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(BY NANCY HERTERT)

A FANTASY OF

It's sometime in the late 1980's and the neighborhood you live in has a People's Computer Center - founded, funded and staffed by neighborhood people.

This month's story is about

The Cybernetic Theatre

Today is the first Friday of the month, and tonite, there will be a new show at the Theatre.

The building used to be a small supermarket. It had a brief renaissance in the early 1980's as a neighborhood bartering center for home-grown vegetables, poultry, and local baked goods.

Nowadays, the building is honecombed with small rooms and alcoves. Most can comfortably hold 3 or 4 people. A few have facilities for a dozen. And all have a large color tv screen, connected to the Theatre's computer.

Seven o'clock is show time and people start arriving by six. A few have bicycled here from a neighboring town, 30 miles away.

Someone is hawking a slim booklet for tonite's show. "Five dollars for a program! Only five bucks a copy!" she calls.

You're here with your family and a cousin who's visiting from upstate. The nearest Theatre to his home town is over a hundred miles miles away. He arrived two days ago, to visit and see your local *Theatre.*

It's show time! Everyone is pressing forward. The evening admission price during First Week is fifteen dollars a head.

"Popcorn, anyone?" you ask. No one's interested, which is good - two bucks is still two bucks.

"Which is our room tonite?" asks Caroline, the youngest.

"We've got one of the mixed rooms." These are the rooms with floor pillows as well as some sort of chairs.

The lights slowly go out, leaving behind the bluish glow of the hall Glow-Globes. They start pulsing in the way that means five minutes to show time.

Your room has floor cushions scattered around, with two high stools in the back. Everybody finds their favorite spot. There is a Glow-Globe in here, too, but it is the *only* source of light. Except for the huge tv screen on the front wall.

There's a kaleidoscopic image swirling and shifting colors on the screen. The music-box below it is playing a slow, rhythmic musical piece, in tempo with the image. The effect is soothing.

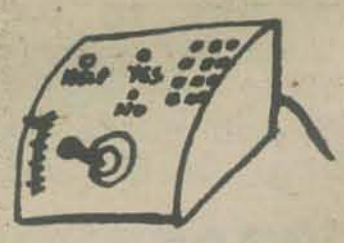
Everyone finds a seat and plugs in their own control-board. The boards have buttons, knobs, and a joystick, and each board has a unique color. They're also on long cords, so you can sit where you like.

The show is about to start.

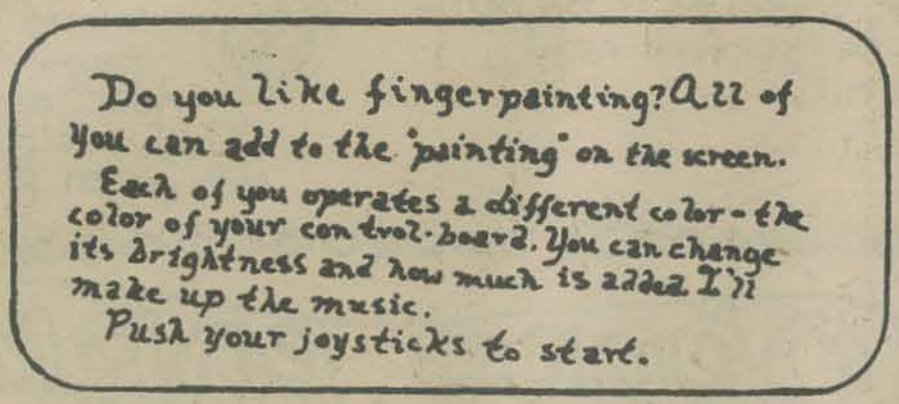
The screen image melts to a pale violet, and the title slowly appears:

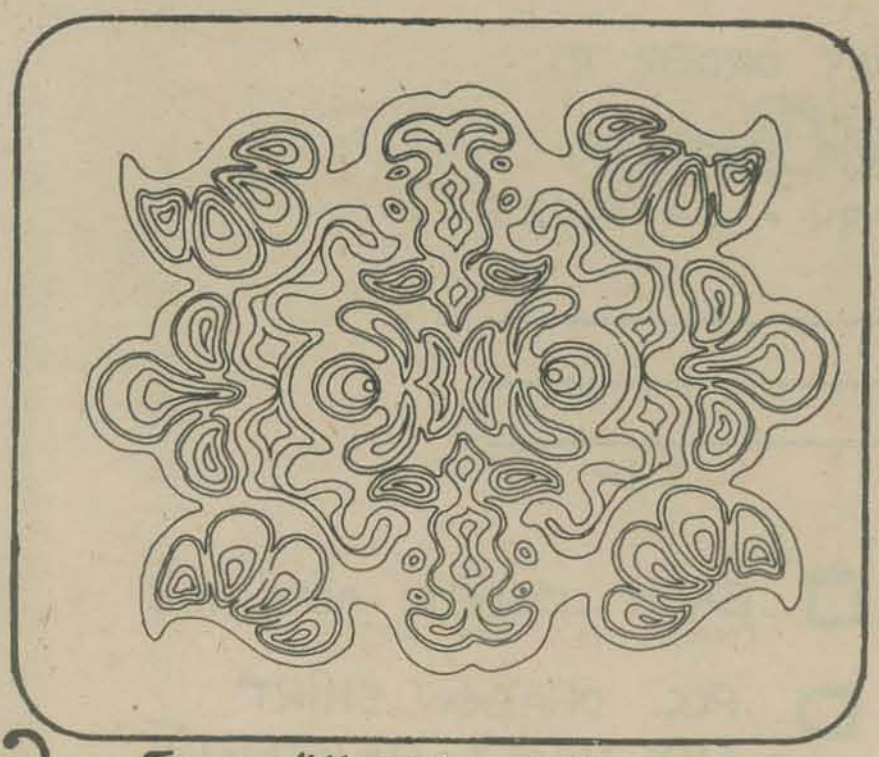
Credits follow.

A short explanation is "written" on the screen, letter by letter:



Control-board





2 From "Kaleidoscope"

No sooner than the last period is written on the screen and everybody nudges their joystick.

COLORS !

Rich and swirling, like blobs of mud, oozing across the screen. The screen seems to rotate, as if you were watching a rotating table from above. Blobs on the edge slide off - and new ones seem to appear, oozing out of special places on the screen. You push your joystick forward and one of the blobs spurts out faster.

With the images comes the sound of ocean waves from the music-box. When blobs collide, there is a crashing, roaring sound. *You can even imagine the foam!*

The screen settles down, as things "organize themselves." It still sounds like you're near an ocean, but there is a growing throbbing, rhythmic and distinct.

As the throbbing grows, the colors seem to lose their richness. They melt like cheese.

Soon there is a pale clay color. The music-box is silent.

"How long was that one?" asks Ben as everyone settles back.

"Twenty minutes" someone answers.

"Wow - they go so fast" he murmurs.

FUTURE FORMS

Another short "piece" is going on. There's an image of cylinders, one in the center, the others smaller and further back, going to infinity. And the colors are changing. No physical motion - just the dynamics of color changes.

Suddenly, the screen goes white, then black, then white - black - white - black. It's like blinking your eyes. Now there's the sound of a Chinese gong. Each "bong" echoes, it seems, for ever.

The black on the screen wins, and white dots appear. Slowly, very slowly, the edge of a planet comes into view from off-screen. And there's a space station is orbit around it.

A human voice comes over the music-box speaker.

"Space station to shuttle craft. Space station to shuttle craft. Commence orbital matching and docking proceedures. Expect you on board in thirty minutes. Meteor storm reported. Good luck."

Small sections of the screen show colored rectangles: yellow, white, red ... There's one rectangle for everyone in the room. And the color coding matches the control-board colors.

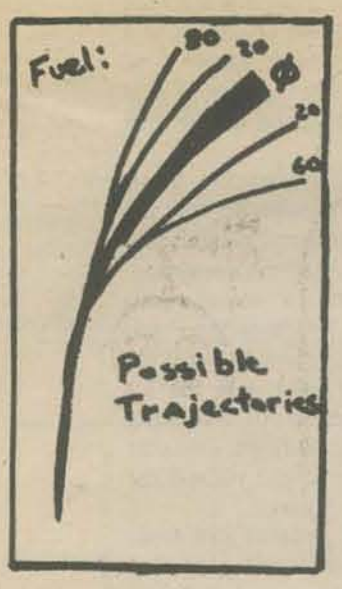
"I've got navigation" shouts Caroline.

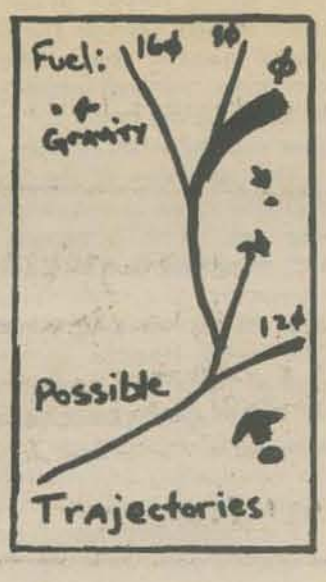
"I want meteor watch" you yell.

Pretty soon, the chores of bringing the ship into dock are divided up. After pressing the **HELP** button on your control board, messages appear in your rectangle, explaining what data can be displayed. You decide to watch the long-range radar and trajectory curves.

There's mayhem for 10 minutes while everyone figures out how to fly the spaceship together. The craft flips head-over-heels a few times, and once it almost dives straight into the atmosphere.

The trajectory curves are really beautiful, and every 3 - 4 seconds, they are erased and replaced with a new set, erased and replaced, erased and replaced ...





From "Orbital Docking"

"Hey! What're those dots over there - the ones that're moving together. Ben, are you on meteor watch? Is that a meteor swarm? Are we on collision course???"

"I'm in charge of fuel and supplies" says Ben.

You snap out of your daydream. "It's me - sorry, I think those dancing curves put me to sleep." By switching back and forth from radar to one of the trajectory curves, you can estimate the possibility of collisions.

"We're sure headed for it", you say. "Not enough time to pull out - let's hope we pass through safely."

A few dots whiz across the screen, and in a few minutes there are dozens of them. Some of the data rectangles flash red.

"We're hit!" someone shouts.

"It must've hit our fuel lines" says Ben, " 'cause we're losing fuel pretty quick."

"Do we have enough to make it?" asks the pilot.

"How much is that?" asks Ben.

No one knows, so the crew decides to wait and see. Meanwhile, the space station is getting larger.

"Oh, shit!" says Ben. "The hole must be getting bigger or something. The bottom's dropping out."

A voice comes on the speaker, "Space station to shuttle craft. Space station to shuttle craft. You seem to be drifting away. Our rescue craft is not available and we cannot send fuel to you.

"Goodbye!"

The screen turns a light blue and this appears:

Tonite's pieces at The Cybernetic Theatre:

KALEIDOSCOPE by Ruth Harper, an art student at Washington High

MUSICAL FINGERPAINTING by the Cincinnati People's Computer Center. Winner of last year's regional computer art festival.

CANS CAN CAN–CAN by Howard Seigel, who works here.

ORBITAL DOCKING by Janet Auerbach and David White. This piece was supported by an Arts In Need grant by the National Arts Council, grant no. 145830. The voice was that of Howard Seigel.

THANX FOR COMING

IF YOU WANT TO BE ON OUR MAILING LIST, TALK TO SUE AT THE DESK.

GOOD NIGHT!

THE NEXT SHOW STARTS IN FIFTEEN MINUTES. PLEASE BE OUT BY THEN.

Reprinted by permission from COMPUTER MAGAZINE, a publication of the IEEE Computer Society. The complete article is 11½ pages long and includes technical details of the design of FRED. You will find it in the August 1974 issue of COMPUTER. Do read it! For info on reprints, subscriptions to COMPUTER , or membership in IEEE Computer Society, write to:
IEEE Computer Society, 5855 Naples Plaza, Suite 301, Long Beach, California 90803. Tell 'em P.C.C. sent you.

A PRACTICAL, LOW-COST, HOME/SCHOOL MICROPROCESSOR SYSTEM

Excerpts

Joe Weisbecker
RCA Laboratories

Meet Fred

Despite the recreational and educational potential of stored-program computers, the single factor of cost has kept them out of the economic reach of most people. But with the advent of LSI microprocessor and memory chips, this may all change – particularly if we take a more modest applications approach and place reasonable limitations on hardware capability.

This system, called FRED (Flexible Recreational and Educational Device), has been developed using the RCA COSMAC microprocessor.

A computer of this type could have major social value. As an interactive, open-ended, adaptive, recreational and educational device, it could stimulate the development of analytical and other intellectual abilities. One can easily imagine the formation of a whole new group of computer hobbyists, complete with user groups and publications for the exchange of programs and ideas. In short, the inexpensive home/school computer could open the door to an entirely new environment that stimulates experimentation, analysis, and creativity.

Application and System Overview

In schools, FRED could provide a powerful educational tool. It could be used to drill and test students from first grade on. It could be used in educational games, simulation exercises, and reading readiness, as well as in teaching programming, as an adjunct to math courses, and as an accessible student tool in almost any subject. FRED could be used to set up stimulating demonstrations and experiments in a wide variety of areas, to help correct learning disabilities, and to stimulate the development of creative abilities. Cost per student hour would be measured in pennies.

In the home, FRED has already functioned as a sophisticated entertainment center for the whole family. It provides a variety of games, simulates a calculator, and even provides a controllable TV puppet for the youngest member of the family. FRED permits a number of creative activities including TV picture drawing, low-fidelity music synthesis, and programming at a variety of skill levels. FRED also provides a shooting gallery, a variety of puzzles, and animated TV greeting cards for holidays.

Since FRED is a stored-program computer, it requires a program to be loaded into memory before use. Program loading is performed with an inexpensive audio cassette player which also gives the computer its voice, music, and sound effect capabilities. Prerecorded program cassettes can be loaded in less than 30 seconds.

After a program cassette is selected and loaded, FRED is operated with a small 16-position keyboard. For a game, the player presses appropriate keys to indicate the moves. Overlay cards are provided so that keyboard labeling can be changed for different programs.

FRED is attached to the antenna terminals of any TV set. This provides an inexpensive, flexible, dynamic output display which is ideally suited for home/school use. Numbers, words, or simple pictures can be displayed on the TV screen in the form of dot patterns.

The basic FRED system comprises the RCA COSMAC microprocessor, 1024 bytes of RAM, a simple hex keyboard, an inexpensive audio cassette player, and the user's own TV set. One would be hard-pressed to imagine a less expensive free-standing computer system. This system is supported by a library of cassette programs in the same way that a phonograph is supported by a record library. A continuing supply of new programs could be provided by the manufacturer of the system together with a selection of optional hardware attachments.

Adding a $25 punched card reader and $10 manual punch to the basic system increases its usefulness and provides more sophisticated users with the ability to prepare and save short parameter lists or programs. Adding a module for recording the contents of memory on cassettes turns the basic FRED system into a user-programmable computer for serious hobbyists. Other possible attachments include light guns, extra memory (RAM), pre-stored programs or tables (ROM), and output relays for control uses.

Applications Philosophy

The open ended aspect of a stored program computer differentiates it from other types of recreational and educational devices. Any number of special purpose devices such as TV games, shuffleboard tables, electric football games, and educational toys are ideally suited to their intended function. None of these, however, will change their characteristics as user moods or interests change. Many of these special purpose devices are seldom used after their initial novelty expires. The stored program computer is a general purpose device. New programs can adapt it to changing moods and interests without the expense of new hardware. It can satisfy the needs of young and old and can grow with individual abilities.

The real value of the home/school system lies in its ability to stimulate and develop human capabilities that are often ignored or discouraged by conventional recreational and educational devices. The computer system provides an environment that stimulates experimentation, analysis, and creativity. For example, contemporary TV encourages passive viewing. However, the computer attached to a TV set enables the user to interact and play a game with the TV set. As the games played increase in sophistication, the user is encouraged to improve his analytical abilities. The user can subsequently be encouraged to experiment via specific programs or eventually to write his own programs.

For a child, the computer may initially provide arithmetic or spelling drills. Even this kind of memory development can be made more interesting via interaction with the computer. However, the child will eventually begin to wonder about the computer. Programs are made available which stimulate this curiosity and let him experiment with changing game rules. He can even begin to formulate and develop his own simple programs in a variety of simulation languages. While the initial use of the computer involves memory skills, it eventually encourages experimentation and the development of analytical and other capabilities.

