publication I could find that might have a bearing on uses for my Apple. Most of the subscriptions will not be renewed. I am very tired of seeing an interesting article or program in a magazine, only to find out it is relative to some other computer. Some of that is acceptable, but there is so much time reading about other systems. Where articles are intermixed it is often difficult to quickly determine what system is being discussed.

SoftSide: Apple was so very enjoyable because you knew that every article would be about a subject applicable to Apple. Realizing the monetary advantages to the publisher of a single publication that includes the Apple, S-80 and Atari. I would like to make the following suggestion. Divide the **SoftSide** into four sections.

FIRST SECTION - Articles and advertising that would apply to more than one of the three computers.
SECOND SECTION - Apple articles and advertising.
THIRD SECTION - S-80 articles and advertising.
FOURTH SECTION - Atari articles and advertising.

It would give everyone most of the benefits of both worlds.

Yours Truly,
Clyde C. Elsasser
Junction City, OR

Dear **SoftSide**

My compliments on an excellent magazine from its "slick" format to the outstanding software contained within—a bargain like this has been unheard of since the nickel cigar!

As **SoftSide** is to software—so is the Atari 400 to hardware—an outstanding buy. Not all us"computerists" have an unlimited cash supply—yet I still wanted a machine with Hi-Res color graphics and sound. I have everything the 800 has (10K operating system etc.) except for the nice keyboard and only one memory expansion slot (Atari technicians told me a company already makes a 32K RAM Board for it—so I really don't lose in this respect).

The keyboard really isn't as bad as it looks—each key has a raised border so you can feel it—plus audio feedback.

Are there any Atari users group yet? If yes, let's hear from you, if not let's start one!

As a novice programmer, I really appreciate the program comments so I can figure out just what the author was trying to do.

I would like to see more of Tim Hays and maybe an intro to Machine Langage.

Sincerely,
Everett P. Rantares

Dear **SoftSide;**

I am writing because I have several comments on your publication and some of the programs that you have published.

On the "Dr. Livingston" program: I had a hard time getting it to run. I have a 16K, Level II (with the new ROM) and I kept running out of memory. To solve this problem I had to reduce the CLEAR statement in line 50 to about 330 and also go through the program and take out spaces and shorten some of the words, ie., I use SWAMI instead of S W A M I. I would like to know if anyone else had the same problem.

On "Monster Maze" with Sound on line 98 what goes in place of the exclamation point?

Now for some comments on your publication. I think its great. I was sorry to read that some people don't like your new format (having S-80, Atari etc. in the same magazine) however I feel that anyone who owns or uses a home computer has an eye for the future and a mind wanting to learn. What better way to learn more about our friend the computer but to see how the other side works? Maybe if you split your magazine into sections ie. pages 1-15 for S-80 and 16-30 for Atari etc., it would help.

Well thanks again for a great publication that I'm sure, will get better.

Sincerely,
Robert D. Arrington
Chatham, ILL

Editor's Reply:

Line 98 in "Monster Maze" should have a greater than sign in place of the exclamation point.

Dear SoftSide:

I must admit to having a love/hate relationship with **SoftSide**. I love the articles and programs and, as an Atari owner, I appreciate your terrific Atari coverage. But, oh, those mistakes in the programs that drive me crazy after spending hours to enter programs!! Your November issue is typical. "Meteor Storm" is interesting, but doesn't seem to do things quite right; "Boing!" is okay far as it goes, but you forgot to include part of the program; and "Trench," after giving a warning to be careful in entering the very lengthy lines, goes right ahead and has one that is longer than the 120 characters that the Atari will accept (line 890).

Well, I think I have a good solution to your problem (other than the obvious one of better proof reading by your staff). Why don't you get a couple of owners of each computer covered who are subscribers to proof read the programs by trying to enter them and run them prior to publication. As an incentive, you could give them a free subscription (including a working copy on cassette or disk) when the correct programs were published. In this way, all the other subscribers would be more assured of getting error free programs and everyone would be a lot happier!! Think about it.

Yours truly,
Richard Kushner
High Bridge, NJ

Editor's Reply:

The programs listed in the magazine are listings dumped directly to a lineprinter from a working version of the program running on a computer. While we cannot guarantee that every program is free of bugs (some programs are so complex that is is impossible to verify every subroutine), we can assure you that no typographical errors are getting past proofreaders simply because the programs are not TYPED in!

Dear **SoftSide**,

I am delighted about Scott Adams's new column in **SoftSide**. The debounce patch will be much appreciated.

My main frustration with the adventures is saving and loading games to and from cassette. I don't mind hanging from flagpoles or jumping out of space ships, but wrestling with a cassette player at 2:00 AM is too much to ask of even the most ardent adventurer. I have transferred my adventure programs to disk, so loading the programs is a breeze. Is it possible to patch them so that games in progress could be saved to disk instead of cassette?

I realize that these are large programs and there may not be enough room in 16K to implement such a change, but there are plenty of disk users with 48K. Besides, we've been trained to expect miracles from our adventures. Maybe, if I say YOHO . . .

Sincerely,
David A Kater
La Mesa, CA

SoftSide™

INPUT POLICY

SoftSide Magazine welcomes your comments and thoughts on both the magazine and the field of microcomputing. We try to publish as many of our readers' letters each issue as we can.

For the sake of clarity and legibility, all letters should be typewritten and double-spaced. Send your letters to:

SoftSide Publications,
Input
6 South St.,
Milford, N.H. 03055

We reserve the right to edit any letters prior to publication.

OUTGOING MAIL

It seems in these times that things are changing faster than ever before. Five years ago, very few people had home computers. Can you remember anyone who had a computer in 1975? But now home computers are becoming commonplace due primarily to the lower cost of manufacturing. I'll bet that everyone reading this column knows at least one person who owns a home computer.

SoftSide, along with the entire industry has grown and undergone many changes since its birth in the basement of our publisher's home. Those of you who have been subscribing to the magazine for the last year have seen **SoftSide** change from a digest of ready to run programs for your S-80 to a full sized color magazine supporting the world's three most popular microcomputers with well documented software.

But the changes haven't stopped yet. This month we have added another regular column. "The Hardware Corner" is a new column designed to give readers a place to have their hardware questions answered.

Next month we'll be bringing you "Dominoes" for the S-80, Atari, and Apple computers.

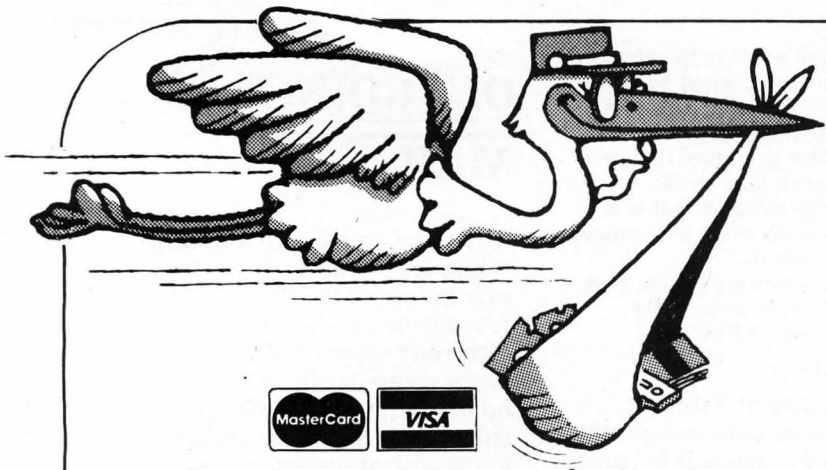
'Til next month . . .

Phillip

OOPS!

Due to an unfortunate eleventh hour shuffling of pages, we erroneously listed the "Christmas Card" program in the December 1980 SoftSide as beginning on page 48. Our own Christmas card began on that page. The program by Fred Pence started on Page 20. Sorry about that.

The Editors



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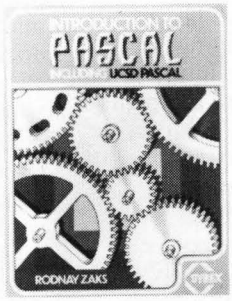

INTRODUCTION TO PASCAL

INTRODUCTION TO PASCAL (INCLUDING UCSD PASCAL), a step-by-step guide to UCSD and STANDARD PASCALS, is written as a tutorial for beginners — even those with no programming experience — yet includes complex concepts for experienced programmers. Both will find the book a useful reference tool because of its logical format and extensive appendices.

..... $12.95 plus $1

THE CP/M HANDBOOK WITH MP/M

Control Program for Microprocessors, or CP/M, is an operating system — a program designed to let the user execute applications programs conveniently on the computer. Most microcomputers used for business use the CP/M operating system.

The CP/M HANDBOOK WITH MP/M has been written for all users of the CP/M operating system. The book contains a comprehensive description of all CP/M facilities and resources; instructions for advanced operations; and complete discussions of all versions of CP/M up to and including 2.2, CDOS and MP/M (Multiprogramming Control Program for Microprocessors, an operating system that allows several terminals to be used simultaneously).

..... $13.95 plus $1

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YOUR FIRST COMPUTER

Originally published in 1978 as "An Introduction to Personal and Business Computing", this widely acclaimed best seller has been completely revised, redesigned and expanded to meet the needs of a growing segment of the population becoming interested in small computers. The computer section has been totally rewritten and represents an up-to-date summary of equipment available in the marketplace. The business section has been expanded to show actual examples using a word processing system or a mailing list system. All other sections have been modified and updated to reflect the phenomenal growth and change in the microprocessing industry in the two years since the book's first publication.

..... $7.95 plus $1

THE PASCAL HANDBOOK

A complete reference guide for every PASCAL instruction, function, operator or reserved word. Each symbol or word is described in its own section which includes syntax, definition and examples of its use. Covers virtually all versions of PASCAL Including Niklaus-Wirth, UCSD, PASCAL/M, CDC-PASCAL, Intel, Zilog, AMI, PASCAL/MT, Apple-PASCAL, North Star, ISO standard PASCAL, DECUS, Hewlett-Packard and more.

This book has been designed for ease of use and follows the format of a dictionary so the reader may quickly look up the meaning of any operator or function or check the valid constructs for statements, files or records.

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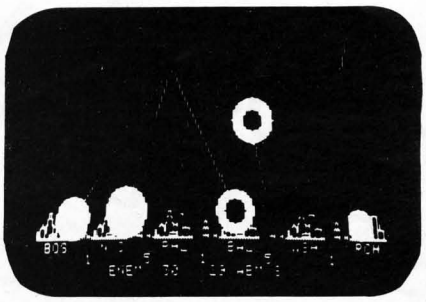

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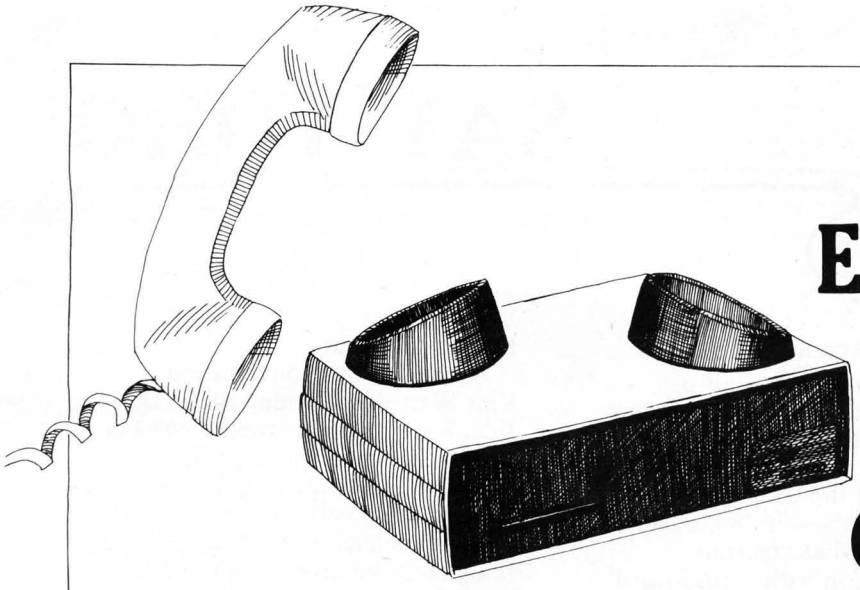

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SAY YOHO

by Scott Adams

There has been a lot of discussion recently on software piracy in the industry. Now I'd like to throw in my two cents' worth. At the Chicago personal computer show in '80, I had a long and somewhat vigorous conversation with a confirmed software pirate.

The discussion started when two gentlemen came up to our booths and were interested in buying a Lynx modem for the S-80 (the Lynx, by the way, is an excellent alternative to the RS232 card and modem as sold by Radio Shack). While describing the Lynx, I mentioned that it came with a cassette-based terminal package, but that if you were using it on a disk based system there were some excellent terminal packages available from Lance Micklus which would work wonders.

At this point, the other "Gentleman" turned to his friend and said something to the effect that he had a copy, it was a great program, and he would give him a copy when they got home.

When I suggested it would probably be better to let his friend purchase his own copy of ST80, he replied that it would be a waste of money, since he already had a copy to give him.

When I pointed out that Lance and myself are both fairly creative authors who are trying to make a living full time at writing good software, he gave an interesting reply...

His basic argument was that in the early days of microcomputing, he had shelled out many thousands of dollars for software, which was basically useless, and that since he had now, in effect, paid his dues, he no longer had to buy software anymore!

I pointed out to him that just because he was cheated by fly-by-night operators, it wasn't really fair to then take his losses out on innocent authors like Lance.

All in all, neither of us really changed each other's viewpoint very much during our little discussion, but one interesting fallout did occur.

All during our conversation, Kim Watt was listening off to the side. Kim is a very little known but extremely clever and capable Machine Language programmer. He wrote the very first version of "Space Invaders" in Machine Language ever to be marketed for the S-80, and recently he wrote a utility called "Super Utility" for the S-80 disk systems.

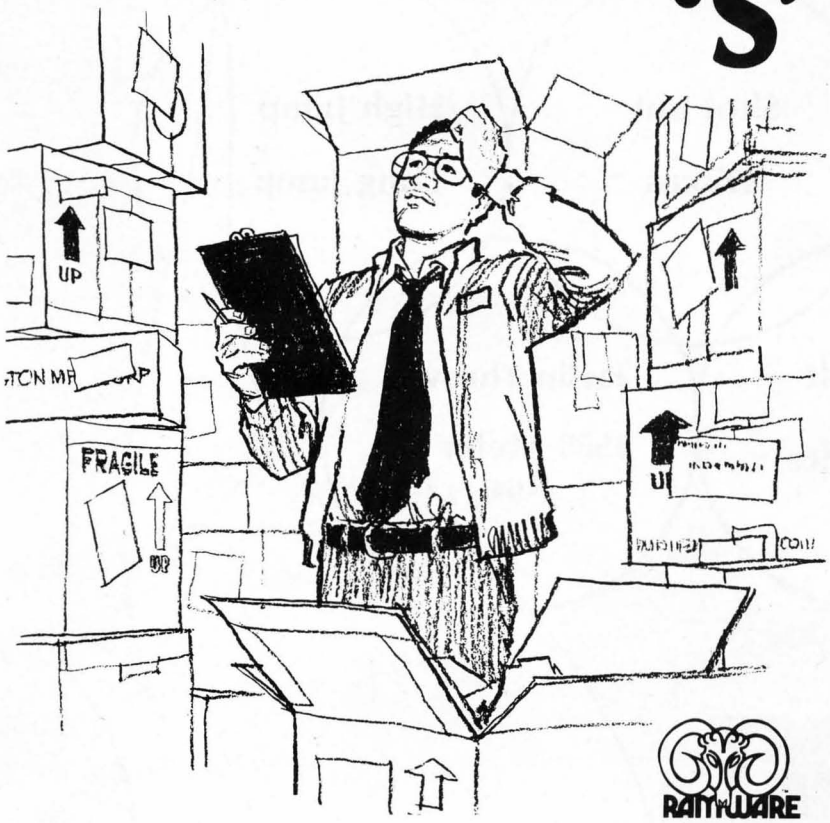
"Super Utility" has been a bone of contention between Kim and myself because of one of the features found in it. Besides allowing you to format a disk without erasing it, repairing bad sectors, memory utilities, and a host of other fine features, it also allows you to make backup copies of protected tapes and disks!

My feeling has always been that giving someone a feature like that is tantamount to selling handguns through the mail: You really don't know what use it will be put to! Well, anyway, back to my story. Kim had listened to our entire conversation, and later, after the pirate had left, he came over to me and said that I had told him about critters like that, but he never really thought people actually did things like this, didn't they realize it was dishonest, if not downright illegal? Poor Kim left feeling quite upset; here he had invented the better mousetrap and it turns out his friends are the mice!

To sum up this whole mess, it seems odd, but for some reason, the average person would not go into a large department store and shoplift, but he would take a pirated copy of a software program. In my opinion, either action is stealing, and should be punished by the full extent of the law. Maybe one day all people will be honest and trustworthy, and war will stop, and life will be idealistic, but until then BEWARE the software pirate!

(P.S.: Adventure International, in a joint suit with Microsoft, recently successfully tried and convicted a software pirate in the English High Court system! There may be hope yet for this industry.)

INVENTORY 'S'



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by Roger W. Robitaille Sr.

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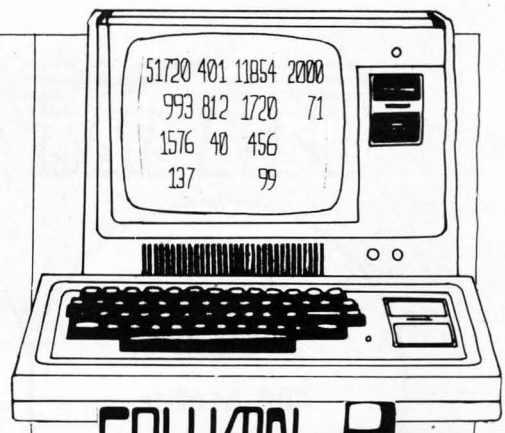

COLUMN CALCULATOR 4.1

by David T. Gray

COLUMN CALCULATOR is a "word processor for numbers," a number processor designed to be used like a calculator. But it can handle large blocks of information as if handling one number at a time. The work space can be thought of as a large matrix with rows and columns much like an accountant's spreadsheet. Data can be easily entered into columns; and the columns can then be moved around. Columns can be overlaid from existing data file on disk. One column can be added, subtracted, multiplied, divided, or raised to a power of another and the results put in another column. Columns can be totalled, or set with a constant, and any column can be sorted, carrying the rest of the columns with it. A predefined function can be defined, thereby preprogramming the worksheet.

The statistical section provides analysis of the data. The analysis includes simple statistics, linear regression, simple correlation, histogram and the T-test.

The information can be printed out on the lineprinter in a compressed format at any stage in the development of a data base. Thus, it can be used as a finished report or as a copy of the worksheet to permit the filling in of additional data for later entry into the data base. The data base can be saved on disk and recalled at a later date for modification or for generating a report. Any column in a file on disk can be referenced and added to the current worksheet.

All user communication with COLUMN CALCULATOR uses FLASH, the line input/editor routine. This enables the user to not only key in instructions, but to edit errors or data as well.

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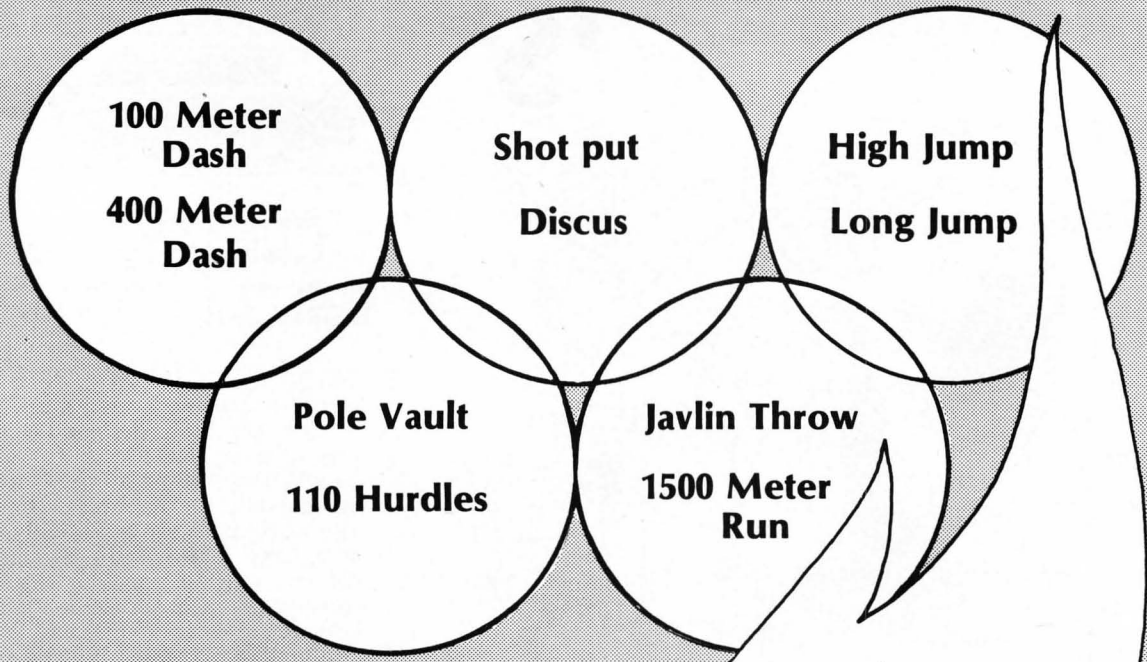

MICROSOFT

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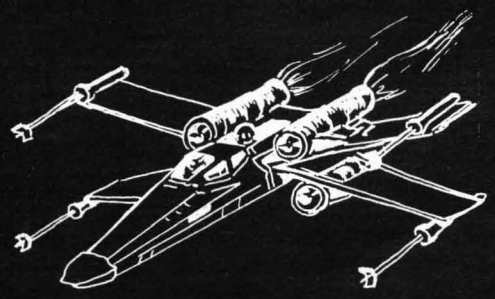
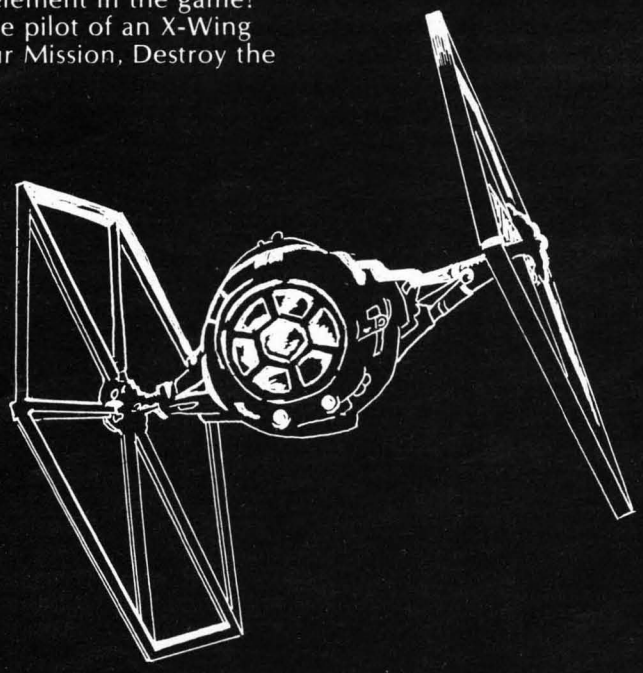
X-WING II

by Chris Freund



For the thousands who have enjoyed X-Wing Fighter, X-Wing II presents a totally new element in the game!

You are the pilot of an X-Wing fighter....Your Mission, Destroy the Death Star!



Where X-Wing I left Death Star looming on the screen, X-Wing II lets you guide your fighter into the trench, find the exhaust port, aim and fire—all the while avoiding enemy fighters. Excellent graphics, 12 levels of play, and extensive INKEY$ commands make this one of our most exciting "real-time" games.

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by George Blank

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S-80, Level II, 16K, Cassette $9.95

DEVELOPING DATA BASE

Part 6 – So you want fancy printing...

by Mark Pelczarski
translations by Rich Bouchard and Phillip Case

For Apple, S-80, or Atari

It's a little distressing writing two months ahead of release time. As I write this, the December issue, with the corrections to the original Atari program, is just now being printed. I hope all of the Atari owners have caught up with us.

As promised, this month we'll add capabilities for print formatting, so the program will let you print whatever you want, wherever you want. Since I departed a little from past practice by taking a different approach to formatting than I have before (the previous installments of "Data Base" had their beginnings in a similar program I'd done on a time-shared system), I'll try to re-create the steps taken from idea to end.

Since information stored in a data base often must be printed onto special forms,the goal was to create a method for taking a record, and instead of printing it: heading, item, heading, item, etc., allowing the placement of everything, on screen or printer, to be specified exactly beforehand. This specification would be called a format, and any number of formats should be able to be saved on disk by the user. As a result, we have to allow the program to create some kind of "format file," and decide what information must be kept in it. Each time the user wants to print data, the program would ask what format should be used, and when told, would set the appropriate format information from disk. (This will be asked in our print initialize routine, starting at line 3000.)

What information is needed in the format file? If the program user is to be allowed a free choice of format, the information should be "what goes where?" To be totally flexible, the user should also be allowed to choose what gets printed and what doesn't. Suppose someone wants address labels printed from a file that has names, addresses, phone numbers, and other information. You don't want the phone number on the address label, nor do you want headings. The first part of "what-goes-where" should then be the "what".
With any given record (as an example we'll say our records contain five headings—this varies, of course), you have a choice of placing five headings and five actual items of information. The user should be able to specify a headings 1-5, or an item 1-5.

Now a point of decision: How to record placements? There are several ways, but one natural way is to define what the first line printed looks like, then the second, and so on. That means the information necessary is: when to tab over to a specified column, when to print something, when to go to the next line, and when is the task complete. The initial thought was to code all this information into the file with numeric codes, or perhaps with short mnemonics like T for Tab, L for next Line, H for Heading, I for Item, and E for End. After each code would be a number telling where to tab, how many lines to skip, or what number heading or item to print.

The numeric coding began to look appealing when considering how the print routines would decode this information. With numerics (1,2,3,4,5) instead of mnemonics (T,L,H,I,E), an ON - GOTO statement could be used rather than several IF statements when directing actions. (It should be noted that no matter what is actually stored, it will be the computer that will code and decode this information. The user will see much more friendly choices.)

Just when numeric arrays seemed a likely method for storing this data, a couple considerations turned that decision around. The more obvious was that a single digit number stored as a number takes five bytes (on the Apple). Stored as a character it takes only one byte. Although other factors also affect the actual total storage, storing numerically in this case would use about twice as much space. The second reason was a late idea that was thrown into the situation. If the formatting is to allow the use of special *forms for* printing, why not let the program create the forms itself? That is, why not let the user put things on the output that are not in the actual data base, such as title and other headings? That would only involve storing those character strings with the rest of the format information.

To make the story shorter at this point, the resulting format uses the following codes:

1-Headings.
2-Item.
3-Tab.
4-Next line.

Each of the above is followed by a two-digit number clarifying the action. Single digit numbers will be preceded by a zero for uniformity.

5-String.

This will be followed by the characters that are to be printed (title, or whatever). The end of those characters will be denoted by an exclamation point (!). This is AUTOMATICALLY inserted by the computer so it can locate the next format instruction. As a result, your strings may not contain a '!' unless you change your program to use another character.

6-End.

Here's an example of a format file, as the computer (not the user) sees it:

```
3105A NEAT REPORT! 4013105
----------!4031053152054022013
202064012024012034056
```

According to the codes above, printing a record would do the following:

3 10-Tab to column 10.

5 A NEAT REPORT !-Print the string "A NEAT REPORT".

4 01-Skip to the next line.

3 10-Tab to column 10.

5----------! - Print the string of hyphens, which would underline A NEAT...

4 03-Skip three lines (triple space -giving two blank lines.

1 05-Print heading number 5.

3 15-Tab to column 15.

2 05-Print item number 5.

4 02-Skip two lines (double space).

2 01-Print item number 1.

3 20-Tab to column 20.

2 06-Print item number 6.

4 01-Skip to next line.

2 02-Print item number 2.

4 01-Skip to the next line.

2 03-Print item number 3.

4 05-Skip five lines.

6-end.

The output would appear as in figure 1.

A NEAT REPORT

Member Number 21540

John Edwards (815)756-1234
6117 Madison St.
DeKalb IL 60115

figure 1

The actual program changes involve revision of the print routines and addition of a routine that allows you to load or create a format. In the sequence that the changes were made, the "print select" routine was first modified to allow a choice between special or default formatting (lines 3005-3008). The default format is the one we've used all along. Yet another switch, this time FS, for format switch, is introduced and has the value 1 if the default is used, 2 if a special format is selected. If a special format is chosen, the program is directed to the new subroutine at line 10000.

F$ is the variable that will hold the character string with the format codes. Except on the Atari, it is dimensioned as an array of six elements (0-5) so it allows more than 255 characters (maximum string length on the other computers) in the format definition. The variable NF will tell how many of these lines are actually used. Lines 10000-10030 check if a format has already been loaded [if so, F$(0) is not empty]. If one has been loaded, the user is asked whether the same one should still be used. If that answer is yes, the subroutine returns. In any other case the user is asked whether an existing format should be loaded or if a new one should be created. Lines 10100-10160 load an existing format.

The set of statements from 10200 to the end allow the user to create a format. Line 10220 gives the choices, and line 10240 adds the character equivalent of the numeric choice to F$. J keeps track of how many characters are already in F$ so the 255 limit is not exceeded. 10250 directs the next action based on the choice. if a heading or item was chosen (1 or 2), the list of headings is printed and the user chooses one. If a tab or line feed was chosen (3 or 4), the user is asked for a number (line 10300). In all of the above cases, lines 10310 and 10320 covert the numeric choice to a two-digit number and add it to F$.

If a string was chosen (5), line 10350 gets the string and puts the "!" at the end. Line 10360 then checks if there is enough room left in F$ for the string. If not, the next array element of F$ is used. 10370 adds the string to F$. In every case, line 10380 now checks if F$ has enough room for one more instruction, and if not, adds one to NF so the next array element is used. (This is one case where Atari owners don't have to mess around, since Atari strings can be of unlimited length.) When the end is chosen, lines 10400 to 10450 save the format under a user-supplied name.

Now that the format is coded, we have to make the program capable of decoding it. The print routines at 3300 and 3600 have been stripped so that they call default or format subroutines depending on FS, the format switch. The default subroutine is at line 3700, and looks like our old print routines.

The format subroutine starts at 3800, and must set up the printing to conform to our specifications. In this subroutine B$ is a print buffer, and it is in B$ that we'll assemble each line of print before actually printing it. J keeps the place in the format string, F$, as we move through it, and T keeps track of which element of the array F$ we're using (Apple and S-80). At 3810, B$ is set empty. 3820 decodes the first instruction, putting it in J1. If a number is involved (J1<5), then the number is decoded into N. In the following lines, A$ will temporarily hold anything that will later be printed

If you can keep all that straight, line 3840 direccts the appropriate action. 3850 and 3860 put either a heading or item value into A$. 3870 does a tab. What happens there is B$ is chopped off at the tab column, in case the last item overlapped onto that location in the print line. That means that if a name is long, for example, and overlaps onto the column you reserved for phone number, the name is cut short and the phone number is still put in the desired position. See figure 1 again: The phone number will always appear where it is now, even if a name has to be cut short. The FOR-NEXT loop in the same program line adds spaces to B$ if they are needed to fill in to column N.

Line 3890 takes action if the instruction was "next line". If prints B$ and advances any extra lines, if necessary. The following statement resets B$ to empty.

Finally, 3910-3940 find any string that is in the format instructions, J2 marking the location of the "!" when it is found. Line 3950 adds A$ onto B$. 3960 checks if there are any more instructions in F$(T) (for the non-Atari folks), and 3970 finishes printing what was left when the "end" instruction is leading.

Note to Apple parallel card users: To get your printer to use more than 40 columns, add the following to line 8200 after PR#1:
PRINT CHR$(9);"80N"
This example will use 80 columns. You may replace 80 with whatever number you want.

The print routine probably adds more flexibility to the data base than any previous installment. The next few issues will be devoted to cleaning up some of what's already been done, using numbers, and expanding beyond RAM so you can store more information in a file.

As before, questions, comments, and ideas should be directed to:

Mark Pelczarski
1206 Kings Circle
West Chicago, IL 60185

continued on next page

continued from previous page

S-80 VERSION

```
102 SC=16414:S1=PEEK(SC):S2=PEEK(SC+1)
103 PR=16422:P1=PEEK(PR):P2=PEEK(PR+1)
105 DIMC$(7),C1(7),C2(7),F$(5)
360 IF A$ = "D"THENSB=4:FS=1:GOSUB8000:GOTO200
3000 IFNI=-1THENGOSUB9000:RETURN
3005 PRINT"(S) SELECT FORMAT, (D) DEFAULT";:GOSUB60000
3006 IFA$="S"THENGOSUB10000:FS=2:GOTO3010
3007 IFA$<>"D"THEN3005
3008 FS=1
3010 PRINT"(S) SCREEN OR (P) PRINTER";:GOSUB60000:PRINT
3020 IFA$="P"THENSB=2:GOTO3050
3030 IFA$<>"S"THEN3010
3040 SB=1:PRINT:PRINT"AFTER EACH RECORD (M) WILL RETURN TO MENU,
ANY OTHER KEY CONTINUES,":PRINT"<PRESS ANY KEY>"
3050 GOSUB60000:GOSUB8010
3090 IF SB=2 THEN POKE SC,S1:POKE SC+1,S2
3100 RETURN
3299 ' PRINT ONE RECORD TO SCREEN, VERSION 4
3300 ON FS GOSUB 3700,3800
3340 GOSUB60000:IFA$="M"THENRS=1
3350 RETURN
3599 ' PRINT ONE RECORD TO PRINTER, VERSION 4
3600 ON FS GOSUB 3700,3800
3640 RETURN
3699 ' PRINT ONE RECORD DEFAULT VERSION 1
3700 PRINT" ":PRINT"RECORD ";I+1:PRINT" "
3710 FORJ=0TONH
3720 PRINTH$(J),I$(I,J)
3730 NEXTJ
3740 RETURN
3799 ' PRINT ONE RECORD FORMAT VERSION 1
3800 J=1:T=0:B$=""
3820 J1=VAL(MID$(F$(T),J,1)):J=J+1
3825 'STOP
3830 IFJ1<5THENN=VAL(MID$(F$(T),J,2)):J=J+2
3840 ON J1 GOTO3850,3860,3870,3890,3910,3970
3850 A$=H$(N):GOTO3950
3860 A$=I$(I,N):GOTO3950
3870 B$=LEFT$(B$,N-1):IFLEN(B$)<N-1THENFORJ2=LEN(B$)TON-2:B$=B$+" ":NEXT
3880 GOTO3960
3890 PRINTB$:IFN>1THENFORJ2=2TON:PRINT" ":NEXT
3900 B$="":GOTO3960
3910 IFJ>LEN(F$(T))THENT=T+1:J=1
3920 J2=J
3930 IFMID$(F$(T),J2,1)<>"!"THENJ2=J2+1:GOTO3930
3940 A$=MID$(F$(T),J,J2-J):J=J2+1
3950 B$=B$+A$
3960 IFJ>LEN(F$(T))THENT=T+1:J=1
3965 GOTO3820
3970 PRINTB$:RETURN
8200 RS=0:IF SB=2 THEN POKE SC,P1:POKE SC+1,P2
9999 ' PRINT FORMATTING VERSION 1
10000 IFF$(0)=""THEN10040
10010 PRINT"SAME FORMAT?";:GOSUB60000
10020 IFA$="Y"THENRETURN
10030 IFA$<>"N"THEN10010
10040 PRINT"(L) LOAD FORMAT, OR (C) CREATE FORMAT";:GOSUB60000
10050 IFA$="C"THEN10200
10060 IFA$<>"L"THEN10040
10100 INPUT"FORMAT NAME:";A$
10110 OPEN"I",2,A$
10130 INPUT#2,NF
10140 FORJ=0TONF:INPUT#2,F$(J):NEXT
10150 CLOSE2
10160 RETURN
10200 NF=0:J=0:F$(0)=""
10210 CLS:PRINT"START IN THE UPPER LEFT CORNER AND WORK ACROSS EACH LINE."
10220 PRINT"1:HEADING, 2:ITEM, 3:TAB, 4:NEXT LINE, 5:STRING, 6:END":INPUTJ1
10230 IFJ1<1ORJ1>6THEN10220
10240 F$(NF)=F$(NF)+RIGHT$(STR$(J1),LEN(STR$(J1))-1):J=J+1
10250 ONJ1GOTO10260,10260,10300,10300,10350,10400
10260 FORT=0TONH:PRINTT+1;") ";H$(T):NEXT
10270 INPUT"WHICH";T:T=T-1:IFT<0ORT>NHTHEN10270
10280 GOTO10310
10300 INPUT"HOW MANY";T:IFT<1ORT>99THENPRINT"OUT OF RANGE.":GOTO10300
10310 A$=RIGHT$(STR$(T),LEN(STR$(T))-1):IFT<10THENA$="0"+A$
10320 F$(NF)=F$(NF)+A$:J=J+2
10330 GOTO10380
10350 INPUT"STRING:";A$:A$=A$+"!"
10360 IFLEN(A$)+J>255THENNF=NF+1:J=0:F$(NF)=""
10370 F$(NF)=F$(NF)+A$:J=J+LEN(A$)
10380 IFJ>252THENNF=NF+1:J=0:F$(NF)=""
10390 GOTO10220
10400 INPUT"FORMAT NAME:";A$
10410 OPEN"O",2,A$
10430 PRINT#2,NF:FORJ=0TONF:PRINT#2,F$(J):NEXT
10440 CLOSE2
10450 RETURN
60000 A$=INKEY$:IF A$=""THEN 60000 ELSE PRINT:RETURN
```

continued to page 82

ABOUT THIS ISSUE

Thar's gold in them there pages! It's Missouri gold, mind you, and the price tends to jump around worse'n a mule with athlete's hoof. That Phil Case feller brought it to our pages . . . the gold, not the athlete's hoof! But you have to dig the stuff out and then deal with the megabusiness of these confusin' modern times. Miner, can you succeed where others didn't?

After you've made your fortune, you can retire to St. Petersburg, or wherever, and play golf . . . Mini-Golf that is. Mitch Voth, along with the unbeatable translation of Rich Bouchard (who gave the Miner program to you Atari owners), grace our pages with a nine-hole miniature golf course. The eighth hole is a killer.

If you tire of a life of ease, consider turning mercenary and driving a tank . . . Tanks-a-Lot permits you to face any other formerly retired mercenary tank jockey in a head to head duel . . . if you can find the other fellow in the maze before he finds you!

As if that isn't enough, while away your time in the trenches with a Hangman game with a new twist: Famous Sayings Hangman. Changing Hearts is another game between the pages this month. No, it isn't about turncoats and the like, it's a puzzle. We munchkins love puzzles . . . but we're still working on that one about "what are we doing here?" Haven't figured it out yet.