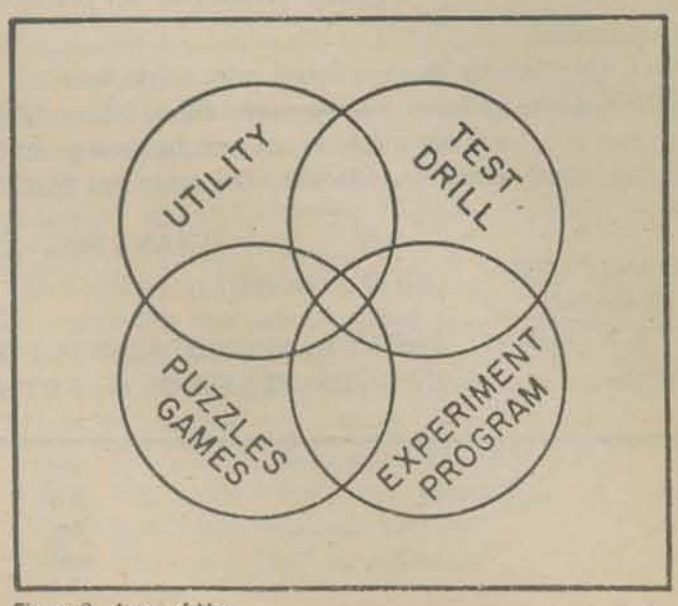
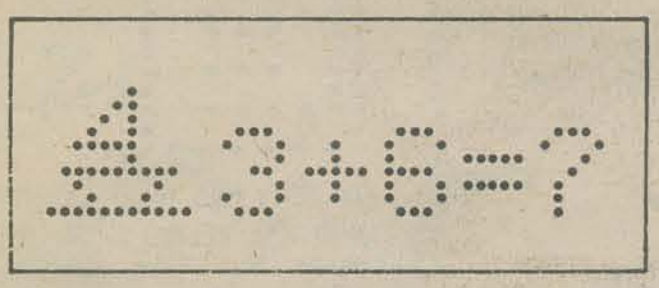


Figure 8. Areas of Use

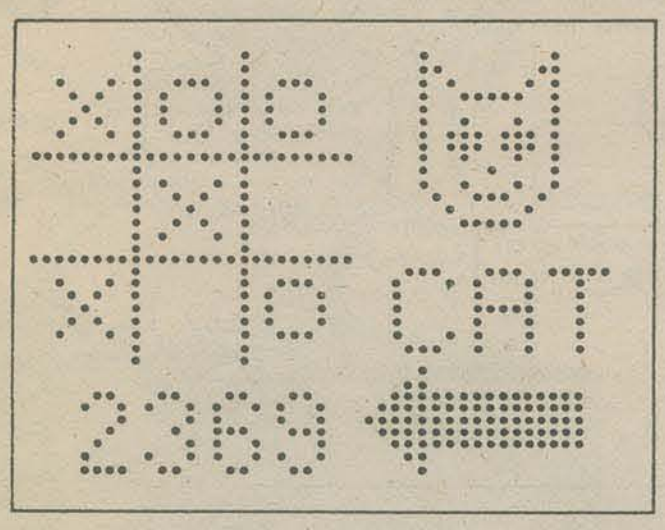
*Four Function Decimal Calculator
Hex Binary Calculator
Game Score Keeper
*Number Base Converter
Weight/Measure Converter (Metric)
Secret Code Computer
Logic Machine[5]
Classification Computer
Gambling Strategy Computer
Other Specialized Calculators
(temperature conversion, interest, etc.)
Electronic Dice
Random Number Generator
Simulation Game Computer
Bar Graph
Interactive Audio-Visual Toy
*TV Greeting Card
*Electronic "Etch a Sketch"
TV Puppet
*Audio-Visual Demonstrator
Mind Reading Computer
Party Compatibility Computer
Programmed Timer/Controller
Stop Watch/Game Timer
Simple Electronic Organ
Metronome
Advertising Display

*Already developed for the COSMAC miniprocessor.



*TIC TAC TOE
*Hexapawn[9]
*Sliding Block Puzzles
*State Change Games/Puzzles[10]
*Bowling
Football[11]
*Minikreig
*Target Shoot (Optional Gun)
*One Armed Bandit
*Network Games
*Twenty One
*Cell Matching Games
*Maze Tracing (Invisible, Changing)
*Race Games (Against Time)
*Space War
Bombs Away
Combinational/Sequential Puzzles[12]
Dodge Games (Space Ship & Asteroids)
Fish Card Game
Moon Landing
*NIM Games (Static/Dynamic)
Invisible Counter Board Games
Simulation Games[13]
Game Forms of Utility/Test/Drill Programs

*Already developed for the COSMAC miniprocessor.



*TV Arithmetic Drill
*Word Spelling Drill
*Word Recognition Test
*Pattern Recognition (Superimposed, Complex)
Electronic Flash Cards
Classroom Group Games
Preschool Shape/Color Recognition
Up-Down, Left-Right Discrimination
Sound-Picture Matching
Reading Readiness Skill Drills
Logical Aptitude Test[6]
*Number Base Conversion Drill
Flap Board Simulator[7]
Morse Code Drill
Reflex Testing
*Logical Deduction Test (21 Questions)
Logidex[8]
Memory Training (Sobriety Test)
Individual Testing & Scoring Aid
Change Making Drill
X-Y Curve Plotting Drill
Time Sense Development

*Already developed for the COSMAC miniprocessor.

*LIFE[14]
Penny Matching Computer[15]
Turing Machine[16]
*Tutorial Computer
Picture Computer
Sound Computer
Machine Code Programming
Simulations
Variable Rule Games
Logic Simulator
Learning Machines
Probability & Monte Carlo Experiments
Heuristic Program Design

*Already developed for the COSMAC miniprocessor.

The mention of low-cost computers usually evokes one of two images. Some of us see a super calculator; others picture a large data-base processor. The system described here is a more modest machine that could sell for under $500 in the relatively near future. Not much has been written on practical computers of this size. Nevertheless, prototypes of this mass-market free-standing computer system have been constructed, programmed, and operated in a home environment over the past several years.

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and now—new! from the data-point corner... the game of

MAZE

You make a maze, and Itchi solves it!!!

LOOK!?

INSTRUCTIONS:

This is the game of M*A*Z*E

As you may know, Itchy isn't very smart (see Vol. 2, Number 5 of the PCC). Its sister Itchi, however, used to work in a science lab solving mazes. Well, that kind of experiment went out with hula-hoops, so Itchi come to the PCC for employment.

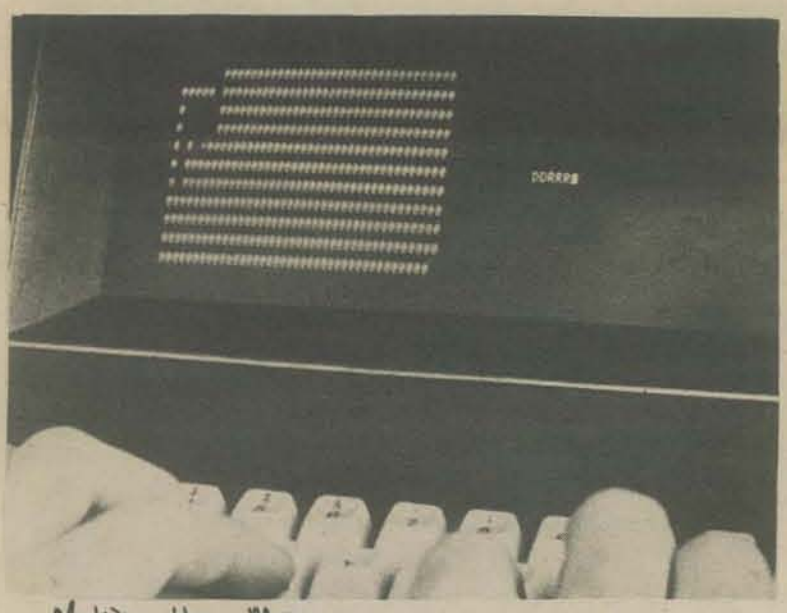
To employ Itchi:
She will type out a block of '@'s. You will hole out tunnels in it to make the maze. The commands for making the maze are... U (up), D (down), L (left), and R (right).

P.S.– you can also type multiple commands on one line. Thus, UUU means to dig 3 units up, etc....

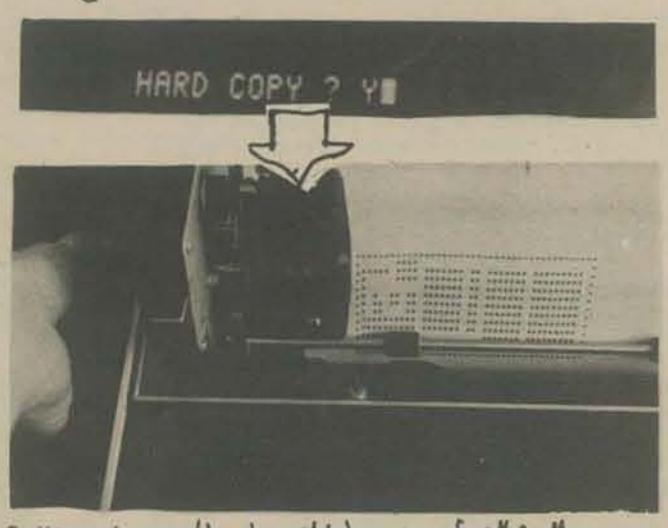
When you get to the bottom right-hand corner, Itchi will start...

Itchi may be smarter than Itchy, but not by much–
To measure how good your maze is, there exists a click-counter. It changes each time Itchi moves. (clicks) If you get more than 400 clicks on your maze, you are doing pretty well.

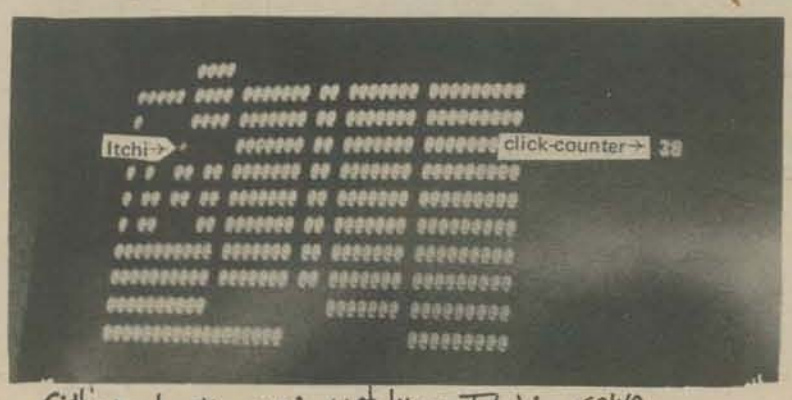
GOOD LUCK!!!



Making the Maze...



Getting the optional printed copy of the Maze



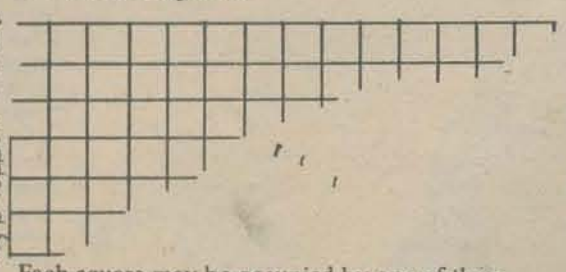
Sitting back and watching Itchi solve...

*Here I go!

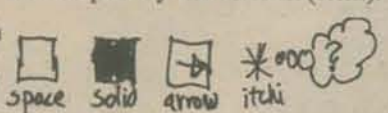
writing, creation, graphics, etc. by Albert Bradley (the AARDVARK)

HOW IT WORKS

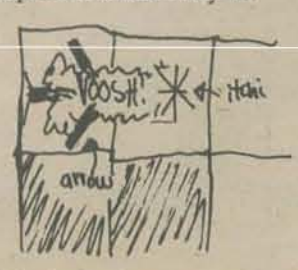
Let's pretend that the maze is a 40x10 grid which is composed of squares.



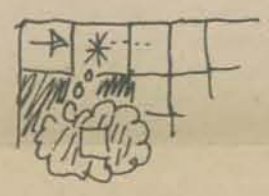
Each square may be occupied by one of three things: space, solid, or an arrow. It may also be occupied by the asterisk (Itchi).



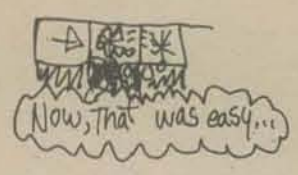
When the asterisk gets to a square, it fills the square it came from with an arrow pointing to the square it is currently in:



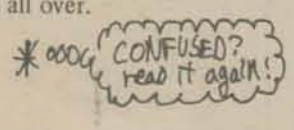
Then it looks in the squares on four sides for a space (left, down, right, and up, in that order)



If it finds a sqace, it moves to it, and starts the procedure all over.



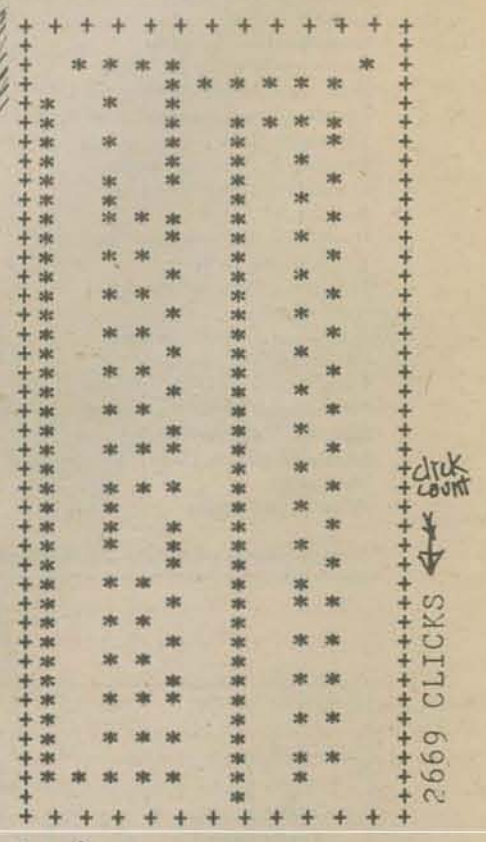
If it doesn't find a space, it looks in the same manner for an arrow. When it finds an arrow, it moves to where the arrow is. It then turns the arrow 90° counter-clockwise. If the arrow is pointing to a solid, it gets turned again. If it isn't pointing to a solid, Itchi moves there and starts all over.



Do you have a criticism? an impossible maze? a crank letter? whatever? feel free to write to:

the AARDVARK
c/o the P.C.C.
P.O. box 310
Menlo Park CA. 94025

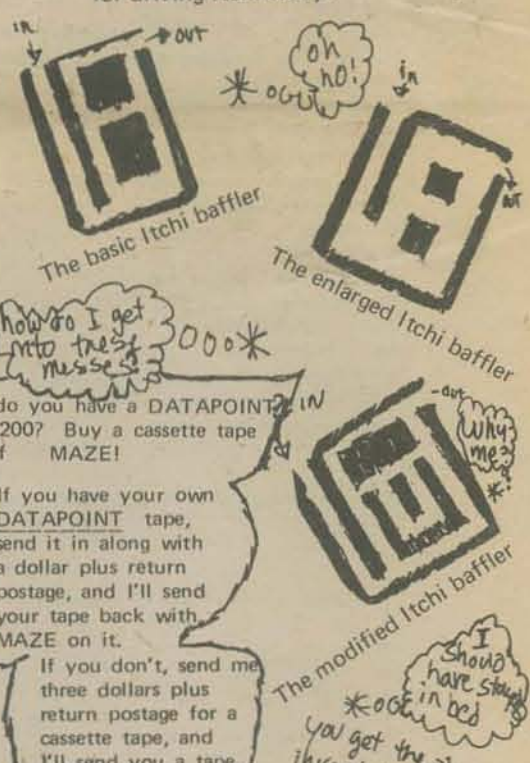
Itchi can be kind of dumb, as you can see from the click-count of this maze....