And we have a new writer in our stable, named Ed, of course. Ed Umlor, or Granite Knoggin to his friends. He lets you in on the wonders of hardware and software, not to mention a success story to make Horatio Alger roll over in his library.

And guess what? The **SoftSide** Continuing Data Base does just that: continues. Not to mention Scott Adams, Joan Truckenbrod, Mark Pelczarski, and Roger W. Robitaille Sr. all getting long-winded and filling pages with pearls of wisdom. Go ahead, don't take our word for it, read on.

Until next month, a merry munchkin farewell!

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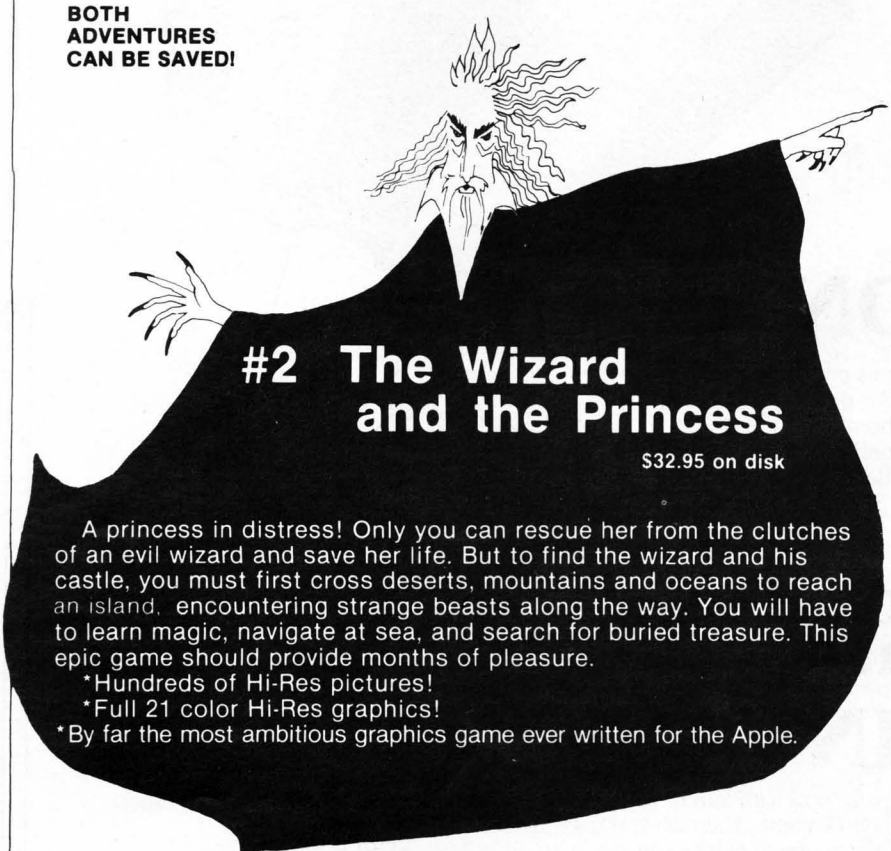

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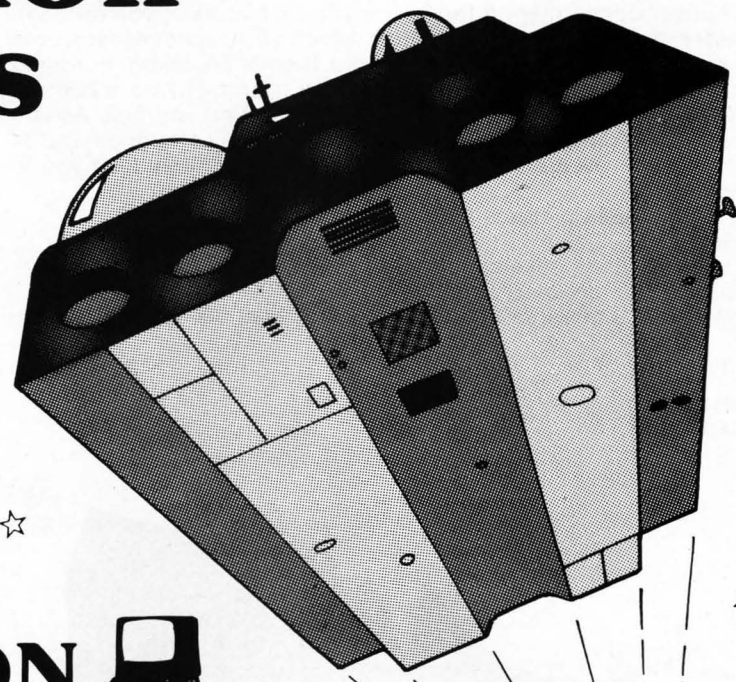

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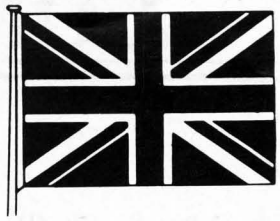

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COMPUTER GRAPHICS

Three Dimensional Rotation Pt. III

by Joan Truckenbrod

Three-dimensional figures or objects can be constructed and rotated in space with the aid of a computer graphics system. Objects in three-dimensional space are described by X, Y and Z coordinates in a Cartesian coordinate system. The procedure for constructing a three-dimensional figure in space is illustrated in the previous issue of **SoftSide**, January, 1981. Once constructed, these figures can be rotated around the X, Y or Z axes. Figures can be rotated in these three directions individually or in various combinations. By using various combinations of X, Y and Z rotations, a figure can be moved about in space in any direction. Visually dynamic figures and objects can be created by rotating a figure simultaneously on all three axes. For example, a figure can be drawn in perspective with 20 degree rotation on the X axis, a 60 degree rotation on the Y axis and 300 degree rotation on the Z axis. Using the rotation technique described here, dynamic figures can be created for video games, computer-aided learning programs, and for animated sequences.

The program illustrated here provides the capability for drawing a three-dimensional figure in perspective at any desired viewing angle. In the program, the figure is defined and its orientation relative to the X, Y, and Z axes, is specified. These figures are drawn on the video screen in line, as wire frame drawings. Various planes in these drawings can be colored in or shaded in by hand or with the use of a digitizing tablet in order to clarify the three-dimensional character of the drawings. The rotation formulas used in this program rotate the figure around the origin (0,0). In order to rotate the figure in its original location on the video screen, it is necessary to move the figure so that it is centered on the origin, apply the rotation formula, and then move it back to its original position. Consequently, the rotation formulas contain translation factors which are the X, Y and Z coordinates of the center point of each figure (XC, YC and ZC). These values are identified and assigned in subroutine 4000 in the program. This rotation procedure was discussed in the November, 1980 issue of **SoftSide**.

Rotation around the Z axis rotates or turns the figure in a counter-clockwise manner around the axis that projects out towards you, as is shown in figure 1. This type of rotation is carried out in subroutine 5000 in the program. An example of a Z rotation is shown in figure 2, in which a cube is sequentially rotated around the Z axis from zero to 90 degrees in ten degree increments. To further aid in visualizing this type of rotation, figure 3 shows a series of cubes, all rotated 20 degrees on the Y axis and sequentially rotated from zero to 90 degrees in intervals of ten degrees on the Z axis. Rotation around the Y axis is similar to turning the pages of a book. The rotation formula for Y rotations is in subroutine 6000 in the program. This formula rotates or turns the figure in a counter-clockwise direction around the Y axis as shown in figure 4. With this rotation, the cube is turning on a pole that projects vertically through the cube from the top to the bottom. This is illustrated in figure 5. The same rotation sequence is repeated in figure 6 with the addition of 20 degree rotation on the X axis to show the cube rotating in a clearer manner.

Rotation around the X axis is carried out in subroutine 7000 in the program. Figure 7 contains a diagram of the direction of the X rotation. In this type of rotation the cube turns around a horizontal pole projected through the center of the cube from the left side to the right side. In figure 8 the cube is shown rotating around the X axis from zero to 90 degrees in ten degree increments. Figure 9 shows the same rotation sequence on the X axis with the addition of a 20 degree rotation on the Y axis. The potential of combined X, Y and Z rotations will be explored in the next issue. Subroutine 8000 translates the X, Y, and Z coordinates defining the rotated image in space, into X and Y coordinates so that it can be drawn on the two-dimensional video screen. The process of translating a three-dimensional figure back into a two-dimensional plane, was discussed in the previous issue of **SoftSide**, January, 1981

ROTATION AROUND THE Z AXIS

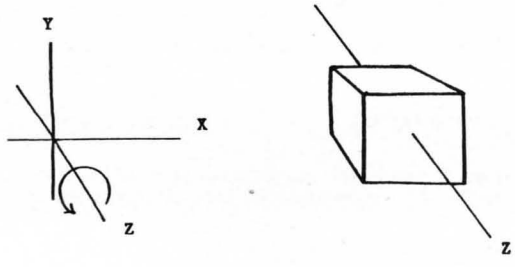

Figure 1

Z ROTATION FORMULA

```
5020  FOR I = 1 TO NP
5030 X1(I) = (X(I) - XC) *  COS (R) - (Y(I) - YC) *  SIN (R) + XC
5040 Y1(I) = (X(I) - XC) *  SIN (R) + (Y(I) - YC) *  COS (R) + YC
5050 Z1(I) = Z(I)
5060  NEXT I
```

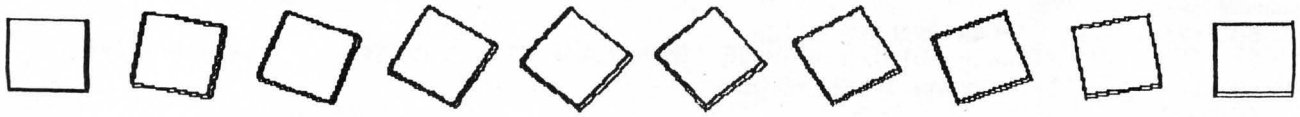

Figure 2 — Cube rotating around the Z axis at 10 degree intervals.

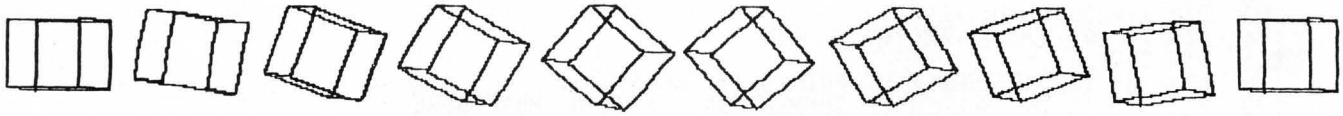

Figure 3 — Cube rotating around the Z axis at 10 degree intervals with a 20 degree rotation around the Y axis.

ROTATION AROUND THE Y AXIS

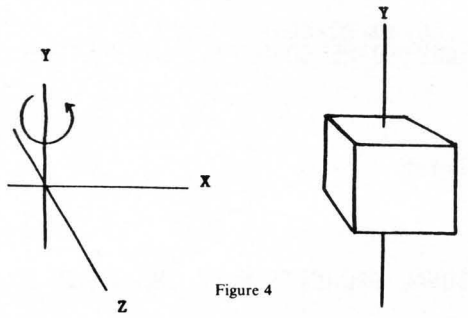

Figure 4

Y ROTATION FORMULA

```
6020  FOR I = 1 TO NP
6030 X2(I) = (Z1(I) - ZC) * SIN (R) + (X1(I) - XC) * COS (R) + XC
6040 Z2(I) = (Z1(I) - ZC) * COS (R) - (X1(I) - XC) * SIN (R) + ZC
6050 Y2(I) = Y1(I)
6060  NEXT I
```

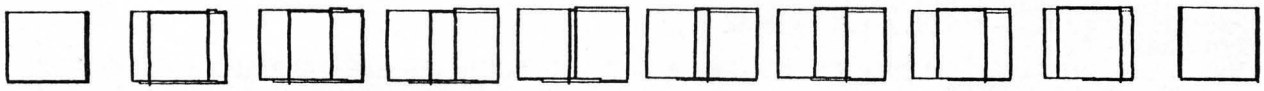

Figure 5 — Cube rotating around the Y axis at 10 degree intervals.

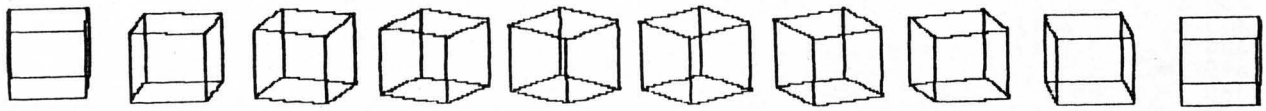

Figure 6 — Cube rotating around the Y axis at 10 degree intervals with a 20 degree rotation around the X axis.

ROTATION AROUND THE X AXIS

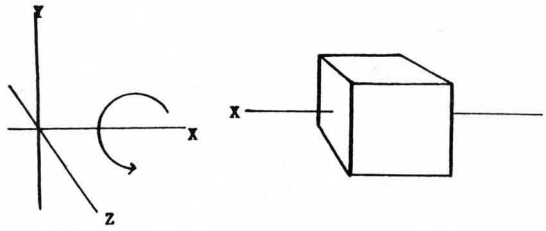

Figure 7

X Rotation Formula

```
7020  FOR I = 1 TO NP
7030 NZ(I) = (Z2(I) - ZC) * COS (R) + (Y2(I) - YC) * SIN (R) + ZC
7040 NY(I) = (Y2(I) - YC) * COS (R) - (Z2(I) - ZC) * SIN (R) + YC
7050 NX(I) = X2(I)
7060  NEXT I
```

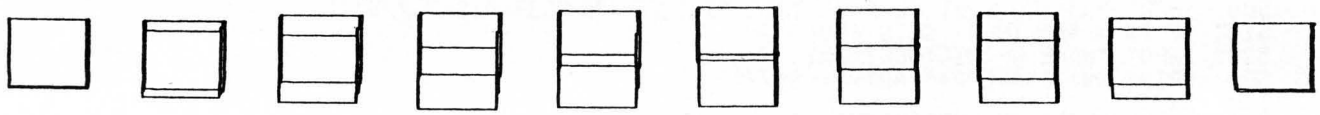

Figure 8 — Cube rotating around the X axis at 10 degree increments.

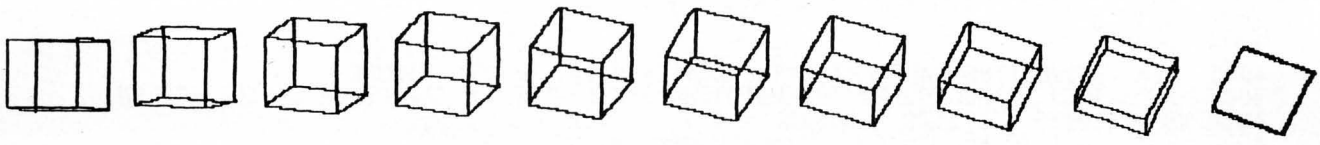

Figure 9 — Cube rotating around the X axis at 10 degree increments with a 20 degree rotation around the Y axis.

continued on next page

continued from previous page

```
50  REM  THREE DIMENSIONAL ROTATION
53  REM  THIS PROGRAM ROTATES A THREE DIMENSIONAL FIGURE ON THE X, Y AND/OR Z AXIS
60  REM  WRITTEN BY JOAN TRUCKENBROD
70 D$ = ""
80  REM  D$ CONTAINS A CTRL D
100  DIM X(10),Y(10),Z(10)
101  DIM XT(10),YT(10),ZT(10)
102  DIM NX(10),NY(10),NZ(10)
103  DIM X1(10),Y1(10),Z1(10)
104  DIM X2(10),Y2(10),Z2(10)
105  DIM C(24)
110  REM  NP IS THE NUMBER OF POINTS IN THE FIGURE
120  REM  NC IS THE NUMBER OF CONNECTION LINES IN THE FIGURE
130 NP = 8
140 NC = 12
145  REM  THE FOLLOWING LOOP READS THE X, Y AND Z VALUES THAT DESCRIBE THE FIGURE.
150  FOR I = 1 TO NP
160  READ X(I),Y(I),Z(I)
170  NEXT I
180  DATA  50,50,0,90,50,0,90,90,0,50,90,0,50,90,40,50,50,40,90,50,40,90,90,40
185  REM  THE FOLLOWING LOOP READS POINT NUMBERS THAT ARE TO BE CONNECTED WITH LINES
      TO CONSTRUCT THE FIGURE IN SPACE.
190  FOR I = 1 TO NC * 2
200  READ C(I)
210  NEXT I
220  DATA  1,2,2,3,3,4,4,1,5,6,6,7,7,8,8,5,1,6,2,7,3,8,4,5
230  REM  STATION POINT LOCATION IS SX,SY,SZ
240 SX =  - 150
241 SY =  - 100
242 SZ =  - 7000
250  REM  THE NEXT TWO LOOPS CALCULATE THE TWO DIMENSIONAL PROJECTION OF THE THREE D
     IMENSIONAL FIGURE.
260  FOR I = 1 TO NP
270 XT(I) = (X(I) * SZ) / (Z(I) + SZ)
280 YT(I) = (Y(I) * SZ) / (Z(I) + SZ)
290  NEXT I
300  REM  THIS LOOP CALCULATES THE NEW X AND Y COORDINATES FOR CONSTRUCTING THE FIGU
     RE ON THE SCREEN.
310  FOR I = 1 TO NP
320 X(I) = ((SZ - Z(I)) * XT(I)) / SZ
330 Y(I) = ((SZ - Z(I)) * YT(I)) / SZ
335 NX(I) = X(I)
336 NY(I) = Y(I)
340  NEXT I
360  HCOLOR= 3
370  GOSUB 3000
380  PRINT "DO YOU WANT TO ROTATE THE FIGURE? Y/N"
385  INPUT A$
390  IF A$ = "N" THEN  GOTO 600
395  GOSUB 4000
396  PRINT
400  INPUT "ANGLE OF ROTATION AROUND Z AXIS";A1
405  PRINT
410  INPUT "ANGLE OF ROTATION AROUND Y AXIS";A2
415  PRINT
420  INPUT "ANGLE OF ROTATION AROUND X AXIS";A3
423  PRINT
424  PRINT "Z ROTATION IS",A1
425  PRINT "Y ROTATION IS",A2
426  PRINT "X ROTATION IS",A3
430  GOSUB 5000
440  GOSUB 6000
450  GOSUB 7000
460  GOSUB 8000
470  GOSUB 3000
500  INPUT "DO YOU WANT TO SAVE THIS PICTURE ON YOUR DISK? Y/N";B$
510  IF B$ = "N" THEN  GOTO 600
520  INPUT "NAME OF PICTURE?";P$
530  PRINT D$;"BSAVE"P$",A8192,L8192"
600  END
3000  REM  PLOTTING SUBROUTINE
3005  HGR
3010  FOR I = 1 TO NC * 2 STEP 2
3020  HPLOT NX(C(I)),NY(C(I)) TO NX(C(I + 1)),NY(C(I + 1))
3030  NEXT I
3050  RETURN
4000  REM  SUBROUTINE CALCULATES THE CENTER POINT OF THE FIGURE
4005  REM  THIS IS NECESSARY FOR ROTATING THE FIGURE IN ONE PLACE ON THE SCREEN.
4010 XS = 280:YS = 192:ZS = 300:XL = 0:YL = 0:ZL = 0
4020  FOR J = 1 TO NP
4030  IF X(J) < XS THEN XS = X(J)
4040  IF X(J) > XL THEN XL = X(J)
```

```
4050  IF Y(J) < YS THEN YS = Y(J)
4060  IF Y(J) > YL THEN YL = Y(J)
4070  IF Z(J) < ZS THEN ZS = Z(J)
4080  IF Z(J) > ZL THEN ZL = Z(J)

4090  NEXT J
4100 XC = (XS + XL) / 2:YC = (YS + YL) / 2:ZC = (ZS + ZL) / 2
4110  RETURN

5000  REM  ROTATION AROUND THE Z AXIS
5003  IF A1 = 0 THEN  GOTO 5070
5005  REM  THE ANGLE OF ROTATION IS TRANSLATED INTO RADIANS FOR THE SIN AND COS FUNC
    TIONS.

5010 R = A1 / 57.2958
5020  FOR I = 1 TO NP

5030 X1(I) = (X(I) - XC) *  COS (R) - (Y(I) - YC) *  SIN (R) + XC
5040 Y1(I) = (X(I) - XC) *  SIN (R) + (Y(I) - YC) *  COS (R) + YC
5050 Z1(I) = Z(I)
5060  NEXT I

5065  GOTO 5100
5070  FOR I = 1 TO NP
5080 X1(I) = X(I):Y1(I) = Y(I):Z1(I) = Z(I)
5090  NEXT I

5100  RETURN
6000  REM  ROTATION AROUND THE Y AXIS
6003  IF A2 = 0 THEN  GOTO 6070

6010 R = A2 / 57.2958
6020  FOR I = 1 TO NP
6030 X2(I) = (Z1(I) - ZC) *  SIN (R) + (X1(I) - XC) *  COS (R) + XC

6040 Z2(I) = (Z1(I) - ZC) *  COS (R) - (X1(I) - XC) *  SIN (R) + ZC
6050 Y2(I) = Y1(I)
6060  NEXT I
6065  GOTO 6100


6070  FOR I = 1 TO NP
6080 X2(I) = X1(I):Y2(I) = Y1(I):Z2(I) = Z1(I)
6090  NEXT I
6100  RETURN

7000  REM  ROTATION AROUND THE X AXIS
7005  IF A3 = 0 THEN  GOTO 7070
7010 R = A3 / 57.2958
7020  FOR I = 1 TO NP

7030 NZ(I) = (Z2(I) - ZC) *  COS (R) + (Y2(I) - YC) *  SIN (R) + ZC
7040 NY(I) = (Y2(I) - YC) *  COS (R) - (Z2(I) - ZC) *  SIN (R) + YC
7050 NX(I) = X2(I)
7060  NEXT I

7065  GOTO 7100
7070  FOR I = 1 TO NP
7080 NX(I) = X2(I):NZ(I) = Z2(I):NY(I) = Y2(I)

7090  NEXT I
7100  RETURN
8000  REM  TRANSLATION OF THREE-D ROTATED FIGURE TO TWO-D PLANE

8010  FOR I = 1 TO NP
8020 XT(I) = (NX(I) * SZ) / (NZ(I) + SZ)
8030 YT(I) = (NY(I) * SZ) / (NZ(I) + SZ)

8040  NEXT I
8050  REM  NEW X AND Y COORDINATES
8060  FOR I = 1 TO NP

8070 NX(I) = ((SZ - NZ(I)) * XT(I)) / SZ
8080 NY(I) = ((SZ - NZ(I)) * YT(I)) / SZ
8090  NEXT I
8100  RETURN
```

ATTENTION AUTHORS

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I DON'T THINK WE'RE IN KANSAS ANYMORE . . .

by Mark Pelczarski

This whole industry can be very intimidating at times. Ten years from now looking at one of our present-day microcomputers will be like someone today looking at one of those newfangled hand-held calculators that appeared eight years ago. You know, the ones that could add, subtract, multiply, divide, and even find squares and square roots. Cost: $150. My roommate in college got one of those. Me, I waited a year for one of the ones with all the fancy trig functions, logs, factorials, and a memory location! Cost: $150. Today you could get one like my former roommate's for opening a bank account, mine might cost $40.

It's intimidating discovering that some of the leaders in the software field are still in their teens. Yes, some of the major software pieces out there are written by 17, 18, and 19 year-olds. At that age I was still using a slide rule. (A what?) Am I over the hill at 26?

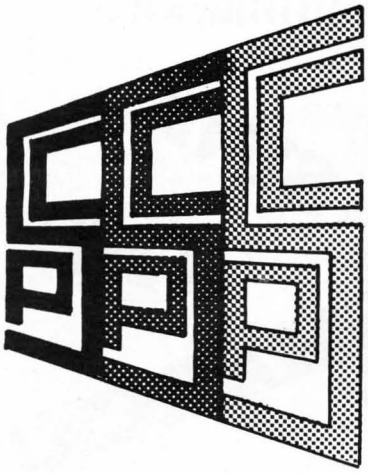
Where does it all go now? The current wave has been refinement of existing ideas rather than dramatic new changes. Better use of existing processors, better and cheaper printers, improved graphics and sound, and more sophisticated software on the same machines are the current trends. Don't let that lull you to sleep.

Teleprocessing is what will bring computer use into the home. Systems like "The Source" and "Micronet" just touch the surface of the future. Tomorrow's phone will be a computer terminal itself. It may not look like a computer, but it will be there, allowing you to access more information than you could ever possibly need. It will probably have one of those calculator-style printers attached, if you like. Oh, yes, there will be a cordless hand-held unit on it too, so you can still call your friends.

And what other advances can we expect in the meantime? Memory. Googols of it. (Mathematicians please pardon the exaggeration.) Our 48K machines will be mere toys. How many hundred K do you want? And today's amateur programming experts will be rarities. It takes a lot of program to fill a couple hundred thousand bytes, but what programs they'll be! The amateurs will still exist, of course, but keeping up with state-of-the-art software will start requiring full-time effort. Floppy disk drives may be occasional conveniences, perhaps used with the above mentioned phones. If you're at all serious you'll have a mini-hard disk. Faster. Holds a lot more, no fuss. Oh, talking too. And listening. Good thing you can pull the plug.

Given a little more time, programming a computer will no longer be synonymous with using BASIC, Pascal, Fortran, COBOL, or whatever. Programming a computer will mean being able to make it display the stock market prices, or making it put that information into something like "Visicalc"; the type of procedures that current-day programs allow us to do. Remember that the languages mentioned above are nothing more than programs themselves. The BASIC programmer is usually oblivious to what's really going on in machine language. There are still purists who believe you're not programming unless you use machine language. In the future people will turn on a machine and have immediate access to word processing, data bases, computational aids, and even games — and justly feel that they are able to program a computer. It will be very conversational, close to using straightforward English. And we'll all be the purists claiming that one doesn't really program computers unless one uses BASIC, Pascal, Fortran,...

P.S. Four days after writing this, I found a calculator similar to mine advertised for $13.88. I must have blinked.



COMPUTER SCIENCE PRESS

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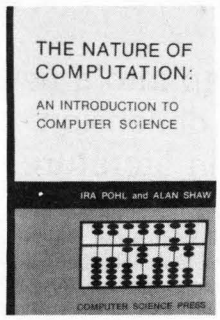
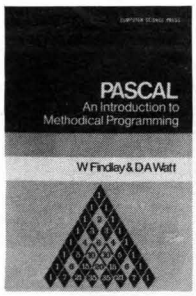
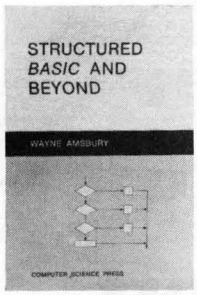
THE NATURE OF COMPUTATION: AN INTRODUCTION TO COMPUTER SCIENCE

Ira Pohl and Alan Shaw



Intended for a first course in computer science, this book deals with the core concepts of the subject parelleled with an introduction to programming. It provides the following three major objectives: a survey of the field, an initial literacy in the language and methods of computer science, and a historical, philosophical, and social perspective. Since computer science is the study of algorithms, the book covers the technical foundations and applications by constructing and studying a number of basic algorithms for each topic. The history, applications, and social implications of various technical developments are discussed, and significant contemporary work is described. Also introduced are some of the controversies surrounding advances in computing, including those related to noncomputability, artificial intelligence, computer modeling, and data banks and privacy. *November 1980. $16.95, (CIP) 0-914894-12-9.*





PASCAL: AN INTRODUCTION TO METHODICAL PROGRAMMING

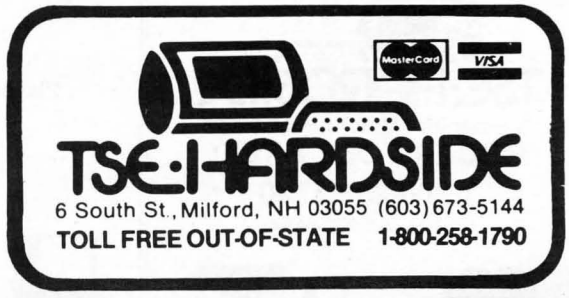
William Findlay and David Watt

This book, intended for use in a first course in programming, is based on the PASCAL language. It assumes no prior knowledge of computing and only elementary mathematics. Emphasizing programming principles, good style, and a methodical approach to program development, it is an excellent introduction to PASCAL, including a thorough treatment of both the fundamental language features and the few features which are not truly fundamental. Thus the book is useful to readers who go on to program in a language other than PASCAL. *1978. $12.95, Paper, (CIP) 0-914894-19-6.*

STRUCTURED BASIC AND BEYOND

Wayne Amsbury

Although over 130 books have been published on the BASIC programming language, this book is an outstanding teaching and self-educational vehicle. The details of the language are presented in an easily understood and well written manner oriented toward interactive terminal use. It emphasizes structured programming concepts and goes beyond to include concepts related to data structures, file, strings and lists, stacks and queues. This book presents one of the most comprehensive and most useful set of examples and exercises in BASIC, ranging from simple to challenging. These features make this book ideal for both teacher and student. *September 1980. $10.95, Paper, (CIP) 0-914894-16-1.*



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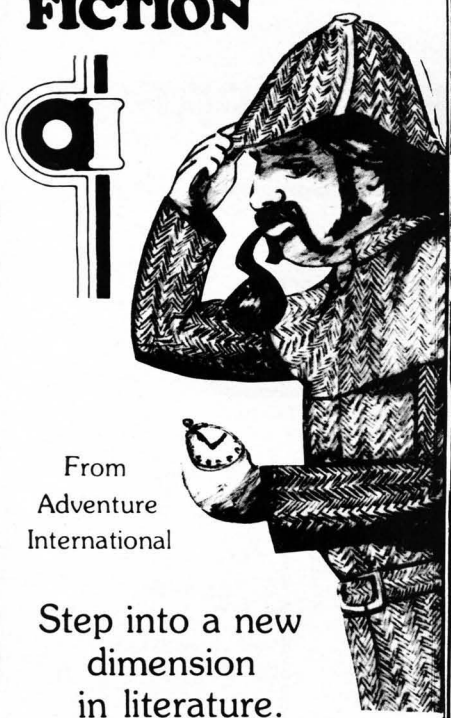

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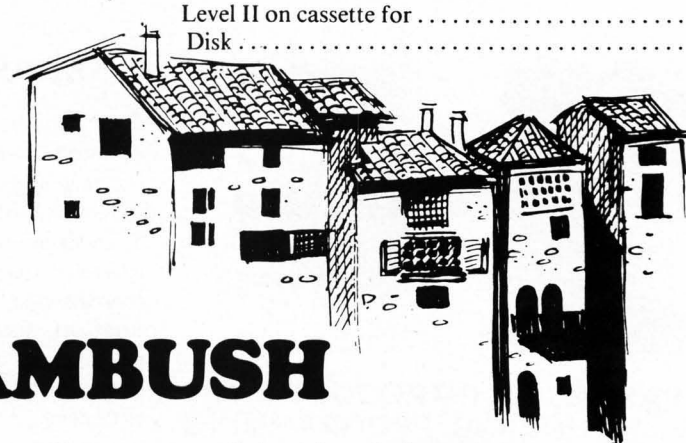

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FROM

PERSONAL SOFTWARE

LONG DISTANCE

Long Distance is an S-80 program which will run in 4K of RAM.

As you may know, I just recently joined the **SoftSide** editorial staff. Being native to Missouri, I frequently make long distance telephone calls back home. This situation is great for Ma Bell, but not the greatest for the ol' bank account.

This short routine was written out of necessity, and when used it really inspires you to shorten your phone calls. Especially after accumulating a toll of several dollars.

When shown to Dave Albert, another editor accustomed to racking up substantial phone bills, he suggested I give it to you for your use.

The following routine is very short, and will give fairly accurate readings on a Level II machine. For disk users, I suggest you delete the timing loop and get your time off the clock. This modification is relatively simple.

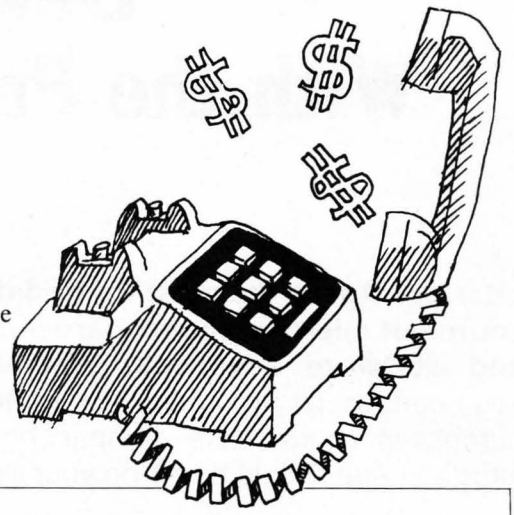
Note the colons (:). They are used for fine tuning the wait loop for the first minute.

This program has no copyright and can be considered in the Public Domain.

Phillip

Variables

Y$: Image statement for time display.
X$: Image statement for per minute toll.
Z$: Image statement for total accumulated toll.
A$: Start Input.
A: Timing loop.
TM: Toll on first minute of call.
CM: Toll for each minute after the first.
ABT: Total toll during call.
H: Hours.
M: Minutes.
S: Seconds.



```
10 Y$="##:##:##":X$="$$$.##":Z$="$$$$.##":CLS:PRINT"LONG DISTANC
E TIMER/COST DISPLAY":PRINT:PRINT:INPUT"ENTER COST FOR FIRST MIN
UTE";TC:INPUT"ENTER COST FOR ALL THEREAFTER";CM:INPUT"<PRESS ENT
ER WHEN READY TO START>";A$:PRINT@128,CHR$(31)
60 FORA=1TO202:NEXTA:S=S+1:IFS>59THENM=M+1:S=0:IFM>59THENH=H+1:M
=0:'  ANYONE MAKING 24 HOUR CALLS SHOULDN'T WORRY ABOUT COST.
70 PRINT@320,"YOUR TIME SO FAR IS --->        ";USINGY$;H;M;S
80 IFM<1ANDH<1THENGOSUB900:GOTO60
90 ABT=TC+(((H*60)*CM)+((M-1)*CM)+(CM*(S/60)))
100 ::::::::::::::::PRINT@448,"YOUR COST SO FAR HAS BEEN ---> ";
USINGZ$;ABT:PRINT@576,"YOUR COST PER MINUTE IS --->    ";USINGX$
;CM:GOTO60
900 FORA=0TO19:NEXTA:PRINT@448,"YOUR COST SO FAR HAS BEEN --->";
USINGZ$;(TC*(S/60)):PRINT@576,"FIRST MINUTE COST IS --->      ";
USINGX$;TC:RETURN
```

"GOOD AFTERNOON, APPLE COMPUTER COMPANY, MS. CLARK, ALIAS 'MOTHERBOARD', SPEAKING."

Programming Hints - S-80

The following is a short BASIC program that performs a bit-by-bit test of the memory from the end of the BASIC program and variables, to the beginning of the stack. In case you have a machine language program in this area (dangerous!) or need it for some thing else, line 30 restores the original bytes with a POKE N,A. If you wish a more thorough test of possible errors of interrelations of the bits within bytes, change B=1 to B=0, and B=B*2 to B=B+1. This, however, is painfully slow. In non-disk systems, the test should start at around 17318. With 4K of memory, the test will end at 20383, or approximately 32671 with 16K.

```
10 ONERRORGOTO30:FORN=PEEK(16637)+PEEK(16638)*256+33TOPEEK(16616
)+256*PEEK(16617)-44:A=PEEK(N):B=1
20 POKEN,B:IFPEEK(N)<>BTHENPRINT"ERROR IN"N"AT"B:ENDELSEB=B*2:GO
TO20
30 POKEN,A:PRINTN,:RESUME40
40 NEXT
```

John S. Owens
Virginia Beach, VA

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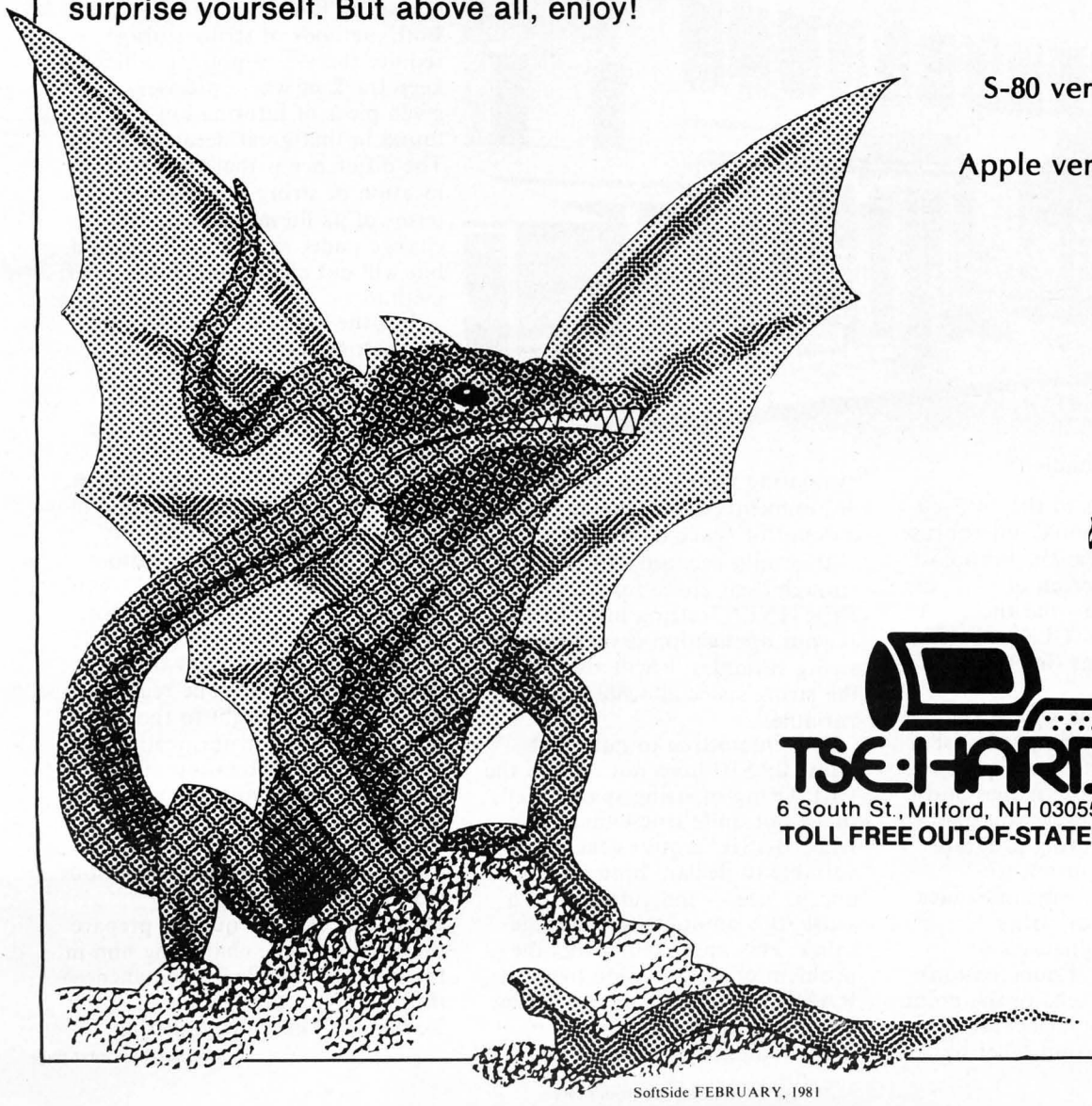
As you become more skilled in overcoming obstacles and avoiding hazards, more regions of the cave will open up to you. Keep your wits about you and you may eventually become a Grand Master. Slip up and you may not become anything, if that. It all depends upon your ability and your ingenuity.

When your adventure begins, you will find yourself outside of the cave. From there on in you must tell the computer what you wish to do by means of one- or two-word commands. Sometimes the computer might offer to help you with a small hint, but remember, there's no free lunch! You will have to do most of the work, including learning to use magic, yourself. Look for allies in unexpected places and you might surprise yourself. But above all, enjoy!



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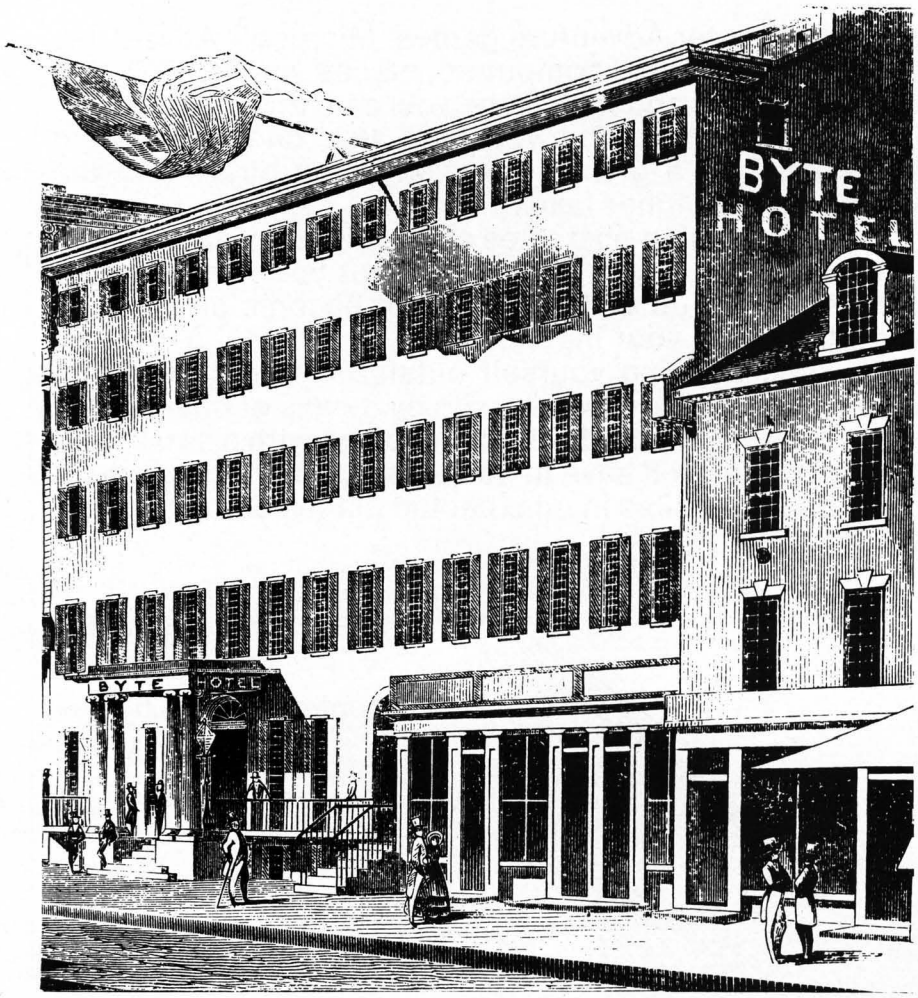


by Roger W. Robitaille

First off, owners of the TRS-80™ Model I and III should not confuse the ‹CLEAR key of the keyboard which cleans the screen of unwanted scribbling and the CLEAR statement. CLS will clean your screen just fine (in Applesoft, CLS = HOME).

Stated simply, the CLEAR statement tells the computer just how many bytes of string space to put aside for all those names and addresses (or whatever) you plan to be working with during program operation. It's important to *appreciate* that this memory space will only be used for string information (combinations of letters, numbers and punctuation). If your program swells to the point that memory space is becoming a problem, you may find relief by evaluating your string space requirements and reducing the amount of space allocated.

It is only necessary to have enough clear space for PERTINENT string information. If your application is reusing your string variables, it will also reuse the string space allocated to that variable.

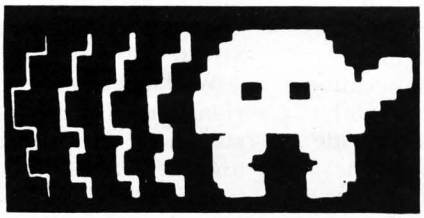
It is interesting to note that Atari BASIC does not require the CLEARing of string space. Well, that's not quite true either. The Atari BASIC requires each string variable to declare both its name and its size — individually. In a sense, this amounts to the same thing. This approach covers the problem of setting aside bytes of RAM to house anticipated string information. In effect, the individual variable definitions amount to a series of CLEAR statements.

The key difference between the two methods is that under the CLEAR method, you have what amounts to a pool of string space which all string variables use according to need, versus the size declaration method of Atari BASIC interpreter which does not permit sharing of space. The implications of that difference become considerable when the problems of simulating string arrays under Atari BASIC are compared to slowing of the Central Processing Unit (CPU) itself due to string gathering procedures characteristic of the CLEAR method.

Back to the TRS-80™ Applesoft (CLEAR) method of allocating RAM for string storage. Both methods of string storage require the use of pointer tables to keep track of where precisely a given piece of information will be found in that great ocean of RAM. The difference is that the actual location of string information, in terms of its literal address, will change under the CLEAR method, but will not change under the Atari method.

For the sake of clarity let's try an analogy. Let's compare the process to the management of a 500 room hotel. The hotel gets founded on Line100 CLEAR500 and instantly Hotel Byte is partitioned out of the great desert RAM, dedicated to the housing of transient string visitors. Shortly afterward, the great Application Program bequeathed to the wonderful, all-knowing Operator, guidance in how to conduct itself today. This request went through channels, of course. The request was carefully brought to the plain of video RAM for purification and benovelent interpretation of the Character Generator. No one really knows what happens from there. The Radio Frequency winds whisk away the message to the mysterious world of MONITOR. The emissaries of CPU quickly prepare the Prince of Q$, chartering him in the hall of Variable Table, whence they scurry to the Temple of Keyboard. There the gathering

continued on next page



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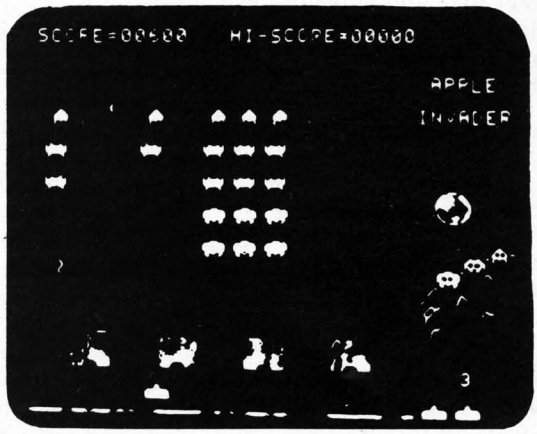

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continued from previous page
awaits a sign. Such haste is *generally wasted as* the Operator has much to ponder. Later — much later — a sign appears on the walls of the Temple of Keyboard: It's a "Y". But is that all — look to the〈ENTER〉wall (also known as〈RETURN〉in other lands), it signals: that's all!!!

Even before the Applications Program is allowed to study the message, the visitor "Y" is brought to Hotel Byte and lodged in room 1. Prince Q$ is informed where the visitor is lodged and how many members in the party (1).

Philosophical note:

In this world of computer electronics, everything is a memory. And as it is with memories, it can exist in many places and ultimately exist nowhere so the term impression (imp) to relay the travel of a value without requiring it to cease to be at its place of origin.

Shortly after checking in, Applications Program searched the Variable Table for Prince Q$ and Q$ passed the information to AP where to find the imp (in Room 1 of the Hotel Byte). The impression was made and compared against another "Y" in the Operator and things went on from there.

Philosophical Note:

For those of you into comparative societies, you should consider Prince Q$ and the resident of Rm. 1 of Byte Hotel as a married pair. One gives title and the other value.

As the Applications Program proceeds through time and process, other royalty become needed and are inducted into the Variable Table and quickly married to residents of Hotel Byte. In fact, Prince Q$ is married several times and loses all track of his original spouse. But this is not a cruel world, and Prince Q$'s original imp, "Y", still resides in Rm. 1, and his second imp "N" in Rm. 67, along with his present imp, "MAIL/DAT" in Room 420 thru 427. But the time has come when there is no room left in Byte Hotel and there is a new guest in the lobby. It's time for the ceremony of THE GATHERING OF STRING.

Once the priests of String Gathering are summoned from the bowels of BASIC, all other processing is suspended. It is rumored that a few SYSTEM processes are continued, that be as it may, Applications Program is suspended — even communications from Operator are ignored! Only RESET or other such worldwide calamities can interfere with the Priests of String Gathering's sacred task.

The whole purpose of the STRING GATHERING ritual is to cast out unpaired imps from the Byte Hotel. The ceremony can last a century or be over in a mere fortnight, it all depends on the total number of active members of the string ($) line of the Royal Family of variables. The process begins with the priests interviewing all the princes of string ($) to determine which has the imp lodged in the lowest room #. This imp is then moved to the highest possible room assignment. Then the process is repeated with the balance of the $ princes until all valid imps have been located and moved to adjoining blocks of suites. The final step in the ritual is alerting the hotel management to what is the next available room number. Naturally, throughout this ceremony, the princes of string have kept advised of any movements of their respective imps.

Historical Comment: - Out of String Space

It is seldom mentioned in polite company,however, occasionally the ceremony is unsuccessful. Even after the hotel is wrung of its stowaways, there is no room in the inn, so to speak. Operator is then informed of the Application Program's failure. The consequences are frequently severe. Termination of the millenium of process. Editing of the Application Program, even loss of DATA!

For the sake of comparative sociology (in a manner of speaking), the Atari culture (BASIC) is much the same. Keyboard, Character Generator, Application Program, Operator, Variable Table, etc., are all present, however, the Byte Hotel is replaced with individual inns chartered to the various princes of string. When the size of the imp exceeds the capacity of the inn, it's a first-come, first-served system with the surplus left out in the cold. Under these circumstances, the Priests of String Gathering are unneeded.

We have now covered the significance of the CLEAR statement, the problem it solves, and the problem it brings (string gathering). We have also covered how the Atari approach to the problem eliminates the need for CLEAR in its vocabulary.

The Atari approach to storing string information is certainly less sophisticated than the CLEAR method. Being a smaller BASIC, (8K of ROM vs 12K & 16K), that can be expected. The primary effect of this simplicity is that the application program will tend to waste RAM space anticipating the largest possible use level of a given string variable. The burden of that judgment is placed on the programmer. If ten bytes of space were allocated to the variable and 12 characters are entered, the last two are ignored. Sometimes that's not a serious problem — sometimes it spells disaster.

CLEAR, on the other hand, will be more efficient in its need of RAM for string storage. Sometimes string gathering becomes a problem. This occurs when 500 or more discrete string variables are in play, (each element of a string array is essentially a separate variable). This problem can be compounded by insufficient CLEAR space for the amount of string manipulation going on in the application. For example, let's say you have 2000 names to sort. The string gathering procedure of that many string elements would take several minutes. Let's say that 90% of the string space is occupied with valid information. Even efficient code using a minimum string movement will trigger string gathering several times before completion of the sort. Poor programming technique, unappreciative of the string gathering situation, could mulitply the problem. Enlarging total string space by 20% would triple the available space for temporary use, reducing the number of string gathering interruptions by two-thirds.

Not covered in this article are how numeric variable needs differ, string (and numeric) arrays, and a more complete picture of how the variable table is constructed. But that is for another day.

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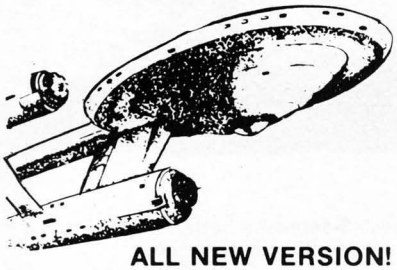

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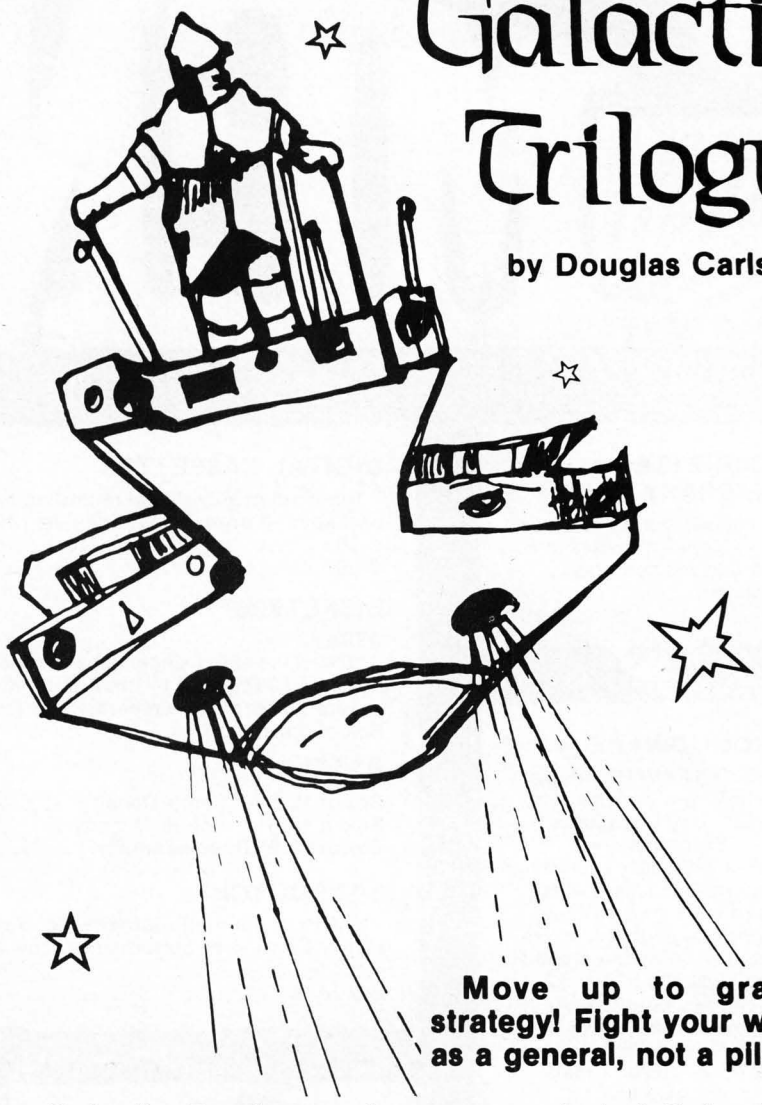

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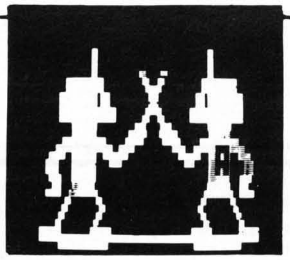
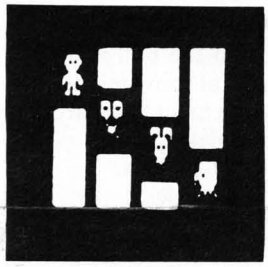
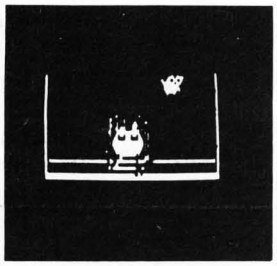
FIVE







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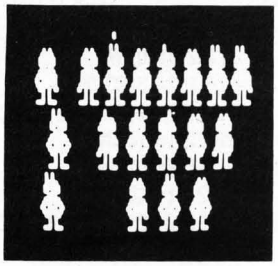

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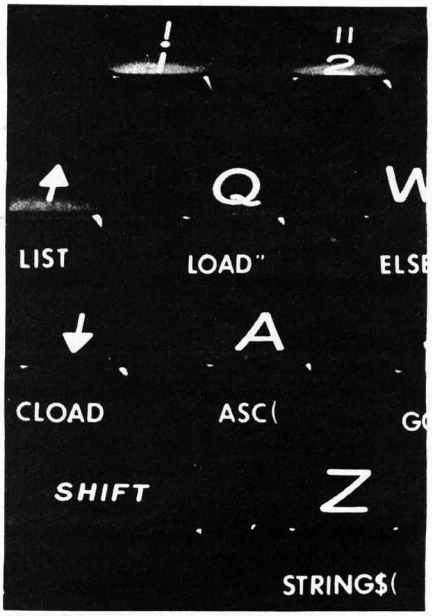

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MINI GOLF

by Mitch Voth

Mini Golf is an S-80 program requiring at least 16K of RAM.

Remember the frustration you underwent at your first game of miniature golf ? Well for those of you who exist on frustration, here's the program you've dreamed about.

"Mini Golf" is an excellent representation of a nine-hole miniature golf course, complete with banked walls and sound. The program will accomodate up to ten players for even more FUNstration!!!

To play "Mini Golf" you control the angle of your putter by pressing the left and right arrows.

Then when you feel the angle is correct, press a number from one to nine indicating how hard you wish to stroke the ball, (one being a light tap and nine being a hard hit).

The game also has very simple sound for you audio nuts!!!

Variable Listing:
A: Misc. logic.
B1, B2, C1, C2, D1, D2: Variables used for moving the ball.
HH: How hard the ball is hit.
HM: Horizontal movement.
M1, M2: Movement indicators (for calculating angles).
NP: Number of players.
P: Par for each hole.
PT: Players turn.
S(1-10): Score for each player.
S: Number of strokes per hole.
VM: Vertical movement.
Z$(1-10): Player name$.

```
1 '  BY MITCH VOTH
2 '  * MINIATURE GOLF *
3 '  TRS-80   16K
4 '  SEPTEMBER 1980

  Lines 10-30: Initialize variables and input number of players
               and player names.

10 CLS:CLEAR200:DEFINTA-H:DEFSTRZ:PRINTCHR$(23):PRINT@18,"TRS-80
  9 HOLE";:PRINT@82,"MINIATURE GOLF"
30 PRINT@400,"NUMBER OF PLAYERS";:INPUTNP:IFNP>10,10ELSEPRINT@40
0,CHR$(30);:FORA=1TONP:PRINT@400,"PLAYER #";A;:INPUTZ(A):PRINT@4
00,CHR$(30);:NEXT:CLS:GOTO300

  Line 40: Score subroutine.

40 CLS:PRINTCHR$(23):PRINT@12,"SCORE:":FORA=1TONP:PRINTZ(A),S(A)
:NEXT:FORA=1TO4000:NEXT:CLS:RETURN

  Lines 50-70: Input routine to get putter movement and
               numeric input for hitting ball.

50 Z=INKEY$:IFZ<>"",IFASC(Z)<58ANDASC(Z)>48,HH=VAL(Z)*10:POKEHP,
46:HM=0:VM=0:IFA=1,RESET(C1,C2):RESET(C1+1,C2):GOTO200ELSESET(C1
,C2):SET(C1+1,C2):GOTO200
60 T=0:IFZ<>"",IFASC(Z)=8,CP=CP+1:IFCP=17,CP=1:IFA=1,RESET(C1,C2
):RESET(C1+1,C2):GOTO100ELSESET(C1,C2):SET(C1+1,C2):GOTO100ELSEI
FA=1,RESET(C1,C2):RESET(C1+1,C2):GOTO100ELSESET(C1,C2):SET(C1+1,
C2):GOTO100
70 IFZ<>"",IFASC(Z)=9,CP=CP-1:IFCP=0,CP=16:IFA=1,RESET(C1,C2):RE
SET(C1+1,C2):GOTO100ELSESET(C1,C2):SET(C1+1,C2):GOTO100ELSEIFA=1
,RESET(C1,C2):RESET(C1+1,C2):GOTO100ELSESET(C1,C2):SET(C1+1,C2):
GOTO100
80 GOTO50
90 POKEHP,46:SET(B1,B2):SET(B1+1,B2):IFPOINT(C1,C2)=-1,A=0:RESET
(C1,C2):RESET(C1+1,C2):GOTO50ELSESET(C1,C2):SET(C1+1,C2):A=1:GOT
O50

  Lines 100-116: Routine to alter ball or putter position
                 values.

100 ONCPGOTO101,102,103,104,105,106,107,108,109,110,111,112,113,
114,115,116
101 C1=B1:C2=B2+2:M1=0:M2=-1:GOTO90
102 C1=B1+2:M1=-1:GOTO90
103 C1=B1+4:C2=B2+2:M1=-2:M2=-1:GOTO90
104 C2=B2+1:M2=-.5:GOTO90
105 C2=B2:M2=0:GOTO90
106 C2=B2-1:M2=.5:GOTO90
107 C1=B1+4:C2=B2-2:M1=-2:M2=1:GOTO90
108 C1=B1+2:M1=-1:GOTO90
109 C1=B1:M1=0:GOTO90
110 C1=B1-2:M1=1:GOTO90
111 C1=B1-4:C2=B2-2:M1=2:M2=1:GOTO90
112 C2=B2-1:M2=.5:GOTO90
113 C2=B2:M2=0:GOTO90
114 C2=B2+1:M2=-.5:GOTO90
115 C1=B1-4:C2=B2+2:M1=2:M2=-1:GOTO90
116 C1=B1-2:M1=1:GOTO90

  Line 150: Hole in one routine.

150 IFS=1,PRINT@153,"A HOLE IN ONE!!";:FORA=1TO100:OUT255,1:OUT2
55,0:NEXT:PRINT@153,CHR$(30);:RETURNELSEPRINT@149,"THAT TOOK YOU
";S;"STROKES";:FORA=1TO2000:NEXT:PRINT@149,CHR$(30);:RETURN
  Lines 200-205: Routine to calculate reflection angles.
200 D1=B1:D2=B2:RESET(B1,B2):RESET(B1+1,B2):IF(ABS(M1)=1ANDHM=1)
ORABS(M1)=2,D1=B1+2*SGN(M1):HM=0ELSEHM=1
205 T=T+1:IFT>4,RC=2:RETURN
  Line 210: Check for hole.
210 IFPOINT(D1,B2)=-1,RC=0:RETURNELSESET(D1,B2):SET(D1+1,B2):B1=
D1:IFPEEK(HP)<>46,IFPEEK(HP)=140,S(PT)=S(PT)+S-P:RC=1:GOSUB150:R
ETURNELSEPOKEHP,46
220 OUT255,1:OUT255,0:RESET(B1,B2):RESET(B1+1,B2):IF(ABS(M2)=.5A
NDVM=1)ORABS(M2)=1,D2=B2+SGN(M2):VM=0ELSEVM=1
230 IFPOINT(B1,D2)=-1,RC=0:RETURNELSESET(B1,D2):SET(B1+1,D2):B2=
D2:IFPEEK(HP)<>46,IFPEEK(HP)=140,S(PT)=S(PT)+S-P:RC=1:GOSUB150:R
ETURNELSEPOKEHP,46
240 T=0:HH=HH-1:IFHH<0,RC=2:RETURNELSE200

  Line 300: Display score.

300 FORA=50TO79:SET(A,44):SET(A,9):NEXT:FORA=9TO44:SET(50,A):SET
(51,A):SET(78,A):SET(79,A):NEXT:HP=15648:PRINT@25,"HOLE # 1   PA
R 2";:P=2:FORPT=1TONP:S=1:PRINT@91,CHR$(30);:PRINT@91,Z(PT);"'S
TURN";:B1=RND(11)*2+52:B2=41:SET(B1,B2):SET(B1+1,B2):POKEHP,46:
CP=1
305 GOSUB100

310 IFRC=2,S=S+1:CP=1:GOSUB100:GOTO310
320 IFRC=1,NEXTPT:GOTO400
325 HH=HH-10:IFHH<2,HH=2

330 IFD1=50ORD1=78,M1=-M1:GOSUB200:GOTO310ELSEM2=-M2:GOSUB200:GO
TO310
  Lines 400-1120: Routines for displaying individual holes
                  on screen.
```

```
400 GOSUB40:FORA=50TO79:SET(A,44):SET(A+22,9):NEXT:FORA=20TO43:S
ET(50,A):SET(51,A):SET(78,A):SET(79,A):NEXT:SET(78,19):SET(79,19
):FORA=78TO101:SET(A,18):NEXT:FORA=10TO17:SET(100,A):SET(101,A):
NEXT:FORA=52TO71:SET(A,45.5-A/2):NEXT:HP=15663

405 PRINT@25,"HOLE # 2   PAR 2";:P=2:FORPT=1TONP:S=1:PRINT@91,CH
R$(30);:PRINT@91,Z(PT);"'S TURN";:B1=RND(11)*2+52:B2=41:POKEHP,4
6:CP=1:SET(B1,B2):SET(B1+1,B2):GOSUB100

420 IFRC=2,S=S+1:CP=1:GOSUB100:GOTO420
430 IFRC=1,NEXTPT:GOTO500
435 HH=HH-10:IFHH<2ANDHH>-6,HH=2

440 IFD2=90ORD2=44OR(D2=18ANDD1>79),M2=-M2:GOSUB200:GOTO420ELSEIF
D1=50ORD1=78ORD1=100,M1=-M1:GOSUB200:GOTO420ELSEA=M1:M1=-M2*2:M2
=-A/2:GOSUB200:GOTO420
500 GOSUB40:FORA=20TO43:SET(22,A):SET(23,A):SET(50,A):SET(51,A):
SET(78,A):SET(79,A):NEXT:FORA=22TO79:SET(A,44):NEXT:FORA=44TO57:
SET(A,9):NEXT:PRINT@409,CHR$(191);:FORA=10TO19:SET(63-A*2,A):SET
(62-A*2,A):SET(38+A*2,A):SET(39+A*2,A):NEXT:HP=16210
510 PRINT@25,"HOLE # 3   PAR 2";:P=2:FORPT=1TONP:S=1:PRINT@91,CH
R$(30);:PRINT@91,Z(PT);"'S TURN";:B1=RND(11)*2+52:B2=41:SET(B1,B
2):SET(B1+1,B2):POKEHP,46:CP=1:GOSUB100
520 IFRC=2,S=S+1:CP=1:GOSUB100:GOTO520
530 IFRC=1,NEXTPT:GOTO600
540 HH=HH-10:IFHH<2ANDHH>-6,HH=2
550 IFD2=90ORD2=44,M2=-M2:GOSUB200:GOTO520ELSEIFD1=22ORD1=50ORD1=
78,M1=-M1:GOSUB200:GOTO520ELSEIFD1<50,A=M1:M1=-M2*2:M2=-A/2:GOSU
B200:GOTO520ELSEA=M1:M1=M2*2:M2=A/2:GOSUB200:GOTO520
600 GOSUB40:FORA=17TO44:SET(50,A):SET(51,A):SET(78,A):SET(79,A):
NEXT:FORA=17TO29:SET(98,A):SET(99,A):SET(116,A):SET(117,A):NEXT:
FORA=66TO101:SET(A,9):NEXT:FORA=52TO77:SET(A,44):NEXT:FORA=94TO1
01:SET(A,37):NEXT:FORA=80TO97:SET(A,17):NEXT

610 FORA=10TO16:SET(85-2*A,A):SET(84-2*A,A):SET(83+A*2,A):SET(82
+A*2,A):SET(60+A*2,A+20):SET(61+A*2,A+20):SET(134-A*2,A+20):SET(
135-2*A,A+20):NEXT:HP=15852:PRINT@25,"HOLE # 4   PAR 3";:P=3:FOR
PT=1TONP:S=1:PRINT@91,CHR$(30);:PRINT@91,Z(PT);"'S TURN";

615 CP=1:B1=RND(11)*2+52:B2=41:SET(B1,B2):SET(B1+1,B2):GOSUB100
620 IFRC=2,S=S+1:CP=1:GOSUB100:GOTO620
630 IFRC=1,NEXTPT:GOTO700
640 HH=HH-10:IFHH<2ANDHH>-6,HH=Z

650 IFD2=90ORD2=44OR(D2=37ANDD1>90)OR(D2=17ANDD1>70ANDD1<100),M2=
-M2:GOSUB200:GOTO620ELSEIFD1=50ORD1=78ORD1=98ORD1=116,M1=-M1:GOS
UB200:GOTO620ELSEIF(D1>80ANDD2<20)OR(D2>25ANDD1<96),A=M1:M1=M2*2
:M2=A/2:GOSUB200:GOTO620ELSEA=M1:M1=-M2*2:M2=-A/2
660 GOSUB200:GOTO620

700 GOSUB40:FORA=19TO44:SET(78,A):SET(79,A):NEXT:FORA=50TO77:SET
(A,44):NEXT:FORA=32TO43:SET(50,A):SET(51,A):NEXT:FORA=42TO49:SET
(A,32):NEXT:FORA=19TO22:SET(22,A):SET(23,A):NEXT:FORA=42TO59:SET
(A,9):NEXT:FORA=9TO18:SET(42+A*2,A):SET(43+A*2,A)

710 SET(59-A*2,A):SET(58-A*2,A):SET(A*2+4,A+14):SET(A*2+5,A+14):
SET(40+A*2,A+14):SET(41+A*2,A+14):NEXT:HP=15827:PRINT@25,"HOLE #
 5   PAR 2";:P=2:FORPT=1TONP:S=1:PRINT@91,CHR$(30);:PRINT@91,Z(P
T);"'S TURN";:B1=RND(11)*2+52:B2=41:SET(B1,B2):SET(B1+1,B2)
715 CP=1:GOSUB100

720 IFRC=2,S=S+1:CP=1:GOSUB100:GOTO720
730 IFRC=1,NEXTPT:GOTO800
740 HH=HH-10:IFHH<2ANDHH>-6,HH=2

750 IFD2=90ORD2=44OR(D2=34ANDD1<50),M2=-M2:GOSUB200:GOTO720ELSEIF
D1=22ORD1=50ORD1=78,M1=-M1:GOSUB200:GOTO720ELSEIFD1<50ANDD2<20,A
=M1:M1=-M2*2:M2=-A/2:GOSUB200:GOTO720ELSEA=M1:M1=M2*2:M2=A/2:GOS
UB200:GOTO720

800 GOSUB40:FORA=9TO44:SET(50,A):SET(51,A):NEXT:FORA=32TO44:SET(
78,A):SET(79,A):NEXT:FORA=52TO77:SET(A,44):NEXT:FORA=52TO111:SET
(A,9):NEXT:FORA=9TO23:SET(112,A):SET(113,A):NEXT:FORA=80TO95:SET

(A,32):NEXT:FORA=18TO23:SET(70,A):SET(71,A):SET(90,A-6)
810 SET(91,A-6):NEXT:FORA=24TO32:SET(116-A*2,A):SET(117-A*2,A):S
ET(158-A*2,A):SET(159-A*2,A):NEXT:HP=15838:PRINT@25,"HOLE # 6  P
AR 3";:P=3:FORPT=1TONP:S=1:PRINT@91,CHR$(30);:PRINT@91,Z(PT);"'S
 TURN";:CP=1:B1=RND(11)*2+52:B2=41:SET(B1,B2):SET(B1+1,B2)

815 GOSUB100

820 IFRC=2,S=S+1:CP=1:GOSUB100:GOTO820
830 IFRC=1,NEXTPT:GOTO900
840 HH=HH-10:IFHH<2ANDHH>-6,HH=2
850 IFD2=90ORD2=44OR(D2=32ANDD1>79),M2=-M2:GOSUB200:GOTO820ELSEIF
D1=50ORD1=78ORD1=112ORD1=90OR(D1=70ANDD2<23),M1=-M1:GOSUB200:GOT
O820ELSEA=M1:M1=-M2*2:M2=-A/2:GOSUB200:GOTO820

900 GOSUB40:FORA=30TO79:SET(A,44):NEXT:FORA=23TO43:SET(78,A):SET
(79,A):NEXT:FORA=30TO51:SET(A,30):SET(A,9):NEXT:FORA=20TO33:SET(
8,A):SET(9,A):SET(50,A+11):SET(51,A+11):NEXT:FORA=10TO29:SET(A,2
9+A/2):SET(A,24.5-A/2):NEXT:FORA=50TO79
910 SET(A,A/2-16):NEXT:FORA=50TO67:SET(A,A/2-9):NEXT:FORA=50TO59

:SET(A,A/2-1):NEXT:HP=16150:PRINT@25,"HOLE # 7  PAR 3";:P=3:FORP
T=1TONP:S=1:PRINT@91,CHR$(30);:PRINT@91,Z(PT);"'S TURN";:B1=RND(
11)*2+52:B2=41:SET(B1,B2):SET(B1+1,B2):CP=1:GOSUB100
920 IFRC=2,S=S+1:CP=1:GOSUB100:GOTO920
930 IFRC=1,NEXTPT:GOTO1000

940 HH=HH-10:IFHH<2ANDHH>-6,HH=2
950 IFD1=78ORD1=80R(D1=50ANDD2>30),M1=-M1:GOSUB200:GOTO920ELSEIF
D2=30ORD2=90RD2=44,M2=-M2:GOSUB200:GOTO920ELSEIFD1<40ANDD2<24,A=
M1:M1=-M2*2:M2=-A/2:GOSUB200:GOTO920ELSEA=M1:M1=M2*2:M2=A/2:GOSU
B200:GOTO920

1000 GOSUB40:FORA=50TO79:SET(A,44):SET(A,9):NEXT:FORA=33TO43:SET
(50,A):SET(51,A):SET(78,A):SET(79,A):NEXT:FORA=18TO24:SET(32,A):
SET(33,A):SET(96,A):SET(97,A):SET(56,A+1):SET(57,A+1):SET(72,A+1
):SET(73,A+1):NEXT:FORA=34TO49:SET(A,A/2+8)

1010 SET(A,34.5-A/2):SET(A+46,49.5-A/2):SET(A+46,A/2-7):NEXT:FOR
A=56TO64:SET(A,A/2-2):SET(A+9,58-A/2):NEXT:FORA=52TO57:SET(A,A/2
-10):SET(A+20,44.5-A/2):NEXT:HP=15904:PRINT@25,"HOLE # 8  PAR 3"
;:P=3:FORPT=1TONP:S=1:PRINT@91,CHR$(30);:B1=RND(11)*2+52
1015 PRINT@91,Z(PT);"'S TURN";:B2=41:SET(B1,B2):SET(B1+1,B2):CP=
1:GOSUB100
1020 IFRC=2,S=S+1:CP=1:GOSUB100:GOTO1020

1030 IFRC=1,NEXTPT:GOTO1100
1040 HH=HH-10:IFHH<2ANDHH>-6,HH=2
1050 IFD2=44ORD2=9,M2=-M2:GOSUB200:GOTO1020ELSEIFD1=32ORD1=96ORD
1=72ORD1=56ORD1=50ORD1=78,M1=-M1:GOSUB200:GOTO1020ELSEIF(D1<78AN
DD1>63)OR(D1>70ANDD2>20)OR(D1<60ANDD2<20),A=M1:M1=-M2*2:M2=-A/2:
GOSUB200:GOTO1020ELSEA=M1:M1=M2*2:M2=A/2:GOSUB200
1060 GOTO1020

1100 GOSUB40:FORA=34TO95:SET(A,9):NEXT:FORA=50TO79:SET(A,44):NEX
T:FORA=33TO43:SET(50,A):SET(51,A):SET(78,A):SET(79,A):NEXT:FORA=
10TO33:SET(34,A):SET(35,A):SET(94,A):SET(95,A):NEXT:FORA=36TO49:
SET(A,33):SET(A+44,33):NEXT:FORA=48TO63
1110 SET(A,A/2-1):SET(A+18,54.5-A/2):NEXT:FORA=56TO61:SET(A,49.5
-A/2):SET(A+12,A/2-9):NEXT:HP=15904:PRINT@25,"HOLE # 9  PAR 4";:
P=4:FORPT=1TONP:PRINT@91,CHR$(30);:PRINT@91,Z(PT);"'S TURN";:S=1
:B1=RND(11)*2+52:B2=41:SET(B1,B2):SET(B1+1,B2):CP=1:GOSUB100

1120 IFRC=2,S=S+1:CP=1:GOSUB100:GOTO1120
1130 IFRC=1,NEXTPT:GOTO2000
1140 HH=HH-10:IFHH<2ANDHH>-6,HH=2

1150 IFD2=90ORD2=33ORD2=44,M2=-M2:GOSUB200:GOTO1120ELSEIFD1=34ORD
1=94OR(D1=78ANDD2>30)OR(D1=50ANDD2>30),M1=-M1:GOSUB200:GOTO1120E
LSEIF(D1>64ANDD2>22)OR(D1<64ANDD2<22),A=M1:M1=-M2*2:M2=-A/2:GOSU
B200:GOTO1120ELSEA=M1:M1=M2*2:M2=A/2:GOSUB200
1160 GOTO1120

  Line 2000: End game routine.
2000 CLS:PRINTCHR$(23);:PRINT@20,"FINAL SCORE:":FORA=1TONP:PRINT
Z(A),S(A):NEXT:PRINT@900,"PLAY AGAIN (Y/N)";:INPUTZ:IFZ="Y",10
```

continued on next page

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In the Atari version of "Minigolf", the following strings should be typed using the Atari logo key to produce reverse video:
Line 10: "ATARI 9 HOLE", and "MINIATURE GOLF"
Line 40: "SCORE:"
Line 2000: "FINAL SCORE:"
Line 2040: "GOOD BYE."

The message such as "HOLE #1" and "PAR 2" should be typed using reverse video for all nine holes.