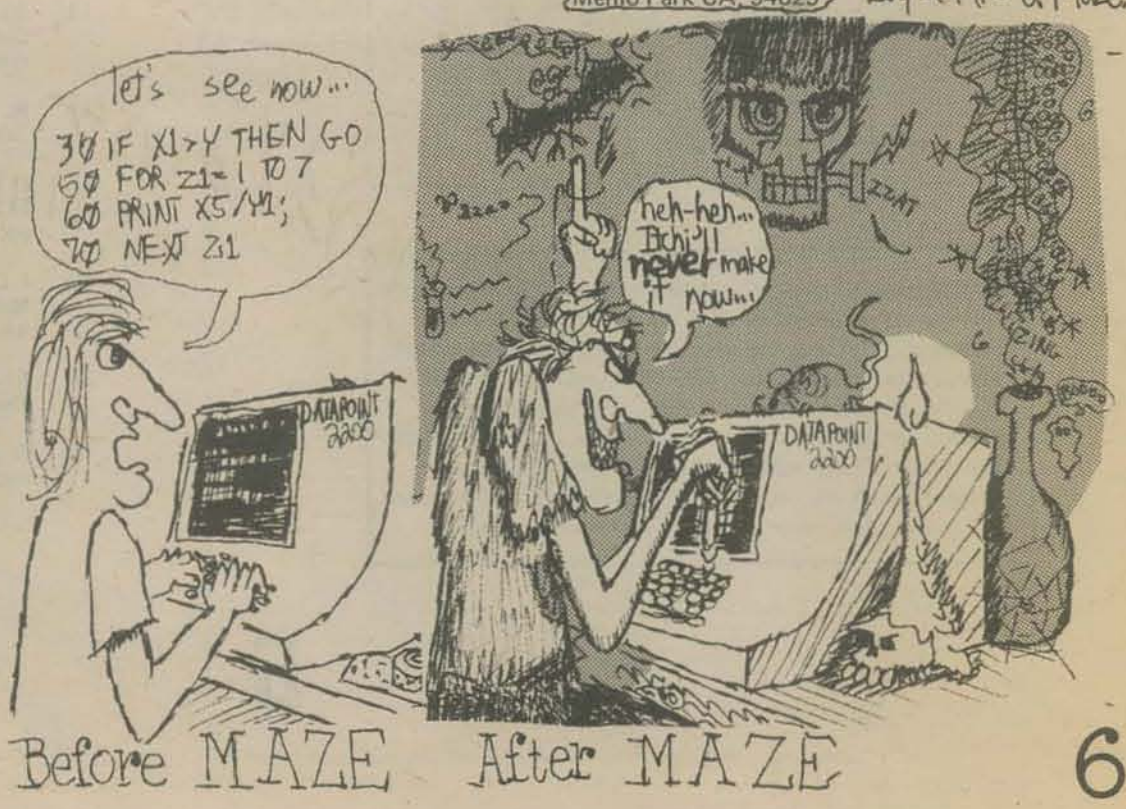


(so far, this maze is the one with the record click-count, made by John Kowto, age 13)

* * * * * * * * * * *

So you will have a fair chance at gaining the record click-count, I have some techniques for driving Itchi crazy:





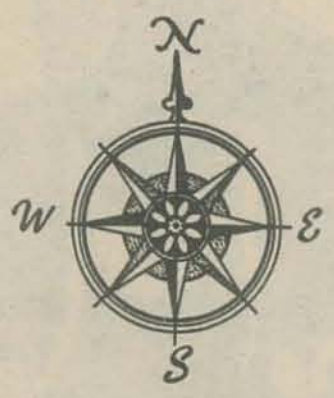
The Return of INCHWORM . . .

Anybody remember INCHWORM ? This friendly critter first appeared in the May '73 issue of P.C.C. and again in September '73. We have been playing INCHWORM games with kids, 5 years old and up, using paper and pencils, blackboards, and checker boards.

INCHWORM will be a regular feature in P.C.C. from now on – If you use INCHWORM games with kids, how about sharing your experiences and ideas ?
Send them to: INCHWORM, % P.C.C., P.O. Box 310, Menlo Park, Ca. 94025

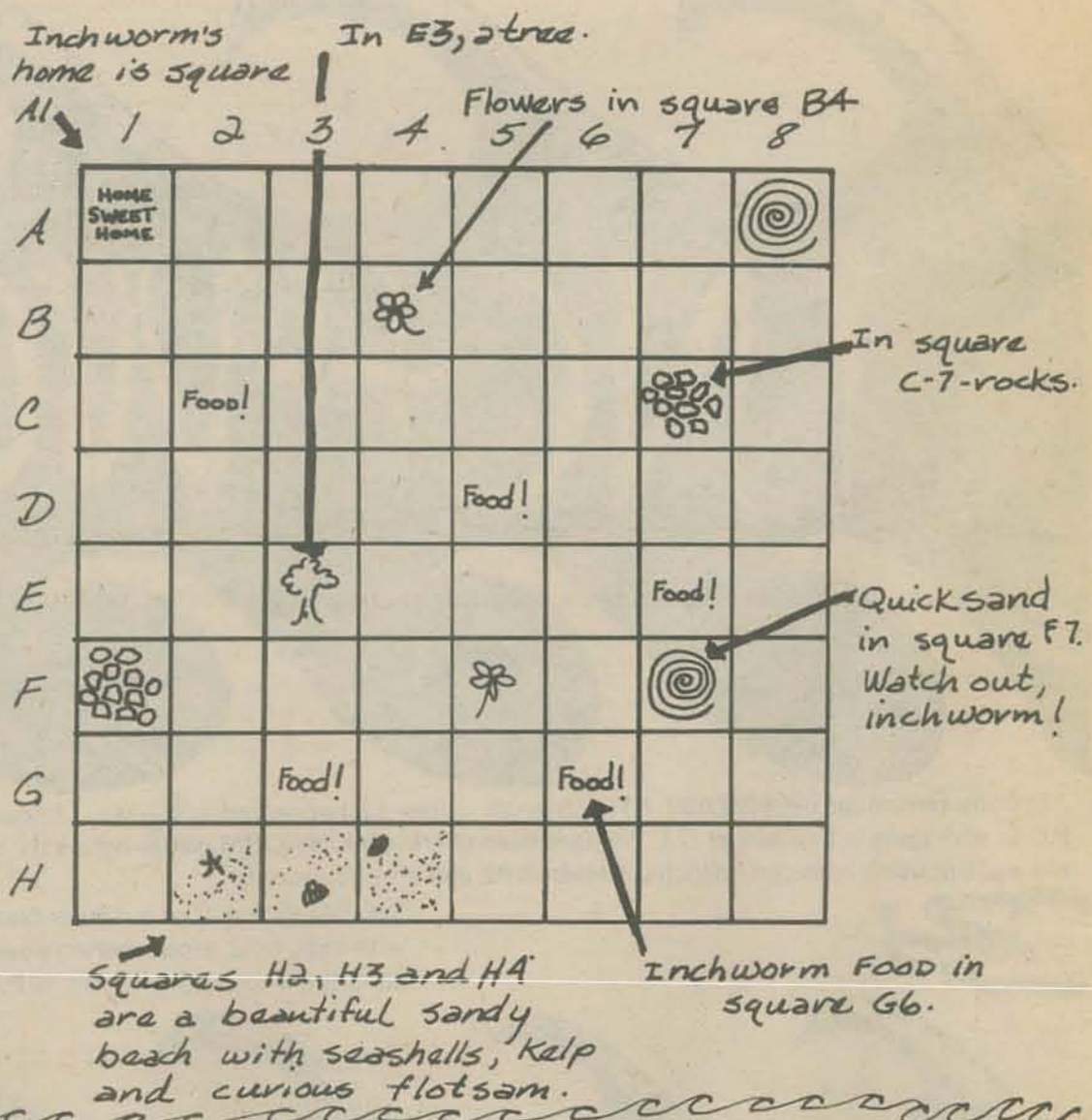
INCHWORM is programmable
We write a program to make INCHWORM do something – kids "play computer" and execute the program.
Kids write programs – we execute the programs.
Kids write programs – other kids execute the programs.

If a program "doesn't work", whose fault is it, the programmer or the computer ?



Well, we should also tell you that INCHWORM'S home is in the NORTHWEST corner of the island. Also on the island are interesting things such as rocks, flowers, trees, seashells and good things to eat. Here is a map of INCHWORM'S island.

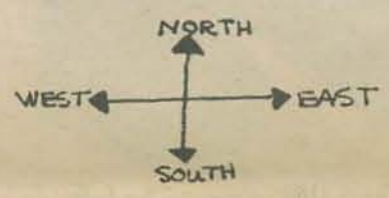
* Where are the flower patches ?
* What is in square G3 ?
* Where can INCHWORM find food ?
* What is in square A8 ?
* Where is a tree ?



Our INCHWORM isn't just any old everyday run–of–the–mill inchworm. He is computerized! We can program him to explore the island!

Here are some things INCHWORM can do. He can move – one square at a time – NORTH or EAST or SOUTH or WEST

- *To tell him to move one square NORTH, write N*
- *To tell him to move one square EAST, write E*
- *To tell him to move one square SOUTH, write S*
- *To tell him to move one square WEST, write W*



Suppose INCHWORM is home (in square A1) and we want him to visit the flowers in square B4.

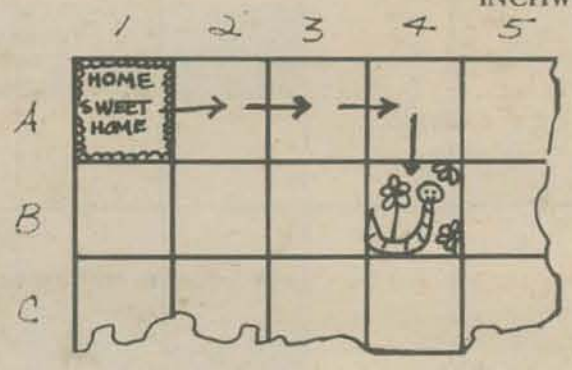
We tell him like this: E E E S

* This is the program
* The program has 4 instructions.
* Each instruction tells INCHWORM to go one square in a certain direction.

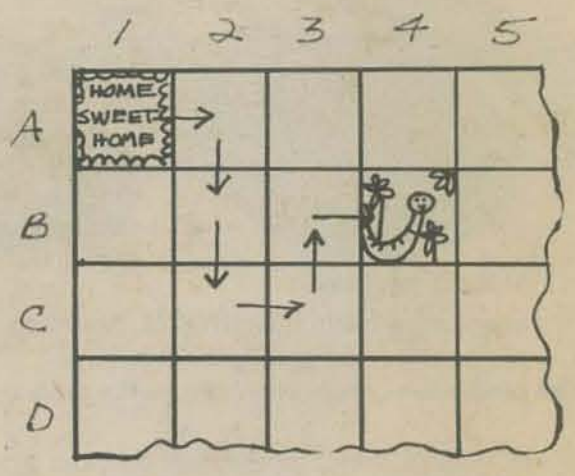
Our program tells INCHWORM to go EAST, go EAST, go EAST, go SOUTH. Here is how he goes.

Program : E E E S

INCHWORM's Path (follow the arrows)



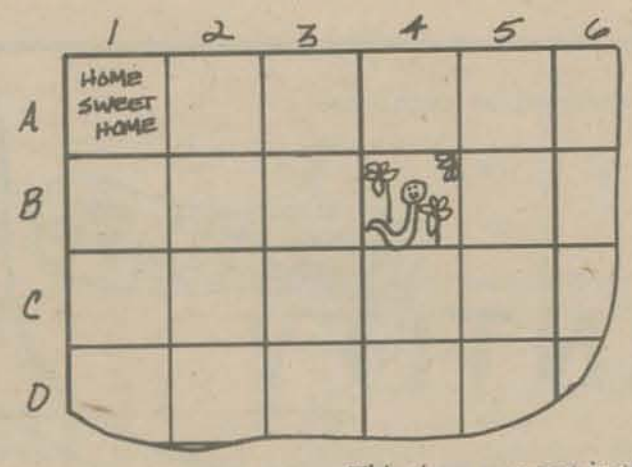
Program: E S S E N E



Here is a different program to get INCHWORM from his home to the flower patch.

He sort of wanders there.

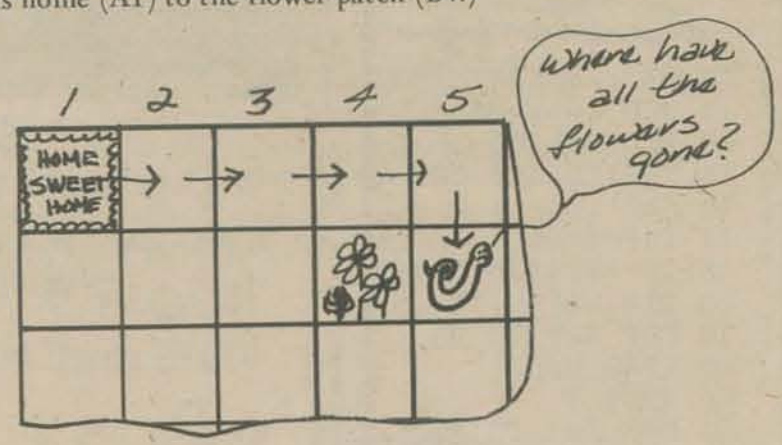
Program: S S E E E E N N W S



This time, you put in the arrows showing INCHWORM's path.

Someone wrote the following program to get INCHWORM from his home (A1) to the flower patch (B4.)

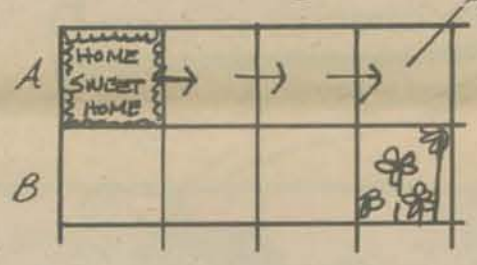
Program: E E E E S

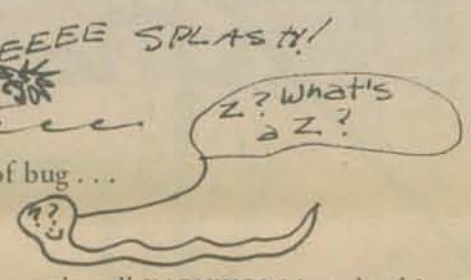


Alas! INCHWORM does not get to the flower patch. The program does not work. It has a "bug."

When a program does not work, we say it has a "bug." We have to "debug it" – find and correct the bug. Can you debug our program?

Here is a program with a really bad bug!
Program: E E E N
If INCHWORM obeys this program, he falls off his island into the sea – hope he gets back before a sea monster gets him !





Still another kind of bug . . .

Program: S S S Z

Remember: You can only tell INCHWORM to do things he knows how to do, like N and E and S and W.

INCHWORM THINGS TO TRY

* INCHWORM is at home. Write a program to make INCHWORM go around the tree and return home. (Not to the tree. He doesn't enter square E3.)

* INCHWORM is at home and his pantry is bare. Write a program to send INCHWORM to the nearest food, then visit a flower patch, then return home.

* INCHWORM likes pretty things. Write a program to send INCHWORM from home to collect seashells and return home.

* MORE THINGS . . . Make your own version of INCHWORM's island – make it large– use real flowers, real rocks, real seashells, . . . (but, probably not real trees.) Make an INCHWORM that you can move around. Could be INCHWORM– EATERS on the island – don't let INCHWORM get too close! Perhaps an INCHWORM – EATER lives at square H8 and moves around randomly (flip coins or roll dice to move him.) If INCHWORM and INCHWORM – EATER are in the same square, guess what happens!

* Two person game – One person writes INCHWORM program. Second person writes INCHWORM – EATER program. Then – programs run together– every other step.

10

BUY A LOT

Special issue on poetry & Graphics

without sacen print insert which was bonus for subscribers

QUANTITY PRICES

Vol. 2 No. 6 July 1974

1 $1.00
2-9 each 0.80
10-99 " 0.70
100 ++ " 0.60
LOTS and LOTS
Make us an offer we can't refuse

HAIKU:
YES
ONE MORE

AND STILL DI
DUSK STILL SA
TREES SONG GONE

BRIGHT DISTANCE DI
FROGLINGS WEIRD THE
FAR SCARECROW OLD DI

Listing

```
10 REM -- HAIKU BY
11 REM -- transcrib
13 DIM B$[10]
15 "HAIKU: DO YOU W
16 F=0
17 INPUT B$
18 IF B$[1]="Y" THE
20 DIM V$[35,12],S[
30 FOR I=1 TO 35
40 READ V$[I]
50 NEXT I
60 FOR I=1 TO 35
70 READ S[I]
80 NEXT I
90 DATA "SCARECROW
100 DATA "TREES"
110 DATA "NEVER"
120 DATA "WEIR
130 DATA "ECH
140 DATA 2
145 "ONE
150 FOR
160 FO
170 I
180
```

Poetry

...nds at the line bet... ...ational, and ...wn. The computer poet uti... ...capabilities of ...s a way of ensnaring scraps of insig... ...rom the universe, ...t which has never been seen. A printout of computer poems ...y be compared to a dense woods in which the sharpeyed observer may be able to catch momentary glimpses of escaping creatures dwelling among the words placed there by the machine. A computer, being one of man's tools, does not have a mind of its own, and itself cannot judge good poetry. It can produce its work only within the limits provided by the efforts of the programmer, and it is this artistic "indifferenc which is itself the advantage of the machine in producing poetry. Within the range of variation defined by the program (vocabulary length, treatment of grammar, etc.), the form of any poem produced by the machine may be considered to be an accident. A creative work must be one which is new, and one which takes its place as an unpredictible event in the environment. However, in addition to being an experience of the new, a creative work must also be appropriate to actually solving the problem originally tackled, or to in fact providing a real perception or coherent image. Thus, the computer can be quite useful in providing the opportunity for exploring new poetic styles and images, but it is up to the human element to spot them and make a judgement about their wort...

Jim Runner's remarks on his SNOBOL IV poetry program printed below:

The co... ...try given here uses the entire word listing of a ...'s dictionary ... ...cabulary of about 3,000 words. The ...en separated ... ...tegories of nouns, adjectives, ...e or intransiti... ...ces themselves have ...her different pl... ...s" which are ... There are seventy ... ...ng noun, adjective, and ... ...se to be the subject of the ... ...a transitive verb ... About one

GOAL: TEACH THE COMPUTER TO DREAM!