A special Atari note: The keys used to aim the ball in this game are the "+" and the "*" keys which have the small arrows on their upper left hand corners.

```
1 REM * MINIATURE GOLF
2 REM * ORIGINAL PROGRAM BY
3 REM * BY MITCH VOTH
4 REM * ATARI TRANSLATION BY
5 REM * RICH BOUCHARD
6 REM
8 OPEN #1,4,0,"K:"
9 DIM Z$(100),A$(30),S(10)
10 GRAPHICS 0:PRINT "           ATARI
  9-HOLE":PRINT "          MINIATURE
GOLF"
20 FOR A=1 TO 100:Z$(A)=" ":NEXT A
25 FOR A=1 TO 10:S(A)=0:NEXT A
30 PRINT :PRINT :PRINT "NUMBER OF PLAY
ERS";:INPUT NP:IF NP>10 THEN 10
32 FOR A=1 TO NP:S(NP)=0:PRINT "PLAYER
 #";A;:INPUT A$:IF LEN(A$)>10 THEN A$=
A$(1,10)
33 IF LEN(A$)=0 THEN A$=" "
34 Z$(A*10-LEN(A$)+1,A*10)=A$:NEXT A:G
RAPHICS 5:POKE 752,1
38 SETCOLOR 0,0,0:SETCOLOR 4,3,10:GOTO
 300
40 GRAPHICS 0:POKE 752,1:PRINT "
  SCORE:":PRINT :FOR A=1 TO NP:PRINT Z
$(A*10-9,A*10),S(A):NEXT A
42 PRINT :PRINT "HIT ANY KEY":GET #1,A
:GRAPHICS 5:POKE 752,1:SETCOLOR 0,0,0:
SETCOLOR 4,3,10:RETURN
50 GET #1,Z:IF Z<58 AND Z>48 THEN HH=(
Z-48)*11:HM=0:VM=0:COLOR A:PLOT C1,C2:
GOTO 200
60 T=0:IF Z<>43 THEN 70
62 CP=CP+1:IF CP=17 THEN CP=1
64 COLOR A:PLOT C1,C2:GOTO 100
70 IF Z<>42 THEN 50
72 CP=CP-1:IF CP=0 THEN CP=16
74 COLOR A:PLOT C1,C2:GOTO 100
90 COLOR 1:PLOT HP1,HP2:PLOT HP1+1,HP2
92 COLOR 3:PLOT B1,B2:LOCATE C1,C2,A:I
F A<>2 THEN COLOR 2:PLOT C1,C2:GOTO 50
94 COLOR 3:PLOT C1,C2:GOTO 50
100 GOTO CP+100
101 C1=B1:C2=B2+2:M1=0:M2=-1:GOTO 90
102 C1=B1+1:M1=-1:GOTO 90
103 C1=B1+2:C2=B2+2:M1=-2:GOTO 90
104 C2=B2+1:M2=-0.5:GOTO 90
105 C2=B2:M2=0:GOTO 90
106 C2=B2-1:M2=0.5:GOTO 90
107 C1=B1+2:C2=B2-2:M1=-2:M2=1:GOTO 90
108 C1=B1+1:M1=-1:GOTO 90
109 C1=B1:M1=0:GOTO 90
110 C1=B1-1:M1=1:GOTO 90
111 C1=B1-2:C2=B2-2:M1=2:M2=1:GOTO 90
112 C2=B2-1:M2=0.5:GOTO 90
113 C2=B2:M2=0:GOTO 90
114 C2=B2+1:M2=-0.5:GOTO 90
115 C1=B1-2:C2=B2+2:M1=2:M2=-1:GOTO 90
116 C1=B1-1:M1=1:GOTO 90
150 COLOR 3:PLOT HP1,HP2:PLOT HP1+1,HP
2:IF S>1 THEN 156
152 PRINT "A HOLE IN ONE!!!!!!":FOR A=
1 TO 5:FOR B=1 TO 59:SETCOLOR 4,B/4+1,
14:SOUND 0,B,0,10:NEXT B:NEXT A
154 SETCOLOR 4,3,10:SOUND 0,0,0,0:GOTO
 158
156 PRINT "THAT TOOK YOU ";S;" STROKES
":FOR A=1 TO 50:SOUND 0,A,10,10:NEXT A
:FOR A=49 TO 2 STEP -1
157 SOUND 0,A,10,10:NEXT A:SOUND 0,0,0
,0
158 FOR A=1 TO 700:NEXT A:PRINT CHR$(2
8);"
":PRINT CHR$(28);CHR$(28);:RETURN
200 D1=B1:D2=B2:COLOR 2:PLOT B1,B2:IF
(ABS(M1)=1 AND HM=1) OR ABS(M1)=2 THEN
 204
202 HM=1:GOTO 210
204 D1=B1+SGN(M1):HM=0
205 T=T+1:IF T>4 THEN RC=2:RETURN
210 SOUND 0,200,10,10:SOUND 0,0,0,0:LO
CATE D1,B2,A:IF A=0 THEN RC=0:RETURN
211 IF (D1<>HP1 AND D1<>HP1+1) OR D2<>
HP2 THEN IF A=1 THEN RC=0:RETURN
212 COLOR 3:PLOT D1,B2:B1=D1:LOCATE HP
1,HP2,A:IF A<>1 THEN S(PT)=S(PT)+S-P:R
C=1:GOSUB 150:RETURN
214 LOCATE HP1+1,HP2,A:IF A<>1 THEN S(
PT)=S(PT)+S-P:RC=1:GOSUB 150:RETURN
220 COLOR 2:PLOT B1,B2:IF (ABS(M2)=0.5
 AND VM=1) OR ABS(M2)=1 THEN D2=B2+SGN
(M2):VM=0:GOTO 230
222 VM=1
230 LOCATE B1,D2,A:IF A=0 THEN RC=0:RE
TURN
231 IF (D1<>HP1 AND D1<>HP1+1) OR D2<>
HP2 THEN IF A=1 THEN RC=0:RETURN
232 COLOR 3:PLOT B1,D2:B2=D2:LOCATE HP
1,HP2,A:IF A=3 THEN S(PT)=S(PT)+S-P:RC
=1:GOSUB 150:RETURN
234 LOCATE HP1+1,HP2,A:IF A=3 THEN S(P
T)=S(PT)+S-P:RC=1:GOSUB 150:RETURN
240 T=0:HH=HH-1:IF HH<0 THEN RC=2:RETU
RN
242 GOTO 200
300 COLOR 2:FOR A=3 TO 36:PLOT 27,A:DR
AWTO 45,A:NEXT A:PRINT "  HOLE # 1   P
AR 2"
302 P=2:FOR PT=1 TO NP:S=1:PRINT Z$(PT
*10-9,PT*10);"'S TURN":B1=INT(RND(0)*1
1+32):B2=31:CP=1
304 HP1=35:HP2=6
305 GOSUB 100
310 IF RC=2 THEN S=S+1:CP=1:GOSUB 100:
GOTO 310
320 IF RC=1 THEN NEXT PT:GOTO 400
325 GOSUB 3000
330 IF D1=26 OR D1=46 THEN M1=-M1:GOSU
B 200:GOTO 310
332 M2=-M2:GOSUB 200:GOTO 310
400 GOSUB 40:COLOR 2:FOR A=13 TO 36:PL
OT 27,A:DRAWTO 45,A:NEXT A:FOR A=0 TO
11:PLOT 27+A,13-A:DRAWTO 70,13-A
402 NEXT A:PRINT "  HOLE # 2   PAR 2":
FOR PT=1 TO NP:S=1:PRINT Z$(PT*10-9,PT
*10);"'S TURN"
404 HP1=60:HP2=8:B1=INT(RND(0)*11+32):
B2=31
405 CP=1:GOSUB 100
420 IF RC=2 THEN S=S+1:CP=1:GOSUB 100:
GOTO 420
430 IF RC=1 THEN NEXT PT:GOTO 500
435 GOSUB 3000
440 IF D2=1 OR D2=37 OR (D2=14 AND D1>
45) THEN M2=-M2:GOSUB 200:GOTO 420
442 IF D1<27 OR D1=46 OR D1=71 THEN M1
=-M1:GOSUB 200:GOTO 420
444 A=M1:M1=-M2*2:M2=-A/2:GOSUB 200:GO
TO 420
500 GOSUB 40:COLOR 2:FOR A=13 TO 36:PL
OT 17,A:DRAWTO 55,A:NEXT A:FOR A=0 TO
11:PLOT 17+A,13-A:DRAWTO 55-A,13-A
502 NEXT A:COLOR 1:PLOT 36,10:DRAWTO 3
6,36
510 PRINT "  HOLE # 3   PAR 2":FOR PT=
1 TO NP:PRINT Z$(PT*10-9,PT*10);"'S TU
RN":B1=INT(RND(0)*11+42)
512 S=1:B2=32:CP=1:HP1=25:HP2=32:GOSUB
 100
520 IF RC=2 THEN S=S+1:CP=1:GOSUB 100:
GOTO 520
530 IF RC=1 THEN NEXT PT:GOTO 600
540 GOSUB 3000
550 IF D2=1 OR D2=37 THEN M2=-M2:GOSUB
 200:GOTO 520
552 IF D1=16 OR D1=36 OR D1=56 THEN M1
=-M1:GOSUB 200:GOTO 520
554 IF D1<36 THEN A=M1:M1=-M2*2:M2=-A/
2:GOSUB 200:GOTO 520
556 A=M1:M1=M2*2:M2=A/2:GOSUB 200:GOTO
 520
600 GOSUB 40:COLOR 2:FOR A=13 TO 24:PL
OT 21,A:DRAWTO 63,A:NEXT A:FOR A=25 TO
 36:PLOT 21,A:DRAWTO 35,A:NEXT A
602 FOR A=1 TO 8:PLOT 36+A,24+A:DRAWTO
 63-A,24+A:PLOT 21+A,13-A:DRAWTO 63-A,
13-A:NEXT A
604 COLOR 1:PLOT 36,25:DRAWTO 36,14:DR
AWTO 51,14:PLOT 51,14:DRAWTO 51,24
610 PRINT "  HOLE # 4   PAR 3":FOR PT=
1 TO NP:PRINT Z$(PT*10-9,PT*10);"'S TU
RN":B1=INT(RND(0)*8)+20
615 S=1:B2=32:CP=1:HP1=43:HP2=19:GOSUB
 100
620 IF RC=2 THEN S=S+1:CP=1:GOSUB 100:
GOTO 620
630 IF RC=1 THEN NEXT PT:GOTO 700
640 GOSUB 3000
650 IF D2=4 OR D2=12 OR D2=37 OR (D2=3
3 AND D1>44 AND D1<55) OR (D2=14 AND D
1>36) THEN 654
652 GOTO 656
```

```
654 M2=-M2:GOSUB 200:GOTO 620
656 IF D1=20 OR D1=49 OR D1=51 OR D1=6
4 OR D1=36 THEN M1=-M1:GOSUB 200:GOTO
620
658 IF (D1>56 AND D2<13) OR (D2>24 AND
 D1<57) THEN A=M1:M1=M2*2:M2=A/2:GOSUB
 200:GOTO 620
659 A=M1:M1=-M2*2:M2=-A/2
660 GOSUB 200:GOTO 620
700 GOSUB 40:COLOR 2:FOR A=25 TO 36:PL
OT 41,A:DRAWTO 55,A:NEXT A:FOR A=1 TO
9:PLOT 33-A,25-A:DRAWTO 55,25-A
702 PLOT 24+A,11-A:DRAWTO 55-A,11-A:NE
XT A:FOR A=1 TO 5:PLOT 24,16-A:DRAWTO
55,16-A:NEXT A
704 COLOR 1:FOR A=1 TO 2:PLOT 55,25-A:
DRAWTO 45,15-A:NEXT A
710 PRINT "  HOLE # 5   PAR 2":P=2:FOR
 PT=1 TO NP:S=1:PRINT Z$(PT*10-9,PT*10
);"'S TURN":CP=1
715 B1=INT(RND(0)*8)+43:B2=33:HP1=33:H
P2=13:GOSUB 100
720 IF RC=2 THEN S=S+1:CP=1:GOSUB 100:
GOTO 720
730 IF RC=1 THEN NEXT PT:GOTO 800
740 GOSUB 3000
750 IF D2=1 OR D2=37 OR (D2=25 AND D1<
41) THEN M2=-M2:GOSUB 200:GOTO 720
752 IF D1=23 OR D1=40 OR D1=56 THEN M1
=-M1:GOSUB 200:GOTO 720
754 IF D1<40 AND D2<11 THEN A=M1:M1=-M
2*2:M2=-A/2:GOSUB 200:GOTO 720
756 A=M1:M1=M2*2:M2=A/2:GOSUB 200:GOTO
 720
800 GOSUB 40:COLOR 2:FOR A=25 TO 36:PL
OT 31,A:DRAWTO 45,A:NEXT A:FOR A=1 TO
11:PLOT 31,25-A:DRAWTO 51+A,25-A
801 NEXT A
802 FOR A=2 TO 13:PLOT 31,A:DRAWTO 62,
A:NEXT A:COLOR 1:FOR A=1 TO 2:PLOT 30+
A,24:DRAWTO 39+A,15:NEXT A
804 PLOT 41,15:DRAWTO 41,10:PLOT 49,10
:DRAWTO 49,4
810 PRINT "  HOLE # 6   PAR 3":P=3:FOR
 PT=1 TO NP:S=1:PRINT Z$(PT*10-9,PT*10
);"'S TURN"
815 B1=INT(RND(0)*8)+34:B2=33:HP1=35:H
P2=13:CP=1:GOSUB 100
820 IF RC=2 THEN S=S+1:CP=1:GOSUB 100:
GOTO 820
830 IF RC=1 THEN NEXT PT:GOTO 900
840 GOSUB 3000
850 IF D2=5 OR D2=1 OR D2=37 OR (D2=25
 AND D1>45) OR ((D2=10) AND (D1=41 OR
D1=49)) THEN M2=-M2:GOSUB 200:GOTO 820
852 IF D1=30 OR D1=46 OR D1=63 OR D1=4
9 OR (D1=41 AND D2<=16) THEN M1=-M1:GO
SUB 200:GOTO 820
854 A=M1:M1=-M2*2:M2=-A/2:GOSUB 200:GO
TO 820
900 GOSUB 40:COLOR 2:FOR A=1 TO 9:PLOT
 25-A,37-A:DRAWTO 54,37-A:PLOT 15+A,17
-A:DRAWTO 51-A,17-A:NEXT A
902 FOR A=21 TO 27:PLOT 16,A:DRAWTO 54
,A:NEXT A:FOR A=1 TO 4:PLOT 16,16+A:DR
AWTO 50+A,16+A:NEXT A
904 COLOR 1:PLOT 38,11:DRAWTO 50,23:PL
OT 38,16:DRAWTO 45,23:PLOT 26,27:DRAWT
O 38,27
906 PLOT 39,27:DRAWTO 39,36
910 PRINT "  HOLE # 7   PAR 3":P=3:FOR
 PT=1 TO NP:S=1:PRINT Z$(PT*10-9,PT*10
);"'S TURN"
915 B1=INT(RND(0)*8)+44:B2=33:HP1=33:H
P2=32:CP=1:GOSUB 100
920 IF RC=2 THEN S=S+1:CP=1:GOSUB 100:
GOTO 920
930 IF RC=1 THEN NEXT PT:GOTO 1000
940 GOSUB 3000
950 IF D1=15 OR D1=55 OR (D1=39 AND D2
>26) THEN M1=-M1:GOSUB 200:GOTO 920
952 IF D2=37 OR D2=7 OR D2=27 THEN M2=
-M2:GOSUB 200:GOTO 920
954 IF D1<25 AND D2<17 THEN A=M1:M1=-M
2*2:M2=-A/2:GOSUB 200:GOTO 920
956 A=M1:M1=M2*2:M2=A/2:GOSUB 200:GOTO
 920
1000 GOSUB 40:COLOR 2:FOR A=27 TO 36:P
LOT 29,A:DRAWTO 43,A:NEXT A:FOR A=1 TO
 8:PLOT 29-A,27-A:DRAWTO 43+A,27-A
1002 PLOT 21,19-A:DRAWTO 52,19-A:PLOT
21+A,11-A:DRAWTO 52-A,11-A:NEXT A
1004 COLOR 1:PLOT 30,11:DRAWTO 33,14:D
RAWTO 33,21:DRAWTO 36,24:PLOT 37,24:DR
AWTO 40,21:DRAWTO 40,14:DRAWTO 43,11
1010 PRINT "  HOLE # 8   PAR 3":P=3:FO
R PT=1 TO NP:S=1:PRINT Z$(PT*10-9,PT*1
0)
1015 B1=INT(RND(0)*8+32):B2=33:HP1=36:
HP2=17:CP=1:GOSUB 100
1020 IF RC=2 THEN S=S+1:CP=1:GOSUB 100
:GOTO 1020
1030 IF RC=1 THEN NEXT PT:GOTO 1100
1040 GOSUB 3000
1050 IF D2=37 OR D2=2 THEN M2=-M2:GOSU
B 200:GOTO 1020
1051 IF D1=33 OR D1=40 THEN IF D2=21 O
R D2=14 THEN 1054
1052 IF D1=20 OR D1=53 OR D1=33 OR D1=
40 OR D1=28 OR D1=44 THEN M1=-M1:GOSUB
 200:GOTO 1020
1054 IF (D1>43 AND D2>18) OR (D1<30 AN
D D2<11) OR (D1>36 AND D1<44) THEN A=M
1:M1=-M2*2:M2=-A/2:GOSUB 200:GOTO 1020
1056 A=M1:M1=M2*2:M2=A/2:GOSUB 200
1060 GOTO 1020
1100 GOSUB 40:COLOR 2:FOR A=27 TO 36:P
LOT 29,A:DRAWTO 43,A:NEXT A:FOR A=3 TO
 27:PLOT 20,A:DRAWTO 52,A:NEXT A
1102 COLOR 1:PLOT 34,10:DRAWTO 31,13:P
LOT 39,10:DRAWTO 42,13:PLOT 27,14:DRAW
TO 35,22:PLOT 38,22:DRAWTO 46,14
1110 PRINT "  HOLE # 9   PAR 4":P=4:FO
R PT=1 TO NP:S=1:PRINT Z$(PT*10-9,PT*1
0);"'S TURN"
1115 B1=INT(RND(0)*8+32):B2=33:HP1=36:
HP2=17:CP=1:GOSUB 100
1120 IF RC=2 THEN S=S+1:CP=1:GOSUB 100
:GOTO 1120
1130 IF RC=1 THEN NEXT PT:GOTO 2000
1140 GOSUB 3000
1150 IF D2=37 OR D2=2 OR D2=28 THEN M2
=-M2:GOSUB 200:GOTO 1120
1152 IF D1=19 OR D1=53 OR ((D1=28 OR D
1=44) AND D2>26) THEN M1=-M1:GOSUB 200
:GOTO 1120
1154 IF (D1>37 AND D2>13) OR (D1<36 AN
D D2<14) THEN A=M1:M1=-M2*2:M2=-A/2:GO
SUB 200:GOTO 1120
1156 A=M1:M1=M2*2:M2=A/2:GOSUB 200
1160 GOTO 1120
2000 GRAPHICS 0:PRINT "    FINAL SCORE
:":PRINT :PRINT "    PLAYER  SCORE":PR
INT "-----------------"
2005 FOR A=1 TO NP:PRINT Z$(A*10-9,A*1
0);" : ";S(A):NEXT A
2010 PRINT :PRINT "PLAY AGAIN (Y/N)";
2020 GOSUB 3000:A=PEEK(764):IF A<>43 A
ND A<>35 THEN 2020
2030 IF A=43 THEN RUN
2040 PRINT :PRINT :PRINT "GOOD BYE.":C
LOSE #1:END
3000 SOUND 0,50,10,10
3005 HH=HH-10:IF HH<2 AND HH>-6 THEN H
H=2
3010 SOUND 0,200,10,10
3020 SOUND 0,0,0,0:RETURN
9999 END
```

APPLE ONE LINERS

by Roger Schoenmeyer
Dayton, Ohio

```
5 T = 18.8495559: HOME : HGR : HCOLOR=
     7: HPLOT 0,0: CALL 62454: HCOLOR=
     0: FOR X = 0 TO T STEP T / 2
     79: HPLOT 140,96 TO X * 14.8
     ,60 *  SIN (X) + 96: NEXT
```

---

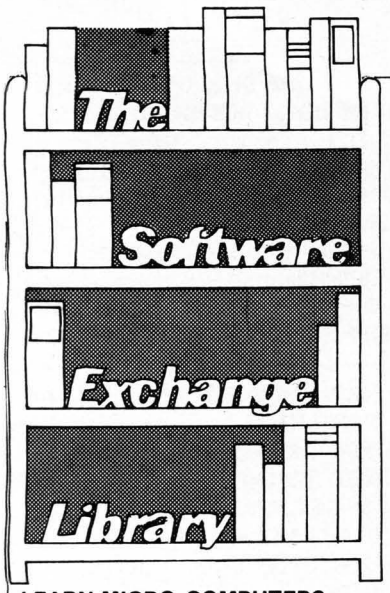
by Robert Thompson
Lorton, Virginia

```
10 LINES = 35:LOOP = 1000: HGR2 :
     FOR Y = 1 TO  RND (10) * LI
    NES: HCOLOR=  RND (20) * 8: HPLOT
     RND (30) * 280, RND (40) *
    192 TO  RND (50) * 280, RND
    (60) * 192: FOR X = 1 TO LOO
    P: NEXT : GOTO 10
```

---

by Carl Mueller
Murfreesboro, Tennessee

```
1 CALL -1229: GR : POKE -16302
  ,0: FOR I=0 TO 1 STEP 0: FOR
  Y=Y1 TO Y2: HLIN X1,X2 AT Y:
   NEXT Y:Y2= RND (48):Y1= RND
  (Y2+1):X2= RND (40):X1= RND
  (X2+1): COLOR= RND (16): NEXT
  I
```



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by Phillip Case

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Miner is an S-80 program which requires at least 16K of Ram.

It's 1859, just after the fervent rush for gold in California. Finding a fortune in your claim is no longer the key to becoming wealthy. All the large veins have been depleted, and the remaining gold lies deep in the ground...so deep in fact that only the large mining companies with their vast resources can really make a profit on the gold that remains.

But you still own some claims which seem promising. Your only option for getting rich now lies in selling your claims to one of the several mining companies that all but own the entire area.

However, before anyone will consider buying your claim, you must show that there is indeed enough gold there to make the claim a profitable venture. To do this you must risk your life deep in the mines. ALONE!!!

Your claim awaits your decision, will you risk your life for riches??? Here's your chance.

Playing "Miner" is simple. The dots underground are prospects which have a great potential. To go underground you must use the elevator as the topsoil is too loose and will cave in if dug through. To use the elevator, walk into it by pressing the arrow indicating the direction you want to go. Once in the elevator, use the up and down arrows to move. Then you move around by pressing the appropriate arrow.

The dangers in the mines are many: Underground springs, cave-ins; loose sandstone and solid rock will impede your progress. If, however, you find you are trapped in the mines, simply press the CLEAR key and the game will end.

Variables: S-80 version
A: Misc. Logic.
AD: Start of video RAM.
B: Misc. Logic.
C$: Elevator cable string.
CK: Random variable to determine what prospect may be.
E$: Elevator string.
EP: Elevator position.
ER$: Erasing string.
G: Random number of ounces of gold found.
GC: Gold carried.
GP: Gold price.
M: Money.
MP: Movement indicator.
NM: No movement indicator.
P: Player position.
P1: Movement direction.
PP: PEEK (14400)
T1: Initialize screen variable.
T2: Initialize screen variable.
W$: Fill in string.
X: Initialize screen variable.
Y: Initialize screen variable.

```
10 ' xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
     xx             MINER VER. 1.0    xx
     xxx   (C) BY PHILLIP CASE 6/80  xxx
     xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

20 CLEAR300:RANDOM:DEFINTA-Z:CLS:AD=15360:E$=CHR$(162)+STRING$(2
,179)+CHR$(149):EP=121:ER$=STRING$(4,128):C$=CHR$(128)+CHR$(170)
+CHR$(149)+CHR$(32):M=500:P=15464
30 FORT1=(AD+128)TO(AD+191):POKET1,152:NEXT
40 FORT2=T1TO(AD+1023):POKET2,191:NEXT
50 FORT1=(AD+960)TO(AD+1023):POKET1,153:NEXT
60 FORT1=(AD+192)TO(AD+896)STEP64:POKET1,149:POKE(T1+63),170:NEX
T
70 FORT1=AD+184TOAD+959STEP64:FORT2=1TO4:POKE(T1+T2),128:NEXTT2,
T1
80 FORX=115TO120:SET(X,0):NEXT:FORY=2TO7:SET(122,Y):NEXT:SET(121
,1):SET(122,2):SET(123,3):SET(124,4):SET(125,5):SET(126,6):SET(1
17,1):SET(118,1):SET(118,2):SET(117,2)
90 FORY=0TO8:SET(77,Y):NEXT:SET(86,0):SET(86,1):FORY=86TO93:SET(
Y,2):NEXT:FORX=77TO93:SET(X,6):SET(X,7):NEXT:PRINT@39,"BANK";
100 PRINT@0,CHR$(191)+STRING$(9,32)+CHR$(191)+STRING$(9,32)+CHR$
(191)+STRING$(14,32)+CHR$(191);:FORX=0TO71:SET(X,3):NEXT
110 GOSUB390
120 GOSUB280
130 W$=STRING$(20,191):PRINT@410," MINER ";:PRINT@539," BY ";:PR
INT@662," PHILLIP CASE ";:FORA=1TO2000:NEXT:PRINT@410,W$;:PRINT@
539,W$;:PRINT@662,W$;
140 GOSUB410
150 '   COMMAND LOOP
160 POKEP,88:::::::::::::::::::::::::::::::::::::::::::::::POKEP,4
3:::::::::::::::::::::::::::::::::::::::::::::::::POKEP,32
170 PP=PEEK(14400)
180 IFPP=2THENGOTO780
190 IFP=15467ANDPP=32THENGOSUB720:PP=0:GOTO150
200 IFPP=8THENP1=P-64ELSEIFPP=16THENP1=P+64ELSEIFPP=32THENP1=P-1
ELSEIFPP=64THENP1=P+1
210 IFPEEK(P1)=162THENGOSUB620
220 NM=0:GOSUB690
230 IFNM=1THENP1=0:GOTO160
240 IFPEEK(P1)=46THENGOSUB490:GOTO270
250 IFPEEK(P1)<>32THENGOSUB440
260 P=P1
270 GOTO 150
280 ' ELEVATOR ROUTINE
290 '  MP=1 TO GO UP xxxxxMP=2 TO GO DOWN
300 ' EP=ELEVATOR POSITION
310 IFMP=1ANDPEEK(AD+EP-64)<>128THENRETURN
320 IFMP=2ANDEP=953THENRETURN
330 IFMP=2ANDPEEK(AD+EP+64)<>128THENRETURN
340 IFMP=1ANDEP=121THENRETURN
350 IFMP=1THENEP=EP-64ELSEIFMP=2THENEP=EP+64
360  PRINT@EP,E$;:IFEP>895THEN370ELSEIFMP=1THENPRINT@EP+64,ER$;
370 IFEP=121THENRETURNELSEIFPEEK(AD+EP-64)<>191THENPRINT@EP-64,C
$;
380 MP=0:RETURN
390 ' FIGURE PRICE OF GOLD
400 GP=500+RND(300):GOSUB740:RETURN
410 ' GENERATE TERRAIN
420 FORT1=1TO35
430 X=RND(832)+191:IFPEEK(AD+X)=191THENPOKEAD+X,46:NEXT:RETURN:E
LSE430
440 '  CHECK FOR WIN OR LOSS.
450 IFM>7000THENCLS:FORA=1TO10:PRINTTAB(A*5);"YOU WIN!!!!":NEXT:
PRINT"
YOU CAN NOW SELL YOUR CLAIM TO A BIG MINING COMPANY AND
RETIRE FROM THE ROYALITYS.
PRESS ENTER";:INPUTA:RUN
460 M=M-5:GOSUB740
```

```
470 IFM<=0THENCLS:PRINT"YOU HAVE GONE BANKRUPT.
PRESS ENTER TO PLAY AGAIN.";:INPUTA$:RUN
480 RETURN
490 ' PERFORM CHECK OF TERRAIN
500 GOSUB390
510 IFPEEK(P1)=46THENCK=RND(5):ONCKGOSUB530,540,560,600,610:GOSU
B740:RETURN
520 RETURN
530 POKE(P1),71:G=RND(3):GC=GC+G:PRINT@65,"GOLD NUGGET,";G;"OZS.
";:FORA=1TO500:NEXT:PRINT@65,STRING$(19,131);:POKE(P1),32:RETURN
540 POKE(P1),83:PRINT@65,"UNDERGROUND SPRING!!!";:FORT1=P1TO1638
3:IFPEEK(T1)=32ORPEEK(T1)=128THENPOKET1,37:NEXT:ELSENEXT
550 PRINT@65,STRING$(21,131);:POKE(P1),37:RETURN
560 POKEP1,32:PRINT@65,"CAVE-IN!!!";:FORT1=P1-68TOP1+68STEP64:FO
RT2=1TO9
570 IFPEEK(T1+T2)=32ORPEEK(T1+T2)=128THENPOKE(T1+T2),191:NEXTT2,
T1:ELSENEXTT2,T1
580 P1=0:IFRND(5)=1PRINT@65,"YOU LOST ALL YOUR GOLD!!!";:GC=0:FO
RA=1TO500:NEXT:PRINT@65,STRING$(25,131);:RETURN
590 PRINT@65,STRING$(15,131);:POKEP1,191:RETURN
600 POKEP1,32:PRINT@65,"SANDSTONE, EASY DIGGING";:M=M+4:FORA=1TO
500:NEXT:PRINT@65,STRING$(23,131);:RETURN
610 POKEP1,82:PRINT@65,"SOLID ROCK, PICK-AXE WON'T DO";:FORA=1TO
500:NEXT:PRINT@65,STRING$(29,131);:RETURN
620 P1=0:' ELEVATOR SUB
630 PP=PEEK(14400):IFPP=64THEN630
640 IFPP=8THENMP=1ELSEIFPP=16THENMP=2
650 IFMP=1ANDPEEK(EP+AD-64)<>128THENMP=0
660 GOSUB280
670 IFPEEK(14400)=32AND(PEEK(AD+EP-1)=32ORPEEK(AD+EP-1)=128ORPEE
K(AD+EP-1)=191)THENP1=AD+EP-1:RETURN
680 GOTO630
690 NM=0:'PERFORM CHECK ROUTINE
700 IFPEEK(P1)<>46ANDPEEK(P1)<>32ANDPEEK(P1)<>191THENNM=1:RETURN
710 RETURN
720 ' BANK ROUTINE
730 M=M+(GC*GP):GC=0:FORA=1TO10:PRINT@103,STRING$(8,36);:FORB=1T
O50:NEXT:PRINT@103,STRING$(8,32);:FORB=1TO50:NEXTB,A:GOSUB740:RE
TURN
740 ' DISPLAY FIGURES
750 PRINT@1,"GM $";GP;:PRINT@13,GC;"OZS.";:PRINT@22,"CASH $";M;:
IFM>7000GOSUB760:GOSUB440:ELSERETURN
760 ' FLASH WINNING FIGURES
770 FORA=1TO10:PRINT@22,"CASH $";M;:FORB=1TO100:NEXTB:PRINT@22,"
          ";:FORB=1TO100:NEXTB,A:RETURN
780 '    BAD MINE
790 CLS:PRINTCHR$(23);"
          MINERS LUCK
TOO BAD THE OLD MINE JUST DIDN'T          PAN OUT.
```

ATARI VERSION

```
 10 REM xxxxxxxxxxxxxxxxxxxxxxxx
 11 REM x MINER V1.0           x
 12 REM x (C)1980 PHILLIP CASE x
 13 REM xxxxxxxxxxxxxxxxxxxxxxxx
 14 REM
 15 DIM A$(20)
 20 PX=27:PY=2:GRAPHICS 0:M=500:EP=3
 22 POKE 752,1
 40 FOR Y=4 TO 22:POSITION 2,Y:PRINT ">
";:FOR X=3 TO 38:PRINT CHR$(160);:NEXT
 X:PRINT "<";:SOUND 0,Y,8,2:NEXT Y
 50 FOR X=0 TO 36:PRINT CHR$(16);:NEXT
 X
 60 REM LINE 40
 70 FOR Y=4 TO 22:POSITION 34,Y:PRINT "
    ";:NEXT Y
 80 POSITION 20,2:PRINT "BANK: ";CHR$(1
 );" ";CHR$(4);:POSITION 26,1:PRINT CHR
 $(17);CHR$(18);CHR$(5);
 110 GOSUB 390
 120 GOSUB 280
 130 FOR T=1 TO 20:A$(T)=CHR$(160):NEXT
  T
 132 POSITION 15,7:PRINT " MINER ";:POS
 ITION 16,9:PRINT " BY ";:POSITION 11,1
 1:PRINT " PHILLIP  CASE ";
 133 POSITION 10,13:PRINT "ATARI VERSIO
 N BY:";:POSITION 11,15:PRINT " RICH BO
 UCHARD ";
 134 POSITION 11,17:PRINT " FIRE TO STA
 RT "
 136 IF STRIG(0)<>0 THEN 136
 138 FOR Y=7 TO 17:POSITION 10,Y:PRINT
 A$;:NEXT Y
 140 GOSUB 410
 150 REM x COMMAND LOOP
 160 POSITION PX,PY:PRINT "X";CHR$(30);
 :FOR T=1 TO 15:NEXT T:PRINT "+";CHR$(3
 0);:FOR T=1 TO 15:NEXT T
 162 PRINT " ";:FOR T=1 TO 15:NEXT T
 170 POS=STICK(0)
 180 IF STRIG(0)=0 THEN 780
 182 IF POS=15 THEN 160
 184 XX=PX:YY=PY
 190 IF PY=2 AND PX=27 THEN PY=3:GOSUB
 720:GOTO 150
 200 IF POS=14 AND PY<>5 AND PY<>1 THEN
  YY=PY-1
 202 IF POS=13 AND PY<>3 THEN YY=PY+1
 204 IF POS=11 THEN XX=PX-1
 206 IF POS=7 THEN XX=PX+1
 210 IF XX=34 AND YY=EP THEN GOSUB 620
 220 GOSUB 690
 230 IF NM=1 THEN SOUND 0,0,0,0:GOTO 16
 0
 235 SOUND 0,200,10,14
 236 SOUND 0,0,0,0
 240 IF A=46 THEN GOSUB 490:GOTO 270
 250 IF A<>32 THEN GOSUB 440
 260 PX=XX:PY=YY
 270 GOTO 150
 280 REM x ELEVATOR ROUTINE
 290 REM x MP=1 TO GO UP, MP=2 DOWN
 300 REM x EP=ELEVATOR POSITION
 310 LOCATE 34,EP-1,A:IF MP=1 AND A<>32
  THEN RETURN
 320 IF MP=2 AND EP=23 THEN RETURN
 330 LOCATE 34,EP+1,A:POSITION 34,EP+1:
 PRINT CHR$(A);:IF MP=2 AND A<>32 THEN
 RETURN
 340 IF MP=1 AND EP=2 THEN RETURN
 350 IF MP=1 THEN EP=EP-1
 355 IF MP=2 THEN EP=EP+1
 360 POSITION 34,EP:PRINT CHR$(138);CHR
 $(160);CHR$(136);:IF EP>21 THEN 370
 362 IF MP=1 THEN POSITION 34,EP+1:PRIN
 T "   ";
 370 IF EP<>1 THEN LOCATE 34,EP-1,A:IF
 A<>160 THEN POSITION 34,EP-1:PRINT " "
 ;CHR$(160);" ";:MP=0:RETURN
 372 RETURN
 374 PRINT CHR$(A);:RETURN
 390 REM x FIGURE PRICE OF GOLD
 400 GP=501+INT(RND(0)*300):GOSUB 740:R
 ETURN
 410 REM x GENERATE TERRAIN
 420 FOR T=1 TO 35
 430 X=INT(RND(0)*35):Y=INT(RND(0)*17+6
 ):LOCATE X,Y,A:IF A<>160 THEN 430
 432 SOUND 0,200,12,10:POSITION X,Y:PRI
 NT ".";:SOUND 0,0,0,0:NEXT T:RETURN
 440 REM x CHECK FOR WIN OF LOSS
 450 IF M<7000 THEN 460
 452 GRAPHICS 0:FOR A=1 TO 10:PRINT A$(
 1,A*2);"YOU WIN!!!!":NEXT A
 454 PRINT :PRINT "NOW YOU CAN SELL YOU
 R CLAIM TO A":PRINT "BIG MINING COMPAN
 Y AND RETIRE"
 456 PRINT "ON THE ROYALTIES"
 458 GOTO 810
 460 M=M-5:GOSUB 740
 470 IF M>0 THEN RETURN
 475 GRAPHICS 0:PRINT "YOU HAVE GONE BA
 NKRUPT.":PRINT "PRESS FIRE TO PLAY AGA
 IN."
 480 IF STRIG(0)<>0 THEN 480
 485 RUN
 490 REM x PERFORM CHECK OF TERRAIN
 500 GOSUB 390
 510 IF A=46 THEN CK=INT(RND(0)*5+1):PO
 SITION 2,3:ON CK GOSUB 530,540,560,600
 ,610:GOSUB 740
 512 POSITION 2,3:PRINT "
             ";:RETURN
 530 G=INT(RND(0)*3+1):GC=GC+G:PRINT "G
 OLD NUGGET, ";G;" OZS.";:POSITION XX,Y
 Y:PRINT "G";
 532 FOR A=1 TO 10:FOR X=1 TO 50:SOUND
 0,X,10,10:NEXT X:FOR X=50 TO 1 STEP -1
 :SOUND 0,X,10,10:NEXT A
 534 PRINT CHR$(30);" ";:RETURN
 540 PRINT "UNDERGROUND SPRING!!!";:POS
 ITION XX,YY:PRINT "S";:SOUND 0,1,0,6
 542 FOR Y=22 TO YY STEP -1:FOR X=3 TO
```

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```
38:LOCATE X,Y,A:POSITION X,Y:PRINT CHR
$(A);
544 IF Y=YY AND X<XX THEN 548
546 LOCATE X,Y,A:POSITION X,Y:PRINT CH
R$(A);:IF A=32 THEN POSITION X,Y:PRINT
 "%";
548 NEXT X:NEXT Y
550 POSITION XX,YY:PRINT "%";:SOUND 0,
0,0,0:RETURN
560 PX=XX:PY=YY:PRINT "CAVE-IN!!!";:PO
SITION XX,YY:PRINT " ";
565 FOR X=XX-4 TO XX+4:FOR Y=YY-1 TO Y
Y+1:SOUND INT(RND(0)*4),INT(RND(0)*100
)+150,12,12
570 IF X<2 OR X>39 OR Y<1 OR Y>23 THEN
 574
572 LOCATE X,Y,A:POSITION X,Y:IF A=32
THEN PRINT CHR$(160);:GOTO 574
573 PRINT CHR$(A);
574 NEXT Y:NEXT X
580 XX=PX:YY=PY:IF RND(0)<0.2 THEN POS
ITION 2,3:PRINT "YOU LOST ALL YOUR GOL
D!!!";:GC=0:FOR A=1 TO 500:NEXT A
582 FOR X=0 TO 3:SOUND X,0,0,0:NEXT X:
RETURN
590 POSITION XX,YY:PRINT CHR$(160);:RE
TURN
600 PRINT "SANDSTONE, EASY DIGGING";:P
OSITION XX,YY:PRINT " ";:M=M+4:FOR A=1
 TO 300:NEXT A
605 RETURN
610 SOUND 0,5,10,14:PRINT "SOLID ROCK,
 PICKAXE WON'T DO";:POSITION XX,YY:PRI
NT "R";
615 SOUND 0,100,10,10:FOR T=1 TO 10:NE
XT T:SOUND 0,0,0,0:FOR A=1 TO 300:NEXT
 A:RETURN
620 XX=PX:YY=PY:REM * ELEVATOR SUB
630 SOUND 0,EP*10,10,6:MP=0:POS=STICK(
0):IF POS=7 OR POS=15 THEN 630
640 IF POS=10 OR POS=14 OR POS=6 THEN
MP=1
645 IF POS=13 OR POS=9 OR POS=5 THEN M
P=2
655 IF POS=11 AND EP<>4 THEN 670
660 GOSUB 280:GOTO 630
670 LOCATE 33,EP,A:IF A=32 OR A=160 TH
EN XX=33:YY=EP:SOUND 0,0,0,0:RETURN
680 GOTO 630
690 NM=0:REM * PERFORM CHECK
695 IF XX<2 OR XX>33 OR YY<0 THEN NM=1
700 LOCATE XX,YY,A:POSITION XX,YY:? CH
R$(A);:IF A<>46 AND A<>32 AND A<>160 T
HEN SOUND 0,50,10,10:NM=1:RETURN
710 RETURN
720 REM * BANK ROUTINE *
725 IF GC=0 THEN RETURN
730 M=M+(GC*GP):GC=0:FOR A=1 TO 14:SOU
ND 0,0,0,0:POSITION 10,2:PRINT "$$$$$$
$$";:FOR B=1 TO 20:NEXT B
731 SOUND 0,200-A*10,6,10
732 SETCOLOR 2,A+1,2:POSITION 10,2:PRI
NT "          ";:FOR B=1 TO 20:NEXT B:NE
XT A:SETCOLOR 2,9,2:GOSUB 740:RETURN
740 REM * DISPLAY FIGURES
750 POSITION 2,0:PRINT "GM $";GP;:POSI
TION 13,0:PRINT GC;" OZS.";:POSITION 2
2,0:PRINT "CASH $";M;"    ";
752 IF M>7000 THEN GOSUB 760:GOTO 440
754 RETURN
760 REM * FLASH WINNING FIGURES *
765 SOUND 0,0,0,0
770 FOR A=1 TO 10:POSITION 22,0:PRINT
"CASH $";M;:FOR B=1 TO 100:NEXT B:POSI
TION 22,0:PRINT "              ";
772 FOR B=1 TO 100:NEXT B:NEXT A:RETUR
N
780 REM * BAD MINE
790 GRAPHICS 0:PRINT :PRINT "
  MINERS LUCK":PRINT :PRINT "TOO BAD T
HE OLD MINE DIDN'T PAN OUT."
795 SOUND 0,255,12,12
800 FOR T=1 TO 1000:NEXT T
810 PRINT :PRINT "PRESS FIRE TO CONTIN
UE"
820 IF STRIG(0)<>0 THEN 820
830 RUN
```

APPLE VERSION

SHAPE TABLE

Shape 1: Prospect
Shape 2: Tunnel
Shape 3: Bank
Shape 5: Empty elevator
Shape 6: Miner
Shape 7: Elevator with miner.

MATRIX VARIABLES:
C: Contains information about where miner has been and where prospects are.
D: Used in checking that prospects are drawn within mine.

NON– MATRIX VARIABLES:
EP: Incremented or decremented as elevator moves.
S: Incremented, or decremented as miner moves vertically. Used to see if miner's position is equal to last elevator position.
M: Cash on hand.
P: Current length of the elevator cable.
X: Miner's horizontal position (graphics only).
Y: Miner's vertical position (graphics only).
H: Miner's horizontal position in the matrix (25,8).
V: Miner's vertical position in the matrix (25,8).
FL,I,J,PR: Misc. logic.
GP: Current price of gold.
GC: Number of ounces collected.
N: Horizontal graphics increment.
N1: Vertical graphics increment.
A$: Player's input (I,J,K,M).
Z: Random type of prospect.

```
 10  HOME : VTAB 8: HTAB 100: PRINT
     "MINER": VTAB 11: HTAB 97: PRINT
     "BY PHIL CASE": VTAB 12: HTAB
     93: PRINT "APPLE TRANSLATION
     BY": VTAB 13: HTAB 97: PRINT
     "STEVE JUSTUS": FOR I = 1 TO
     3000: NEXT I
 11  HOME : VTAB 10: PRINT "   TO
     MOVE YOUR MINER, USE THE 'I'
     , 'J', 'K', AND 'M' KEYS.  E
     ACH TIME YOU DIG,  IT COSTS
     YOU 5$. TO MOVE THE ELEVATOR
     , USE THE 'I' AND 'M' KEYS.
     IF YOU BECOME HOPELESSLY TRA
     PPED HIT CONTROL-C TO END."
 12  FOR I = 1 TO 500: NEXT I: VTAB
     16: HTAB 16: PRINT "GOOD LUC
     K": FOR I = 1 TO 500: NEXT I
 20  DIM C(26,10): DIM D(30)
 30  SCALE= 1: ROT= 0:EP = 0:S = 0
     :P = 31:M = 500
 Load the shapes.
 40  GOSUB 1230: POKE 232,0: POKE
     233,64
 50  HGR : HCOLOR= 1: HPLOT 0,0: CALL
     62454
 Set up the screen.
 60  HCOLOR= 3: FOR I = 0 TO 31: HPLOT
     0,I TO 276,I: NEXT I
 70  FOR I = 257 TO 276: HPLOT I,0
     TO I,159: NEXT I
 80  HCOLOR= 0: DRAW 3 AT 191,29: HPLOT
     259,0 TO 259,P - 16:: DRAW 5
     AT 257,P
 90  HCOLOR= 0: HPLOT 0,31 TO 191,
     31
 Generate prospects.
 100  FOR I = 1 TO 30
 110 X =  INT ( RND (1) * 25 + 1) *
     10
 120 H = X / 10
 130 Y =  INT ( RND (1) * 10 + 1) *
     16
 140 V = Y / 16 - 1
Lines 150-190 keep the prospects
from being drawn on the same place
or outside the mine.
 150  FOR F = 1 TO I - 1
 160  IF X + Y = D(F) THEN FL = 1
 170  NEXT F
 180  IF FL = 1 THEN FL = 0: GOTO
      110
 190  IF X > 245 OR X < 15 OR Y <
      31 THEN 110
 Put a '1' in the matrix to
 represent a prospect.
 200 C(H,V) = 1
 210  DRAW 1 AT X,Y
 220  NEXT I
 230  GOSUB 710
 Movement routine for miner.
 260 H = 23:V = 0
 270 X = 226:Y = 30
 280  HCOLOR= 0: DRAW 6 AT X,Y
 290  GET A$
 300  IF  ASC (A$) = 3 THEN  GOSUB
      1410
 310 N = 0:N1 = 0
 330  IF A$ < "I" OR A$ > "M" THEN
      290
```

```
340  ON  ASC (A$) - 72 GOTO 350,4
     10,470,290,550
```

Movement up.

```
350  IF Y < 55 AND X < 253 THEN 6
     10
360 N1 =  - 16
370  IF C(H,V - 1) = 3 THEN 290
380 V = V - 1:S = S - 1
390  IF Y > 32 AND C(H,V) = 0 THEN
     M = M - 5: GOSUB 730
400  GOTO 610
```

Movement left.

```
410  IF X < 7 OR X < 203 AND Y <
     32 THEN 610
420 N =  - 10: IF Y < 33 THEN  HCOLOR=
     3: DRAW 6 AT X,Y
430  IF C(H - 1,V) = 3 THEN 290
440 H = H - 1
450  IF Y > 32 AND C(H,V) = 0 THEN
     M = M - 5: GOSUB 730
460  GOTO 610
```

Movement right.

```
470 PR = 0
```

If miner's vertical position equals position where he left elevator, then let him enter.

```
480  IF X > 240 AND S = EP THEN  GOSUB
     830: IF Y > 32 THEN 650ELSE2
     30
490  IF X > 240 AND Y > 30 THEN 2
     90
500 N = 10: IF Y < 33 THEN  HCOLOR=
     3: DRAW 6 AT X,Y
510  IF C(H + 1,V) = 3 THEN 290
520 H = H + 1
```

If the matrix contains a '0' (dirt) then charge him 5$ to dig.

```
530  IF Y > 32 AND C(H,V) = 0 THEN
     M = M - 5: GOSUB 730
540  GOTO 610
```

Movement down.

```
550  IF Y > 150 THEN 610
560  IF Y < 32 AND X < 250 THEN 6
     10
570 N1 = 16
580  IF C(H,V + 1) = 3 THEN 290
590 V = V + 1:S = S + 1
600  IF Y > 32 AND C(H,V) = 0 THEN
     M = M - 5: GOSUB 730
610  IF Y < 30 OR X > 249 THEN 67
     0
```

Decide which color to draw miner depending on background.

```
620  HCOLOR= 3: IF Y > 30 AND X <
     250 THEN  HCOLOR= 0
630  IF Y < 32 THEN  HCOLOR= 0: GOTO
     670
```

If miner hits prospect then goto prospect routine.

```
640  IF C(H,V) = 1 THEN  GOSUB 10
     00
```

Draw a tunnel at miner's position and save it as a '2' in the matrix.

```
650  DRAW 2 AT X,Y: DRAW 2 AT X +
     N,Y + N1:C(H,V) = 2
660  HCOLOR= 0: IF Y > 30 AND X <
     250 THEN  HCOLOR= 3
```

Draw miner at predetermined increments.

```
670 X = X + N:Y = Y + N1: DRAW 6 AT
     X,Y: IF X < 200 AND Y < 32 AND
     PR = 0 THEN M = M + (GP * GC
     ):PR = 1:GC = 0: GOSUB 710
680 N = 0:N1 = 0
690  GOTO 290
```

Figure price of gold.

```
710 GP =  INT ( RND (1) * 600) +
     300: IF GP < 501 THEN 710
```

Display figures.

```
730  POKE 34,20: HOME : PRINT "GM
      $ ";GP;: PRINT  TAB( 16): PRINT
     GC;" OZS."
740  PRINT "CASH $ ";M;: IF M > 7
     000 THEN  GOSUB 780
750  IF M <  = 0 THEN 1210
760  RETURN
770  END
```

Flash winning figures.

```
790  TEXT : POKE 34,0: HOME : FOR
     I = 1 TO 20:P =  INT (1.5 *
     I): NORMAL : PRINT  SPC( P);
     : FLASH : PRINT "CASH $";M: FOR
     S = 1 TO 100: NEXT S: NEXT I
     : NORMAL
800  PRINT "YOU CAN NOW SELL YOUR
      CLAIM TO A BIG    MINING CO
     MPANY AND RETIRE ON THE
      ROYALTIES."
810  END
```

Elevator routine.

```
830  IF Y < 32 THEN  HCOLOR= 3: DRAW
     6 AT X,Y: GOTO 850
840  HCOLOR= 0: DRAW 6 AT X,Y
850  HCOLOR= 0: DRAW 7 AT 257,P
860  GET A$
870  IF A$ < "I" OR A$ > "M" THEN
     860
880  ON  ASC (A$) - 72 GOTO 900,9
     40,860,860,960
```

Move elevator up.

```
900  IF P < 32 THEN 860
910 S = S - 1:EP = EP - 1:V = V -
     1
```

Draw new elevator, erase old, and draw cable to new elevator position.

```
920 P = P - 16: DRAW 7 AT 257,P: XDRAW
     7 AT 257,P + 16: HCOLOR= 3: HPLOT
     259,P TO 259,P + 16: HCOLOR=
     0: GOTO 860
```

Move elevator left.

```
940  XDRAW 7 AT 257,P: DRAW 5 AT
     257,P:Y = P: RETURN
```

Movement down.

```
960  IF P > 150 THEN 860
970 EP = EP + 1:S = S + 1:V = V +
     1

980 P = P + 16: DRAW 7 AT 257,P: XDRAW
     7 AT 257,P - 16: HPLOT 259,0
      TO 259,P - 16: GOTO 860
```

Routine to determine type of prospects.

```
1000 Z =  INT ( RND (1) * 6) + 1
1010  ON Z GOTO 1020,1030,1040,10
     50,1130
1020  POKE 34,20: HOME : PRINT "S
     ANDSTONE, EASY DIGGING": FOR
     I = 1 TO 500: NEXT I:M = M +
     4: GOSUB 710: RETURN
1030  POKE 34,20: HOME : PRINT "S
     OLID ROCK": FOR I = 1 TO 500
     : NEXT I:M = M - 25: GOSUB 7
     10: RETURN
1040  POKE 34,20: HOME :G =  INT
     ( RND (1) * 3 + 1):GC = GC +
     G: PRINT G;"OUNCE GOLD NUGGE
     T": FOR I = 1 TO 500: NEXT I
     : GOSUB 710: RETURN
1050  POKE 34,20: HOME : PRINT "U
     NDERGROUND SPRING": FOR I =
     1 TO 500: NEXT I
```

Fill all tunneled areas below miner with blue for water.

```
1060  FOR I = V + 1 TO 8
1070  FOR J = 1 TO 25
1080  IF C(J,I) = 2 THEN C(J,I) =
     3: HCOLOR= 2: DRAW 2 AT (J *
     10) - 3,(I + 2) * 16 - 1
1090  NEXT J
1100  NEXT I
1110  GOSUB 710
1120  HCOLOR= 0: RETURN
1130  POKE 34,20: HOME : PRINT "C
     AVE-IN": IF  INT ( RND (1) *
     5) = 1 THEN  PRINT "YOU LOSE
      ALL YOUR GOLD!": FOR I = 1 TO
     500: NEXT I:GC = 0: GOSUB 71
     0
```

Cave in a square area around miner.

```
1135  IF V < 3 THEN 1200
1140  FOR I = V - 2 TO V + 2
1145  HCOLOR= 1
1150  FOR J = H - 2 TO H + 2
1160  IF C(J,I) = 2 THEN C(J,I) =
     0: HCOLOR= 1: DRAW 2 AT J *
     10 - 3,(I + 2) * 16 - 1
1170  NEXT J
1180  NEXT I
1190  GOSUB 710
1200  RETURN
1210  TEXT : HOME : VTAB 10: HTAB
     10: PRINT "YOU HAVE GONE BAN
     KRUPT, IF YOU WOULD LIKE TO
     PLAY AGAIN TYPE RUN.": END
1220  END
```

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```
Shape table routine.
1230 L = 16384
1240  FOR MX = 1 TO 6
1250  READ B$
1260  FOR I = 1 TO  LEN (B$) STEP
     2
1270 AD =  ASC ( MID$ (B$,I,1)) -
     48
1280  IF AD > 9 THEN AD = AD - 7
1290 CH =  ASC ( MID$ (B$,I + 1,1
     )) - 48
1300  IF CH > 9 THEN CH = CH - 7
1310  POKE L,AD * 16 + CH
1320 L = L + 1: NEXT I
1330  NEXT MX
1340  RETURN
1350  DATA  "0700100021007300C500
     CA00EB00FB00"
1360  DATA  "363636363636363E2424
     2424242424040024242424242424
     2C2D2D2D2D363636363636363E3F
     3F3F27242424242424"
1370  DATA  "2C2D2D2D363636363636
     3E3F3F27242424242C2D2D3636
     3636363E3F27242424242C2D3636
     36363E3F252424242C3636363600
     "
1380  DATA  "2424242424343636363636
     3624242424242424242424242424
     242D2D2D2D2D2D2D2D2D2D2D2D2D
     2D2D2D2D353636363636363F3F3F
     3F3F3F3F3F3F3F2424243C3F3F
     3F3F3636363636363636363636363F
     0700"
1390  DATA  "2C3E2C06002D2D2D2D
     2524242424242424243F3F3F3F372D
     2D2D2D3636363636363E3F3F3F07
     002C242D3626242424243E363F2D
     360600"
1400  DATA  "2D2D2D2D252424242424
     24243F3F3F3F372D2D2D2D363636
     3636363E3F3F24242424241C1236
     3F1709313E36372E0500"
1410  TEXT : HOME : VTAB 10: HTAB
     10: PRINT "TOO BAD, THE OLD
     MINE JUST      DIDN'T PAN OU
     T.": END
```

BUGS, WORMS, and other undesirables

The following lines should be added to the S-80 version of "Convoy" published in the January **SoftSide**

```
50020 GOSUB101:POKEU+1,10:POKEU+2,15:US=USR(0):RETURN
50030 FORU=1TO5:OUT255,0:OUT255,1:NEXT:RETURN
50040 X9=LEN(F):V9=1023-32+X9/2:FORW9=1TOX9:F1=LEFT$(F,W9):GOSUB
50030:PRINT@V9-W9,F1;:NEXT:PRINT@V9-W9,STRING$(W9,32);:RETURN
50050 GOSUB101:POKEU+2,3:FORX=200TO90STEP-9:POKEU+1,X:US=USR(0):
NEXT:RETURN
```

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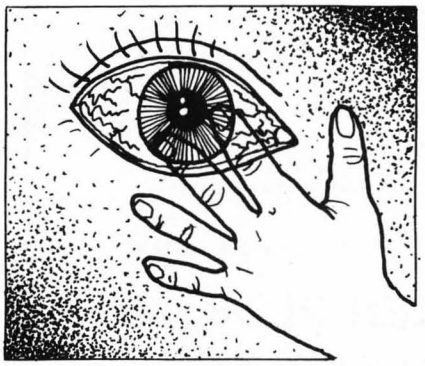
EYE HAND COORDINATION

by Judy Neyhart

You've all seen the type: eyes red and bloodshot from staring at the TV screen, thumb swollen to twice its original size from pounding frantically on the paddle button, shoulders and back permanently bent over from leaning toward the keyboard, and teeth clenched in a permanent grimace. That's my son, Andy, the "Pinball," "Invaders," "Asteroids," Wizard. Call him what you will, he's hooked on computer games. Let's start at the beginning...

When he was five, his kindergarten teacher said his eye/hand coordination needed work (you see, he couldn't cut out circles from construction paper and make them look like circles). This coordination is necessary for proper development of reading skills. Anything that we could furnish to help him develop this elusive eye/hand coordination would be invaluable for his education, she said. Enter "the father," very devoted, wanting to provide everything his children need (and also chafing at the bit to be the first one on his block to have his OWN computer). With these two prerequisites, the time was perfect to present the case to me. Yes, we were the first ones on our block to have our own computer (after four years, we're still the only ones on our block with our own computer).

Because we chose an Apple, the color graphics were eye-catching and the hand coordination developed quickly. The first game attacked was the "Little Brick Out" that comes at no charge with the computer (no charge - HA! They know that this will be the addictive drug that leads to a long spending spree on same after same. But I'm getting ahead of myself). Despite the summer heat, Andy *spent* the entire day playing "Brickout." After four hours, he had it mastered. Every single time he would destroy all the bricks with a single ball. A demolition team would have been envious of his destructive results.



The eye/hand was developing. MORE, he said. As Christmas was soon upon us, more he got. Santa Claus responded to his request. He next concentrated his new-found coordination on "Sink the Ship." Soon he could blow up hundreds of enemy battleships in one afternoon. MORE led to MORE.

"Invaders" was the beginning of a new trend for the Game Addict. He began putting up charts with his highest scores all over the walls. When a new high mark was reached, all the old scores were scratched off and the new ones scrawled in. The Game Addict had become a Chart Maker. "Invaders" did have something new. It was the first one with sound effects. I began to hear in my sleep the weird whirring of the space ships and the haunting splurt of the bombs exploding. The little laughing spacemen didn't laugh at him after the first day because he could clear the screen three times and get additional bases over and over.

"Pinball" was the first one that kept the high score automatically. That gave him a reason to play on. The ball-hitting talents he picked up with "Brickout" helped, but "Pinball" also required calculation of angles of deflection. The "Pinball" game required time to master, but the Wizard spent time willingly. He had to beat that score at the top of the screen. He began to be late for dinner. "I can't stop now, Mom, I'm in the middle of a game!"

The next game to be conquered was "Asteroids." Those little meteor-type shapes hurling at his spaceship didn't stop him for a minute. He could whirl his ship around in time to barely miss being demolished and then whirl back around and hit the offending asteroid in the back. It was something to watch.

"Bowling," we thought. That will take him a while longer to master, but no such luck. In a few hours the little man at the end of the alley could bounce up and down and get in *exactly the right* position (with Andy's help) to throw a strike almost every time. This, however, lent itself to the Chart Maker in a grand scale. Total Strikes, Total Spares, Consecutive Strikes, and Total Score were the chart titles that appeared on his walls.

With **Star Wars** fresh in his memory, "Death Star" was a must. If Yoda knew of Andy's talents, my son could easily become a Jedi Master. The round space ships, the ground installations, the space satellites, and even the reactor chute were easy targets. Fighter flying and shooting were added to his list of eye/hand acquisitions.

"Shooting Gallery" required a few minor changes in our hardware. You see, he was pushing the button so hard that his thumb was being bruised. His father put in a larger paddle button. Then the Wizard could go to town with his "trigger thumb." The first row of ducks could be wiped out easily. Even the decoy, Iron Bottom, didn't fool him. Then the second row of spiders fell prey to his gun. Those elusive little bull's-eyes could be hit with ease after his weeks of eye/hand training. If only the computer could pass out stuffed animals for the high score like they do at carnivals!

Yes, he's hooked. A Wizard at computer games? He's in fifth grade now and his kindergarten teacher would be amazed at his eye/hand coordination. But, I'd be happy to break his hand or blacken his eye every time he belittles my scores. You see, I can't even come close to any of his scores and I try, really I try. Oh, well, I can cut circles out of construction paper.

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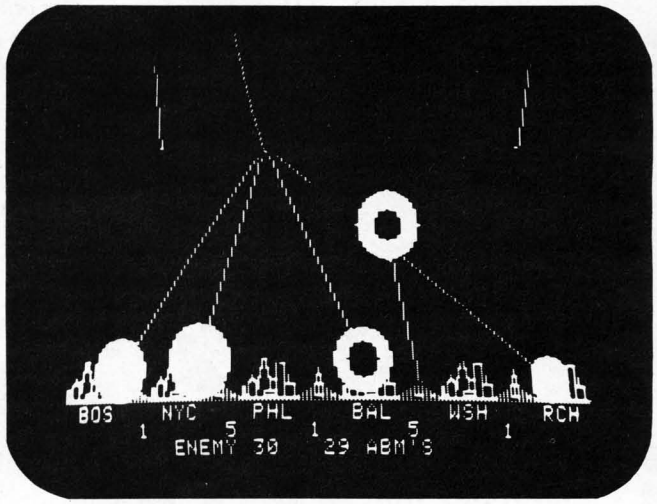

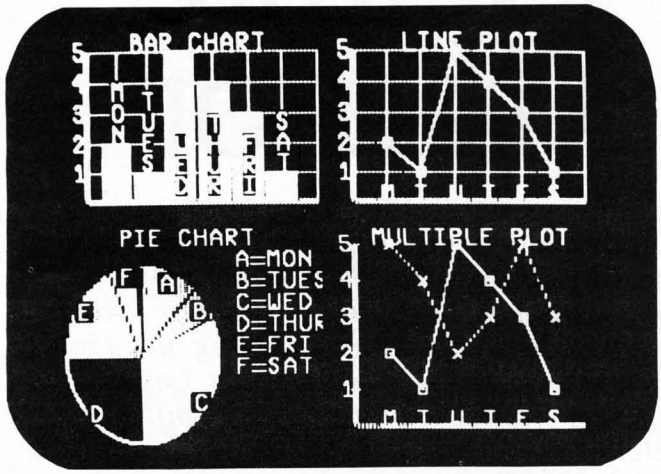

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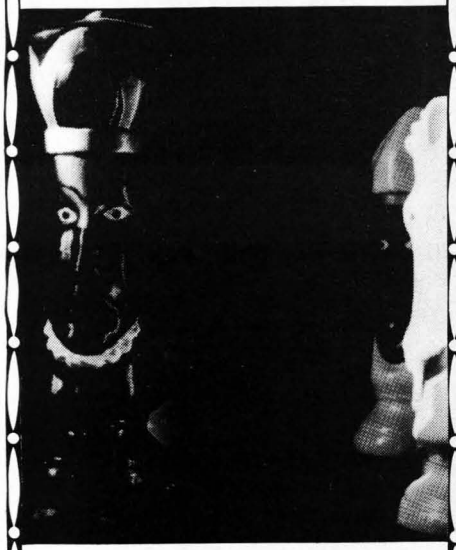

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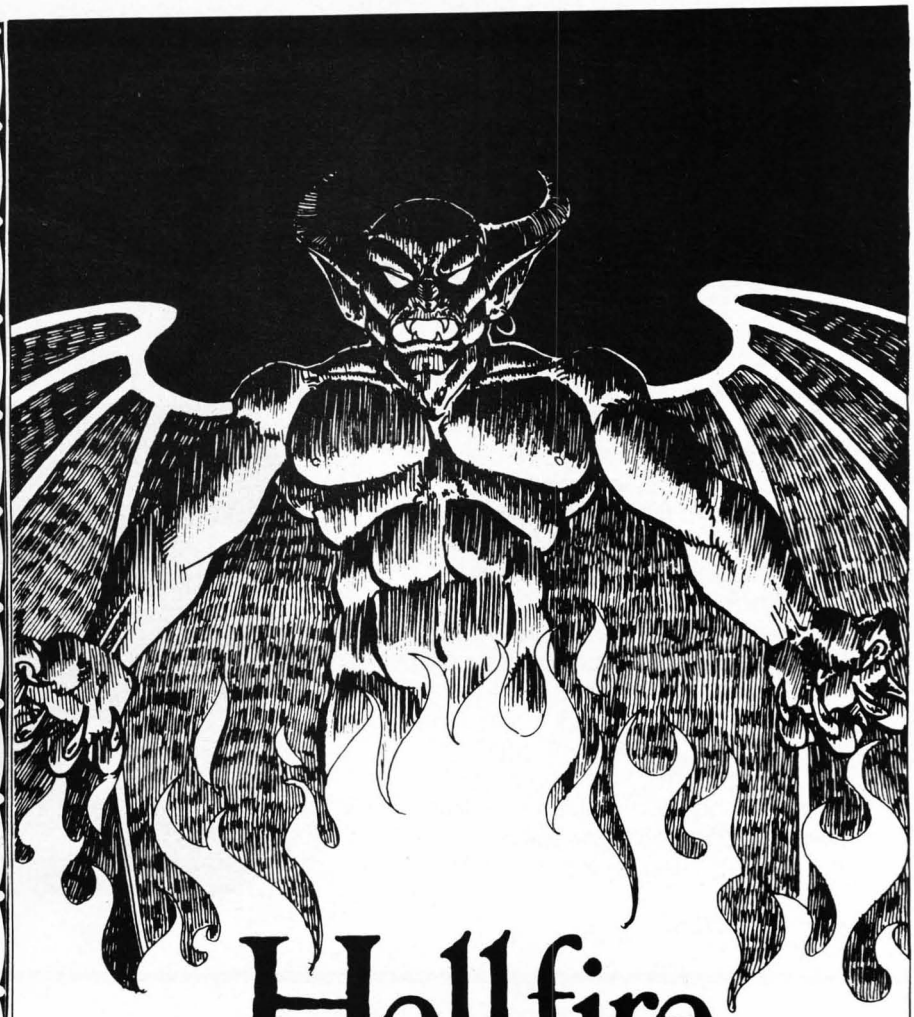

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FAMOUS SAYINGS HANGMAN

by Mark Cross

FAMOUS SAYINGS HANGMAN runs in 32K Apple with Applesoft.

This game is easier to play and more rewarding than most hangman games. It doesn't try to stump you with short impossible words like "zephyr," instead you get a long phrase to guess. You can decipher it from what you know of spelling and sentence structure. At the end you have rediscovered a famous proverb or metaphor. This is an educational game for children since it teaches reading and spelling.

More sayings are easy to add. Just insert the new message at line 2575 and add one to the maximum counter (N) in line 267. The program operates by starting at a random phrase in its list. Then it gives lower numbered phrases to guess until it reaches phrase #1. After that it recycles to the highest numbered phrase in its list. Study lines 265-268 for more detail.

MATRIX VARIABLES

E$ (8): The list of wrong guesses.
M$ (40): The secret phrase to be guessed.
OUT$ (40): A mixture of known letters and unknown dashes.
TEMP$ (40): Temporary string used while checking for correct letters that were found.

NON-MATRIX VARIABLES

A$: The letter guesses by the player.
E: Number of errors.
I: Count that moves through the secret phrase.
L: Length of secret phrase.
LMEM: LoMem, usually 2048 in Integer BASIC.
N: Number of the next secret phrase.
X$: Temporary character used in checking for correct guesses.

```
128 E$ = "":E = 0
Skips instructions for the next
game.
140  IF CC < > 0 THEN 195
150  TEXT : CALL  - 936: POKE  -
     16298,0
152  PRINT : PRINT : PRINT
155  PRINT "FAMOUS  SAYINGS  HA
     NGMAN"
157  PRINT : PRINT  TAB( 20);"COP
     YRIGHT 1980": PRINT  TAB( 20
     );"BY MARK CROSS": PRINT : PRINT
     : PRINT
159  FOR I = 1 TO 888: NEXT I
170  PRINT "THIS IS A HANGMAN GAM
     E WITH": PRINT "FAMOUS SAYIN
     GS FOR YOU TO GUESS.": PRINT
171  FOR I = 1 TO 2555: NEXT I
172  PRINT "THE SAYINGS ARE UP TO
      40 CHARACTERS LONG INCLUDIN
     G NUMBERS AND LETTERS.": PRINT
174  FOR I = 1 TO 2111: NEXT I
175  PRINT "YOU CAN GUESS ONE CHA
     RACTER AT A"
176  PRINT "TIME.  ON THE FIFTH M
     ISTAKE YOU WILL BE   X X X
     HUNG  X X X.": PRINT
178  FOR I = 1 TO 1666: NEXT I
179  PRINT "PRESS ANY KEY TO STAR
     T.  ";
181  POKE  - 16368,0: GET A$
185  CALL  - 936: VTAB 21: HTAB 1
     : PRINT "GUESS WHAT THE DASH
     ES MEAN."
The random value of N determines
what saying will be used.
190 N = 5 +  INT (111 * RND (1))
195 CC = 1: GR : COLOR= 7: FOR I =
     0 TO 39: HLIN 0,39 AT I: NEXT
     I: GOSUB 1030
255  GOSUB 258
256  GOTO 267
258  ON N GOTO 2000,2005,2010,201
     5,2020,2025,2030,2035,2040,2
     045,2050,2055,2060,2065,2070
     ,2075,2080,2085,2090,2095,21
     00
259  ON (N - 21) GOTO 2105,2110,2
     115,2120,2125,2130,2135,2140
     ,2145,2150,2155,2160,2165,21
     70,2175,2180,2185,2190,2195,
     2200
260  ON (N - 41) GOTO 2205,2210,2
     215,2220,2225,2230,2235,2240
     ,2245,2250,2255,2260,2265,22
     70,2275,2280,2285,2290,2295,
     2300
261  ON (N - 61) GOTO 2305,2310,2
     315,2320,2325,2330,2335,2340
     ,2345,2350,2355,2360,2365,23
     70,2375,2380,2385,2390,2395,
     2400
262  ON (N - 81) GOTO 2405,2410,2
     415,2420,2425,2430,2435,2440
     ,2445,2450,2455,2460,2465,24
     70,2475,2480,2485,2490,2495,
     2500
263  ON (N - 101) GOTO 2505,2510,
     2515,2520,2525,2530,2535,254
     0,2545,2550,2555,2560,2565,2
     570,2575,2580,2585,2590,2595
     ,2600
267 N = N - 1: IF N < 1 THEN N =
     115
Form the string OUT$ with dashes
for unknown letters.
268 L =  LEN (M$):OUT$ = "": FOR
     I = 1 TO L
270 A$ = "-":X$ =  MID$ (M$,I,1)
272  IF  ASC (X$) < 48 OR  ASC (X
     $) > 90 THEN A$ = X$
274 OUT$ = OUT$ + A$: NEXT I
280  VTAB 22: PRINT OUT$
300  VTAB 23: HTAB 30: PRINT "GUE
     SS  ? ";
303  GET A$:I =  PEEK ( - 16336) +
      PEEK ( - 16336) -  PEEK ( -
     16336)
304  IF  ASC (A$) = 3 THEN  END
306  IF  ASC (A$) < 48 OR  ASC (A
     $) > 90 THEN 303
355  VTAB 23: HTAB 30: PRINT "
          ";
Look for a match between A$ and
something in M$.  Line 365 saves
the match position as 'J' and sets
I=999 to avoid leaving an
unfinished loop.
360  FOR I = 1 TO L
365 J = I: IF  MID$ (M$,I,1) = A$
      THEN I = 999
370  NEXT I
372  IF I < 888 THEN 375
373 I = J: GOTO 450
Go to line 375 for a wrong guess.
375 E = E + 1:E$ = E$ + A$
380  ON E GOTO 1042,1055,1065,107
     5,1085,1094
385  FOR I = 1 TO 50:X =  PEEK ( -
     16336): POKE  - 16336,0: NEXT
     I
387  IF E <  > 3 THEN 395
389 E = 4: GOTO 380
395  VTAB 22: HTAB 1: PRINT OUT$
400  IF E < 1 THEN 300
403  VTAB 24: HTAB 1
405  PRINT "MISTAKES:  ";: FOR I
      = 1 TO E
406  PRINT  MID$ (E$,I,1);" ";: NEXT
     I
407  IF E = 6 THEN 570
410  GOTO 300
Put some control-G bells in the
next line.  Lines 450-600 process a
right guess.
```