GOAL: TEACH THE COMPUTER TO DREAM!

'S URPRISE ME!

Lillian Schwartz: "The video synthesizer is a very complex circuitry. It has consoles, it has as many channels as you want, and it has all sorts of knobs and buttons to push to change the colors. I've used it. I'm working with a 16mm chain link that was computer ge... ...d using that plus 35 ... plus the video syn... ...totally new v... ...can see i...

Knowlton: "Sometimes com... ...ures are just representations ... ...ginal data but in a way th... ...ou to see things ... ...another way. ... ...wave comm... ...storm. ... ...py? ... ...y di...

Resch: "Work at Utah has delt ...ely with the problem of rep... ...gralistically things in a ...al field."

GMJART4 is a FORTRAN IV version of a co... language, ART I, devised by Professor Williams ... Katharine Nash, Pro... ...of Minnesota uses this pr... ...dents to make simple grap... Cupertino, Calif., obtained ... Greg Mushial, a data proces... ...e program in FORTRAN IV ... Art Class, Spring of ...974, u... ...n Quirke, Instr...

Bill Fetter: "I believe co... design can be seen as migrating thr... three basic phases, integrating three basic phases, each integrating at a higher level and each in... the previous phase. From ... ...nings in the Bauhaus, desi... focused on the artifact. ... dependent on fo... ...tionships. Curre... design activities focus on th... its success dependent on the ...ci... ...ples of ad... ...tion. The next focus emerging is the design of our lives ... in which success will be measure... quality of life achieved. The quest ... is, 'How can com... ...systems help people ma... ...out their lives tha... ...or at least ... ...ad of ... ...systems?

picture memory

Many manipulations and I will describe later. With this pic I decided that by all of the red shade= blowing them up by a factor of two a... overlaying the blow-up on...

a possible ...them

t.v.

10 TIMES MAKES BLACK

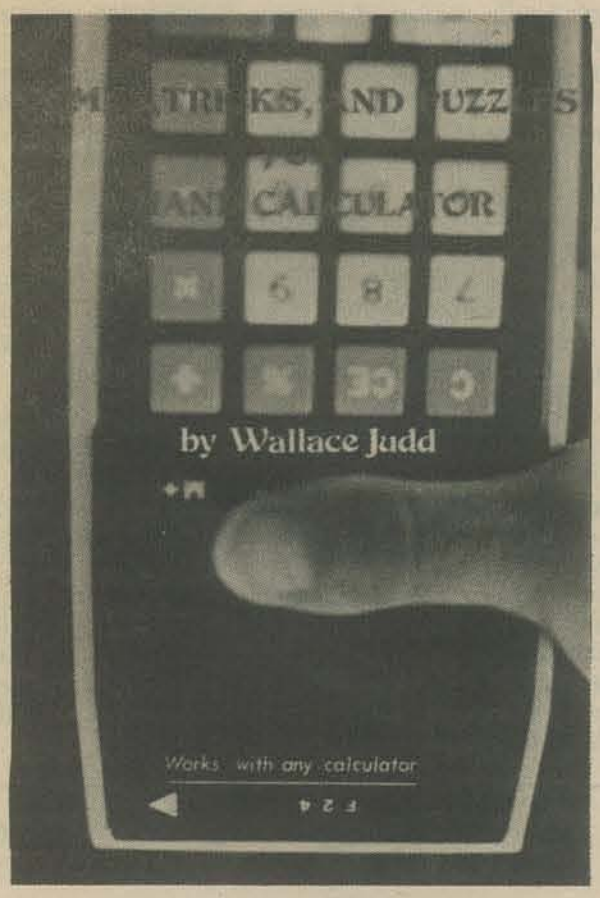
You read a go... ...tool. It is. ...ear i...

...year these days about the computer being a pow... ...many different kinds or tools, and to form ...puter may be capable of doing, yo... ...erature of tools.

If my ideas are correct, then the machine should make drawings which look as though they had been done by hand, IF its behavior actually IS enough like human behavior.

Harold Cohen 1974

Manfred Mohr



Games, Tricks, and Puzzles for a Hand Calculator

Wallace Judd
Dymax 1974 $2.95
P.O. Box 310
Menlo Park, Ca. 94025

Do you own a hand calculator? You do? This informative, entertaining and very useful volume was written just for you.

From the epilog:

"The book stems from the basic premise that most of us have so far explored numberland by the very laborious number route. The hand calculator lets you travel by automation and explore far afield effortlessly."

The author has covered many of your favorite mathematical games and recreations; how a calculator can be used to perform many of the more common mathematical operations such as how to extract square roots and percents, get the power of a number and even generate random numbers. You are also shown how to perform tricks unique to the calculator and its keyboard. In addition to all of this, a typical calculator's insides are exposed to view so that you can learn how it was put together and functions and thus understand the hints given by the author on how to detect and correct some of the more common malfunctions hand calculators are prone to. The author ends his book by answering the questions asked in the text, of which there were many, and giving the solutions to all of the problems and puzzles he posed to the reader.

This book is a necessity for anyone who owns or intends to purchase a hand calculator, from the most sophisticated (the HP-65, for example) to the basic "four banger."

Bill Holden

Programming style

The Elements of Programming Style

Brian W. Kernighan and P.J. Plauger
McGraw-Hill Book Company
New York, 1974 $2.95

One of the great books. It should be owned and read regularly by everyone who ever programs a computer. It is to programming what Strunk and White's *Elements of Style* is to writing: a combined sourcebook and cautionary tale.

Programming is difficult, far more difficult than most programmers imagine. The way good programs are constructed is, to date, something of an art. What separates the masterpieces from the kitch is the elusive thing called style. Style is good useage, good composition clarity of thought, and care in execution. Without style a program is likely to work only part of the time, be difficult to understand, and impossible to modify.

Kernighan and Plauger collect a number of rules to help a programmer make good programs. They use a lot of examples of programs written in FORTRAN or PL/I and show how they could be made better by the application of stylistic rules. BASIC programmers shouldn't have any problem understanding and applying the principles to their programs too. The examples, incidentally, are all taken from programming language textbooks!

Dennis Allison

some things you learn from this book

Write clearly – don't be too clever.
Say what you mean, simply and directly.
Parenthesize to avoid ambiguity.
Write first in an easy-to-understand pseudo-language, then translate into whatever language you have to use.
Modularize. Use subroutines.
Use GOTOs only to implement a fundamental structure.
Don't patch bad code – rewrite it.
Write and test a big program in small pieces.
Test input for plausibility and validity.
Identify bad input; recover if possible.
Make input easy to prepare and output self-explanatory.
Check some answers by hand.
10.0 times 0.1 is hardly ever 1.0.
Make it right before you make it faster.
Make if fail-safe before you make it faster.
Don't sacrifice clarity for small gains in "efficiency."
Make sure special cases are truly special.
Keep it simple to make it faster.
Don't diddle code to make it faster – find a better algorithm.

from the preface

Good programming cannot be taught by preaching generalities. The way to learn to program well is by seeing, over and over, how real programs can be improved by the application of a few principles of good practice and a little common sense. Practice in critical reading leads to skill in rewriting, which in turn leads to better writing.

This book is a study of a large number of "real" programs, each of which provides one or more lessons in style. We discuss the shortcomings of each example, rewrite it in a better way, then draw a general rule from the specific case. The approach is pragmatic and down-to-earth; we are more interested in improving current programming practice than in setting up an elaborate theory of how programming should be done. Consequently, this book can be used as a supplement in a programming course at any level, or as a refresher for experienced programmers.

The examples we give are all in Fortran and PL/I, since these languages are widely used and are sufficiently similar that a reading knowledge of one means that the other can also be read well enough. (We avoid complicated constructions in either language and explain unavoidable idioms as we encounter them.) **The principles of style, however, are applicable in all languages, including assembly codes.**

Our aim is to teach the elements of good style in a small space, so we concentrate on essentials. Rules are laid down throughout the text to emphasize the lessons learned. Each chapter ends with a summary and a set of "points to ponder," which provide exercises and a chance to investigate topics not fully covered in the text itself. Finally we collect our rules in one place for handy reference.

A word on the sources of the examples: all of the programs we use are taken from programming textbooks. Thus, we do not set up artificial programs to illustrate our points – we use finished products, written and published by experienced programmers. Since these examples are typically the first code seen by a novice programmer, we would hope that they would be models of good style. Unfortunately, we sometimes find that the opposite is true – textbook examples often demonstrate the state of the art of computer programming all too well. (We have done our best to play fair – we don't think that any of the programs are made to look bad by being quoted out of context.)

Let us state clearly, however, that we intend no criticism of textbook authors, either individually or as a class. Shortcomings show only that we are all human, and that under the pressure of a large, intellectually demanding task like writing a program or a book, it is much too easy to do some things imperfectly. We have no doubt that a few of our "good" programs will provide "bad" examples for some future writer – we hope only that he and his readers will learn from the experience of studying them carefully.

Brian W. Kernighan
P.J. Plauger

TTL Cookbook

Donald E. Lancaster
Howard W. Sams & Co., Inc.
The Bobbs-Merrill Co., Inc.

from: PCC Bookstore $7.95
P.O. Box 310
Menlo Park, California

TTL Cookbook is an excellent book if you have just run into transistor-transistor logic.

The book is predominatly about digital logic. The author starts discussing what is required to understand and use TTL with the assumption that the reader is familiar with electronics up to and including transistors.

After covering some basics of construction and a discussion of the different types of TTL, the author describes the integrated circuits that are used in the rest of the book. This eliminates the need for other references.

Chapter 3 discusses digital logic and from then on each chapter discusses circuit types, shows examples, and projects using them.

Chapter 8 is called "Getting it All Together" and covers a numbers of advanced projects.

Some good advice about construction –

Bob Mullen
Computer Designer

I found the *TTL Cookbook* to be an excellent instructional aid. It also doubles as a quick reference guide to the 7400 series.

An an instructional aid the *TTL Cookbook* has many "design it yourself – build it yourslef" projects. Don Lancaster uses the "redundancy" method. This method is often a one package solution and gives the desired result in only a few seconds of think time.

As a quick reference the "Cookbook" is crampacked with useful tables and charts. It also has a complete reference section (in Chapter 2) for the 7400 series.

This book was a great help to me in learning TTL logic design.

Dave Delisle
High School Student

TTL COOKBOOK

A *digital logic family* consists of a group of integrated circuits or other elemental, compatible blocks that can be combined in various ways to perform a series of "yes-no" decisions based on the presence or absence of "yeses" and "nos" on various inputs, and possibly taking into account the history of previous "yeses" and "nos" gone before.

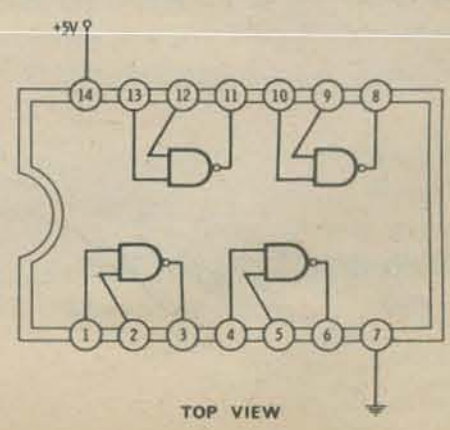
Depending on how you interconnect these logic blocks, you can build a computer, a calculator, an electronic music system, a digital voltmeter or counter, a television terminal readout display, a color-tv dot-bar generator, educational demonstrators, or any of thousands of other possibilities. While a single "yes-no" decision by itself usually is not too useful, the proper combination of grouped "yes-no" decisions taken together can represent a number, a word, a command, a musical note, a test signal, or practically anything else you might like.

There is a tendency to blame the poor IC for every circuit problem, including incorrect logic design, pc layout errors, shorted outputs, solder blobs, lack of pull-up resistors on open collector outputs, unconnected supply leads, layout mixups (watch the 7400 and 7402!), poor supplies and bypassing, layouts done topside and etching done backwards, floating inputs, etc.

If an experimental or breadboard circuit appears defective, the problem is almost never a bad or burned-out IC. Every other possibility should be exhausted before an IC is replaced. The rule, and this is the hardest one in this book to learn, is simply: *Always blame yourself first, the IC last.* If you follow this rule, you will find that it saves time and money 99% of the time.

7400

QUAD 2-INPUT NAND GATE



TOP VIEW

All four positive-logic NAND gates may be used independently. On any one gate, when *either* input is *low* the output is driven *high*. If *both* inputs are *high* the output is *low*.

Propagation delay ..... 10 nanoseconds average

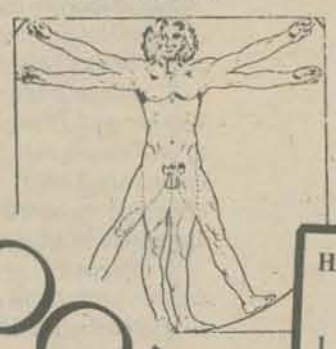
Current per package ..... 12 milliamperes average

12

"And if you buy this month I'll throw in a green widget"

When urged to buy from a particular vendor because of extra goodies, be sure that you consider them valuable because you will proba[illegible]ay for them. Also, get it in writing or they [illegible] arrive.

"I'd like a computer that's about this high and this wide..."



PCC LOOKS AT HARDWARE

buyers' guide

[illegible]econdary teachers entering the field of instru[illegible]al computing in recent years have done so with a [illegible]odel 33 Teletype terminal (Teletype is a trademark of Teletype Corporation, Skokie, IL). The terminal is usually connected to a school owned minicomputer or a commercial service selling cheap time. This generally produces $3 to $5 per hour computing instead of the $6 to $15 per hour time sold on large commercial time shared computers. Even $3 to $5 per hour le[illegible] to about $4000 per classroom per year. However, [illegible] are alternatives to buying your own minicomputer a terminal:

RSTS

VENDOR/SYSTEM PERFORMANCE

D E C

HARDWARE

You can take three different approac[illegible] writing specs for hardware. You can be SUPER-SPECIFIC. For instance, you could specify an 8K, DEC Edusystem 20 with 4 terminals (ASR 33). Unless you added "or the equivalent," this kind of spec would get you one single bidder, DEC. If you add "or the equivalent" it would be like opening Pandora's box. Everyone would bid claimin[illegible] they were "equivalent" or *better* than an Edusystem 20 and you might have a real hassle proving otherwise. Unless your mind is completely closed, we don't recommend this approach.

HARDWARE ISSUE Vol. 2, No. 4

Quantity Prices

1	1.00 ea.
2 – 9	0.80 ea.
10 – 99	0.70 ea.
100 +	0.60 ea.

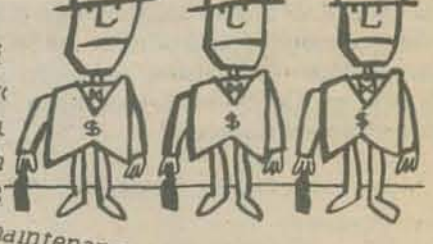
ALTERNATIVES

If you are shopping for a mini [illegible] for your school or whatever, y[illegible] from some 150 mini manufactu[illegible] of them can provide you with h[illegible] of them can provide you with B[illegible] software. A FEW can provide maintenance within a reasonabl[illegible] [illegible]d of time and w[illegible] [illegible]out TWO can [illegible] [illegible]hat we think is [illegible].

[illegible]nother approach is to spec your hardware completely around your software specs – "the hardware provided will be capable of operating the software described elsewhere in this document." This seems like an awfully gutsy thing to do and requires that your soft[illegible]re specs be exhaustive and exacting. This [illegible] probably makes the most sense but [illegible]d it's practical unless you [illegible]nec writers around

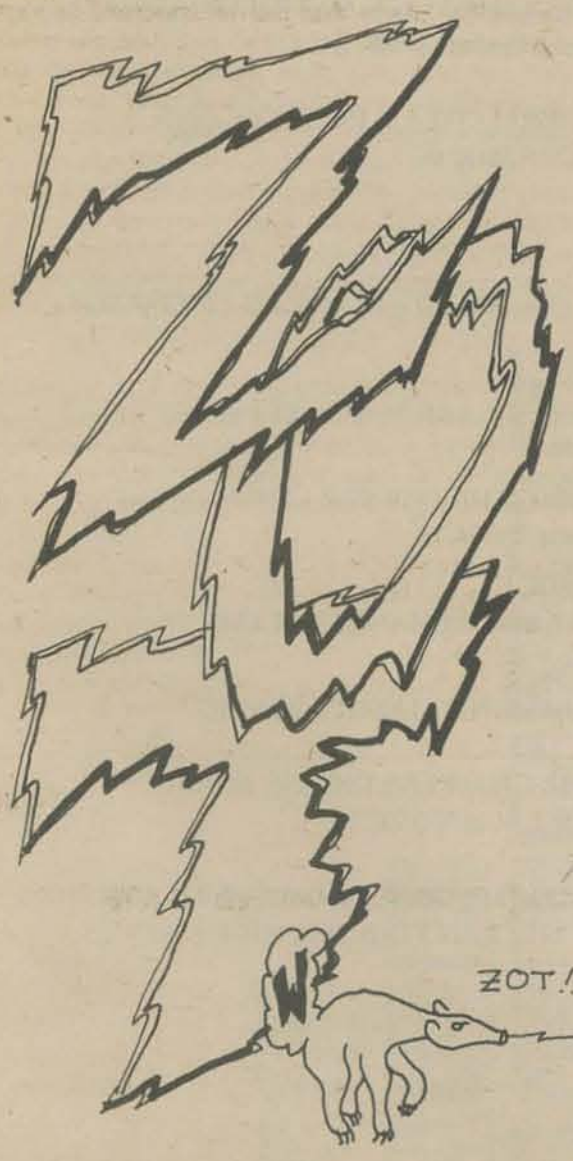
THESE PRICES INCLUDE THE TTY TERMINALS ARE XTRA.