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```
450  HTAB 1: VTAB 21: PRINT "x x
     x   H I T   x x x
         "
451  FOR II = 1 TO L: IF  MID$ (M
     $,II,1) <  > A$ THEN 459
452  IF II > 1 AND II < L THEN 45
     8
453  IF II = 1 THEN 457
455 OUT$ =  LEFT$ (OUT$,L - 1) +
     A$: GOTO 459
457 OUT$ = A$ +  MID$ (OUT$,2,L -
     1): GOTO 459
458 OUT$ =  LEFT$ (OUT$,II - 1) +
     A$ +  RIGHT$ (OUT$,L - II)
459  NEXT II
460  VTAB 22: HTAB 1: PRINT OUT$
461  HTAB 1: IF E < 1 THEN 464
462  VTAB 24: PRINT "MISTAKES:
     ";: FOR I = 1 TO E: PRINT  MID$
     (E$,I,1);" ";: NEXT I
464  FOR I = 1 TO L
465  IF  MID$ (OUT$,I,1) = "-" THEN
     I = 999
470  NEXT I
471  VTAB 21: HTAB 1: PRINT "
                           ";
472  IF I > 777 THEN 300
 Put some control-G bells in the
 next line.
474  VTAB 21: HTAB 1: PRINT " Y O
      U    G O T   I T !
         "
476  GOTO 600
570  GOSUB 5000
580  FOR J = 1 TO 3: FOR I = 1 TO
     100:X =  PEEK ( - 16336): POKE
      - 16336,0: NEXT I:Y = 123 *
     12: NEXT J
590  VTAB 22: HTAB 1: PRINT M$;
600  FOR I = 1 TO 1222: NEXT I
610  VTAB 24: HTAB 1: PRINT "
            ";: HTAB 1
620  PRINT "PRESS 'S' TO STOP;  R
     ETURN TO CONTINUE.";
621  POKE  - 16368,0
622 I =  PEEK ( - 16384): IF I <
     128 THEN 622
623  POKE  - 16368,0
624  CALL  - 936: IF I <  > 211 THEN
     128
630  END
 Draw Gallows.
1030  COLOR= 0: HLIN 2,22 AT 1: HLIN
     2,22 AT 2: VLIN 1,36 AT 3: VLIN
     1,36 AT 2: HLIN 4,34 AT 35: HLIN
     4,34 AT 36: RETURN
 Draw head.
1042  COLOR= 9: VLIN 3,5 AT 19: HLIN
     17,21 AT 6: VLIN 7,12 AT 16:
      VLIN 7,12 AT 22: HLIN 17,21
      AT 13
1044  HLIN 18,20 AT 11: PLOT 18,8
     : PLOT 20,8: GOTO 385
 Draw body.
1055  COLOR= 4: VLIN 15,24 AT 18:
      VLIN 15,24 AT 20: VLIN 14,2
     4 AT 19: GOTO 385
 Draw right arm.
1065  COLOR= 9: VLIN 17,22 AT 15:
      VLIN 16,17 AT 16: PLOT 14,2
     2: VLIN 15,16 AT 17: GOTO 38
     5
 Draw left arm.
1075  COLOR= 9: VLIN 17,22 AT 23:
      VLIN 16,17 AT 22: PLOT 24,2
     2: VLIN 15,16 AT 21: GOTO 38
     5
 Draw right leg.
1085  COLOR= 9: VLIN 24,25 AT 17:
      VLIN 25,26 AT 16
1086  VLIN 26,31 AT 15: PLOT 14,3
     1: GOTO 385
 Draw left leg.
1094  COLOR= 9: VLIN 24,25 AT 21:
      VLIN 25,26 AT 22
1096  VLIN 26,31 AT 23: PLOT 24,3
     1: GOTO 385
 Metaphors, proverbs, and quotations
 to guess.
2000 M$ = "A STITCH IN TIME SAVES
      NINE.": RETURN
2005 M$ = "A FOOL AND HIS MONEY A
     RE SOON PARTED.": RETURN
2010 M$ = "ROSES ARE RED, VIOLETS
      ARE BLUE.": RETURN
2015 M$ = "SPARE THE ROD AND SPOI
     L THE CHILD.": RETURN
2020 M$ = "IF AT FIRST YOU DON'T
     SUCCEED TRY AGAIN": RETURN
2025 M$ = "THE QUALITY OF MERCY I
     S NOT STRAINED.": RETURN
2030 M$ = "LAUGH AND THE WORLD LA
     UGHS WITH YOU.": RETURN
2035 M$ = "FLOAT LIKE A BUTTERFLY
     , STING LIKE A BEE": RETURN
2040 M$ = "APPLE COMPUTERS HAVE N
     O WORMS.": RETURN
2045 M$ = "THE LION IS THE KING O
     F BEASTS.": RETURN
2050 M$ = "EARLY TO BED, EARLY TO
      RISE": RETURN
2055 M$ = "THE EARLY BIRD CATCHES
      THE WORM.": RETURN
2060 M$ = "I'M DREAMING OF A WHIT
     E CHRISTMAS.": RETURN
2065 M$ = "DON'T BURN YOUR CANDLE
      AT BOTH ENDS.": RETURN
2070 M$ = "A PENNY SAVED IS A PEN
     NY EARNED.": RETURN
2075 M$ = "AN EVIL MAN HAS A BOLD
      MOUTH.": RETURN
2080 M$ = "A WISE SON MAKES A GLA
     D FATHER.": RETURN
2085 M$ = "IT IS A SPORT TO A FOO
     L TO DO MISCHIEF.": RETURN
2090 M$ = "SIMPLE PEOPLE BELIEVE
     POLITICIANS.": RETURN
2095 M$ = "A SOFT ANSWER TURNETH
     AWAY WRATH.": RETURN
2100 M$ = "ONLY FOOLS REFUSE TO B
     E TAUGHT.": RETURN
2105 M$ = "A NAGGING WIFE IS LIKE
      DRIPPING WATER.": RETURN
2110 M$ = "OH BEAUTIFUL FOR SPACI
     OUS SKIES": RETURN
2115 M$ = "UNDER THE SPREADING CH
     ESTNUT TREE": RETURN
2120 M$ = "HE WHO PLANTS A TREE P
     LANTS A HOPE.": RETURN
2125 M$ = "BREATHES THERE A MAN W
     ITH SOUL SO DEAD?": RETURN
2130 M$ = "THERE IS NO PLACE LIKE
      HOME.": RETURN
2135 M$ = "DISCRETION IS THE BETT
     ER PART OF VALOR.": RETURN
2140 M$ = "FOUR SCORE AND SEVEN Y
     EARS AGO": RETURN
2145 M$ = "WHEN IN THE COURSE OF
     HUMAN EVENTS": RETURN
2150 M$ = "BEAUTY IS ONLY SKIN DE
     EP.": RETURN
2155 M$ = "CHILDREN OBEY YOUR PAR
     ENTS.": RETURN
2160 M$ = "A WORD TO THE WISE IS
     SUFFICIENT.": RETURN
2165 M$ = "A FOOL'S MOUTH IS HIS
     RUIN.": RETURN
2170 M$ = "HE WHO LOVES PLEASURE
     SHALL BE POOR.": RETURN
2175 M$ = "WHERE THERE IS SMOKE T
     HERE IS FIRE.": RETURN
2180 M$ = "A ROLLING STONE GATHER
     S NO MOSS.": RETURN
2185 M$ = "EXPERIENCE IS A HARD T
     EACHER.": RETURN
2190 M$ = "A POEM AS LOVELY AS A
     TREE": RETURN
2195 M$ = "RED SKY AT NIGHT, SAIL
     OR'S DELIGHT": RETURN
2200 M$ = "DON'T BITE OFF MORE TH
     AN YOU CAN CHEW.": RETURN
2205 M$ = "ASK WHAT YOU CAN DO FO
     R YOUR COUNTRY.": RETURN
2210 M$ = "ONE IF BY LAND, TWO IF
      BY SEA": RETURN
2215 M$ = "AS HARMLESS AS A DOVE"
     : RETURN
2220 M$ = "GO WEST YOUNG MAN.": RETURN
2225 M$ = "A GENTLEMAN'S WORD IS
     HIS BOND.": RETURN
2230 M$ = "ALL'S WELL THAT ENDS W
     ELL.": RETURN
2235 M$ = "FAILURE IS THE LINE OF
      LEAST PERSISTENCE": RETURN
2240 M$ = "DON'T BURN YOUR CANDLE
      AT BOTH ENDS.": RETURN
2245 M$ = "TIME AND TIDE WAIT FOR
      NO MAN.": RETURN
2250 M$ = "AS BUSY AS A BEAVER": RETURN
2255 M$ = "AS BUSY AS A BEE": RETURN
2260 M$ = "A MEMORY LIKE AN ELEPH
     ANT": RETURN
2265 M$ = "AS SLY AS A FOX": RETURN
2270 M$ = "PRETTY AS A PICTURE": RETURN
2275 M$ = "KNEE HIGH BY THE FOURT
     H OF JULY": RETURN
2280 M$ = "A LISTENER IS A SILENT
      FLATTERER.": RETURN
2285 M$ = "THE POT CALLED THE KET
     TLE BLACK.": RETURN
2290 M$ = "IT'S RAINING CATS AND
     DOGS.": RETURN
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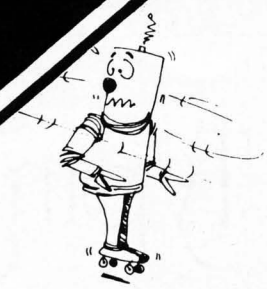
```
2295 M$ = "GIVE ME LIBERTY OR GIV
     E ME DEATH.": RETURN
2300 M$ = "WHO'S THE FAIREST OF T
     HEM ALL?": RETURN
2305 M$ = "LANGUAGE IS THE DRESS
     OF THOUGHT.": RETURN
2310 M$ = "NO MAN CAN SERVE TWO M
     ASTERS.": RETURN
2315 M$ = "AS CUTE AS A BUTTON": RETURN
2320 M$ = "AS MAD AS A HORNET": RETURN
2325 M$ = "AS STRONG AS AN OX": RETURN
2330 M$ = "AS HUNGRY AS A BEAR": RETURN
2335 M$ = "AS FAT AS A PIG": RETURN
2340 M$ = "AS HAPPY AS A LARK": RETURN
2345 M$ = "THANK GOD IT'S FRIDAY.
     ": RETURN
2350 M$ = "LAUGH AND THE WORLD LA
     UGHS WITH YOU.": RETURN
2355 M$ = "REJOICE IN THE WIFE OF
      THY YOUTH.": RETURN
2360 M$ = "2 4 6 8  WHO DO WE APP
     RECIATE?": RETURN
2365 M$ = "PATIENCE IS PASSION TA
     MED.": RETURN
2370 M$ = "HERE TODAY AND GONE TO
     MORROW": RETURN
2375 M$ = "ONE GIANT LEAP FOR MAN
     KIND": RETURN
2380 M$ = "BLESSED ARE THE PEACEM
     AKERS.": RETURN
2385 M$ = "TO BE OR NOT TO BE": RETURN
2390 M$ = "UNCLE SAM NEEDS YOU.":
      RETURN
2395 M$ = "GARBAGE IN, GARBAGE OU
     T": RETURN
2400 M$ = "PAINT THE TOWN RED.": RETURN
2405 M$ = "KEEP YOUR MOUTH AND KE
     EP YOUR LIFE.": RETURN
2410 M$ = "AN APPLE FOR THE TEACH
     ER": RETURN
2415 M$ = "A FOOL'S HONOR IS SUMM
     ER SNOW.": RETURN
2420 M$ = "NICE GUYS FINISH LAST.
     ": RETURN
2425 M$ = "A CHEERFUL HEART IS GO
     OD MEDICINE.": RETURN
2430 M$ = "KIND WORDS ARE LIKE HO
     NEY.": RETURN
2435 M$ = "CHILDREN ARE POOR MEN'
     S RICHES.": RETURN
2440 M$ = "AS GOOD AS GOLD": RETURN
2445 M$ = "FASTER THAN A SPEEDING
      BULLET": RETURN
2450 M$ = "BAREFOOT BOY WITH CHEE
     KS OF TAN": RETURN
2455 M$ = "LIFE IS REAL, LIFE IS
     EARNEST.": RETURN
2460 M$ = "OLD SOLDIERS NEVER DIE
     .": RETURN
2465 M$ = "AS HIGH AS A KITE": RETURN
2470 M$ = "COKE ADDS LIFE.": RETURN
2475 M$ = "PRIDE GOETH BEFORE A F
     ALL.": RETURN
2480 M$ = "LOOK TO THE ANT, THOU
     SLUGGARD.": RETURN
2485 M$ = "AN APPLE A DAY KEEPS T
     HE DOCTOR AWAY.": RETURN
2490 M$ = "A POEM AS LOVELY AS A
     TREE": RETURN
2495 M$ = "COLORS ARE THE SMILES
     OF NATURE.": RETURN
2500 M$ = "2 GOOD 2 BE 4 GOTTEN":
      RETURN
2505 M$ = "AS AMERICAN AS APPLE P
     IE": RETURN
2510 M$ = "THE SKY IS FALLING.": RETURN
2515 M$ = "PENNY WISE AND POUND F
     OOLISH": RETURN
2520 M$ = "WE THE PEOPLE": RETURN
2525 M$ = "TEMPIS FUGIT": RETURN
2530 M$ = "THE CHILD IS FATHER OF
      THE MAN.": RETURN
2535 M$ = "NECESSITY IS THE MOTHE
     R OF INVENTION.": RETURN
2540 M$ = "SEEING IS BELIEVING.":
      RETURN
2545 M$ = "POOR BUT HONEST": RETURN
2550 M$ = "HANG IT UP, LOSER.": RETURN
2555 M$ = "IN THE GOOD OLD SUMMER
     TIME": RETURN
2560 M$ = "I CAME,  I SAW,  I CON
     QUERED.": RETURN
2565 M$ = "HUSBANDS, LOVE YOUR WI
     VES.": RETURN
2570 M$ = "THE EVIL THAT MEN DO L
     IVES AFTER THEM.": RETURN
2575 N = 1: GOTO 261
2580 N = 1: GOTO 261
2585 N = 1: GOTO 261
2590 N = 1: GOTO 261
2595 N = 1: GOTO 261
2600 N = 1: GOTO 261
```

Hanging routine.

```
5000  COLOR= 7
5005  HLIN 10,28 AT 35: HLIN 10,2
     8 AT 36
5010  FOR I = 8 TO 26: VLIN 6,31 AT
     I: NEXT I
5012  COLOR= 0: VLIN 3,10 AT 19
5015  COLOR= 8
5020  HLIN 16,22 AT 11
5025  HLIN 16,22 AT 18
5030  VLIN 12,17 AT 15: VLIN 12,1
     7 AT 23
5035  PLOT 17,13: PLOT 21,13: PLOT
     17,17: PLOT 21,17
5040  HLIN 17,21 AT 16
5045  COLOR= 4
5050  VLIN 19,30 AT 18: VLIN 19,3
     0 AT 19: VLIN 19,30 AT 20
5055  COLOR= 4
5060  PLOT 17,20: PLOT 21,20
5065  VLIN 21,27 AT 16: VLIN 21,2
     7 AT 22
5070  COLOR= 9
5075  VLIN 31,37 AT 18: VLIN 31,3
     7 AT 20
5080  RETURN
```

End of program.

TRS-80 LEVEL II



Board Games-1, CS-3001 (16K)

• Mugwump $7.95

Mugwump is a board game which uses a 10x10 grid on which four friendly Mugwumps are hiding. Your mission is to locate these mysterious animals and capture them.

• Flip Disc

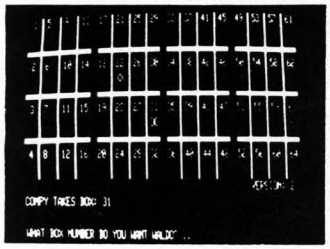
Are you an Othello freak? Flip Disc is a program which will turn your computer into an excellent opponent. Three different skill levels, (good, expert, and genius), provide an introduction for the novice and continuing interest for the experienced player.

• Wumpus

In game 1, you scour a network of underground caves in search of the prized Wumpus. Bagging a Wumpus wins the game, but if you accidentally stumble into his cave, the Wumpus will enjoy a tasty dinner of sauteed computer freak.

• Wumpus 2

If you master the dodecahedron cave network in Wumpus 1, you may proceed to Wumpus 2 which allows you to choose from five different caves, or you can design your own.



• Qubic

Qubic is a three dimensional Tic Tac Toe game. The game is played in a 3 dimensional cube (4x4x4). The object is to outwit the computer and place four pieces in any straight line.

• Backgammon

This is the TRS-80 adaptation of the popular board game. Backgammon uses graphics and all the standard backgammon rules, not a strange computer variation. The computer is your opponent in this version, written by Scott Adams of "Adventure" fame.

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Space Games-3, CS-3002 (16K)

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Ultra-Trek is a fast-paced version of Star Trek, complete with "real time" action graphics, lasers, Nilon space mines, high energy photon torpedoes, enemy ships that move, and an experimental ray which does something different each time you use it. You must act quickly to save yourself and the Federation.

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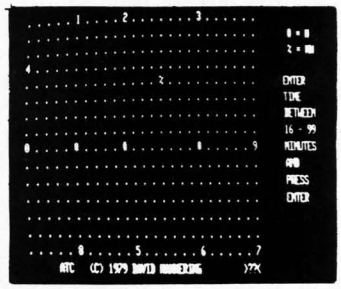
If you hate Darth Vader, you'll love Star Wars. This real time game is fun for aliens of all ages. May the Force be with you!

• Romulan

Your mission is to destroy an invading Romulan space craft. Maneuver through space and around stars looking for the deadly enemy, but be careful! The nasty Romulans fire back.



Air Traffic Controller, CS-3006 (16K) *$7.95*

This real time machine language program puts you in the chair of an air traffic controller. There are 27 airplanes — jets and prop planes — which must be controlled as they land, take off and fly over your air space. You give the orders to change altitude, turn, maintain a holding pattern, clear for approach, and land at your two airports. This realistic simulation includes navigational beacons, and requires planes to take off and land into the wind. Air Traffic Controller was written by an air traffic controller and is a favorite of the Creative Computing staff!

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Jigsaw is a computer-age puzzle game making extensive use of TRS-80 graphics. The computer generates a random puzzle and puzzle board. Using a combination of deductive reasoning and luck you must fit the *graphically* represented puzzle piece into place.

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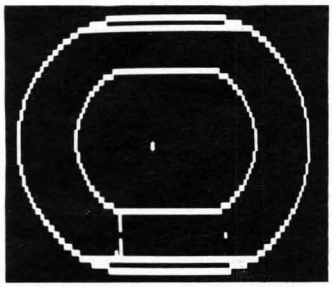
Are you a wandering pro or just a Sunday golfer who would like to keep in practice? Once you're on the green, a worm's-eye view is displayed for putting.



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Motor Racing combines real time racing action with advanced graphics functions. The graphics and animation make Motor Racing fun to watch as well as play.

Pursuit Games, CS-3004 (16K)

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Stock Car Race is a real time racing game on a road race circuit.

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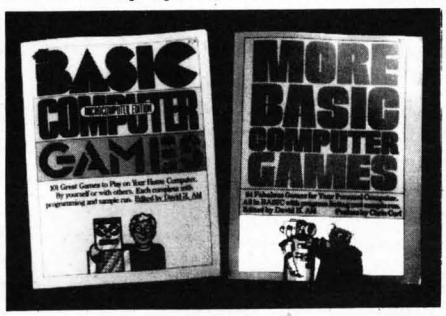

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CHANGING HEARTS

by Stan Ockers

CHANGING HEARTS is an Atari program requiring 8K of memory.

"CHANGING HEARTS" is a version of the puzzle also known under the name "Teaser" or "Shooting Stars." The object is to go from a pattern of dark hearts surrounding a light colored heart to one where light colored hearts surround a dark one. As you select individual hearts, different groups of hearts will be complemented depending on your choice. Selecting a corner will change four hearts in a square including that corner. Choosing a heart at the middle of an edge will reverse all hearts along that edge. Finally, if the central heart is chosen, all hearts in a cross will be switched.

The first challenge is simply to solve this puzzle without losing any hair. A higher challenge is to solve it in the fewest moves possible. Supposedly, this number is eleven. If at any time you wish to return to the starting position, press the letter "I", (initialize). This will cost you a turn, however.

You can save yourself a lot of typing from omiting the instructions, (lines 1000-1110), and deleting line 60.

Of interest to programmers will be the extensive use of strings to hold integer numbers (0-255). There are a number of good reasons for doing this. First, a single character in a string requires much less memory than a number, (two bytes compared to seven). The numbers can be retrieved easily using Atari's string splitting convention (see line 900). String comparison is also useful for comparing entire groups of numbers at once. Notice how easy it is to check for a win or loss in lines 250 and 260. The numbers are entered into strings as control graphics.

Many lines in" Changing Hearts" contain special control characters *which DO NOT* show up in this listing. To enter these special characters, hold the control key down while typing the upper case letters and the commas below:
Line 30: P$ should contain HCJCLCHEJELEHGJGLG
Line 40: G$ contains ABDE,ABC, ,BCEF,ADG,,BDEFHCFI, ,DEGH,GHI,,EFHI
Lines 410-440 contain graphics in their PRINT statement as follows:
Line 410: QRWRWRE
Line 420: ARSRSRD
Line 430: ARSRSRD
Line 440: ZRXRXRC

In lines 1000 and 1010, there should be two control commas (heart characters) in each line PRINT statement. The first one after the open parenthesis character, and one before the closing parenthesis. The first heart in line 1000, and the second one in line 1010, should also be typed in reverse video, as should the word "light" in lines 220 and 1010.

PROGRAM EXPLANATION

Lines 10-40: The keyboard is opened for input to get keys without requiring a RETURN. Various strings are initialized. See the instructions for special comments concerning P$ and G$

Lines 50-60: Title — The hearts blink in and out because of the POKEs which change from upper-case to lower-case graphics mode and back, (POKEs into 756)

Lines 170-180: Initialize game — The board is printed along with the initial heart configuration.

Line 190-270: Main loop of game — Gets player selection, checks for legal move, flashes appropriate group and complements hearts in that group, checks for winning or losing situations and repeats. CHR$(125) clears the text area.

Lines 300-310: Advises of a losing condition

Lines 350-380: Acknowledges a win, small demonstration, asks if repeat wanted. The POKEs into 708 are another way to change colors (color register 0). The POKEs into 656 and 657 align the cursor in the text area (row and column). The POKE into 76 clears the last key byte.

Lines 400-450: Subroutine to print the board. The SETCOLOR 4,2,8 is necessary so the background hearts in graphics mode 2 don't show because they are the same color as the background. The SETCOLOR 3,4,10 makes the light hearts especially light so they show up well on a black and white TV. CHR$(124) creates the vertical lines, completing squares. The POKE into 752 blanks the cursor.

Lines 500-550: Subroutine to put hearts on the board. Flag F controls the configuration printed as described under variables.

Lines 600-620: Subroutine which flashes hearts in a group determined by the number selected, N. The subroutine then complements these hearts.

Lines 700-730: Delay subroutine used during instructions and in winning and losing routines. Delay determined by point where entered.

Lines 750-770: Keyboard input subroutines which prompts and waits for any key to be pressed.

Lines 800-850: A subroutine which operates on a group of positions determined by the number N. Hearts may be printed, erased or complemented depending on the flag F.

Line 900: Subroutine to retrieve screen positions from string P$.

Line 1000-1110: Instructions subroutine—Gives instructions through demonstration so it uses other subroutines, setting flags accordingly.

VARIABLE LISTING

B$, D$: Hold bright and dark heart control characters.
H$: Holds the heart pattern presently on the screen.
F$: Holds the finishing heart pattern for comparison for a win.
L$: Holds the losing heart pattern (all dark).
S$: Holds the starting heart pattern (dark surrounding a center light heart).
N$: Holds the numbers to be printed during instructions to show heart positions.
I,J,K,L: General variables.
K: Key pressed.
T: Turn number.
F: Flag.

In subroutine 600-620 controls the configuration printed on the screen: (1)present (2)starting

(3)finishing (4)location (5) losing.

In subroutine 800-850 determines if hearts are to be: (1)erased (2)printed (3)complemented.

N: Number of the hearts chosen (1-9).

SN: Save N (must be recovered at the end of the subroutine).

H: Heart character from the screen.

X,Y: Horizontal and Vertical positions of the screen.

C: Count used in delay subroutine.

```
 10 DIM P$(18),G$(45),B$(1),D$(1),H$(9)
,F$(9),L$(9),S$(9),N$(9):OPEN #1,4,0,"
K:"
20 D$=CHR$(160):B$=CHR$(128):FOR I=1 T
O 9:L$(I)=D$:F$(I)=B$:NEXT I:S$=L$:S$(
5,5)=B$:F$(5,5)=D$
30 P$="See above for P$  ":N$="1234567
89"
40 G$="See above for G$"
50 GRAPHICS 2:POSITION 2,5:? #6;"CHANG
ING HEARTS":FOR I=3 TO 6:SETCOLOR 0,I,
4:SOUND 0,RND(0)*40+10,10,8
55 GOSUB 710:POKE 756,226:SOUND 0,RND(
0)*40+10,10,8:GOSUB 710:POKE 756,224:N
EXT I:SOUND 0,0,0,0
60 POKE 752,1:? :? ,"Need Instructions
?":? ,"    ( Y or N )":GET #1,K:IF K=8
9 THEN GOSUB 1000
170 T=0
180 H$=S$:GOSUB 400:F=2:GOSUB 500
190 T=T+1
200 ? CHR$(125);"Turn # ";T:? "Pick a
number (1-9)"
210 GET #1,K:N=K-48:IF N=25 THEN 180
215 IF N<1 OR N>9 THEN 210
220 GOSUB 900:GET #6,H:IF H=160 THEN ?
 CHR$(125):? :? "You may only pick lig
ht hearts.":GOSUB 760:GOTO 210
250 GOSUB 600:IF H$=L$ THEN 300
260 IF H$=F$ THEN 350
270 GOTO 190
300 FOR S=30 TO 190:SOUND 0,S,10,8:NEX
T S:SOUND 0,0,0,0:? CHR$(125):? "Sorry
, there's no way out !!!":GOSUB 750
310 GOTO 370
350 ? CHR$(125):FOR J=0 TO 14:POKE 708
,4+16*J:SOUND 0,50-2*J,10,8:GOSUB 730:
POKE 708,40:GOSUB 730
351 NEXT J:SOUND 0,0,0,0
360 POKE 656,1:POKE 657,10:? "CONGRATU
LATIONS !!!":? "You did it in ";T;" tu
rns.":GOSUB 750
370 POKE 764,255:? CHR$(125):? :? "Car
e to try again? (Y or N)":GET #1,K:IF
K=89 THEN 170
380 ? "Thanks for the game.":END
400 GRAPHICS 2:SETCOLOR 4,2,8:SETCOLOR
 3,4,10:POKE 756,226:POKE 752,1
410 POSITION 7,2:? #6;""
420 POSITION 7,4:? #6;""
430 POSITION 7,6:? #6;""
440 POSITION 7,8:? #6;""
450 FOR X=7 TO 13 STEP 2:FOR Y=3 TO 7
STEP 2:POSITION X,Y:? #6;CHR$(124);:NE
XT Y:NEXT X:RETURN
500 FOR N=1 TO 9:GOSUB 900:IF F=1 THEN
 ? #6;H$(N,N);
510 IF F=2 THEN ? #6;S$(N,N);
520 IF F=3 THEN ? #6;F$(N,N);
530 IF F=4 THEN ? #6;N$(N,N);
540 IF F=5 THEN ? #6;L$(N,N);
550 NEXT N:RETURN
600 FOR L=1 TO 5:F=1:GOSUB 800:SOUND 0
,5*N+50,10,8:F=2:GOSUB 800:SOUND 0,5*N
+80,10,8
620 NEXT L:SOUND 0,0,0,0:F=3:GOSUB 800
:RETURN
700 FOR K=0 TO C:NEXT K:RETURN
710 C=150:GOTO 700
720 C=1000:GOTO 700
730 C=30:GOTO 700
750 POKE 764,255:? ,"(Press any key)";
760 IF PEEK(764)=255 THEN 760
770 RETURN
800 SN=N:J=5*(N-1):FOR I=1 TO 5:N=ASC(
G$(J+I)):IF N=0 THEN 850
810 GOSUB 900:IF F=1 THEN ? #6;" ";
820 IF F=2 THEN ? #6;H$(N,N);
830 GET #6,Z:IF F=3 AND Z=160 THEN POS
ITION X,Y:? #6;B$;:H$(N,N)=B$
840 IF F=3 AND Z=128 THEN POSITION X,Y
:? #6;D$;:H$(N,N)=D$
850 NEXT I:N=SN:RETURN
900 X=ASC(P$(2*N-1)):Y=ASC(P$(2*N)):PO
SITION X,Y:RETURN
1000 H$=S$:GOSUB 400:F=2:GOSUB 500:? "
Go from this pattern ...":? ,"('s aro
und )":GOSUB 750
1010 F=3:GOSUB 500:? CHR$(125);"To thi
s pattern ('s around )":? "by choosi
ng light hearts.":GOSUB 750
1020 GRAPHICS 2:F=4:GOSUB 500:POKE 752
,1:? "These are the position numbers."
:? "Different groups of hearts will be
"
1030 ? "reversed depending on your cho
ice.":GOSUB 750:F=2:GOSUB 400:GOSUB 50
0
1040 ? "If you pick the center square,
 the":? "hearts in a cross will be rev
ersed."
1050 GOSUB 720:N=5:GOSUB 600:GOSUB 750
:? CHR$(125);"If you choose the middle
 square on"
1060 ? "an edge, the whole edge will b
e":? "reversed.":GOSUB 720:N=8:GOSUB 6
00:GOSUB 750
1070 ? CHR$(125);"If you pick a corner
, a square":? "including that corner w
ill be":? "reversed"
1080 GOSUB 720:N=7:GOSUB 600:GOSUB 750
:? CHR$(125);"If you end up with all d
ark hearts":? "you lose !!!":F=5
1090 GOSUB 500:GOSUB 750:? CHR$(125);"
Hit the 'I' key to get back to the":?
"initial position."
1100 ? "Understand the instructions?":
POKE 764,255:GET #1,K:IF K<>89 THEN 10
00
1110 RETURN
```

OUT OF SORTS?

by George Blank

Why does an aardvark sit in the front row while a zebra gets stuck in the back of the room? Should school grades run from F for fantastic to A for awful? What kind of name does it take to be the last person in the phone book?

A few anarchists would prefer the telephone book in random order. Some people with last names like Zylinski would like to turn the world upside down. The rest of us are well served by putting things in order. For example, the post office finds it easier to send our mail to the wrong address if we give it to them in zip code order.

Unfortunately, putting things in order is seldom fun. How would you like a monthly job taking 30,000 mailing labels for **SoftSide** and hand sorting them by zip code? The ideal solution would be to find someone or something too stupid to realize that alphabetizing a card catalog is not the most fulfilling way to spend a lifetime. No sooner is the job description announced than 100,000 volunteers step forward! Your computer would be delighted to pause in the never ending battle against the Klingon Empire to organize your Christmas card list.

Sorting is not a new topic for a computer magazine. It is needed in so many different programs that there are hundreds of publishing articles and lots of confusing names like Shuttle, Bubble, Ripple, Shell, Tree, Quick, and Quicker sorts. There are so many that it is hard to pick one to alphabetize the list. How do they work and which should we use?

We can quickly narrow the field. If you are working in a powerful languge such as APL, there are *single* commands such as grade up and grade down for sorting, and we really don't need to know much about how they work. Even BASIC on some high priced computers has built in sort functions such as IBM's ASORT ( ) function.

However, if you are working on a small personal computer with limited memory, there are only a few practical sorting methods. I would like to explain them, offer you programs that display three sorts in action, and offer tips on using them.

THE TRIVIAL SORT

A good place to start is with the trivial case. If you have two items, the way to sort them is to compare both items, and exchange them if they are in the wrong order. All other sorts start at this point. Here is a sample program:

```
10 INPUT A
20 INPUT B
30 IF A < B THEN 70
40 LET T = A
50 LET A = B
60 LET B = T
70 PRINT A, B
```

There are a few things to notice about this program. First of all, it sorts the two values in ascending order, from smallest to largest. If A is already smaller than B, this is discovered in line 30 and the sort is finished. If A is larger than (or equal to) B, then the two values are exchanged in lines 40 to 60. If we wanted to sort in descending order, all we would have to do is change the text in line 30 to:

```
30 IF A > B THEN 70
```

If we wanted to avoid unnecessary exchanges when the two values are equal, we could use:

```
30 IF A <= B THEN 70
```

or

```
30 IF A >= B THEN 70
```

Another thing to notice about the trivial sort is the procedure for exchanging values. The value T is a temporary or holding value. In order to understand what it is for, pick up two objects, perhaps two glasses of beer. With one in each hand, place the objects in the opposite hands. The easiest way to do it is to set the first one down, transfer the second one to the other hand, and then pick up the first object again. The temporary variable is simply a place to set down one variable in order to work with the other. Some BASICs offer a command like SWAP to exchange variables directly, but in most of them a holding variable is necessary.

Alphabetizing string variables works in exactly the same way. I am using simple numerical values in my examples to save typing time, but all you have to do is use the same routines with string variables to sort alphabetically. Here is our trivial sort:

```
10 INPUT A$
20 INPUT B$
30 IF A$ < B$ THEN 70
40 LET T$ = A$
50 LET A$ = B$
60 LET B$ = T$
70 PRINT A$, B$
```

If you want to sort in reverse alphabetical order, use:

```
30 IF A$ > B$ THEN 70
```

If you have only two items to sort, this program could solve your problem. Unfortunately, a computer is not very efficient at sorting two items. It is usually better to do that by hand. Therefore, let us move on to more complex sorts.

THE BUBBLE SORT

The simplest ordinary sort is the Bubble Sort. It works by starting with the first item in the list and comparing it to every other item, exchanging items every time it finds on smaller (or larger, if it is a descending sort). After the first pass, the smallest item is in the first variable. Then the computer takes the second variable and compares it with the rest of the list, then the third item, and so on until it comes to the next to last item in the list. This is the working section of a Bubble Sort of N items in array A(N):

```
100 FOR A = 1 TO N-1
110 FOR B = A + 1 TO N
120 IF A(A) < A(B) THEN 160
      ...(exchange routine goes here)
160 NEXT B
170 NEXT A
```

If you would like to see the Bubble Sort in action, here is a program that displays it visually on the S-80 computer. The display program displays an array of ten items across the top of the screen, and uses labelled arrows to point

to the index variables A and B. Each time two values are exchanged, the exchange is shown on the screen, even down to the holding variable. There is a timing loop to allow you to select the speed of the display. (See Figure 1)

The Bubble Sort is short and simple. If you have a relatively small list to sort, it will probably solve your problems. Unfortunately, it is not very efficient, and if you have a long list to sort, it will take a lot longer than more efficient sorting methods.

THE RIPPLE SORT

Another simple sort is the Ripple Sort. Although it is not significantly more efficient than the Bubble Sort, I like it better philosophically, for it always exchanges variables in the direction of their final placement. The Bubble Sort jumps around all over the place, as can be seen from the demonstration program.

The Ripple Sort passes through the list, exchanging any adjacent values that are in the wrong order, then passes through again. In an ascending sort, large values are pushed to the end, while small values ripple to the beginning. Since at the end of the first pass, the largest value is already at the end, the second pass ends at the next to last position, and each pass is one location shorter. Since the Ripple Sort never swaps variables away from their final position as the Bubble Sort does, a test can be included to see if any swaps were made during the last pass, so that the routine can be terminated if no swaps are made. Thus a Ripple Sort only needs as many passes as there are positions in the array between the starting and ending locations of the element that is furthest from its proper location.

(See Figure 2)

THE SHELL SORT

The weakness of the Ripple Sort lies in the fact that if the smallest number just happens to be in the last position (in an ascending sort), it takes one less pass than there are elements in the array to sort the array. On large arrays, it is more efficient to sort small sections of the array at a time. Most of the *high speed sorts, such as* Quicksort, Heap Sort, and the Shell Sort, work by setting up pointers to segment the array, and then sorting each segment, merging it into the larger list.

Before I talk more about the Shell Sort, let me dwell on this concept. If you are constantly adding data to a large list, it is far more efficient to sort a small list of additions and merge them into the larger list than it is to resort the large list each time. To show you how it is done, let us suppose that you have a sorted name list in a sequential disk file called NAMES, and have just sorted a list of additions and stored them in a sequential file called NEWNAMES. You want to combine them and put them in a file called COMBINED. You would need a subroutine or program to read in the data from each file (NAMES and NEWNAMES) and write out the data element that comes first to COMBINED. Then you would get another entry from the file where you got the data that was written out and compare again. You would have to check each time for the last entry in the file and write out the rest of the other file when you came to the end of the first one.

The most familiar Shell Sort to the microcomputer fraternity is a clumsy implementation by Metzner that was printed in **Creative Computing** years ago and then later appeared in **Kilobaud**. I mention this because many people are under the mistaken impression that the Shell Metzner Sort is an improved algorithm when in fact it is a slow implementation with bad style. Our demonstration program uses a more efficient implementation by Russ Walters. (See Figure 3)

In order to spare you the trouble of removing the displays from the various sorts in order for you to use them, I have put all three of them in separate subroutines in a demonstration program. Feel free to use or modify them as you wish, and note that these algorithms are specifically in the public domain. You do not have to give credit when using them, and you are free to use them for any purpose without royalty or payment. (See Figure 4)

FIGURE 1

```
10 REM * VISIBLE BUBBLE SORT * GEORGE BLANK * 11/28/80 *
20 CLS:DIM A(10):N=10
30 FOR F=1 TO N

40 A(F)=RND(99)
50 NEXT F

60 CLS:Z=5:INPUT"SPEED (1=SLOW TO 10=FAST)";Z
70 IF Z<1 OR Z>10 THEN 60

80 Z=(11-Z)*50
90 CLS:S=0
100 PRINT,"BUBBLE SORT DEMONSTRATOR"

110 FOR F=1TO10:PRINT@61+6*F,F;:PRINT@125+6*F,A(F);:NEXTF
120 FOR A = 1 TO N-1
130  FOR B = A+1 TO N: PRINT@196,CHR$(31)

140   D1=190+6*A:D2=190+6*B:PRINT@D1,"[";:PRINT@D1+64,"A"
150   PRINT@D2,"[";:PRINT@D2+64,"B";
160   IF A(A)<=A(B) THEN 250

170   PRINT@332,"NOW SWAPPING"A" WITH "B
180    S=S+1:PRINT@54,S;" SWAPS";
190    FOR F=1TOZ:NEXT F

200   PRINT@D1-65,"    ";:PRINT@396,"HOLDING VARIABLE ="A(A)
210    FOR F=1TOZ:NEXT F:PRINT@D2-65,"   ";:PRINT@D1-65,A(B);
220    FOR F=1TOZ:NEXT F

230   T=A(A):A(A)=A(B):A(B)=T
240   PRINT@ D2-65,A(B);
250    FOR F=1TOZ:NEXT F

260  NEXT B
270 NEXT A
280 PRINT @256,"SORT COMPLETE"
```

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continued from previous page

FIGURE 2

```
10 REM * VISIBLE RIPPLE SORT * GEORGE BLANK * 11/28/80 *
20 CLS:DIM A(10):N=10
30 FOR F=1 TO N
40 A(F)=RND(99)
50 NEXT F
60 CLS:Z=5:INPUT"SPEED ( 1 = SLOW TO 10 = FAST )";Z
70 IF Z<1 OR Z>10 THEN 60
80 Z=(11-Z)*50
90 CLS : S=0
100 PRINT,"RIPPLE SORT DEMONSTRATOR"
110 FOR F=1TO10:PRINT@61+6*F,F;:PRINT@125+6*F,A(F);:NEXTF
120 FOR C = 1 TO N-1 : FLAG = 0
130  FOR B = 1 TO N - C: A=B+1 :PRINT@196,CHR$(31)
140   D1=190+6*A:D2=190+6*B:PRINT@D1,"[";:PRINT@D1+64,"A"
150   PRINT@D2,"[";:PRINT@D2+64,"B";
160   IF A(B)<=A(A) THEN 260
170   FLAG=1
180   PRINT@332,"NOW SWAPPING"A" WITH "B
190   S=S+1:PRINT@54,S;" SWAPS";
200    FOR F=1TOZ:NEXT F
210   PRINT@D1-65,"    ";:PRINT@396,"HOLDING VARIABLE ="A(A)
220    FOR F=1TOZ:NEXT F:PRINT@D2-65,"   ";:PRINT@D1-65,A(B);
230    FOR F=1TOZ:NEXT F
240   T=A(A):A(A)=A(B):A(B)=T
250   PRINT@ D2-65,A(B);
260    FOR F=1TOZ:NEXT F
270  NEXT B
280 IF FLAG=1 THEN NEXT C
290 PRINT @256,"SORT COMPLETE"
```

FIGURE 3

```
10 REM * VISIBLE SHELL SORT * GEORGE BLANK * 11/28/80 *
20 REM * PREPARE SAMPLE DATA *
30 CLS:DIM A(10):N=10
40 FOR X=1 TO N
50 A(X)=RND(99)
60 NEXT X
70 CLS:Z=5:INPUT"SPEED (1 = SLOW  TO  10 = FAST)";Z
80 IF Z<1 OR Z>10 THEN 70
90 Z=(11-Z)*50
100 CLS : S=0
110 REM * SORT ROUTINE *
120 PRINT,"SHELL SORT (WALTERS) DEMONSTRATOR"
130 FOR F=1TO10:PRINT@61+6*F,F;:PRINT@125+6*F,A(F);:NEXTF
140 C=N
150 C=INT(C/3)+1 : GOSUB 340
160 FOR A=1 TO N-C : GOSUB300
170 GOSUB310:IF A(A)<=A(A+C) THEN 250
180 S=S+1:PRINT@50,S;" SWAPS";
190 T=A(A+C):GOSUB370:F=A+C:GOSUB350:B=A:GOSUB330
200 F=B:GOSUB350:A(B+C)=A(B):F=B+C:T0=A(F):GOSUB360 :B=B-C
210 PRINT@D4,"  ";
220 IF B>0 THEN GOSUB330 : IF T<A(B) THEN 200
230 PRINT@532,CHR$(30)
240 GOSUB320:A(B+C)=T:F=B+C:T0=T:GOSUB360
250 NEXT A
260 IF C>1 THEN 150
270 PRINT@512,"SORT DONE"
280 END
290 REM * SCREEN DISPLAY SUBROUTINES *
300 PRINT@192,CHR$(30);:D1=190+6*A:PRINT@D1,"[A";:GOTO380
310 PRINT@256,CHR$(30);:D2=254+6*(A+C):PRINT@D2,"[A+C";:GOTO380
320 PRINT@320,CHR$(30);:D3=318+6*(B+C):PRINT@D3,"[B+C";:GOTO380
330 PRINT@384,CHR$(30);:D4=382+6*B:PRINT@D4,"[B";:GOTO380
340 PRINT@448,CHR$(30);:D5=446+6*C:PRINT@D5,"[C";:GOTO380
350 PRINT@125+6*F,"   ";:GOTO380
360 PRINT@125+6*F,T0;:GOTO380
370 PRINT@532,"HOLDING VARIABLE =";T
380 FOR X=1TOZ:NEXTX:RETURN
```

FIGURE 4

```
10 REM * THREE SORTS * GEORGE BLANK * 12/2/80 *
20 CLS:N=14:DIM A(N)

30 PRINT"NEW DATA"
40 FOR F=1 TO N
50 A(F)=RND(99)

60 PRINT A(F)
70 NEXT F
80 PRINT@74,"1. BUBBLE SORT";

90 PRINT@202,"2. RIPPLE SORT";
100 PRINT@330,"3. SHELL-WALTERS SORT";
110 PRINT@458,"YOUR CHOICE?";

120 I$=INKEY$:IFI$=""THEN120
130 I=VAL(I$):IFI<1 OR I>3 THEN CLS : END
140 ON I GOSUB 1000,2000,3000

150 PRINT@48,"SORTED DATA";
160 FOR F=1TON
170 PRINT@48+F*64, A(F);

180 NEXT F
190 GOSUB210
200 RUN

210 FOR F=1TO5000:NEXT F:RETURN
999 REM * BUBBLE SORT *
1000 PRINT@586,"BUBBLE SORT DEMONSTRATOR";

1010 FOR A = 1 TO N-1
1020  FOR B = A+1 TO N
1030   IF A(A) <= A(B) THEN 1050

1040   T=A(A) : A(A)=A(B) : A(B)=T
1050  NEXT B
1060 NEXT A

1070 RETURN
1999 REM * RIPPLE SORT *
2000 PRINT@586,"RIPPLE SORT DEMONSTRATOR";

2010 FOR C = 1 TO N-1 : FLAG = 0
2020  FOR B = 1 TO N - C: A=B+1
2030   IF A(B)<=A(A) THEN 2060

2040   FLAG=1
2050   T=A(A) : A(A)=A(B) : A(B)=T
2060  NEXT B

2070 IF FLAG=1 THEN NEXT C
2080 RETURN
2999 REM * SHELL-WALTERS *

3000 PRINT@586,"SHELL-WALTERS SORT DEMONSTRATOR";
3010 C=N
3020 C=INT(C/3)+1

3030 FOR A=1 TO N-C
3040  IF A(A) <= A(A+C) THEN 3090
3050  T=A(A+C) : B=A

3060  A(B+C)=A(B) : B=B-C
3070  IF B>0 THEN IF T<A(B) THEN 3060
3080  A(B+C)=T

3090 NEXT A
3100 IF C>1 THEN 3020
3110 RETURN
```

TANKS-A-LOT

by Mark Koenig

Tanks-a-Lot is an S-80 program which requires at least 16K of RAM

Your opponent lies just over the horizon. Today is the day you've wondered about for so long. You know your opponent will be trying to second guess your every move. *Will you be the victor at the end of the day?* Your life depends on it.