VENDORS



"GOING TO BID"

HP2000E & F



We made up another game for 2 or more players on a rectangular cookie – we call it *ZOT*!

Here is a 4 x 5 *ZOT* board.

```
        N
      1 2 3 4 5
    1 * * * * *
W   2 * * * * *   E
    3 * * * * *
    4 * * * * *
        S
```

The side of the cookie are named North, South, East, and West.

A move is called a *zot*, which consists of taking all the stars in a line from a particular edge of the board to some particular star.
Here are some sample *zot*s.

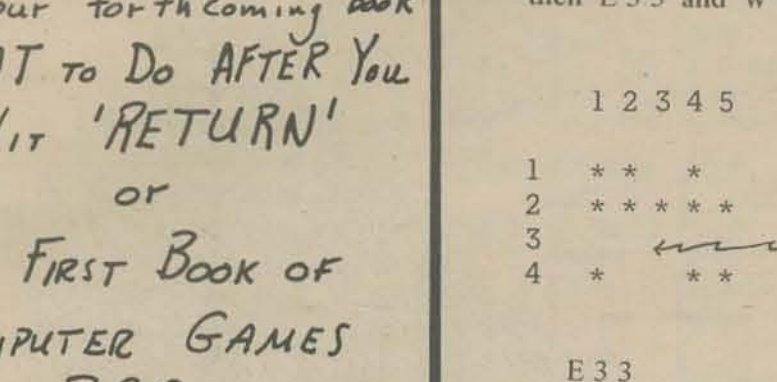
You decide whether the last *zot* wins *or* loses.

A restriction is that all the stars you *zot* must be *consecutive*.

For example, if the cookie looks like this:

```
  1 2 3 4 5
1 * *   *
2 * * * * *
3     * *
4 *     * *
```

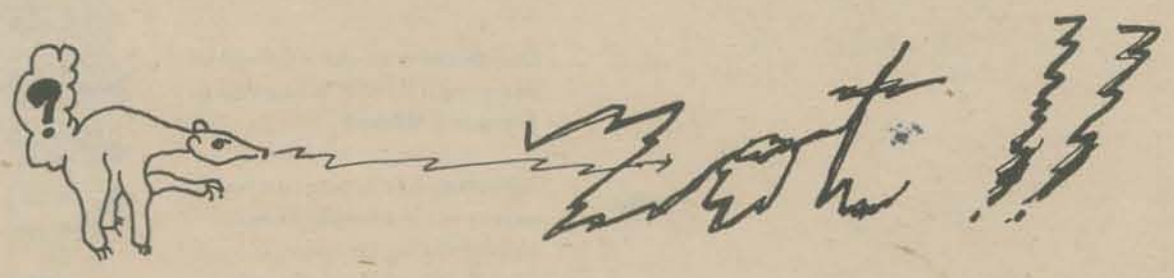
then E 3 3 and W 1 2 are o.k. but *not* W 1 4.



Holes are o.k. in front of the stars (like E 3 3) but not in-between (like W 1 4).

We don't know much about *ZOT* yet. What can you discover?

As a further variation, how about limiting the size of a player's *zotter*?



IF YOU LIKE BRAIN TEASERS, THEN YOU'RE IN FOR SOME FUN!
THE OBJECT OF THIS PUZZLE IS TO END UP WITH A 3x3 MATRIX THAT HAS 1's IN ALL POSITIONS EXCEPT THE CENTER WHICH WILL BE 0.

THE POSITIONS ON THE BOARD ARE REFERRED TO AS ROW, COLUMN. FOR EXAMPLE, THE UPPER RIGHT HAND CORNER IS 1,3.

HERE ARE THE RULES:

YOU MAY CHANGE ANY 1 TO A 0. YOU'RE NOT ALLOWED TO CHANGE A 0 TO A 1.

WHEN YOU MOVE TO CHANGE A 1, THERE ARE "SIDE" EFFECTS.

MOVING IN A CORNER
DRAW A 2x2 BOX CONTAINING THE CORNER. THEN EACH POSITION IN THE BOX CHANGES STATE.

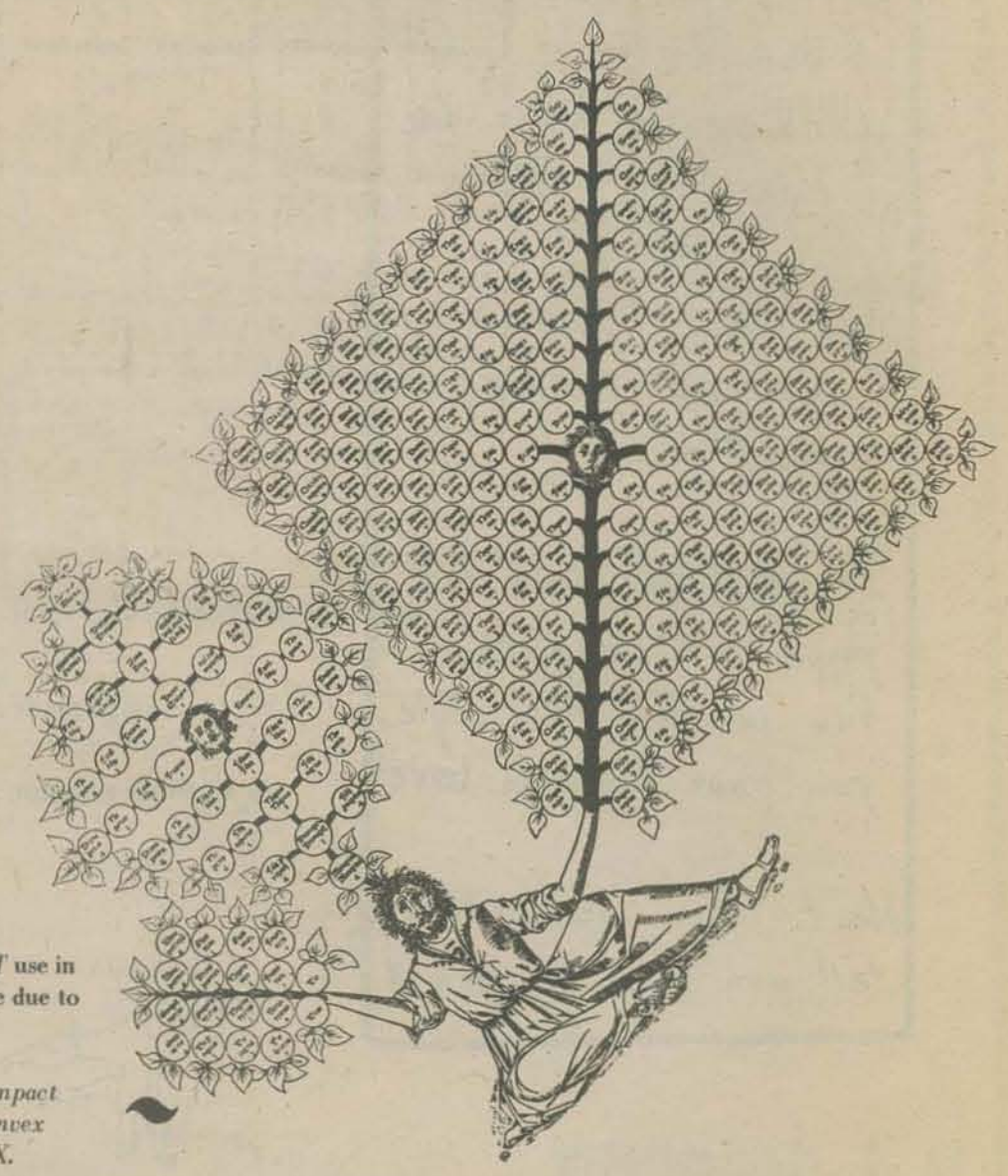
MOVING IN THE CENTER OF AN EDGE
EACH POSITION ALONG THAT EDGE CHANGES STATE.

MOVING IN THE CENTER POSITION.
EACH POSITION IN A '+' (PLUS SIGN) CHANGES STATE.

TRY THE GAME A FEW TIMES AND SEE WHAT HAPPENS ON THE BOARD. THE NEW BOARD WILL BE PRINTED AFTER EACH MOVE.

HINT (CHUCKLE): IT IS POSSIBLE TO REACH THE GOAL FROM EVERY POSITION (EXCEPT ALL 0's) WITHIN 11 MOVES, IF YOU CAN FIND THE RIGHT MOVES.

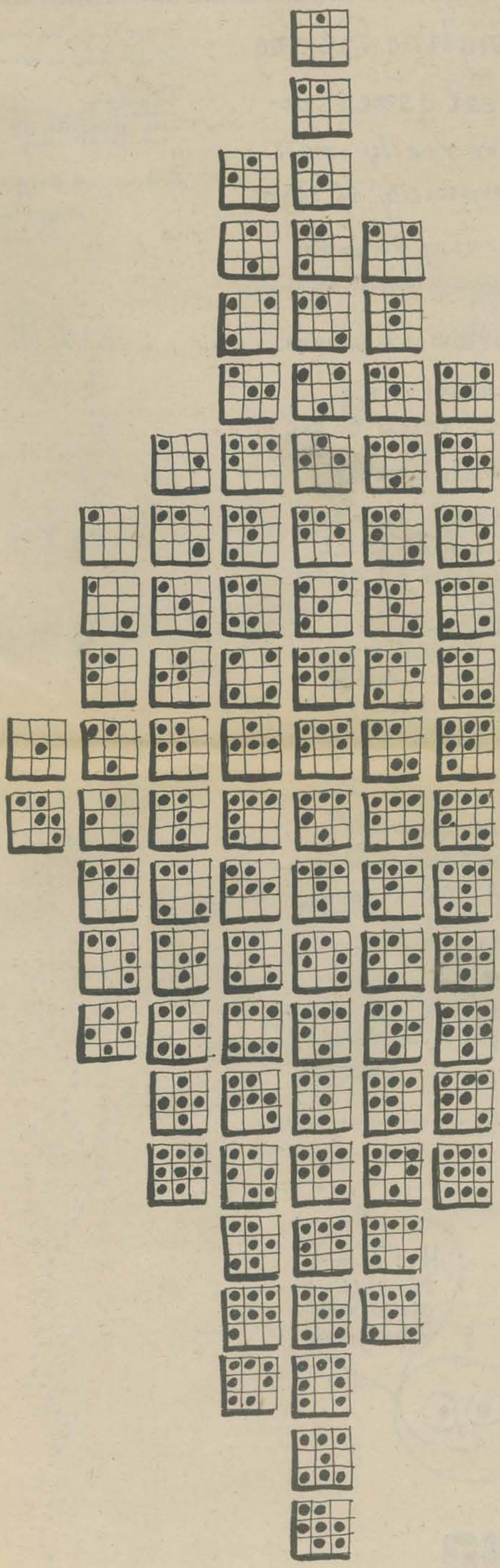
```
HERE WE GO ... THE BOARD IS
 0  1  0
 1  0  1
 0  0  0
YOUR MOVE? 2,3
 0  1  1
 1  0  0
 0  0  1
YOUR MOVE? 3,3
 0  1  1
 1  1  1
 0  1  0
YOUR MOVE? 2,1
 1  1  1
 0  1  1
 1  1  0
YOUR MOVE? 2,2
 1  0  1
 1  0  0
 1  0  0
YOUR MOVE? 3,1
 1  0  1
 0  1  0
 0  1  0
YOUR MOVE? 3,2
 1  0  1
 0  1  0
 1  0  1
YOUR MOVE? 2,2
 1  1  1
 1  0  1
 1  1  1
```



One theorem we did *NOT* use in analyzing *TEASER* is one due to Krein and Milman:

Theorem: ***Let K be a compact convex set in a locally convex topological vector space X. Then K is the closed convex hull of its extreme points.***

A COMPLETE ANALYSIS of TEASER



THIS DIAGRAM CONTAINS EACH OF THE 102 POSSIBLE POSITIONS (EXCLUDING ROTATIONS & REFLECTIONS).

THE WINNER

THE LOSER

KEY

□ = ∅

▣ = 1

EXPLANATION: EACH POSITION CAN BE CHANGED INTO AT LEAST ONE OF THE POSITIONS IN THE COLUMN TO IT'S RIGHT IN ONE MOVE.

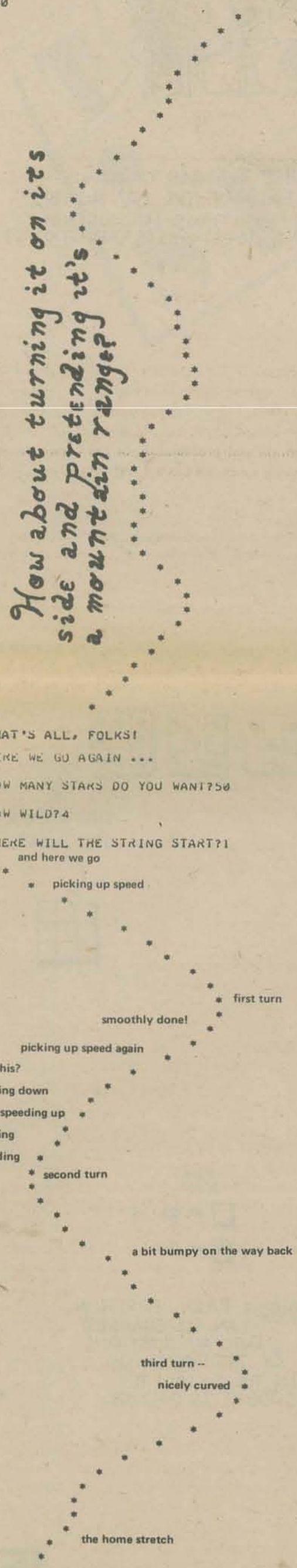
Welcome To... Dangling String

```
HOW MANY STARS DO YOU WANT?50

HOW WILD?
  4=VERY WILD
  3=PRETTY WILD
  2=A LITTLE WILD
  1=A TINY BIT WILD
?2

WHERE WILL THE STRING START?
1         10        20        30
I         I         I         I

?30
```



****

Dangling String is a great game, especially for really small people, especially if they're just learning to count.

****

HERE'S How it WORKS:

As the string grows, it "tries" to get back to the center.

All the way over to the left? It'll try very hard to go to the right.

It'll speed up trying to get back and then start slowing down as it gets to the center.

Pretty soon it's on the other side and will start coming back.

This one isn't wild enough to escape from the center. ⟹

****


```
WELCOME TO ... THE DANGLING STRING

HOW MANY STARS DO YOU WANT?100

HOW WILD?
  4=VERY WILD
  3=PRETTY WILD
  2=A LITTLE WILD
  1=A TINY BIT WILD
?1

WHERE WILL THE STRING START?
1         10        20        30
I         I         I         I

?15
```

THAT'S ALL, FOLKS!

The Computer Illiteracy Problem: A Partial Solution

Peter G. Lykos

Reprinted from the AMERICAN MATHEMATICAL MONTHLY
Vol. 81, No. 4, April, 1974
pp. 393-398

1. How the computer is affecting education. The computer is transforming the ways in which the problem solvers and the decision makers of our society go about doing their jobs. Not only are old problem-solving techniques being speeded up and scaled up, but new techniques are being invented and developed which would not have been considered seriously before the invention and proliferation of the computer. And the proliferation of the computer is being accelerated as a direct consequence of two technological developments [1]:

1. The low cost and increasing flexibility of *minicomputers*, and
2. The increasing flexibility and ease of use of *tele-communications* systems whereby users can use a typewriter-like or keyboard plus TV-like terminal to access a variety of computers remotely located.

Although the first widespread use of the computer in education, other than as a management tool, was to support graduate research in the hard and soft sciences, gradually computer-based elements have come to be developed and incorporated into undergraduate curricula as well. Not only have B.S., M.S., and Ph.D. academic programs in Computer Science evolved in many of our nation's universities, but a large amount of experimentation and ferment in other disciplines is taking place as well, particularly in Accounting, Business, and Management. Indeed, as the major impact of the computer on our society is, and continues for some time to be, in the general area of management [2], we can anticipate a large and continuing growth and proliferation of new curricular emphases on accounting [3], on management information systems [4], on simulation or modeling [5], and on gaming [6].