"Tanks-a-Lot" is a two player game in which each player is a tank commander trying to destroy the other. Here are the control keys for the two commanders.

	Left Commander	Right Commander	
Forward	D	Forward	L
Fire	F	Fire	;
Rotate Right	S	Rotate Right	K
Rotate Left	A	Rotate Left	J

"Tanks-a-Lot" Variables

A$: Tank image strings.
AB: STRING$ (80,32) used to erase portions of screen.
AW: STRING$ (80,191) used to fill portions of screen.
B1-B7: Keyboard scan addresses.
C1-C2: Tank rotation variables.
E: Misc. logic.
I: Movement variable.
IK: Time delay.
K$: CHR$ (140), bullet character.
L1-L2: Read variables used for erasing screen.
0$: Name of player #1.
P1: Number of hits player #1.
P2: Number of hits player #2.
Q: Display winner string.
S$: Erase position string.
SA$: STRING$ (3,24), used for positioning of tanks.
T: PEEK address of tank #2.
T$: Name of player #2.
TW: Location of tank #2.
U: PEEK address of tank #1.
UN: Location of tank #1.

```
1 '     xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
        x     TANKS-A-LOT       x
        x FOR A TRS-80  16K x
        x BY MARK KOENIG - STRONGSVILLE,O.x
        x WRITTEN  11/27/80   x
2 '     xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

  Lines 20-70: Initialize variables including graphic strings.

20 CLEAR500:DEFSTRA,K,S:A(1)=CHR$(188)+CHR$(191)+CHR$(188):A(2)=
CHR$(191)+CHR$(191)+CHR$(140):A(3)=CHR$(143)+CHR$(191)+CHR$(143)
:A(4)=CHR$(140)+CHR$(191)+CHR$(191):A(5)=CHR$(188)+CHR$(179)+CHR
$(188):A(6)=CHR$(191)+CHR$(179)+CHR$(140):P1=0:P2=0
30 K=CHR$(140):A(7)=CHR$(143)+CHR$(179)+CHR$(143):A(8)=CHR$(140)
+CHR$(179)+CHR$(191):CLS:PRINTTAB(24);"TANKS-A-LOT":INPUT"NAME
 OF PLAYER 1";0$:INPUT"NAME OF PLAYER 2";T$
50 SA=STRING$(3,24):S(0)=CHR$(191)+CHR$(131)+CHR$(191)+CHR$(26)+
SA+CHR$(143)+CHR$(140)+CHR$(143):S(1)=" "+CHR$(191)+CHR$(26)+CHR
$(24)+CHR$(143):S(2)=CHR$(179)+CHR$(179)+CHR$(191)+CHR$(26)+SA+C
HR$(143)+CHR$(140)+CHR$(140)
52 S(3)=CHR$(131)+CHR$(179)+CHR$(191)+CHR$(26)+SA+CHR$(140)+CHR$
(140)+CHR$(143):S(4)=CHR$(191)+CHR$(176)+CHR$(191)+CHR$(26)+SA+"
  "+CHR$(143):S(5)=CHR$(191)+CHR$(179)+CHR$(179)+CHR$(26)+SA+CHR
$(140)+CHR$(140)+CHR$(143)
54 S(6)=CHR$(191)+CHR$(179)+CHR$(179)+CHR$(26)+SA+CHR$(143)+CHR$
(140)+CHR$(143):S(7)=CHR$(131)+CHR$(131)+CHR$(191)+CHR$(26)+CHR$
(24)+CHR$(143)
56 S(8)=CHR$(191)+CHR$(179)+CHR$(191)+CHR$(26)+SA+CHR$(143)+CHR$
(140)+CHR$(143):S(9)=CHR$(191)+CHR$(179)+CHR$(191)+CHR$(26)+CHR$
(24)+CHR$(143)
60 INPUT"HIT ENTER TO BEGIN";E$
65 CLS:AW=STRING$(80,191):AB=STRING$(80,32):GOSUB1000
70 B1=14337:B2=14338:B3=14340:B4=14344:B5=14352:B6=14368:B7=1440
0:UNO=195:TWO=889:S=STRING$(3,32):C1=2:C2=8:X=1:GOSUB570
80 IFX=1THEN90ELSE320
90 X=-X:IFPEEK(B7)=16THEN100ELSEIFPEEK(B1)=2THEN120ELSEIFPEEK(B3
)=8THEN140ELSEIFPEEK(B1)=16THEN190ELSE80

  Lines 100-110: Check for rotation change, then print tank #1.

100 IFC1=1THENC1=4ELSEC1=C1-1
110 PRINT@UNO,A(C1);:GOTO80

  Lines 120-130: Same as 100-110 except tank #2.

120 IFC1=4THENC1=1ELSEC1=C1+1
130 PRINT@UNO,A(C1);:GOTO80
140 ONC1GOTO150,160,170,180

  Line 150-180: Check for movement.

150 U=UNO+15360:IF(UNO>63)AND(PEEK(U-64)=32)AND(PEEK(U-63)=32)AN
D(PEEK(U-62)=32)THENPRINT@UNO,S;:UNO=UNO-64:PRINT@UNO,A(C1);:GOT
O80ELSE80
160 IF(UNO+3)/64<>INT((UNO+3)/64)ANDPEEK(UNO+15363)=32THENPRINT@
UNO,S;:UNO=UNO+1:PRINT@UNO,A(C1);:GOTO80ELSE80
170 U=UNO+15360:IFUNO<896ANDPEEK(U+64)=32ANDPEEK(U+65)=32ANDPEEK
(U+66)=32THENPRINT@UNO,S;:UNO=UNO+64:PRINT@UNO,A(C1);:GOTO80ELSE
80
180 IFUNO/64<>INT(UNO/64)ANDPEEK(UNO+15359)=32THENPRINT@UNO,S;:U
NO=UNO-1:PRINT@UNO,A(C1);:GOTO80ELSE80
190 ONC1GOTO200,230,260,290
200 IFUNO<64THEN80ELSEI=UNO-63
210 IFPEEK(I+15360)<>32THEN220ELSEPRINT@I,K;:FORO=1TO5:NEXT:PRIN
T@I," ";:I=I-64:IFI<=0THEN80ELSE210
220 IFI=TWO+2ORI=TWO+1ORI=TWOTHEN550ELSEPRINT@I,CHR$(191);:GOTO8
0
230 IF(UNO+3)/64=INT((UNO+3)/64)THEN80ELSEI=UNO+3
240 IFPEEK(I+15360)<>32THEN250ELSEPRINT@I,K;:PRINT@I," ";:I=I+3:
IFI=INT(UNO/64)*64+63THEN80ELSE240
250 IF(I=TWO)OR(I-1=TWO)OR(I-2=TWO)THEN550ELSEPRINT@I,CHR$(191);
:GOTO80
260 IFUNO>895THEN80ELSEI=UNO+65
270 IFPEEK(I+15360)<>32THEN280ELSEPRINT@I,K;:FORO=1TO5:NEXT:PRIN
T@I," ";:I=I+64:IFI>=960THEN80ELSE270
280 IFI=TWOORI=TWO+1ORI=TWO+2THEN550ELSEPRINT@I,CHR$(191);:GOTO8
0
290 IFUNO/64=INT(UNO/64)THEN80ELSEI=UNO-1
300 IFPEEK(I+15360)<>32THEN310ELSEPRINT@I,K;:FORO=1TO3:NEXT:PRIN
T@I," ";:I=I-3:IFI<=INT(UNO/64)*64THEN80ELSE300
310 IF(I=TWO+2)OR(I=TWO+1)OR(I=TWO)THEN550ELSEPRINT@I,CHR$(191);
:GOTO80
320 X=-X:IFPEEK(B2)=4THEN330ELSEIFPEEK(B2)=8THEN350ELSEIFPEEK(B2
)=16THEN370ELSEIFPEEK(B6)=8THEN420ELSE80
330 IFC2=5THENC2=8ELSEC2=C2-1
340 PRINT@TWO,A(C2);:GOTO80
350 IFC2=8THENC2=5ELSEC2=C2+1
360 PRINT@TWO,A(C2);:GOTO80
370 ONC2-4GOTO380,390,400,410
380 T=TWO+15360:IFTWO>63ANDPEEK(T-64)=32ANDPEEK(T-63)=32ANDPEEK(
T-62)=32THENPRINT@TWO,S;:TWO=TWO-64:PRINT@TWO,A(C2);:GOTO80ELSE8
0
```

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```
390 IFPEEK(15360+TWO+3)=32AND(TWO+3)/64<>INT((TWO+3)/64)THENPRIN
T@TWO,S;:TWO=TWO+1:PRINT@TWO,A(C2);:GOTO80ELSE80

400 T=TWO+15360:IFTWO<896ANDPEEK(T+64)=32ANDPEEK(T+65)=32ANDPEEK
(T+66)=32THENPRINT@TWO,S;:TWO=TWO+64:PRINT@TWO,A(C2);:GOTO80ELSE
80

410 IFPEEK(TWO+15359)=32ANDTWO/64<>INT(TWO/64)THENPRINT@TWO,S;:T
WO=TWO-1:PRINT@TWO,A(C2);:GOTO80ELSE80
420 ONC2-4GOTO430,460,490,520
430 IFTWO<64THEN80ELSEI=TWO-63

440 IFPEEK(I+15360)<>32THEN450ELSEPRINT@I,K;:FORO=1TO5:NEXT:PRIN
T@I," ";:I=I-64:IFI<=0THEN80ELSE440
450 IFI=UNOORI=UNO+1ORI=UNO+2THEN560ELSEPRINT@I,CHR$(191);:GOTO8
0

460 IF(TWO+3)/64<>INT((TWO+3)/64)THENI=TWO+3ELSE80
470 IFPEEK(I+15360)<>32THEN480ELSEPRINT@I,K;:FORO=1TO3:NEXT:PRIN
T@I," ";:I=I+3:IFI>=INT(TWO/64)*64+63THEN80ELSE470

480 IF(I=UNO)OR(I-1=UNO)OR(I-2=UNO)THEN560ELSEPRINT@I,CHR$(191);
:GOTO80
490 IFTWO>895THEN80ELSEI=TWO+65

500 IFPEEK(I+15360)<>32THEN510ELSEPRINT@I,K;:FORO=1TO5:NEXT:PRIN
T@I," ";:I=I+64:IFI>=960THEN80ELSE500
510 IFI=UNOORI=UNO+1ORI=UNO+2THEN560ELSEPRINT@I,CHR$(191);:GOTO8
0

520 IFTWO/64=INT(TWO/64)THEN80ELSEI=TWO-1
530 IFPEEK(I+15360)<>32THEN540ELSEPRINT@I,K;:FORO=1TO3:NEXT:PRIN
T@I," ";:I=I-3:IFI<=INT(TWO/64)*64THEN80ELSE530
540 IF(I=UNO+2)OR(I=UNO+1)OR(I=UNO)THEN560ELSEPRINT@I,CHR$(191);
:GOTO80
```

```
Lines 550-560: Hit routines for both tanks.

550 FORI=1TO10:PRINT@TWO,"HIT";:FORIK=1TO50:NEXT:PRINT@TWO,"   "
;:FORIK=1TO50:NEXT:NEXT:P1=P1+1:IFP1=10THEN580ELSEGOSUB570:PRINT
@UNO,S;:PRINT@TWO,S;:GOTO70

560 FORI=1TO10:PRINT@UNO,"HIT";:FORIK=1TO50:NEXT:PRINT@UNO,"   "
;:FORIK=1TO50:NEXT:NEXT:P2=P2+1:IFP2=10THEN590ELSEGOSUB570:PRINT
@UNO,S;:PRINT@TWO,S;:GOTO70

570 PRINT@0,LEFT$(AB,64);:PRINT@64,LEFT$(AB,64);:PRINT@20,S(P1);
:PRINT@40,S(P2);:PRINT@UNO,A(C1);:PRINT@TWO,A(C2);:RETURN


Lines 580-600: Winning routine.


580 O$=O$:GOTO600
590 O$=T$
600 Q$=O$+" IS THE WINNER!!":FORI=1TO300:PRINT@RND(950),Q$;:NEXT
:FORI=1TO100:NEXT:RUN

1000 PRINT@128,"";
1005 READL1,L2:IFL1=99ORL2=99THENRESTORE:RETURNELSEPRINTLEFT$(AW
,L1);LEFT$(AB,L2);:GOTO1005

1100 DATA67,57,7,3,15,3,15,3,15,3,7,3,3,45,3,3,7,3,3,3,3,3,9
1110 DATA3-3,3,9,3,3,3,3,3,7,9,3,3,3,21,3,3,3,9,7,3,3,3,3,3,3,
15,3,3,3,3,3,3,3,7

1120 DATA9,3,3,3,21,3,3,3,9,7,3,3,3,3,3,9,3,3,3,9,3,3,3,3,3,7,3,
3,45,3,3,7

1130 DATA3,9,3,27,3,9,3,7,57,68,0,0
11010 DATA99
```

HIDING YOUR CODE

Part 1

This month we are going to take a look at hiding your BASIC coding for the TRS-80™. First, let me say that the techniques discussed here will prevent most people from seeing your code. However, no method is foolproof: As the level of protection increases, the number of people who are able to decode your program also decreases.

Also, let me say now that programs submitted to **SoftSide** MAY NOT employ any of the techniques discussed here as we may need to see the code.

Let's start with the simplest way to protect your listing. Turn on your computer and enter this line:

10 CLS:PRINT"HI THERE"

Now run the program and check for errors. This is important, because the program is very hard to debug after you make it list proof. Once the program is verified, EDIT the line. Go to the end of the line and add a (') or REM. The line should now look like this:

10 CLS:PRINT"HI THERE" '

Now, press and hold down the <SHIFT> key. While holding it down, backspace the cursor through the line so that it rests in the position of the digit "1" in 10. After doing this, release the <SHIFT> key and use the space bar to erase the line. At the end of the line, add one extra space so the cursor goes one position past the '.

After spacing through the line, enter a linefeed <DOWN ARROW>. Now, press and hold down the <SHIFT> key again. Now, enter 14 more linefeeds, then press <ENTER>.

Try listing the line. If everything was done correctly, a "ready", not the line, will appear. This technique works fine on both a Level II and disk system. Next month we'll talk about hiding your programs with only a few bytes of RAM. Until then....

Phillip

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Limber up your sword arm and don your breastplate for a journey to an underground dungeon. Loaded with fierce monsters and exotic treasures, the Temple of Apshai awaits the hardy adventurer. You must first equip your character by bargaining with a penny-pinching innkeeper, then you head for the subterranean ruins of an insect-worshipping culture. Watch out for the Ant-men!

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Rex the Reaver and his band of cutthroats have absconded with the precious datestones from the ducal calender and your job is to recover them. Not only must you explore the cavernous lair of the robber band, but you must also face an assortment of monster all hungering for your blood. Oh yes, and you only have a single day to recover the stones. Better start sharpening your sword...

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Attention all veteran warriors! Four more levels of dungeon have been discovered beneath the Temple of Apshai region. These four levels are populated by Undead, Demons, and an assortment of thoroughly nasty types. There is also a good deal of treasure down there, but not many have survived to report about it. Rumor has it that in the very deepest recesses of the lowest vault lies an enchanted warrior maiden, guarded by the very fires of Hell! Are there none so brave and (fool) hardy as to rescue her?

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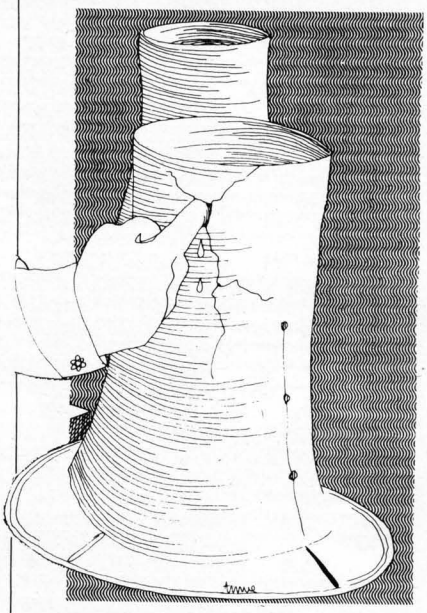
THREE MILE ISLAND



Do you still wonder if the "limited" disaster at Three Mile Island could have been averted? Here's your chance to decide for yourself, by re-enacting the affair. MUSE offers you THREE MILE ISLAND, a simulation of a pressurized nuclear reactor.

Valves, pumps, turbines, filters, and control rods are individually activated by keyboard command. Comprehensive documentation provides detailed descriptions of the operating mechanisms and component interactions.

Are you capable enough to prevent a repetition of the events in Pennsylvania? Or even a bonafide meltdown? There's only one way to find out . . . . . .

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continued from page 4

argument runs something like this: in order to communicate on a mass scale, language must be standardized and compressed. By compressed I mean that secondary and tertiary meanings of a single word are stripped away until a single word has a single meaning, context notwithstanding. The science of cybernetics is just that, the science of language compression. Television uses language that is current (except in PBS programming) and limited in meaning, that is to say that ambiguity is something to be eliminated rather than encouraged. Newspapers do the same thing, aim for language accessible to the lowest common denominator. The alleged result is that the vocabulary of the vox populi shrinks and the expressiveness of the language is damaged. Nevertheless, the language is still English, rife with *double entendres* and ambiguities, puns and wordplay.

Until now, all of our communications media have aspired to use language that is somewhat diverse, if not literary. But the language of computer programming is much more limited than that of other media, in that the computer can only assign a single meaning to any one word — the language must be strictly rational. Held in perspective that is not necessarily bad, for we could all bear with a little more training in rational thought. However, the danger lies in limiting our communicative skills to naught but rationality, for no human is completely rational, nor should they aspire to be so.

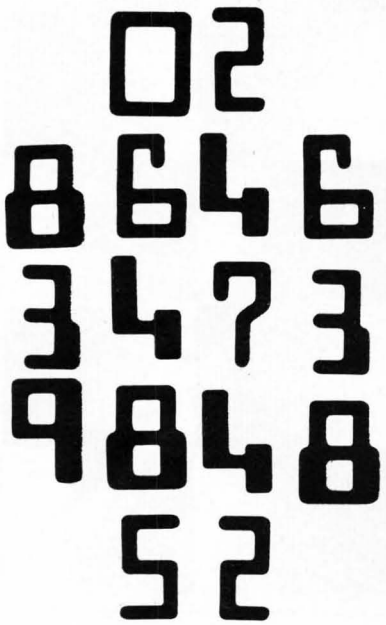
My experience has been that the more one works in a given field, the more the jargon of that field creeps into one's language. After a few months here at **SoftSide**, I find that my analogies tend to computer and programming metaphors. In prior job incarnations, such as journalist and musician, my analogies fell into the metaphors particular to those fields. The more one is exposed to a certain type of language, the more one tends to use that language.

My fear, then, is that as computer programming becomes more and more common (See Mark's predictions for the spread of technology, elsewhere in this issue), so will the language of programming. And that language is highly compressed.

This is not a diatribe against computers, mind you. I own one, I find it an amazingly useful tool and quite an entertainment in the bargain. I like it, I really do. But along with Lewis Mumford, Raymond Williams, Walter Ong, and a host of other scholars in the field of communications and technology, I believe that language is the foundation of civilization, the bottom line. Without language, there is no thought. As such, I wish to see our linguistic skills grow, for the complexity and depth of our society grow with our linguistic abilities. The computer can add a new dimension to our language. It can also replace or preempt part of our language. It is up to each one of use to enrich or deplete the language. The ball is in your court, it was never anywhere else.

STATPAL

by Bruce Chalmers



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The Magic of Line Zero

The Art of the One-Liner

by Phillip Case

THE MAGIC OF LINE ZERO

This month we will discuss one of the seldom used tricks on the S-80. The techniques discussed here, while functional in their own right, do not necessarily represent good programming procedures. For those of you contemplating writing programs for publication in **SoftSide**, DO NOT use these techniques, as they will make your programs harder to understand by the hobbyist.

Most people know that you can have a line zero (0) in your program. Normally, this line number is reserved for a REMark line. In fact, most renumbering utilities do not function when line zero is included in a program.

An interesting thing about the use of line zero is the fact that a GOTO command will default to line zero when no other line is specified. An example follows:

```
0 THIS IS AN EXAMPLE
10 GOTO
```

It is interesting to note that if line zero is not present the program will not default to the first available line. It requires line zero present, otherwise a UL ERROR results.

THE ART OF THE ONE-LINER

When we started our one-liners feature back in September of last year, we had no idea of the quality of programs we would receive. Since September, we've published about 100 one-liners covering everything from space war games to adventures.

Now that the one-liner has become an art form, I guess it's appropriate to discuss some of the finer points of writing one-liners.

Because you are limited to one line of program text, it is important to conserve space whenever possible. The one line adventure in the previous issue was rewritten four times before it could be merged into one program line. One thing to remember is that there are always many ways to accomplish the same thing in a program. In a one-liner, you want the shortest.

One of the most heavily used techniques for saving room is the substitution of a comma (,) for the THEN command. Each comma saves three characters of space. Here's another trick to consider. In many one-liners, the writer intends to create an endless loop. This is usually done like this:

```
FORA=1TO99999.
```

Here's a better way of accomplishing the task:

```
FORA=0TO1STEP0.
```

This loop will run forever without increasing the variable A. Also, when entering a one-liner, you can enter several additional characters by EDITing the program line.

One-liners have become a true art. The one-liners of today are better than many of the early published programs. With the advancement of computers and electronics, it makes you wonder what the one-liners of tomorrow will accomplish . . .

S-80 One-Liner.

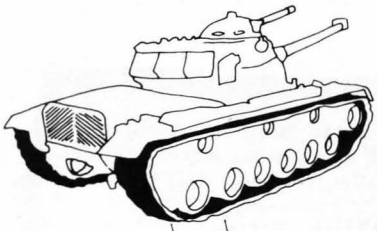
While not strictly adhering to the one-liner rules (continuously changing graphic display, as interesting as possible), MONITOR is of interest in its own right. With MONITOR, you can examine any portion of S-80 RAM or ROM.

Roy Cohen
Englewood, New Jersey

```
1 INPUT"DEC. STARTING ADDR";A:CLS:FORX=1TO2STEP0:IFPEEK(A)<32PRI
NTA;TAB(5)"CONTROL CODE      # ";PEEK(A):A=A+1:NEXTELSEPRINTA,PE
EK(A),CHR$(PEEK(A)):A=A+1:NEXT
```

Three from Potkin

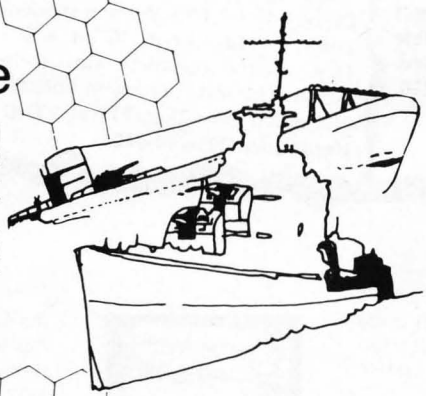
Wargamer's delight



1). Kriegspiel II

A much improved two-player version of the original. Kriegspiel II is a wargamer's delight. Choose the number of mountains (up to 200) and pick a scenario from the 9,999 possible, and then watch the computer set up the pieces, towns, mountains and a river. To win, you must enter the capital city of your opponent or reduce his fighting strength to below half of your own

S-80 Level II, 16K cassette $14.95



2). Up Periscope

The author of the popular Kriegspiel II has done it again. This time the action takes place at sea with one player controlling the submarines while the other attempts to sail around RADSHA Island, with at least three of his fleet surviving the attempt. This realistic wargame includes sonar, depth charges, and torpedos.

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3). Warpath

The Indians are on the warpath! The Chief, along with 24 braves, is out to take the garrison at the fort, or at least to stop reinforcements from entering the stockade. The General, with his 14 troopers, is trying to relieve the garrison before the flag is captured. The player determines the scenario through placement of boulders that provide both shelter and obstacles. Favorite scenarios may be replayed.

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RAMWARE™

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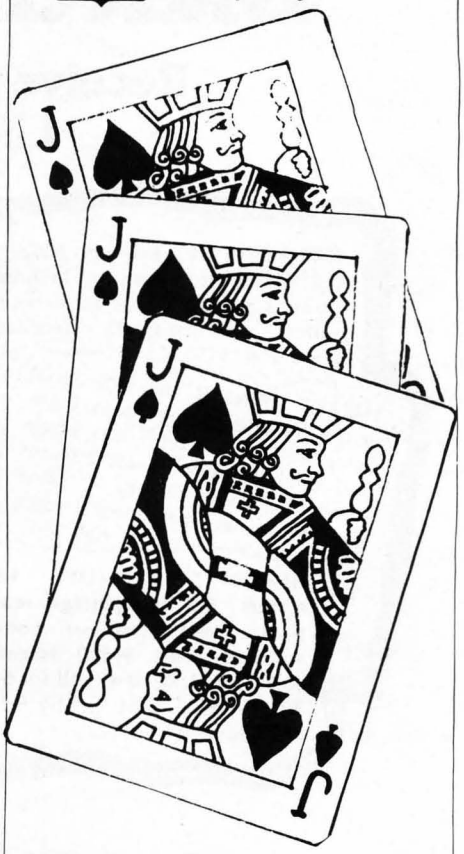

Blackjack Master

Are you a serious student of blackjack? If you are, Hayden has just published a program and booklet package for you. It's Blackjack Master, a simulator/tutor game for your S-80. The purpose of the package is to make you a winner. Unlike other Blackjack programs that emphasize graphics and fun, "Blackjack Master" is a serious game. Performing complex simulations and evaluations of playing and betting strategies, "Blackjack Master" will tutor you in this premier gambling game. Documentation included. Monte Carlo may never be the same.

S-80 Level II Cassette $19.95
S-80 Disk $24.95

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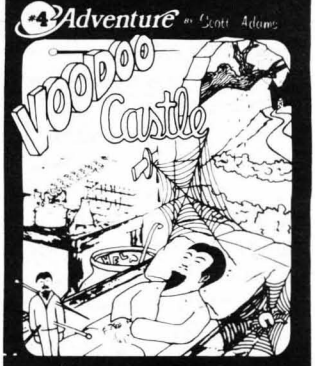
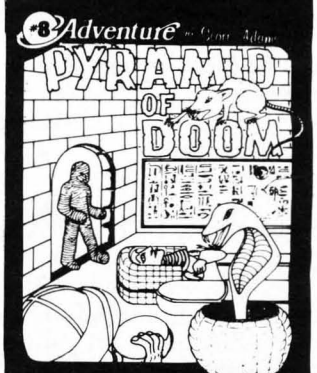
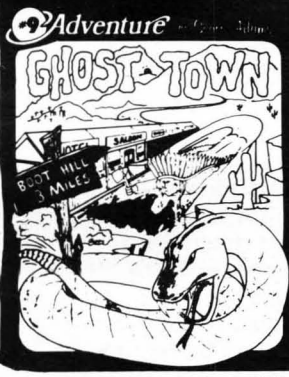
Adventure
BY Scott Adams







Adventure by Scott Adams is like no other program you have ever seen! Inspired by the large Adventure game found on big computers in the last few years, it will run on your 16K Home Computer! This is one game you will NOT master in an hour and then lose interest in! Adventure *is a machine language program using all 16K of your computer.*

0.† **"SPECIAL SAMPLER"** - Never tried Adventure? This special inexpensive sampler complete with 3 Treasures is a cut-down version of our large Adventureland. Guaranteed to supply hours of enjoyment: Try an Adventure today!

1.† **ADVENTURELAND** - You wander through an enchanted world trying to recover the 13 lost treasures. You'll encounter wild animals, magical beings, and many other perils and puzzles. Can you rescue the Blue Ox?

2.† **PIRATE'S ADVENTURE** - "Yo ho ho and a bottle of rum..." You'll meet up with the pirate and his daffy bird along with many strange sights as you attempt to go from your London flat to Treasure Island. Can you recover Long John Silver's lost treasures?

3. **MISSION IMPOSSIBLE ADVENTURE** - Good morning, your mission is to ... and so it starts. Will you be able to complete your mission in time? Or is the world's first automated nuclear reactor doomed? This one's well named. It's hard, there is no magic, but plenty of suspense. Good luck. . . .

4. **VOODOO CASTLE** - Count Cristo has had a fiendish curse put on him by his enemies. There he lies, with you his only hope. Will you be able to rescue him or is he forever doomed? Beware the Voodoo Man. . . .

5. **THE COUNT** - You wake up in a large brass bed in a castle somewhere in Transylvania. Who are you, what are you doing here, and WHY did the postman deliver a bottle of blood? You'll love this Adventure, in fact, you might say it's Love at First Byte. . . .

6. **STRANGE ODYSSEY** - Marooned at the edge of the galaxy, you've stumbled on the ruins of an ancient alien civilization complete with fabulous treasures and unearthly technologies. Can you collect the treasures and return or will you end up marooned forever? . . .

7. **MYSTERY FUN HOUSE** - Can you find your way completely through the strangest Fun House in existence, or will you always be kicked out when the park closes? . . .

8. **PYRAMID OF DOOM** - An Egyptian Treasure Hunt leads you into the dark recesses of a recently uncovered Pyramid. Will you recover all the treasures or more likely will you join its denizens for that long eternal sleep? . . .

9. **GHOST TOWN** - Explore a deserted western mining town in search of 13 treasures. From rattlesnakes to runaway horses, this Adventure's got them all! Just remember, Pardner, they don't call them Ghost Towns for nothin'. (Also includes new bonus scoring system!)

10. **SAVAGE ISLAND - A small island in a remote ocean holds an awesome secret. Will you be the first to uncover it? SAVAGE ISLAND is the first part of a larger, multi-part Adventure. It will be necessary to purchase additional packages to complete the entire Adventure.**

Cassettes for S-80 Model I or III, and Apple II $14.95
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*Note: Apple requires 24K and has no lower case. † Recommended for the novice adventurer, with many built-in HELPS!

REVIEWS

VISICALC
from Personal Software

"Visicalc" is an interesting program. Put simply, it's a blank sheet of paper, a pencil with eraser, and a calculator. By combining these three tools, "Visicalc" has become one of the most powerful programs ever written for the micro. The "Visicalc" work area is simply a two-dimensional (63x254) grid in which any point on the grid can be either a numeric value or a alphabetic label. The unique thing about "Visicalc" is that any numeric element can be a formula deriving its value from other elements on the grid or work space. Learning the "Visicalc" command set is the hardest aspect of this package. There are many commands. Once learned, however, "Visicalc" has to be one of the easiest business programs to use.

The most interesting thing about the package is that once your worksheet is complete, and all the formulas are in, you can change any value and all other values will change, if their formulas relate to the value of the location changed. Personal Software calls this playing "What If," and it's a good analogy because by altering values, it's easy to see the long range results to short-term decisions. No knowledge of programming is necessary to use "Visicalc," making it an even more attractive package. The package has full disk I/O and printer support. At the present, "Visicalc" is available for the S-80, Apple, PET, and Atari. The "Visicalc" diskette comes in a three-ring loose-leaf binder with complete documentation. For those of you needing more information from your system, "Visicalc" can give it to you.

Phillip Case

ENHANCED BASIC
from Cornsoft

You've all seen the ads, the ones promising to make your computer as powerful as a small tornado in only 6K. Well, there's a new tornado out now called Enhanced BASIC (ENHBAS). From Cornsoft, this disk resident BASIC really does give your system some incredible capabilities.

For $49.95, you get many new commands. Here are just a few:

SCROLL: Sets a window on the screen so the lower portion of the screen scrolls up without the upper portion going off the screen.

SORT: An intrinsic sort routine with complete user control over keys and carries.

RENEW: Saves a program after a NEW.

SIZE: Displays a program's size in bytes.

POP: Pops a RETURN off the GOSUB stack.

FIND: Finds a character string in a program.

Some of the new features include audio keyclick, audio error tones, a CTRL-G which plays the Westminister Chimes, formatted listings, lower-case character driver, full control character suport, one letter commands, user-definable cursor, printer abort if printer not enabled, and last but not least, the POKE addresses to enable and disable the above features.

As an editor who has used Level I, II, III, Microsoft BASIC, with and without Apparat alterations, I have finally found my BASIC.

Cornsoft is a relative newcomer to the micro industry, but with products like "ENHBAS," I'm sure they'll do very well.

I really had to scrape to find some drawbacks in "ENHBAS," but here's what I dug up. First, with all the features of "ENHBAS," I expected repeating keys, but alas, this simple feature is omitted from the system. Second, some control characters, CTRL-G for example, are not apparent when inserted into a text string. This feature ought to be incorporated into "ENHBAS".

If you're after more power than you've ever seen before, "ENHBAS" is a great bargain.

Phillip Case

LUNAR LANDER
from Adventure International

I know what you're thinking. What? Another lunar lander? Why waste time on lunar lander #56251. But wait a minute, this one is really different. If you've seen the arcade lunar lander, you know what you're in for.

A.I.'s lunar lander is a 16K Machine Language program which is totally graphics-oriented. The game starts with a page of instructions explaining the use of the keyboard and the goal of the game.

Once started, you're in a small LEM which is skimming across the lunar landscape. Below you are several landing areas, each requiring different skill levels to land successfully—the harder areas being worth considerably more points.

You control your ship with retro rockets, which slow your descent, and course thrusters which control lateral movement. The lunar gravity, although weak, is still strong enough to make delicate control of the lander a difficult task.

When you get within a given proximity of the surface, your display is switched to a close-up view for the final stages of landing. It's quite an impressive display.

Although the game is very arcade-like, it is a real test of skill. I played the game a dozen times before I could successfully touch down anywhere. After playing the game about a hundred times, there are still places I can't land, such as the overhanging lunar cliff, quite a challenge.

You start with 5000 units of fuel and play until you run out, but each crash costs you a thousand units. There is a saving grace, however, in that hidden at the bottom of a ravine is a fuel depot. But landing there is no easy task.

This game was the hit of the Northeast Computer Show this year in Boston. There was a cash prize for the highest score, which turned out to be 6400 points. Get a copy of "Lunar Lander" and try to top that.

Phillip Case

INTERACTIVE FICTION
from Adventure International

The advertising line is enough to make even the most determined novelist shudder and quake: "A new artistic medium"; or "Take part in a story instead of merely reading it!" Well, don't worry, it's

pure hype. "Interactive Fiction" is an interesting diversion, but hardly a new art form.

Perhaps the best one-line description of "Interactive Fiction" by Robert Lafore of Adventure International would be to call it a sub-genre of Adventures. You, the player, are presented with the text of a story. At certain points within that text you are asked to make decisions. Depending upon the decision you make, the story line develops differently. In some cases, the decisions you make don't affect anything at all, at other times the decisions you render are crucial to how the story unfolds.

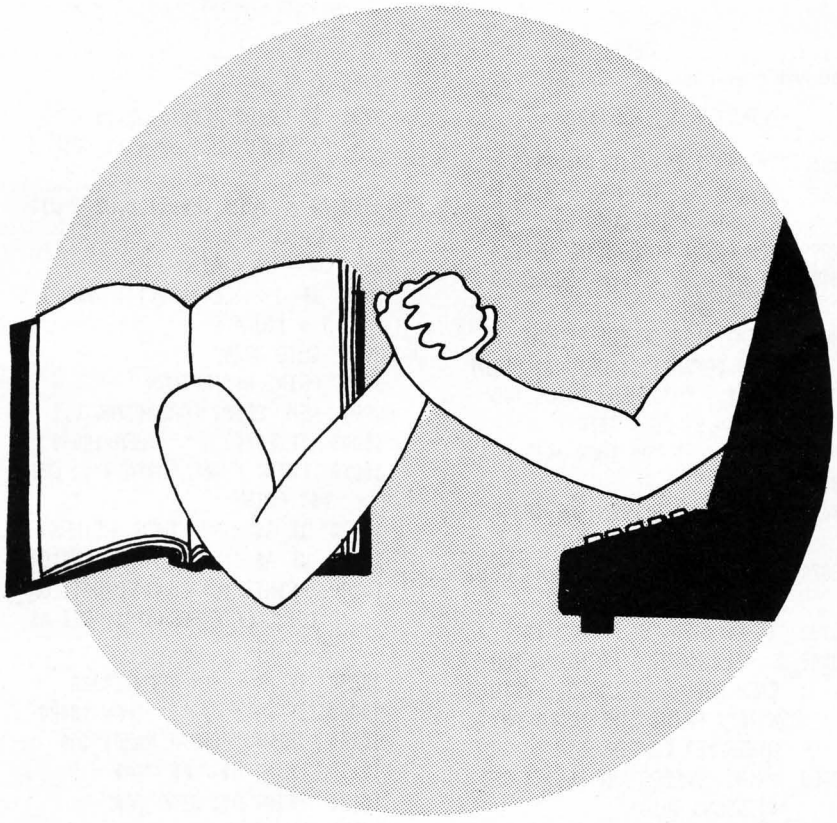
The way it works is simple: The program asks your name and sex and then plugs you into the story as the main character. You read about yourself and the other characters until the moment arrives and you are prompted to give a response. Once you give that response, your character is irrevocably committed to one set of options. Had you given a different answer, the options would in turn be different. The stories themselves come equipped both with happy or sad endings, your choice will determine the nature of your final destiny.

While the concept is a sound one, "Interactive Fiction" has some problems in the execution of its expressed aims. In order to consider these, it may be best to look at the four programs currently on the market. They are:
Six Micro Stories
Two Heads of the Coin
Local Call for Death
His Majesty's Ship "Impetuous"

Six Micro Stories may be the best of the lot for a number of reasons. It consists of six very short stories that have two or three possible endings each...(except for one of them). Each story, with its possible alternate endings, is tight and to the point. There is little in any of these stories that is superfluous, and the player can understand the consequences of decisions immediately. The drawback, of course, is that each story is over before one is really sure that it has started. But on the whole, Six Micro Stories is quite satisfying and leaves one thirsting for more.

Two Heads of the Coin and Local Call for Death are longer pieces. Both are structured loosely along the lines of mystery/detective stories, with a heavy debt to Sir Arthur Conan Doyle and his immortal Sherlock Holmes. In both cases, the player is called upon to solve a mystery. Once accomplished, there is little to hold the reader's interest. In the case of Local Call for Death, the reader is challenged not only to solve the puzzle, but also to list enough evidence to convict a criminal in court. This device extends the life of the program considerably, as opposed to Two Heads of the Coin, where the reader is abandoned virtually as soon as the puzzle is solved, even if it's solved by a lucky guess! Yet both programs are a lot of fun to tackle. The mysteries are well-conceived and the clues to the solution are deftly hidden within the text. Once you have figured out whodunnit, you can still play for hours with the lines of questioning and the ways of arriving at the inescapable conclusion.

His Majesty's ship "Impetuous" is considerably more ambitious. Here Lafore has tried to write an open-ended story with several possible endings, and he has tried to structure it so that the reader/player is unaware of the import of the decisions made. Where in previous stories the player is allowed to ask any question that comes to mind (with often incongruous and confusing results), in "Impetuous" yes or no decisions are presented. There is no way to work around this structure, and it is greatly to the benefit of the program that such is the case. There is no puzzle to solve, only a story to develop. The end goal is to survive and decisions that you make will dictate whether you do or not. However, you cannot decipher what is the proper course of action that will guarantee your success. There are enough critical points (decisions) in the program to make you uncertain of the result of your actions after several games. This greatly enhances the value of the program.



What is perhaps the most interesting aspect of "Interactive Fiction" is watching it develop through the series. Lafore obviously is learning each time around. The programs are getting better and better. His technique improves each time, or at least it seems to. Six Micro Stories and "Impetuous" have the longest replay time, and if their structure is pursued, the next couple of programs should begin to approach an Adventure in terms of playing time.

But please, let's not make undue claims. "Interactive Fiction" is good software, it entertains and edifies. It is not anything close to a novel or a good short story, nor should it purport to be. If you are looking for something different in a game, something that is good fun and novel in its approach, try "Interactive Fiction." You won't be disappointed. Just don't expect Flaubert, James or Twain.

Dave Albert

continued from page 18

APPLE VERSION