2. The computer and the curriculum. Three and a half years ago the American Institute for Research issued a report on an NSF-supported survey made of all 23,000 public high schools in the country. At that time 13% of the schools reported use of the computer as part of the instructional process, primarily in business and accounting, or in mathematics. That percentage has, very likely, increased significantly since that time.

The NSF has sponsored numerous efforts in computers-in-education. Computer-based curricular material at the college level is being developed. Faculty in the several disciplines are being trained in the use of computer hardware and software. Cost-effective systems of delivering computer service are being sought, primarily through regional cooperative networks whereby research-oriented university computer centers have attempted to provide cost-effective computer service appropriate for classroom use in colleges. Approximately 10% of the nation's universities and 10% of the nation's colleges have been involved in 30 regional cooperatives. The NSF is also supporting major projects attempting to collect and adapt "for export" computer programs developed in college environments. A case in point is CONDUIT, a consortium of five university-based remote terminal-accessible computer services organized to study and evaluate the transportability and dissemination of computer related curriculum materials. Much of that material will initially prove suitable for use in secondary schools in honors courses and will then diffuse into the other programs.

In addition to the many NSF sponsored efforts, there are other computer-in-education activities which are having, or will have, a direct influence on secondary schools and community colleges.

An interesting and revealing example is that of Wilbur F. Pillsbury, Chairman of the Department of Economics and Business Administration, Knox College, Galesburg, Illinois. He used a sabbatical leave to learn more about the role of the computer in his discipline. Using an elementary subset of a standard computer language, he developed about 60 short computer programs to augment the teaching of accounting and business. Having had many years of experience in teaching those concepts before computer augmentation, by comparison he was able to demonstrate the increased effectiveness of the computer-augmented approach in the classroom. The South-Western Publishing Company worked with Professor Pillsbury to develop corresponding textbooks under the title, "Computer Augmented Accounting." As of a year ago, over 200 institutions across the country were using his materials based on FORTRAN programs running on 10 different computers. Thus, a viable approach to the preparation and dissemination of *usable* computer-based curricular materials is one where materials are developed by an *experienced* teacher, designed

augment teaching in the classroom, based on a number of *simple* programs in a *standard* language, and edited and distributed by a textbook *publisher*.

Gradually Computer Science has come to be recognized as a separate and distinct discipline. The publication of the report "Curriculum 68" [7] has contributed to the design of computer science courses, and graduate programs in Computer Science have begun to produce M.S. and Ph.D.'s whose primary training has been in Computer Science. Although most professionals who are identified as computer scientists have had their formal training and degrees in Electrical Engineering, Physics, or Applied Mathematics, gradually the field will be dominated and defined by professionals trained as computer scientists just as is the case with other disciplines. The whole field of Computer Science, and of its interface with other disciplines, has become too important to leave to the *ad hoc*-ists.

For those teachers (or those preparing to be teachers) who wish to work at the computer science—other discipline interface (or in Computer Science itself) there needs to be a coordinated set of courses designed to display and develop what Computer Science is. In addition they need to discover the important ways the computer is affecting *what* they teach as well as *how* they teach.

3. The secondary school: pressure from the computer. Several pressures are coming to be felt in the secondary school and community college environments. These include:

1. Computer awareness and experience on the part of incoming students due to proliferation of the computer and ease of its cost-effective use by pre senior high school students.
2. Substantial and growing computer access at the secondary school and community college levels.
3. Substantial and growing development of computer-based curricular materials in the colleges with concomitant developments following at the secondary school level.
4. Lack of training of teachers and administrators regarding computer hardware, software and courseware selection and use. What training there is is usually an elementary computer programming experience; i.e. a vocational skill.
5. Considerable and increasing confusion about the distinction between computer-assisted pedagogy, computer-augmented discipline-oriented techniques of problem-solving and decision-making, vocational training in data processing, computer science and engineering, and use of the computer in the management of the educational enterprise itself.
6. Difficulty of acquiring computer service as a new expense in the face of cost of education rising faster than the gross national product.

Secondary schools attempting to react to these pressures find the difficulty of the task compounded by the layman's very limited view of the computer as an accounting machine on one hand or a super desk calculator on the other. The difficulty is further aggravated by a corresponding mistrust and even antagonism on the part of the average citizen faced by invasion of privacy on one hand and the irritation of having to deal with unresponsive machine-generated billing and accounting statements and amazingly individualized mass mailings on the other.

In the greater Chicago area the pressure of the computer in the secondary schools became particularly acute because of the massive Secondary School Computer Science Education program [8] which, over the past 10 years, brought over 15,000 high school students and over 1200 high school teachers, from over 300 high schools, to the IIT campus to take courses and workshops in computer programming and in computer applications. That IIT-supported program evolved further when, in 1966, IIT installed an IBM 360/40 computer and augmented the IBM operating system with the IIT Remote Job Entry system. (A close copy of that system survives on the UNIVAC 9400 in use by the Montreal Public School System.) High schools and colleges were then able to send computer programs to, and receive computer output from, the IIT computer over ordinary telephone lines, from ordinary teletypewriters. For $2,000 for the academic year a school in Chicago was able to rent a teletypewriter, dataphone, and telephone line from Illinois Bell Telephone Company, and purchase enough computer time on the highly student-oriented IIT computer system so that 50 students, each submitting three programs per week, could be supported for the entire academic year.

In the Chicago Public School system, for example, extensive computer use began when Lane Technical High School and South Shore High School used the IIT computer from teletypewriters [9]. The rapid growth was further facilitated as about 200 Chicago Public High School teachers had received training in the IIT Saturday Teacher's Computer Workshops. By 1971 the Chicago Public School system had installed its own computer and was supporting terminals in all of its 58 secondary schools, as well as in several of its elementary schools.

4. A master of science for teachers in computer science. As a consequence of all the pressures on the secondary school and the community college, particularly in the greater Chicago area, it seemed appropriate to design and to implement a degree program, "Master of Science for Teachers in Computer Science."

Through acquisition of such a degree teachers and administrators could have both the training and credibility to provide competent leadership in addressing the difficult question of what should be happening with computers in secondary and elementary schools.

The IIT MST/CS provides an integrated and coherent program of professional training based on extensive experience in both Computer Science education at the university level, and a large and varied program of long standing of computer training and computer use in many high schools. In addition, with its inception, the IIT MST/CS provided a beginning for the setting of standards of qualification for teachers and administrators charged with responsibility in the use of computers in their educational programs.

The primary purpose of the IIT MST/CS program is to strengthen the teacher's academic background in the emerging discipline of Computer Science. While flexibility is desirable and exists within the program, substantive course work in the core of Computer Science is required.

The 32 semester hour MST/CS program involves a *core curriculum* required of all degree candidates, complemented by an *elective program* which is designed and adapted to meet the needs and career goals of each individual degree candidate.

As originally conceived, the *core curriculum* involved 17 semester hours of work allocated as follows:

3 Sem. Hr. Computers and Society — a lecture and term paper discussion course concerned with the effect of computer/communications technology on academia, industry, and government on one hand, and the life of the individual on the other.

3 Sem. Hr. Computer Languages — a lecture and laboratory course concerned with a comparative study of computer languages and applications programs.

3 Sem Hr. Computer and Curriculum Content — primarily a laboratory course with discussion sessions including the preparation and organization of computer-based curricular elements and a concern with the problems of incorporating such materials in the educational process.

3 Sem. Hr. Computer-Assisted Instruction — a lecture and laboratory course concerned with techniques such as drill and practice, tutorials, author languages, particular CAI systems, and the general problem of computer-assisted pedagogy.

4 Sem. Hr. Special Project — a unique computer-based project done by the degree candidate with a faculty advisor.

1 Sem. Hr. Computer Science Departmental Seminar. Participation is required by all graduate degree candidates.

The *elective program*, comprising 15 Sem. Hrs., was made up of a coordinated set of courses in Computer Science designed to build on the core program and, where appropriate, in other disciplines as well.

Recently the IIT MST/CS core program was revised so that the courses, "Computers and Society," and "Computer Languages" are no longer required; "Computer-Assisted Instruction" has become an alternative to "Practicum in the Application of Computers to Education," a new graduate course "Computer Science in the Classroom" has been added, and four regular senior courses in Computer Science dealing with the structure of algorithms and with programming languages and translators have been added as well. The net result is an increase in the core program (including an MST project) to 26 semester hours, leaving 6 semester hours for electives. Thus the IIT MST/CS program can accommodate teachers from any discipline, although it is expected that the interest will come primarily from t chers of Physics, Chemistry, Biology, Mathematics, and Business.

5. The teacher of mathematics. The teacher of mathematics is in a curious position regarding computers. Research in mathematics, as a discipline, has not been affected significantly by the advent of the computer [10]. Other than as an aid in exhaustive proofs in Number Theory and some work in Group Theory, not much new in mathematics has been discovered because of the computer. Thus, insofar as the teacher of mathematics is preparing students for careers as "pure" mathematicians, the computer is not particularly important at this time. However, to the extent that the teacher of mathematics, as a service to other disciplines, is preparing students to develop or to use mathematics as a language and as an analytic tool in problem-solving and decision-making, considerable attention needs to be given to how the needs of problem solvers and decision makers *have changed* as a consequence of the invention and proliferation of the computer. Accordingly, the priorities must be adjusted regarding which established areas within mathematics need to be taught.

Secondly, an unfortunate problem exists to which the teacher of mathematics needs to be particularly sensitive. The layman regards the computer as somehow "being mathematics." This erroneous concept has an unfortunate consequence in that those administrators, faculty, parents, and students who feel they have no aptitude for mathematics, and hence avoid it, shy away from the computer in the same way. That misconception is probably the single largest factor inhibiting the infusion, and diffusion, of informational technology (of which the computer is only a part) throughout our society. Yet, that misconception is reinforced again and again in part because computer programming courses are usually offered by teachers of mathematics.

Presented in summary form at the Fiftieth Annual Meeting, National Council of Teachers of Mathematics, Section on Teacher Education, April 16–19, 1972. (The opinions expressed here do not necessarily reflect NSF policy.)

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Division of Computing Research, National Science Foundation, Washington, D. C. 20550. (On leave from Chemistry Department, Illinois Institute of Technology.)

DRAGON SMOKE

19

EDU – Dear EduPeople, don't you like me anymore? Nobody sends me EDU anymore! And, it used to be so good. If you don't send it, how can I say interesting things about it in PCC? I hear it is free again. Is you address still

EDU
Digital Equipment Corporation
146 Main Street
Maynard, MA. 01754

HELP – Five dollars a year no longer cover the postage, printing, paper, labor costs of the six double issues sent out per year to every subscriber of Alternatives for Education. It never did cover the extra services such as correspondence, phone bills, travel expenses etc.

Lately, we have to wait until new subscriptions come in to help build up enough money to send out any issues.

We have dug deep into our own personal funds and are feeling that we can't do that anymore. The newsletter has grown beyond a mere local bulletin to an organ to some impact. We have been encouraged by friends in whom we have confided our plight to let the larger circle of our friends know of our present hardship. Steve and I want to continue to send out new information about schools, to continue to present viewpoint articles by creative educators, to inspire the courage to veliece in alternatives, and to stir action to fight for them. **We need your quarters and dollars** to be motivated to continue working hard at bringing to you as fine as publication as we can.

Steve and Thea Clark - Editors
Alternatives for Education
P.O. Box 1028
San Pedro, California 90733

DATABUS is about Computer Techniques in Conflict Simulations – small circulation, serious stuff for people into conflict games. Four heavy but interesting pages each issue. $5 for 4 issues.

Bob Felice
Simulations Publications Inc.
44 East 23rd St.
New York, NY 10010

ECCP – If you want to find out about the Engineering Concepts Curriculum Project and **The man-Made World**, then get the ECCP Newsletter.

ECCP Newsletter
Editor – T. Liao
College of Engineering
State University of New York
Stony Brook, NY 11790

CALCULATIONS – Tektronix, that paragon of oscilloscope manufacturers, has crept into the super-calculator market. So, . . . they are also putting out a magazine (free, I think) about the which, why and how of putting numbers together. It's called **Calculations** and to get it (it says in my Dec. 73 issue) write to:

Jim Buchanan, Devil's advocate and
Calculator advertising supervisor,
P.O. Box 500
Beaverton, Or. 97005

Message From a Far Star – Hello Earthlings – I want to remind you that you can subscribe to the **HP Educational Users Group Newsletter**. Even if you aren't an HP user. $6 for 8 issues. If you don't have a hyperspace transmitter, write to me, c/o of our frontier outpost on your good old earth:

HP
11000 Wolfe Road
Cupertino, CA. 95014

PS Here is something you might like from our Oct/Nov 73 issue.

Chi Corporation is a full-service computer utility wholly-owned by Case Western Reserve University. **Computers in your Schools** is a booklet full of good stuff about computers for skool people. Maybe its free – I haven't been able to find out.

Computers in Your Schools
Chi Corporation
11000 Cedar Avenue
Cleveland, OH 44106

HP Curriculum – Look at what I found in my mail box. . .

To Readers of PCC –

We at Hewlett Packard would like for you to get to know about our Computer Curriculum Project. That is why this little coupon is here. Just fill it out and send it in. You will receive our catalog, a form to order some books and you can ask to be placed on our mailing list to receive information on all the new books as they come out.

Please send me:

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Mail to: Computer Curriculum Project
Hewlett Packard Company
11000 Wolfe Road
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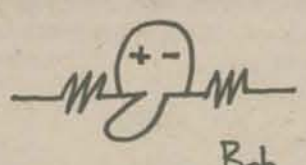


JUST FOR THE FUN OF IT

A beginning astronomy student with zero or little background will truly enjoy this program entitled DRAGON and contributed by Dr. Turner. It simulates a solar eclipse. First . . . the sun appears in boldface, then a dragon moon eats the sun. A corona appears; finally the sun reappears. This entertaining program must be run on a terminal with cursor addressing capabilities such as the Hazeltine 2000. If executed on a teletype terminal, it will print garbage.

Build the Mark 8 Minicomputer – Your personal home-built computer. Use an ASCII keyboard input or tie in a TV Typewriter. Complete with examp

Typewrite. Complete with expandable semiconductor memory, by Jon Titus. **Radio-Electronics** Vol 45 No. 7, Jul. 74, pages 29 – 33. Complete 8 bit by 1K minicomputer. For info, get the July issue of R-E or write:

Radio-Electronics
Micro-Computer
P.O. Box 1307
Radio City Station
New York, NY 10019

LETTERS TO THE EDITOR

THEREMIN

Greetings,

I am looking for a "How to build an electronic music synthesizer with the mathematical mind of a 3 year old." type book. OK? You understand where I stand.

Anyway, I have been absolutely fascinated by the knob laden monsters. I have the capability of etching my own PC boards, and I am a jeweler by 3rd profession so I can solder damn well . . . .

But, I need a schematic and such. Also, some quality suppliers of parts. I don't know how the keyboard mechanism actuates the thing, but I can build the keys themselves, and most of the cabinet and such. [I mean something like oak with inlaid copper or brass designs, after all, I don't want it to look like a matt black beast.]

I heard one of your members on KKUP (I believe) tell of an economical "computer" which can be assembled by such unknowledgeables as I.

If you can send me any information on either, I will be grateful.

In addition . . . I have some information for you. This may be a little much for you, but I heard it from two friends. One is involved in doing experiments in psychometry (as in psychic) at the Defense Language Institute run by the Navy. I know only that they attach EEG electrodes to her while she is trying to pick up impressions. Another is from a friend who says he knows and has seen (in operation) a theremin hooked up to a device which translates brain wave frequencies (or something, he wouldn't say what over the phone you know . . .) into something which triggered the theremin. He said it had to be tuned to your particular frequency and that it didn't take long til you could play *Mary Had a little Lamb* on it. (He is a psychic researcher.)

Leza Chezem
114 Live Oaks Way
Salinas, CA. 93901

Leza, ELECTRONOTES tells all! Write B.A. Hutchins, 60 Sheraton Dr., Ithaca NY 14850. And please send more info about the EEG-THEREMIN hookup! Bob

S/G/N

Simulation/Gaming/News

Used to be a tabloid newspaper about simulations and games – news, reviews, actual games, how they are used in instruction. But – effective Aug. 1, 1974, S/G/N is a magazine – six issues a year for $6. Don Coombs, Editor sez, "We will be inaugurating a completely new current awareness service, to inform readers of all books and reports on simulation gaming as they become available, and subscribers will have increased opportunity to use the columns of S/G/N for personal messages relevant to simulation gaming."

Simulation/Gaming/News
Box 3039
University Station
Moscow, Idaho 83843

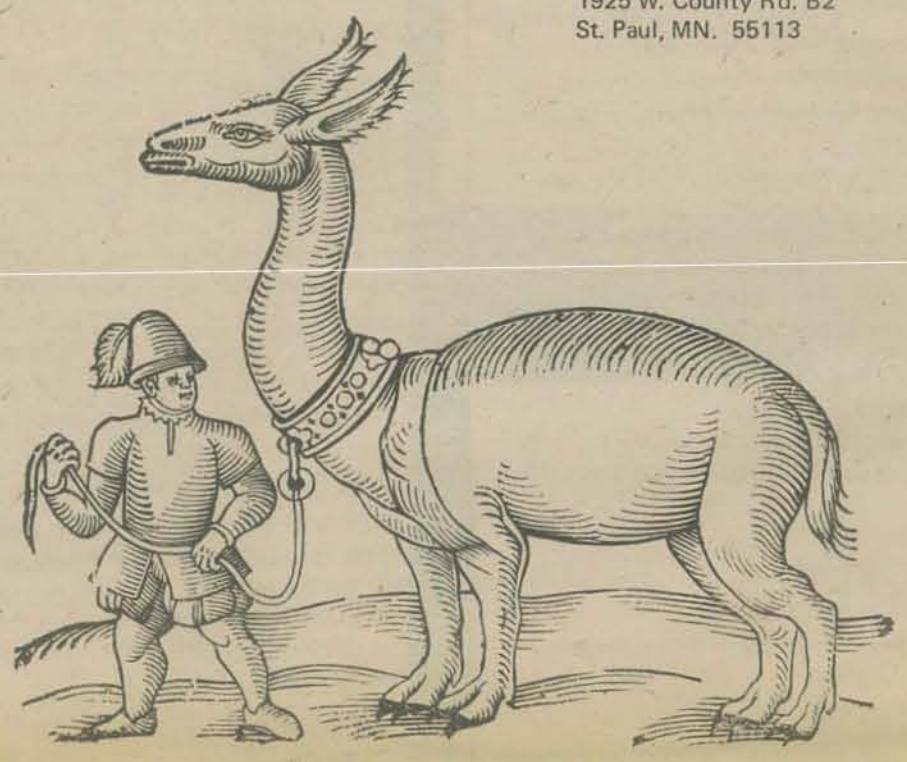
$6 for Six Issues (Overseas $7)

NAUCAL

Go to NAUCAL This Fall?

The National Association of Users of Computer Applications to Learning (NAUCAL, of course) will have its Fall Conference November 7–9 at the Sheraton Ritz Hotel, Minneapolis, Minnesota. The conference will provide teachers, administrators and people with the latest stuff on career with the latest stuff on career and guidance information retrieval, simulation and modeling, problem solving, drill and practice, tutorial, organizational approaches for instructional systems delivery, languages for instructional applications, the computer as an instructional management tool, and the future of computer applications to learning.

For info: Norman E. Thompson
TIES
1925 W. County Rd. B2
St. Paul, MN. 55113



NAUCAL and friend.

Project LOCAL, Westwood, has just announced its Fall program of in-service courses for computer-oriented education. Offerings are included for secondary school teachers of mathematics, physical and biological sciences, business education, and social studies, as well as for teachers at the elementary level. Courses also are included for administrators and guidance personnel.

The courses, which range in level from introductory to advanced, are designed to prepare school personnel to make optimum use of the computer as a teaching aid and as a tool to increase staff efficiency. Further information about the courses is available from

Mrs. Ellsworth
Project LOCAL, Inc.
Westwood, MA. 02090
617-326-3050

Abacus Computer Corporation is offering to secondary school teachers and educational administrators a comprehensive two day (16 hour) course of computer instruction. The course will be presented at the Carlton House Resort Inn in Orlando, Florida on November 22-23, 1974. The course objectives are to provide tools and methods for: 1) learning about computers and programming, 2) reviewing other computer science programs in Secondary Schools, 3) developing an educational program for use in the attendees' own school and 4) determining current status of computer technology as related to education. It is planned that attendees will leave the course with a good exposure to computer technology and will understand how to create their own programs in the BASIC programming language. The course will delve deeply into computer techniques, although it presupposes neither previous knowledge of computers nor a mathematical background.

This course of instruction is being presented by Mr. Donald D. Spencer, President of Abacus Computer Corporation. As part of the tuition, each attendee will receive a Course Library which consists of several booklets, a 200 page bound book of articles and eight textbooks written by the instructor.

A descriptive brochure concerning the course may be obtained by writing or calling

Abacus Computer Corporation
194 E. Granada Ave.
Suite 222
Ormond Beach, FL. 32074
904-672-5672

TED, COME HOME – ALL IS FORGIVEN

To my honorary parents and members of my *karass* at PCC (read Vonnegut's *Cats Cradle!*)

I send you greetings and salutations once again from the land of sand, milk, and honey – although (excepting the Sinai and the Dead Sea area) more and more of the sand is turning into GREEN!

It is with pleasure that I announce that I am to give my first "paper" (to be published with the Conference Proceedings) at the second Jerusalem Conference on Technology. From what I can see, it looks like a loner in a forest of technologically-oriented articles, since the title is: "CAI – Computer Assisted Inhibition or Inspiration?" – in which I tried to point out that CAI has been losing out on its biggest potential by concentrating on reinforcing "right" answers, instead of letting children play and explore new concepts, and that continuation of dogmatic behaviorism will end up producing children inhibited towards creative thinking. Pop Albrecht is quoted (from the Saturday Review article) – I'll try to send a copy of the article to PCC, although the finks don't give me any reprints!

Your newspaper has been a smash hit here – its's being used more and more for ideas, and I suspect you will be receiving more orders from teachers over here for subscriptions of their own.

More happy news. I received an NIMH pre-doctoral fellowship (2 years) to do research on developing a series of computer assisted (Inspirational) programs to teach certain strategies of problem solving and creative thinking. One of the main ideas was to try to put certain related computer games and simulations into optimal learning sequences – like use different kinds of board games together or do a series of games related to inductive reasoning. If anyone has heard of any work being done like this, please have them contact me –

Ted Kahn
c/o Rehov Maoz, 4
Givatayim, Israel

TOOLBOX

PCC

Have obtained an Alpha 16 with 16K words of memory. Awaiting delivery of TTY to operate system. Also on order is a 120 CPS tape reader. Am looking for a good low cost disk for storage.

Was unable to find Marc Lebrun article on "The Programmer's Toolbox" on advanced programming techniques in Vol. 2–4. I thought there was to be one in each issue, as described. They have always been very good and interesting. Is there a book(let) that contains all the ideas and tricks?

One thing for this section might be to point out that logical operations can be made in an arithmetic statement:

```
LET A = X*(Y>1) + Z*(Y<=1)
```

K. Karon
3423 W. 73rd Place
Chicago, ILL. 60629

ALMOST A DRAGON

Gentlemen:

You are nuts.
please enter a subscription to your strange newspaper –

Since DD is a kid and LP is a dragon, we feel that we deserve the lower rate. However, we do not have proof of authenticity so we will – sigh – pay the higher.

If you are interested, I have some experience with Acoustic Couplers, MODEMS, gramma bell and CRT's and my writing is better than my typing. If you are interested let me know.

Leonard P. Levine
4210 N. Farwell Street
Shorewood, WI 53211

Your paper has a style which is so unconventional that there is a temptation to respond in a similar manner. That is why all of us dragons call you knuts. I will be sending a short paper on MODEMs and gramma bell in about a week. I direct the computing center here at the University of Wisconsin, Milwaukee in "real" life. I am interested in the problem of bringing machinery to the high schools and such however, and find your paper a breath of fresh air.

WANT TO BE COUNTED?

The American Institutes for Research, under a grant from the National Science Foundation is conducting a nationwide survey on computer usage in secondary schools to provide a current assessment of the extent and nature of computer usage for instructional and administrative purposes. Questionnaires will be mailed to a random sample of high school principals in October. Since the survey is national in scope, all schools selected for the survey, computer users or not, are urged to respond.

Should your school not be selected as a participant, but you would still like to report how you are using computers in your high school, send a description of your activities to:

Dr. William J. Bukoski
The American Institutes for Research
Communications Research Group
3301 New Mexico Avenue, N.W.
Washington, DC 20016

Your participation in this study would be most appreciated.

GAME PARLOR

Dear People's Company:

Believing that computers can serve people in their recreational as well as their business lives, we at CRI are currently preparing to open a computer time-shared game parlor in the New Jersey area. Eventually we hope to be able to provide a total computer amusement environment within which our users can

(1) play games with each other,
(2) play games with the machine.
(3) watch other people play games, access a variety of amusement-oriented databases.

We would greatly enjoy hearing from PCC people and readers with regards to their ideas, observations, and opinions on our venture. In particular, we are currently considering for purchase any and all nature of BASIC programmed amusements, games, diversions, and pasttimes. We welcome proposals from programming enthusiasts who have or would be willing to develop BASIC programs for CRI.

Scott B. Guthery
CRI Corporation
P.O. Box F
Cliffwood, New Jersey 07721

SCOTT, LOOKS LIKE A STORY HERE. WOULD YOU WRITE IT AND SEND IT?

WHAT'S A FORTRAN?

Dear Dragons, Basilisks, Serpents and Cockatrices,

I really enjoyed the *101 Basic Computer Games* book I bought. However, many of the games are not really worth the trouble to translate into FORTRAN. I've picked out about 20 fair to good programs from it, and along with a few PCC games, but I have lost interest in many of these games. I was wondering if you could send me your listings of either Biosum, Qubic5, or Stocks.

Oh yes, is there any chance you can print this in some unused corner of PCC? Program-starved person would like to know anyone who has programs in FORTRAN or FORTRAN IV. I would be willing to swap.

Eric Haines

1,000,000 STUDENTS

Dear Sirs:

Our school district is interested in the uses of computers in the classroom. Could you send us information, brochures, bibliographies, etc., that relate to the use of the computer in various curricula. Would you also send us information regarding the number of schools and their location that are using computers. I recall a publication called *One Million Schools,* or something similar which I saw during a mind-expanding "Games Computers Play" course I took from you. Could you send a copy or tell me how to get it.

I hope the People's Computer Company is alive, well and still liking you.

Ken Hastings
Curriculum Coordinator
Fairfield-Suisun USD
1025 Delaware Street
Fairfield, CA. 94533

KEN – THE BOOK IS 1,000,000 STUDENTS. GET IT FROM EDUPEOPLE, DEC, 146 MAIN ST., MAYNARD MA 01754.

ULTIMATUS ALGORITHMUS

My Friends,

We have the Ultimate Algorithm: "job cost" and complete access to a model 158 with interfaces to everything else except an ultimate ILLIAC – we're now modestly able to justify a subscription to your happiness. Enclosed is payment by check.

Next we want to design GE's operating system and give it away – but we'll wait until next Revolution for that. Blue meanies down here never bother us. That doesn't mean they wouldn't if they could.

We're moving – if you care – so DDD will change our address. And we're planning microwave thru Southern Services Co. whenever we can find the right people. Bear with us – or please help.

KINESCO BHM
48 Vine Street
Mtn. Brook, AL. 35213

MIKE PITT STRIKES AGAIN

Dear Big A,

YEA YEA YEA!!!

This is just a note to tell you I'm dead and living in NY.

I've already got a response from my letters you printed, a guy from Texas is sending me a printout of the Game Wumpus in RPG, is that totally insane! I don't even know his name.

I'm going to Columbia University during the summer to learn me some BASIC and other stuff. OR I'LL go to a NSF funded thingy at Brooklyn Polytechnic University where they let you play around with the stuff they got there WOH!

I still don't know what to do with the MONROBOT XI don't you have any ideas? Please ask around.

Mike Pitt
213-17 86the Avenue
Queens Village, NY 11427

MIKE, YOU COULD START A MUSEUM. Bob

WHAT IS CREATIVE COMPUTING?

Why, it's David Ahl's new magazine. We haven't seen one yet, but Dave sez:

CREATIVE COMPUTING is a lively new magazine for students and teachers using computers in colleges, junior colleges, secondary schools, and even the lower grades. It contains games, simulations, problems, exercises, curriculum materials, and ideas directly usable in the classroom.

CREATIVE COMPUTING deals with the use of computers and computer related devices in mathematics, science, social science, ecology, computer familiarization, computer science, and career education. The content of Creative Computing reflects the view that computers can make learning fun!

CREATIVE COMPUTING provides evaluative reviews of computer hardware, software, applications material, learning aids, books, games, and related devices. It reports on successful experiences of educational users and provides a vehicle for the interchange of programs and materials. Creative Computing also brings its readers capsule summaries of significant educational and computer conferences and meetings.

CREATIVE COMPUTING is a forum for the discussion of the social impact of the computer with a focus on privacy, automation and jobs, leisure time, medical care, pollution control and the like.

CREATIVE COMPUTING is published bi-monthly; each issue containing between 48 and 72 pages of editorial material. The primary objective of Creative Computing is to bring high quality, useful information to students and educators at a reasonable cost. Try it for a year! You'll like it!

For information, write

Creative Computing
P.O. Box 1036
Concord, MA. 01742

PCC – MIDWEST?

Dear Bob:

I sat up all night reading your back issues – wow! I'm really impressed with what you are doing. I'm only sorry I couldn't have been part of a movement like that about 15 or 20 years ago. The closest I ever got to it was playing with Radio Amateur Teletype (which is still a fascinating hobby).

I have always been interested in computer-like equipment and techniques for game playing and recreational activities. Years ago, I used to haunt the pin-ball operators for old machines that I could haul away and rewire to my own desires. I found many an interesting device or control technique that way. At Engineer's Day in college, we once created a tic-tac-toe machine from old pin-ball parts.

I discovered hands-on computers when the IBM 1620 in the Engineering laboratory was not being used on lunch hours. I used to skip lunch to play with it.. My first programming efforts were typing machine language instructions into memory from the keyboard. (Remember-you could do that on a 1620.) I REMEMBER

By the time I had explored machine language and FORTRAN on the 1620, it was replaced with an 1130. This time I really had a ball! A binary machine! I used to come in 3 hours early (5 AM) every day to get time for learning. I discovered matrices, paper tape techniques, disks, etc.

By this time I had intregrated all of this into my job so that the computer was a necessity. This way I managed to work and have fun at the same time. Practically all the devices I designed required paper tape input for control (this was before mini or micro-computers) and that paper tape was all generated on the 1130 and 1620.

When the PDP8 series was ok'd for purchase, we got one of those. By the time I left my position, the Engineering lab was being used for training, recreation, demonstration and had become a fun place to work.

Through a long and meandering process, I formed Computer Data Systems with a friend of mine, Bob Salem. Bob has been a computer freak like me for many years and we seemed to have similar temperaments. He is more hardware-oriented and I am sort of software-oriented. Our primary purpose with CDS is to make a living, but we sort of do it and have fun at the same time.

Our headquarters is in a warehouse just east of the OSU campus. Since we are confirmed 'junk' collectors, the warehouse was a nice selection. It has large double doors opening into a wide alley in the rear (just the right size for carting all that equipment in and out). We built our own walls to make an office and a 'machine room'. We originally had a contract with a third partner who was looking for a place to store the remains of a defunct radio and TV servicing business. He brought in and installed work benches, test equipment, filing cabinets, parts, etc. He later dropped out and we inherited the work benches and cabinets for a very reasonable price.

We have acquired two mini-computers and some assorted peripheral I/O devices such as high speed paper tape, tab card reader, System 3 card reader, and a channel to another machine with disc, 7 track tape and a high speed printer. We are in the process of interfacing a 9 track tape drive and a floppy disc.

We have a number of computer freaks that work for us part time and we let them use the equipment when it is not busy for their own experiments. We have one system analyst that keeps a hot-air balloon and two second generation NCR computers in the warehouse. Another student is currently finishing up the TV Typewriter from Radio Electronics here and is adding some surplus tape readers and punches that we picked up from the government surplus sales. We also have a microprocessor work area with re-programmable ROMS. All in all, we are having a lot of fun with the various projects going on here.

This explanation is in way of a public notice to the people in the Columbus and surrounding area that we are there and welcome anyone wanting to meet us. If we are busy with "earning-a-living" jobs when you call, we may not be able to spend a lot of time with you, but we can always get together agin at "relaxin" time.

I think we might have the nucleus of a midwestern copy of People's Computer Company here. Let us hear from you.

Fred Hatfield, President
Computer Data Systems, Inc.
1372 Grandview Avneue
Columbus, Ohio 43212

FRED - HAVE YOU EVER THOUGHT ABOUT MOVING TO MENLO PARK CALIFORNIA..?!

YES, COMPUTERS ARE FOR KIDS

Gentlemen:

In the course of attempting to set up a children's minicomputer laboratory at the Center of Science and Industry here in Columbus, I contacted Mr. Rusty Whitney of the Oregon Museum of Science and Industry. He was kind enough to send a sample copy of your wonderful publication along with some other helpful materials.