```
105  DIM C$(7),C1(7),C2(7),F$(5)
360  IF A$ = "D" THEN SB = 4:FS =
     1: GOSUB 8000: GOTO 200
2999  REM PRINT SUBROUTINE VERS.4
3000  IF NI =  - 1 THEN  GOSUB 90
     00: RETURN
3005  PRINT "(S) SELECT FORMAT, O
     R (D) DEFAULT";: GET A$: PRINT
3006  IF A$ = "S" THEN  GOSUB 100
     00:FS = 2: GOTO 3010
3007  IF A$ < > "D" THEN 3005
3008 FS = 1
3010  PRINT "(S) SCREEN, OR (P) P
     RINTER";: GET A$: PRINT
3020  IF A$ = "P" THEN SB = 2: GOTO
     3050
3030  IF A$ < > "S" THEN 3010
3040 SB = 1: PRINT : PRINT "AFTER
      EACH RECORD <ESC> WILL RETU
     RN TO": PRINT "THE MENU, ANY
      OTHER KEY CONTINUES."
3050  PRINT "<PRESS ANY KEY>": GET
     A$: GOSUB 8010
3090  IF SB = 2 THEN  PR# 0
3100  RETURN
3299  REM PRINT ONE RECORD TO SCR
     EEN, VERS.4
3300  ON FS GOSUB 3700,3800
3340  GET A$: IF A$ =  CHR$ (27) THEN
     RS = 1
3350  RETURN
3599  REM PRINT ONE RECORD TO PRI
     NTER, VERS.4
3600  ON FS GOSUB 3700,3800
3640  RETURN
3699  REM  PRINT ONE DEFAULT V.1
3700  PRINT : PRINT "RECORD ";I +
     1: PRINT
3710  FOR J = 0 TO NH
3720  PRINT H$(J),I$(I,J)
3730  NEXT J
3740  RETURN
3799  REM  PRINT ONE FORMAT V.1
3800 J = 1:T = 0:B$ = ""
3820 J1 =  VAL ( MID$ (F$(T),J,1)
     ):J = J + 1
3830  IF J1 < 5 THEN N =  VAL ( MID$
     (F$(T),J,2)):J = J + 2
3840  ON J1 GOTO 3850,3860,3870,3
     890,3910,3970
3850 A$ = H$(N): GOTO 3950
3860 A$ = I$(I,N): GOTO 3950
3870 B$ =  LEFT$ (B$,N - 1): IF  LEN
     (B$) < N - 1 THEN  FOR J2 =
      LEN (B$) TO N - 2:B$ = B$ +
     " ": NEXT
3880  GOTO 3960
3890  PRINT B$: IF N > 1 THEN  FOR
     J2 = 2 TO N: PRINT : NEXT
3900 B$ = "": GOTO 3960
3910  IF J >  LEN (F$(T)) THEN T =
     T + 1:J = 1
3920 J2 = J
3930  IF  MID$ (F$(T),J2,1) < >
     "!" THEN J2 = J2 + 1: GOTO 3
     930
3940 A$ =  MID$ (F$(T),J,J2 - J):
     J = J2 + 1
3950 B$ = B$ + A$
3960  IF J >  LEN (F$(T)) THEN T =
     T + 1:J = 1
3965  GOTO 3820
3970  PRINT B$: RETURN
9999  REM  PRINT FORMATTING,V.1
10000  IF F$(0) = "" THEN 10040
10010  PRINT "SAME FORMAT?";: GET
     A$: PRINT
10020  IF A$ = "Y" THEN  RETURN
10030  IF A$ < > "N" THEN 10010
10040  PRINT "(L) LOAD FORMAT, OR
      (C) CREATE FORMAT";: GET A$
     : PRINT
10050  IF A$ = "C" THEN 10200
10060  IF A$ < > "L" THEN 10040
10100  INPUT "FORMAT NAME:";A$
10110  PRINT D$;"OPEN";A$
10120  PRINT D$;"READ";A$
10130  INPUT NF
10140  FOR J = 0 TO NF: INPUT F$(
     J): NEXT
10150  PRINT D$;"CLOSE";A$
10160  RETURN
10200 NF = 0:J = 0:F$(0) = ""
10210  HOME : PRINT "START IN THE
      UPPER LEFT CORNER AND WORK
     ACROSS EACH LINE."
10220  PRINT "1:HEADING, 2:ITEM,
     3:TAB, 4:NEXT LINE,  5:STRIN
     G, 6:END": INPUT J1
10230  IF J1 < 1 OR J1 > 6 THEN 1
     0220
10240 F$(NF) = F$(NF) +  STR$ (J1
     ):J = J + 1
10250  ON J1 GOTO 10260,10260,103
     00,10300,10350,10400
10260  FOR T = 0 TO NH: PRINT T +
     1;") ";H$(T): NEXT
10270  INPUT "WHICH?";T:T = T - 1
     : IF T < 0 OR T > NH THEN 10
     270
10280  GOTO 10310
10300  INPUT "HOW MANY?";T: IF T <
     1 OR T > 99 THEN  PRINT "OUT
      OF RANGE.": GOTO 10300
10310 A$ =  STR$ (T): IF T < 10 THEN
     A$ = "0" + A$
10320 F$(NF) = F$(NF) + A$:J = J +
     2
10330  GOTO 10380
10350  INPUT "STRING:";A$:A$ = A$
     + "!"
10360  IF  LEN (A$) + J > 255 THEN
     NF = NF + 1:J = 0:F$(NF) = "
     "
10370 F$(NF) = F$(NF) + A$:J = J +
      LEN (A$)
10380  IF J > 252 THEN NF = NF +
     1:J = 0:F$(NF) = ""
10390  GOTO 10220
10400  INPUT "FORMAT NAME:";A$
10410  PRINT D$;"OPEN";A$
10420  PRINT D$;"WRITE";A$
10430  PRINT NF: FOR J = 0 TO NF:
      PRINT F$(J): NEXT
10440  PRINT D$;"CLOSE";A$
10450  RETURN
```

ATARI VERSION

```
30 DIM FI$(20)
105 DIM C1(7),C2(7),F$(400),B$(100),C$
(100)
200 RL=(NH+1)*IL:PRINT "}(S) SAVE CURR
ENT DATA"
360 IF CHR$(A)="D" THEN SB=4:FS=1:GOSU
B 8000:GOTO 200
1000 PRINT :PRINT "ENTER INPUT FILESPE
C";:INPUT FI$
1020 A$="D:":A$(LEN(A$)+1)=FI$:OPEN #1
,4,0,A$
1043 INPUT #1,IL:DIM T$(NH*IL+IL+1)
2000 PRINT :PRINT "ENTER OUTPUT FILESP
EC";:INPUT FI$
2100 A$="D:":A$(LEN(A$)+1)=FI$:OPEN #1
,8,0,A$
2135 IF LEN(H$)<=SEG+249 THEN PRINT #1
;H$(SEG,LEN(H$)):GOTO 2170
2235 IF LEN(I$)<=SEG+249 THEN PRINT #1
;I$(SEG,LEN(I$)):GOTO 2260
3000 IF NI=-1 THEN GOSUB 9000:RETURN
3005 PRINT :PRINT "(S) SELECT FORMAT,
OR (D) DEFAULT";:GET #2,A:PRINT
3006 IF CHR$(A)="S" THEN GOSUB 10000:F
S=2:GOTO 3010
3007 IF CHR$(A)<>"D" THEN 3005
3008 FS=1
3010 PRINT :PRINT "(S) SCREEN OR (P) P
RINTER ?":PRINT
3015 GET #2,A
3020 IF CHR$(A)="P" THEN SB=2:GOTO 305
0
3030 IF CHR$(A)<>"S" THEN 3015
3040 SB=1:PRINT :PRINT "AFTER EACH REC
OD <ESC> WILL RETURN TO":PRINT "THE ME
NU, ANY OTHER KEY CONTINUES."
3050 PRINT "PRESS ANY KEY":GET #2,A:GO
SUB 8010
3090 CLOSE #3:POKE 752,0
3100 RETURN
3299 REM PRINT ONE RECORD VERS. 4
3300 ON FS GOSUB 3700,3800
3340 GET #2,A:IF A=27 THEN RS=1
3350 RETURN
3435 LPRINT "RECORD ";I+1:LPRINT " "
3599 REM PRINT ONE RECORD TO PRINTER,
VERS. 4
3600 ON FS GOSUB 3700,3800
3640 RETURN
3700 PRINT #3:PRINT #3;"RECORD ";I+1:P
RINT #3
3710 FOR J=0 TO NH
3720 PRINT #3;H$(J*HL+1,J*HL+HL);I$(I*
RL+1+J*IL,I*RL+J*IL+IL)
```

```
3730 NEXT J
3740 RETURN
3799 REM PRINT ONE FORMAT
3800 J=1:T=0:B$=""
3802 IF F$(LEN(F$))<>"6" THEN F$(LEN(F
$))="6"
3820 J1=VAL(F$(J,J)):J=J+1
3830 IF J1<5 THEN N=VAL(F$(J,J+1)):J=J
+2
3840 ON J1 GOTO 3850,3860,3870,3890,39
10,3970
3850 A$=H$(N*HL+1,N*HL+HL):GOTO 3950
3860 A$=I$(I*RL+1+N*IL,I*RL+N*IL+IL):G
OTO 3950
3870 FOR QQ=1 TO N:B$(LEN(B$)+1)=" ":N
EXT QQ
3880 GOTO 3960
3890 PRINT #3;B$:IF N>1 THEN FOR J2=2
TO N:PRINT #3:NEXT J2
3900 B$="":GOTO 3960
3910 REM
3920 J2=J
3930 IF F$(J2,J2)<>"!" THEN J2=J2+1:GO
TO 3930
3940 A$=F$(J,J+(J2-J)-1):J=J2+1
3950 B$(LEN(B$)+1)=A$
3960 REM
3965 GOTO 3820
3970 PRINT #3;B$:RETURN
4009 DIM T$(NH*IL+IL)
4010 PRINT :PRINT "RECORD NUMBER ";NI+
1:PRINT :FOR J=0 TO NH
5084 I$(I*RL+1+J*IL,I*RL+J*IL+IL)=A$
8200 RS=0:IF SB=2 THEN OPEN #3,8,0,"P:
":GOTO 8250
8210 OPEN #3,8,0,"S:":POKE 752,1:PRINT
 " "
9999 REM PRINT FORMATTING,V.1
10000 IF F$="" THEN 10040
10010 PRINT "SAME FORMAT?";:GET #2,A:P
RINT
10020 IF CHR$(A)="Y" THEN RETURN
10030 IF CHR$(A)<>"N" THEN 10010
10040 PRINT "(L) LOAD FORMAT, OR (C) C
REATE FORMAT";:GET #2,A:PRINT
10050 IF CHR$(A)="C" THEN 10200
10060 IF CHR$(A)<>"L" THEN 10040
10100 PRINT "ENTER FORMAT NAME";:INPUT
 FI$
10110 A$="D:":A$(LEN(A$)+1)=FI$:OPEN #
1,4,0,A$
10120 REM
10135 F$=""
10140 INPUT #1,NF:FOR J=0 TO NF:INPUT
#1,A$:F$(LEN(F$)+1)=A$:NEXT J
10150 CLOSE #1
10160 RETURN
10200 NF=0:J=0:F$=""
10210 GRAPHICS 0:PRINT "START IN THE U
PPER LEFT CORNER AND":PRINT "WORK ACRO
SS EACH LINE."
10220 PRINT "1:HEADING, 2:ITEM, 3:TAB,
 4:NEXT LINE":PRINT "5:STRING, 6:END":
INPUT J1
10230 IF J1<1 OR J1>6 THEN 10220
10240 F$(LEN(F$)+1)=STR$(J1):J=J+1
10250 ON J1 GOTO 10260,10260,10300,103
00,10350,10400
10260 FOR T=0 TO NH:PRINT T+1;") ";H$(
T*HL+1,T*HL+HL):NEXT T
10270 PRINT "WHICH?";:INPUT T:T=T-1:IF
 T<0 OR T>NH THEN 10270
10280 GOTO 10310
10300 PRINT "HOW MANY?";:INPUT T:IF T<
1 OR T>99 THEN PRINT "OUT OF RANGE.":G
OTO 10300
10310 A$=STR$(T):IF T<10 THEN A$="0":A
$(LEN(A$)+1)=STR$(T)
10320 F$(LEN(F$)+1)=A$:J=J+2
10330 GOTO 10380
10350 PRINT "STRING:";:INPUT A$:A$(LEN
(A$)+1)="!"
10370 F$(LEN(F$)+1)=A$:J=J+LEN(A$)
10380 REM
10390 GOTO 10220
10400 PRINT "FORMAT NAME:";:INPUT FI$
10410 A$="D:":A$(LEN(A$)+1)=FI$:OPEN #
1,8,0,A$
10420 PRINT #1;INT((LEN(F$)-1)/250)
10430 FOR J=0 TO INT((LEN(F$)-1)/250)
10432 IF LEN(F$)<J*250+250 THEN PRINT
#1;F$(J*250+1,LEN(F$)):GOTO 10440
10434 PRINT #1;F$(J*250+1,J*250+250):N
EXT J
10440 REM
10445 CLOSE #1
10450 RETURN
```

LINE 4006 SHOULD ALSO BE DELETED.

DARTS

by John Daoust

"Darts" is written for the Apple in Integer BASIC and uses about 2K of RAM.

"Darts" is a two-player game of eye/hand coordination which you play with the safety and comfort of your Apple game paddles. (No more dart holes in your panelled walls!)

The dart board is shown at the top of the screen, while the darts to be thrown pass by at the bottom. Each player throws three darts per turn, which are released by pressing the paddle button. Hits score from 10 to 50 points, and the first player to tally exactly 210 points is the winner.

Variable Listing

N1$, N2$: Players' names.
A$: General variable.
SCR1, SCR2: Players' scores.
N: Dart count.
X, Y, F: For/next variables.
TURN: Turn pointer.
HIT: Score for throw.
IY: Graphic factor for scoring.
P, D, S: Sound variables.

```
 30 DIM N1$(20),N2$(20),A$(20)
 34 GOSUB 7100
 35 P=230:D=5
 40 CALL -936
 41 TAB 15: PRINT "DARTS": PRINT
    : PRINT
 56 INPUT "ENTER FIRST PLAYER'S NAME
    ",N1$
 58 INPUT "ENTER SECOND PLAYER'S NAM
    E ",N2$

Main routine.

 80 GOSUB 1000
100 SCR1=0:SCR2=0:N=1
105 CALL -936
106 GOSUB 4500
130 FOR X=0 TO 39
132 COLOR=15: PLOT X,39
135 IF PEEK (-16287+TURN)>127 THEN
    GOSUB 2000
148 COLOR=0: PLOT X,39
155 NEXT X
200 GOTO 130
900 END

Routine to draw dart board.

1010 GR
1020 COLOR=9
1030 FOR F=10 TO 13: VLIN 0,3 AT
     F: VLIN 0,3 AT F+15: NEXT F
1035 COLOR=6: FOR F=14 TO 16: VLIN
     0,3 AT F: VLIN 0,3 AT F+8: NEXT
     F
1040 COLOR=13: FOR F=17 TO 18: VLIN
     0,3 AT F: VLIN 0,3 AT F+3: NEXT
     F
1045 COLOR=1: VLIN 0,3 AT 19
1050 COLOR=8: HLIN 0,39 AT 0
1095 RETURN

Dart throwing routine.

2000 FOR Y=39 TO 0 STEP -1
2003 COLOR=15
2005 PLOT X,Y
2030 IF SCRN(X,Y-1)#0 THEN 2050
2038 COLOR=0: PLOT X,Y
2040 NEXT Y
2050 N=N+1
2055 GOSUB 7000
2060 IF TURN=1 THEN 3000
2065 IF TURN=0 THEN 4000
2490 X=0
2500 RETURN

Player number 2's turn.

3000 REM
3020 IF N=4 THEN TURN=0
3022 IF N=4 THEN GOSUB 1000
3025 IF N=4 THEN N=1
3030 GOSUB 5000
3050 SCR2=SCR2+HIT
3052 IF SCR2>210 THEN SCR2=SCR2-
     HIT
3055 GOSUB 4500
3400 GOTO 2490

Player number 1's turn.

4000 REM
4020 IF N=4 THEN TURN=1
4022 IF N=4 THEN GOSUB 1000
4025 IF N=4 THEN N=1
4030 GOSUB 5000
4050 SCR1=SCR1+HIT
4052 IF SCR1>210 THEN SCR1=SCR1-
     HIT
4055 GOSUB 4500
4400 GOTO 2490

Print score.

4500 CALL -936
4510 VTAB 21: PRINT N1$;" = ";SCR1;
     : TAB 20: PRINT N2$;" = ";SCR2
4515 IF SCR1=210 OR SCR2=210 THEN
     GOSUB 6000
4518 VTAB 23: TAB 10
4520 IF TURN=0 THEN PRINT N1$;"'S TUR
     N     SHOT ";N;"     "
4522 IF TURN=1 THEN PRINT N2$;"'S TUR
     N     SHOT ";N;"     "
4550 RETURN

Calculate score.

5000 REM
5010 HIT=0
5015 IY=1
5020 IF Y=5 THEN IY=2
5022 IF Y=6 THEN IY=3
5023 IF Y=7 THEN IY=4
5024 IF Y=8 THEN IY=5
5030 IF SCRN(X,Y-IY)=8 THEN HIT=
     0
5032 IF SCRN(X,Y-IY)=9 THEN HIT=
     10
5034 IF SCRN(X,Y-IY)=6 THEN HIT=
     20
5036 IF SCRN(X,Y-IY)=13 THEN HIT=
     30
5038 IF SCRN(X,Y-IY)=1 THEN HIT=
     50
5100 RETURN

End-of-game routine.

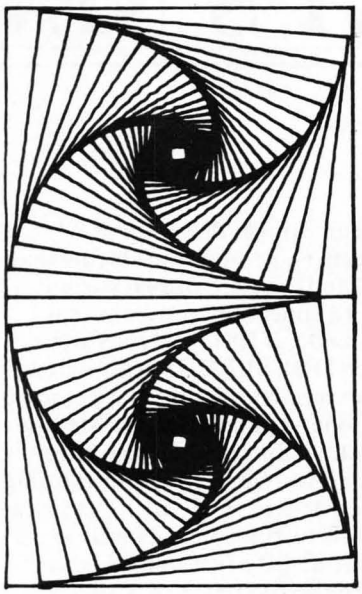
6000 FOR S=1 TO 50: GOSUB 7000: NEXT
     S
6003 VTAB 23: INPUT "WOULD YOU CARE T
     O PLAY AGAIN ",A$
6005 IF SCR2=210 THEN TURN=0
6007 IF SCR1=210 THEN TURN=1
6010 IF A$(1,1)="Y" THEN 80
6020 TEXT : CALL -936: END

Call sound routine.

7000 POKE 0,P: POKE 1,D: CALL 2:
      RETURN

Poke sound generator.

7100 POKE 0,230: POKE 1,0: POKE
     2,173: POKE 3,48: POKE 4,192
     : POKE 5,136: POKE 6,208: POKE
     7,4: POKE 8,198: POKE 9,1: POKE
     10,240
7110 POKE 11,8: POKE 12,202: POKE
     13,208: POKE 14,246: POKE 15
     ,166: POKE 16,0: POKE 17,76
     : POKE 18,2: POKE 19,0: POKE
     20,96
7120 RETURN
```



THREE D

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MasterCard VISA

WHAT'S NEW

By Edward E. Umlor

February seems to be the month of new beginnings. In this column, we hope to be able to give you information on NEW products being offered by supporters of the microcomputer industry. Things will be a little bare this month, because we are just getting started. One of the very first things we need to do is holler "HELP!!!!!" If you are a manufacturer, please send us copies of your new product releases for publication. If you are a computer person that has bought something new for your setup, write a review of the product (good points and problems) and submit it for publication. We are looking for reviews of both hardware items and software. The intent is to have two sections: one for hardware, and one for software. We look forward to publishing your reviews.

HARDWARE

The hardware item for this month is the "DOUBLER." We are a little late in talking about this product from:

PERCOM DATA COMPANY
211 North Kirby
Garland, Tx 75042

Well it's better late than never. The Doubler has been in use in Hardside's service department for about three months. This is long enough to get a feel for its durability. To date, there has not been any trouble in our machines and only one out of almost 200 sold has come back with a problem. That is a very good quality control percentage for the manufacturer.

How is this modification installed? Easily. It is so easy that many people might not take the necessary care to insure proper operation. The biggest thing to watch out for is static electricity. Your body can build up a static charge of a thousand volts or more. Remove the bottom of the expansion interface, carefully remove the 1771 (40 pin chip, be sure to mark the pin 1 end on the board), install the 1771 into the Doubler in the socket provided, insert the Doubler into the socket on the interface board vacated by the 1771, and replace the bottom. This completes the installation. Will I still be able to run my 35 track single density disk? YES!!! The data transfer is much more reliable, because the Doubler has a high performance data separator circuit as well as the 1791 chip that allows double density operation.

DOUBLE DENSITY? Yes, double density format as well as the standard single density format. Single density is ten sectors per track for a total of two grans (gran= five sectors or 1.28K bytes of storage) per track. The standard 35 track drive has a maximum of 70 grans for storage. This is called MFM format to the write head and does not require as high a frequency capability. Double density is 18 sectors per track for a total of 3.6 grans per track. The standard 35 track drive now has a maximum of 126 grans of storage. This is a 180% increase in data stored per disk. As a side benefit, the rate of data transfer is also increased by a factor of 180%. This should be good news to all you Galactic Maillist users. A friend and I measured the time for an add of one name to a list of just over 200, and found the sort and store time reduced by almost 1/3. The head write format is MMFM (M squared FM) and requires a much higher frequency capability head. Almost all manufacturers of disk drives use heads that are compatible with double density. The only drives that I have heard of that do not work well with the Doubler are all over a year old. You will be able to start working in double density right away as PERCOM supplies an operating system with the Doubler.

SOFTWARE

In this area of software, I would like to cover three operating systems for running double density:

1. DOUBLEDOS (supplied with the Doubler),
2. NEWDOS80/DOUBLEZAP 1.1, AND
3. NEWDOS80/DOUBLEZAP 2.0.

1. DOUBLEDOS:

This operating system is an enhanced version of TRSDOS that will run double density and corrects some of the problems that the Tandy system displays from time to time. Any program that runs under TRSDOS, runs well under DOUBLEDOS with only a few exceptions. I have not come up with one yet and Galactic Maillist as well as Special Delivery have been converted. They both run fine and error-free. DOUBLEDOS can be used to run single as well as double density files. The $ is used before the file name of a single density file and is not used for a double density file. It comes with sufficient documentation to give you the changes in format from TRSDOS. If you are used to working with TRSDOS, DOUBLEDOS should not pose any problem.

2. NEWDOS80/DOUBLEZAP 1.1:

The Circle J Software Ranch has produced two sets of zaps for NEWDOS80. This first effort of theirs has one big advantage over the second version: the ease of double backup and double format. The documentation is fairly complete and after generating your new double density compatible disk, you will be able to run all your NEWDOS compatible programs. Again the $ is used as a single density designator with the addition of the word SINGLE being added to the beginning of each line that requires a single density file. SUPERZAP/CMD will not function under 1.1, but SUPERZAP/BAS seems to work fine. The fun of this and DOUBLEDOS is having to keep track of your single density and double density files.

3. NEWDOS80/DOUBLEZAP 2.0:

The Circle J Software Ranch has updated their zap and are producing the 2.0 version. This corrects some of the bother of using mixed density disk. The greatest addition is the ADR/CMD program. This gives you "AUTOMATIC DENSITY RECONGNITION" for running mixed density disk. The two previous operating systems would

continued on next page

HARDWARE CORNER

by Edward Umlor

This is a new feature for **SoftSide** magazine. This corner of the magazine will be dedicated to giving hints, answering questions, and helping to understand some of the "black magic" that goes on inside your computer.

Who is that masked hardhead from Hardware Corner? The name is Edward E. Umlor: a jack of many trades and an expert in none. When I started in electronics (1956), the germanium diode was the very latest thing and the transistor was only hinted at by Bell labs. As a grounded flyboy (ground radar maintenance) in the USAF, basic electronics was hammered through solid granite by greatly exasperated instructors. After three years, eleven months, twenty-eight days, and 8 ½ hours, the gates swung wide and in 1961 I was released upon an unsuspecting populace. From 1961 until 1966 I wandered through the space program working on PCM (Pulse Code Modulation) telemetry systems and the back-up guidance to the LEM (Lunar Excursion Module). In 1966 the call of computers got me and Honeywell accepted me as a system test technician. After working up to a full engineer (no sheepskin) with them, I was laid off in the big cutback in 1975. Since then, the microcomputer has come along to keep me busy.

The aim here is to be of help in the area of hardware. For example, there are many reasons why a tape will not load in your machine (the subject of next month's article). Each computer has its own personality, and each make of computer has its own unique set of rules for loading. There will also be a description of how we record our tapes, why we do it the way we do, and some hints to help you load the tapes more easily.

I will be looking forward to hearing from you about some of the problems you are having with your hardware. This way you will receive direct help in the areas where you most need it. I do not profess to be an expert on all types (or any, for that matter) of microcomputers. The thing going for me is several years in the field and a desire to learn more. Not all questions can be answered in this column, but a earnest endeavor will be made to cover the maximum area in each article. Please write to me in care of the magazine with your questions and comments.

Here is a little quickie to help all of you that are thinking of buying an MX-80 printer for your Model I Level II S-80, and do not have an interface in your system. This means that you plan to buy the R/S printer cable with the in line buffer (P/N 26-1411). The electronics in this cable DO NOT receive power from the keyboard. I would have expected R/S to supply the 5 volts from the keyboard as both ground and 5 volts are available. Just to be different, they decided that the printer should supply these needs. After all, we can't load down the keyboard too much. The 5 volts must appear on pin 18 of printer (Centronics "D" type) connector. Apparently R/S uses the voltage from the printer to drive an exerciser circuit for test purposes. They don't have to tie up a computer for testing the printers by doing this. The MX-80 doesn't have the 5 volts available on pin 18. This condition can be corrected by jumpering 5 volts to pin 18 on the inside of the MX-80 printer. Once this is done, your printer will function with the R/S printer interface cable just like downtown. This problem may occur with other makes of printers. The best way to find out is to look at the pin connections chart in the manual of the printer you plan to buy. If the 5 volts are missing from pin 18, have the people you are buying from install a jumper, or if you have the expertise and it will not void your warranty, do the job yourself.

Please remember to write in with your questions, comments,...etc., to Ed Umlor in care of **SoftSide** magazine. Looking forward to helping unconfuse (or confuse) you in future articles. This is Granite Knoggin signing off for this month.

WHAT'S NEW

continued from previous page

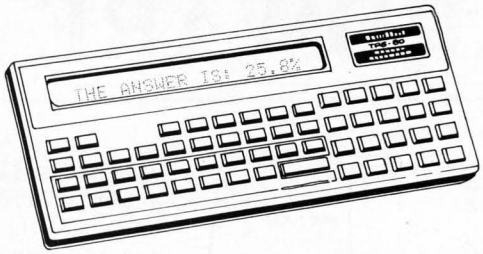
not let you get a DIRectory or run a FREE command on a single density disk. With ADR, you now have full access to the single density disk and the COPY command is in the same format as single density only. For example; COPY SUPERZAP/CMD:1 TO : 0 will copy SUPERZAP from a single density disk in drive 1 to a double density disk in drive 0. The assembly language SUPERZAP will work on a 2.0 zapped doubled density NEWDOS80. The one area I don't like is the sequence for making a backup of the double density disk: Format a disk, copy over, and then fixboot. The double backup command of ZAP 1.1 is much easier to use.

RECOMMENDATION:

The system that I have found easiest to use is a combination of DOUBLEZAP 1.1 & 2.0. The NEWDOS80 is a very convenient operating system and when coupled with the ZAP 2.0 and the DOUBLE/CMD from ZAP 1.1. You will need to have a zapped disk of each for checking out the operating systems that will suit you the best. All the materials and programs you need are available from TSE/Hardside with the exception of DOUBLEZAP 2.0 (Hope to have it available in the near future).

I hope that this information will be of help to you when you are looking for a way to expand your storage capacity on a limited budget.

MODEL II $3599



POCKET COMPUTER $259
with interface

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TRS-80 Model I, 64K RAM (#26-4002)	$3599.00
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TRS-80 Color Computer, Extended BASIC (#26-3002)	$529.00

MODEL III $919

MODEL I PERIPHERALS

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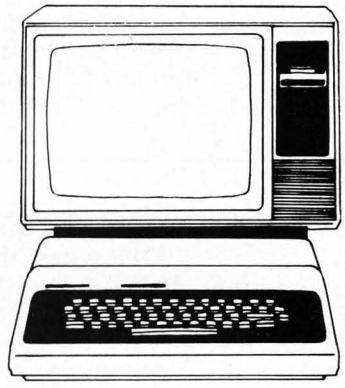

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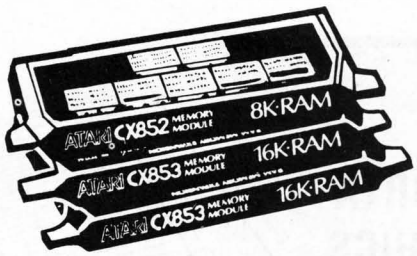
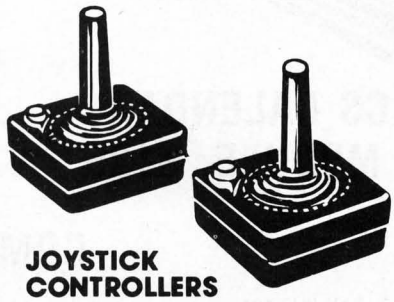


MEMORY MODULES



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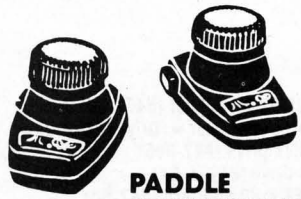

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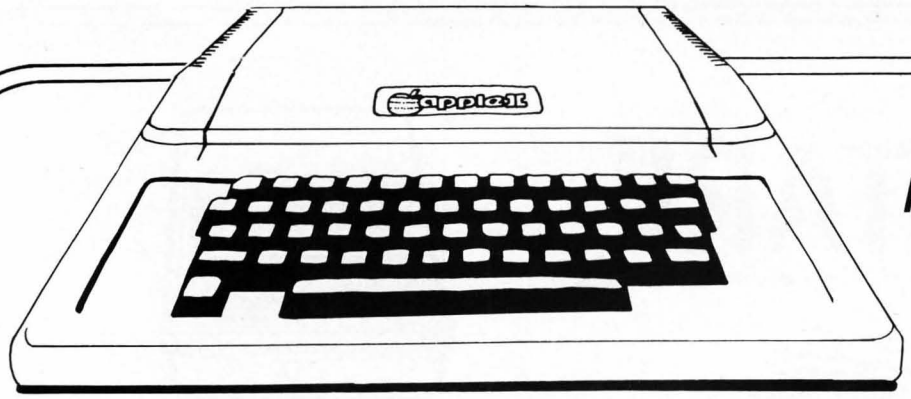

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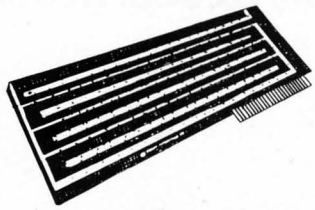

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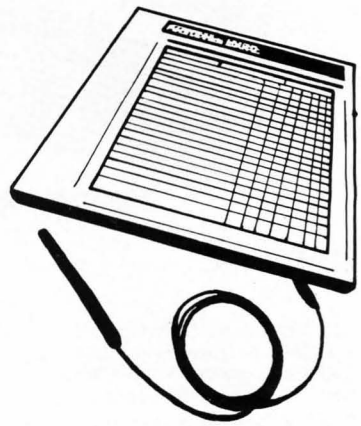

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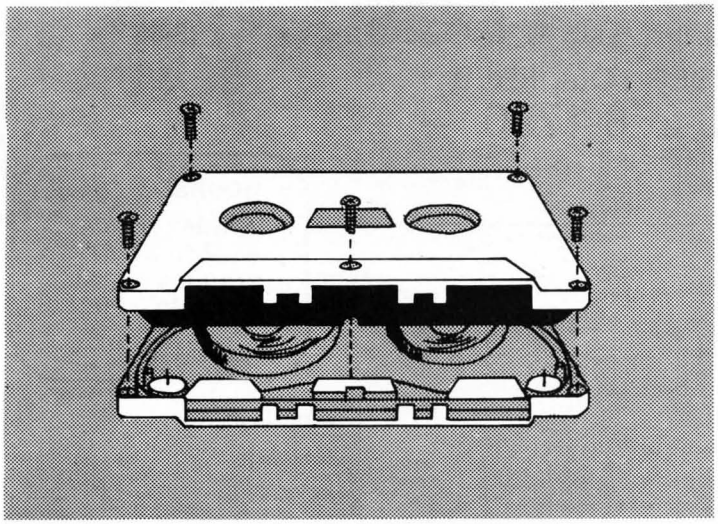

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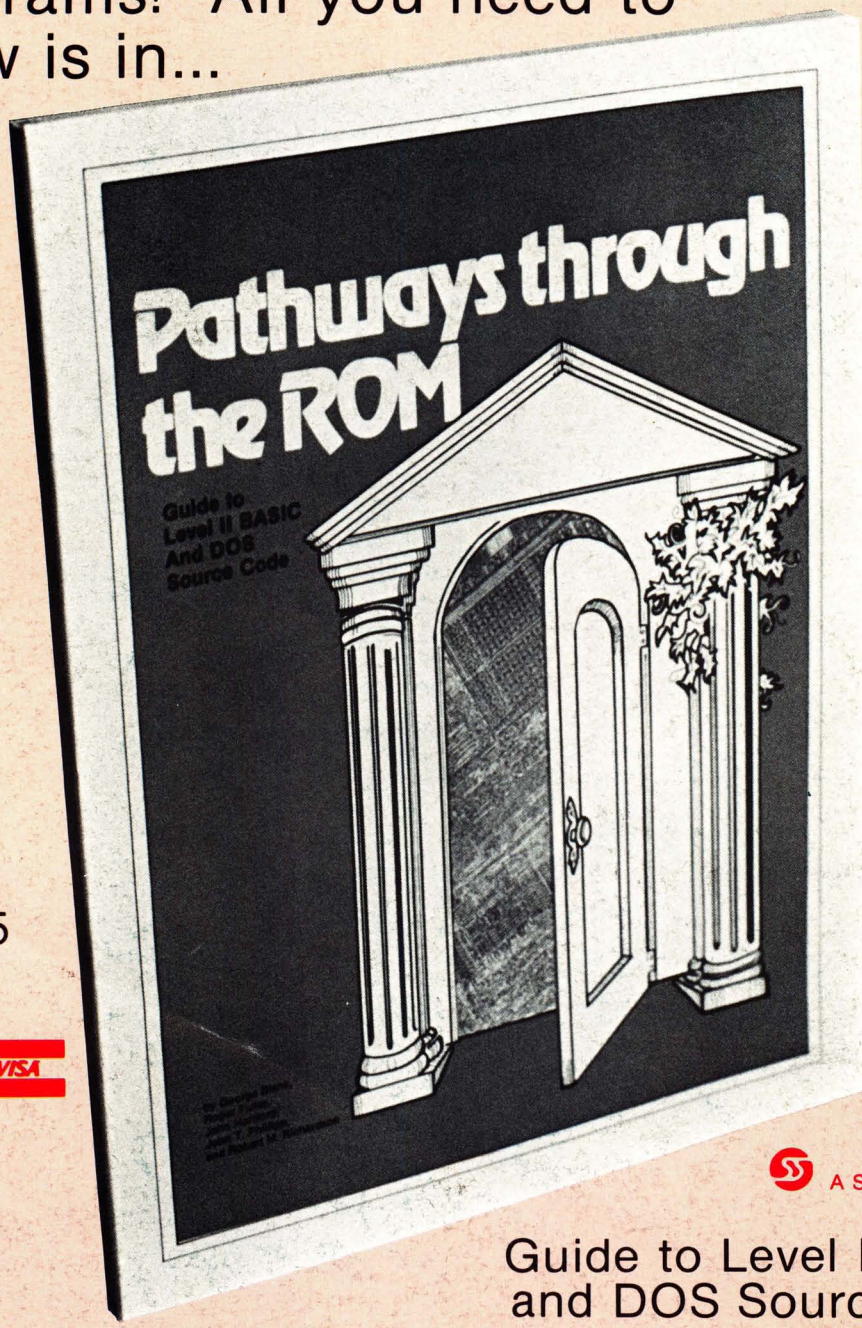

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