I find your articles interesting and exciting. I have been active in the recreational applications of computers for a number of years now and did not realize that there were so many other people with the same interests. I would appreciate any suggestions or comments on the proposed minicomputer laboratory for children at our local Center of Science and Industry.

Fred Hatfield, President
Computer Data Systems, Inc.
1372 Grandview Ave.
Columbus, Ohio 43212

Dear Bob,

Guess what? We have a new computer!

Howie Franklin was over to see it the other day and was veritably freaked out. We're running with three 1200-baud alphanumeric CRT terminals plus three 300-baud terminals in our visitor area; plus a fourth 300-baud deal along with our old PDP-8's ASR33 hidden away in my office.

UNIX has a version of your Wumpus game, written in C, that has become a big hit at Harvard on their system and has been rewritten in other languages there, too. We're going to start running a simplified version of it here today, along with our current old standbys, Tic-Tac-Toe (the Dartmouth BASIC version that is dumb enough to let you win if you go first), Hangperson (aka hangman), and Uguess, the 1-to-100 number guessing game.

In any event, we need more! Our kiddies are starving. Can you send us ASAP hardcopy listings of your games so that we can translate them to C and make them work for our audience? As ever, we will credit the source (a little publicity never hurts anybody).

Also, is there a way/play/proposal under which we can get lots of copies of PCC to sell on a single-copy basis in our Children Shop and/or Teacher Shop?

I'll try to write you an article for a near-future issue about our new baby, but in the meantime you can publish this letter if I don't get around to it soon enough. Hope to get a nice package from you soon.

Bill Mayhew
Director, Computer Systems Dev.
The Children's Museum
Jamaicaway
Boston, MA 02130

Wowie Zowie ain't it neat how I can make the computer do all my drudge work, like editing and typing letters?

HELP! WILL SOMEONE PLEASE WRITE US AN ARTICLE ABOUT UNIX?

GRAPHICS TERMINALS

Dear PCC,

As the number of graphics terminals in use increases, the number of games written for them will also increase. This is true for interactive computer systems in general, and particularly with regard to their proliferation among the nation's schools. And one of the best places for graphics terminals is in the schools, because of their versatility, speed and silence.

SILENCE – One of the blessings of advanced hardware technology. Shy users aren't scared away by clattering 33's and their subsequent attempts to concentrate are not disrupted at the rate of ten rattles per second.

SPEED – To keep the user constantly interested; to draw pictures and charts quickly; to do fancy formatting without wasting time; and to save the experienced user from waiting for familiar instructions or questions to print out.

VERSATILITY – At last, something more than a bulky electric typewriter that talks back. Upper and lower case letters, graphics capability, multiple line speeds, a programable pointer, movable crosshairs, hardware text editing, a light pen, no ribbon to change, no paper to take care of – features on many CRT terminals. A picture is worth a thousand words, so why not be able to have it either way?

So what more could a computer freak want? Not much, really, except a lower price. And terminal prices are continually dropping, making CRT's available to more and more people. That means that many of those people will be exploring the wonders of graphic games, not to mention art, design, and other innovative applications.

The games will start with old favorites that require two or more people to play, each making one move at a time while the computer displays their progress on the screen. Tic-tac-toe would probably be the first to undergo such treatment, followed by checkers, Monopoly, Scrabble, chess, or any other game played with pieces on a board. Hangman, or Hang the Butcher, would be an interesting game on a graphics terminal; the computer would "think" of a word and the player would try and guess the letters that appear in that word. Another piece of the condemned man would be added to the picture if a guess was wrong. Otherwise, the letter would be inserted into the appropriate blanks and the partial word displayed.

A game called POTSHOT currently runs on the Dartmouth Timesharing System and uses a Tektronix terminal. Two players have cannon emplacements on either side of a mountain. They take turns firing pot-shots at one another, altering the angle of their next shot according to where the previous one hit. The first player to knock out the other one's pillbox is the winner. At the beginning of each game, the players can set up the wind speed and direction, the height of the mountain, and the placement of the cannons, or they can let the program do it randomly. The best part, though, is to watch as your cannonball slowly arcs up over the countain and lands inches away from your opponent, when you know his next shot can't miss.

The number of well-known games that lend themselves to graphic display output is endless. I have yet to see one that was programmed for a CRT and was not an instant success.

Brian Follett
4 Baron Park Lane, Apt. 38
Burlington, MA. 01803

BRIAN - WOULD YOU, COULD YOU DO US A WHOLE PAGE ABOUT CRTs ? ... Bob

LOVE LETTER

To the PCC

I love your magazine. Its photos are superb, its articles choice. Juicy with facts and delightful fiction. The format is easily readable and understandable. It is a good magazine.

Byron V. Caloz
Griffin Creek Road
Medford, Oregon 97501

Thanks, Byron. PCC

FROM OUR GALACTIC CORRESPONDENT

Dear Bob,

Just received May '74 PCC and was happy to see the whole darn letter I sent you on the Contract Bridge program (I'll even forgive your leaving out a line – although it confusilates the explanation of the DUMMY and BID commands . . .); now to sit back and await a flood of information, lawsuits, etc., on the program.

Meanwhile, I'd like to expand on what I mentioned to you in our April 1/April 4 Message-O-Gram – my adventures with the Star Trek program that appeared in Dave Ahl's *101 Basic Games*. (The name in the book is SPACEWR, or some such.)

First of all, I found some guys at work (which is Westinghouse Electric's "Aerospace Division" in Baltimore – only they have some other name for it [the division, not the city] now . . .) who have a Nova computer setup with a real-time disc operating system (RDOS). During working hours, they have it processing radar data; during lunchtime and after hours, I get a chance to use it recreationally. So then I saw this program in Dave Ahl's book, and set out to type in the whole thing – took quite a while, as I discovered as I went along that there are some differences between DEC's and DGC's versions of BASIC. The giggie is that string manipulation (and there's lots of it) is different.

Anyhow, I finally finished the monumental typing job and got the thing debugged, and it didn't take long to get several people hooked on the game – at one point, there was a marathon game that lasted from 5:15 PM until 3:30 AM!

QUESTION: Is this game the same one that you have on your computer at PCC? If so, you may be interested in a tape or listing of the present version that I've put together. It seems that everyone who plays the game has more suggestions for 'goodies' to be added, and as a result of this and some of my own ideas, the game is (we think) more fun than the original was. SEND IT! SEND IT! SEND IT!

YUP

YUP!

Some examples of our extras: Messages about ship status are printed out as quotes of the original crew on the starship Enterprise (Spock, Uhura, Scotty, Chekov, etc.); command inputs are 3-letter mnemonics ("NAV" for course control, "PHA" for phasers, etc.) instead of numbers, and adding an inquisitive "Q" to the command gets you a print-out of the instructions for that command; when the Klingons fire back at you, they can damage your ship's systems, depending on their distance away, their remaining firepower (if you've hit them already) and how much energy you have deployed to your deflector shields; when (and if!) you reach and dock with a Starbase, a team of technicians will board and repair any damages to your ship, if you are willing to authorize the repair at the expense of the time to repair (as slightly under-estimated by Damage Control); the library-computer has five options instead of three; the amount of energy used in maneuvering is a funciton of your Warp speed. Also there are lots of little things (alluded to in the game's intro in the book) that we've taken the time to hash out and fix.

[Re-reading the above paragraph, I realize that one who has not played this game before will have a hard time appreciating the points I've mentioned. On the other hand, I think it indicates the kind of suggestions I'm open to for further improvements to the game, so I'll continue . . .]

I'd like to extend my sympathy to anyone who has played this game on a plain ol' TTY unit, as I did for a while before we received our CRT + keyboard unit. The two major readouts of the Star Trek game (short range sensors and cumulative galactic record) take a long time to be printed out mechanically – I now truly appreciate the 9600 baud setting on our Westinghouse 1600 display unit. (And heaven knows how long our marathon game would have taken, if we'd still been using the ASR 33 hookup . . .) An added goodie possible with this display is the "flashing" mode any characters printed subsequent to a "BELL" character will flash at about 1 Hz. Thus, under condition RED, the word "red" is made to flash on the screen (just like the alert panel on the bridge of the Enterprise, I might add); also, the symbol in the quadrant where the starship is located will flash when the cumulative galactic record is requested from the ship's library-computer.

A final point of discussion (and one that shows how freaked out you can get over a game that gets to be quasi-realistic) is the question of "quadrants." Neophyte watchers of the Star Trek show, and newcomers to this computer game will sometimes complain of the fact that the galaxy is made up of a number of quadrants, and that that number is considerably greater than four. "But nothing can have more than four quadrants!" they say, displaying their painfully obvious naivete in the ways of space lore. A memo explaining this apparent contradiction has been prepared (and is attached) which these disbelievers are shown with some disdain.

O.K., Bob, I'm finished rambling on about our version of Star Trek – you've got all summer with no issues of PCC to publish, and I'd like to hear about your version (PCC's version?). And if you can't spare the time, could you at least forward this to some other spacewar freak who'll correspond a bit?

Robert C. Leedom
3429 Rollingview Court
Ellicott City, Md. 21043

Recently, certain critics have professed confusion as to the origin of the "quadrant" nomenclature used on all standard CG (Cartesian Galactic) maps. Naturally, for anyone with the remotest knowledge of history, no explanation is necessary; however, the following synopsis should suffice for the critics:

As every schoolboy knows, most of the intelligent civilizations in the Milky Way had originated galactic designations of their own choosing well before the Third Magellanic Conference†, at which the so-called "2^6 Agreement" was reached. In that historic document, the participant cultures agreed, in all two-dimensional representations of the galaxy, to specify 64 major subdivisions, ordered as an 8 x 8 matrix. This was partially in deference to the Earth culture (which had done much in the initial organization of the Federation), whose century old galactic maps had always shown 16 major regions named after celestial landmarks of the Earth sky. Each of these regions was divided into four "quadrants" designated by ancient "Roman Numerals" (the origin of which has been lost).

To this day, the official logs of starships originating on near-Earth starbases still refer to the major galactic areas as "quadrants."

† Conference held at Federation Starbase 1, Stardates 1016 – 1021;

DRAGON EMBALMERS

Mortals and/or Dragons:

We, the morticians, having observed your paper for a year, have decided to subscribe. Please enter us upon your mailing list.

We have been using a remote hook-up with the Univac 1108 at the Illinois Institute of Technology. Recently we obtained a second hook-up with the IBM 360 at the Chicago Board of Education. We have implemented several of your games on the 360. Some of these games are *Chomp, Super Wumpus, Number, Snark, Hurkle,* and soon *Star Trader.* For the most part, the translation to the 360 (using a 'rax' compiler, which we don't like at all) has been smooth. However, we did run into some problems. For example, you can't transfer to a DIMENSION, REMARK, or to the first statement of a subroutine.

Anyone who had or is having similar problems or anyone who wishes to know more about our implementations is invited to contact us at the following address:

The Morticians
3326 E. 191st. Street
Lansing, Il. 60438
c/o Paul A. Kubinski

Ordinarily, we refrain from doing anything constructive but as they say 'the times are-a-changin.' So, ye readers of PCC, we morticians in defense of the under-privileged, in pursuit of justice, and in recognition of those who are not exceptional examples to mankind but yet are consistently mediocre, end this letter.

Freedom of the Press . . . . . .
The Morticians

DATAPOINTS HAVE FUN TOO

Dear People,

I have been reading your paper for the past year now and have really enjoyed it. Having been rather isolated from the educational scene, for the past several years, I didn't realize that your world of games, dragons and people who can enjoy a computer might really exist. This past year as advisor to an ACM student chapter at a local high school, I found it helpful to be able to relate more than just business DP to the members.

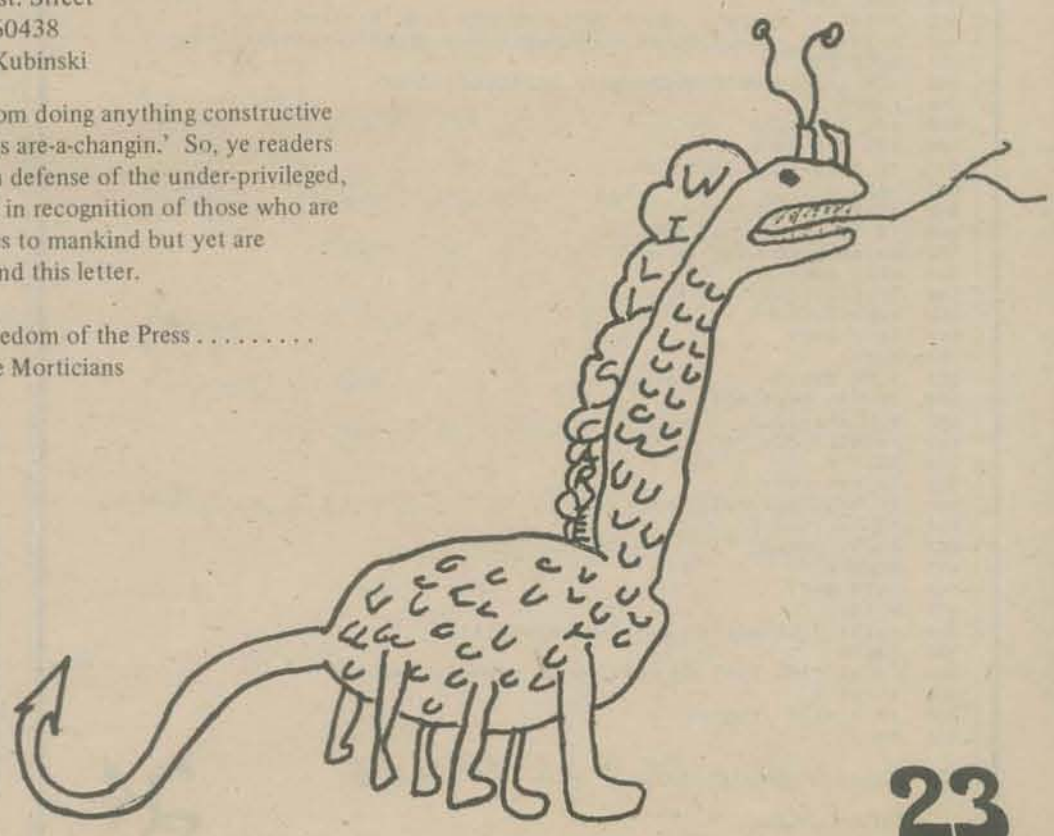
Up to this point, I have had little in common with you except working with young people. My company is a service bureau running strictly a batch environment; we have no time sharing and no BASIC and no interactive devices. In a recent issue of PCC however, you talked about your Datapoint and there we find a mutual interest. Our company is just beginning to use Datapoints in the field for data collection and we have a couple here in house for development and communication. When you wrote about running BASIC on the 2200, I immediately called to have a copy of the system transmitted to me; I have been having a ball ever since. This is my first adventure with an interactive language and I find it extremely stimulating. A member of the ACM student chapter last year programmed LIFE in FORTRAN (our company provided free computer time for the chapter). He later wanted to learn COBOL so he and I reprogrammed LIFE in COBOL. We had wished then that we had an interactive device available, so when I got BASIC on the 2200, LIFE was my first application. Using GEDIT, I have annotated my program and am enclosing a copy of the listing. You probably already have a running version, but you might like to see my approach.

Presently there is very little in the way of computer education in our local high schools. The ACM student chapter is an outgrowth of a computer class and club for advanced students at one high school. They study some FORTRAN and have a programmable desk-top calculator on loan from somewhere. I have been studying up on computer education in other parts of the country (although I haven't found much outside your paper on it) and plan soon to meet with our faculty advisor and see what the school board's thinking is in that area. If you have any good sales points I might find useful, pelase drop me a line. If there are government funds available specifically for this field, that would certainly be nice to know in advance.

Like I said in the beginning, I really enjoy your paper. Keep up the good work, I am looking forward to future issues.

Stephen G. Kent
Innovative Data Systems
Rt. 1 Box 434
Bossier City, LA 71010

STEVE, MORE DATAPOINT STUFF THIS ISSUE, PG. 6. DO YOU KNOW THAT THERE ARE VERSIONS OF PILOT FOR 8K & 12K DATAPOINTS? PILOT? SEE PCC, VOL. 1 #4, APRIL 73. Bob



LISTINGS

Hello game lovers! This year we will publish a couple of pages of listings of game-playing programs each issue. So... here are 3 programs. All have appeared in previous issues of P.C.C. All were written by P.C.C. people, except Bagels* These programs will run on a HP 2000F and, with slight changes, on most other BASICs. * * ENJOY * *

Number

```
100  REM *** NUMBER *** A NUMBER GUESSING GAME ***
110  REM *** COPYRIGHT PEOPLE'S COMPUTER COMPANY
120  REM *** P. O. BOX 310, MENLO PARK CA 94025

200  REM *** PRINT INSTRUCTIONS ON HOW TO PLAY
210  PRINT "I WILL THINK OF A WHOLE NUMBER FROM 1 TO 100."
220  PRINT "TRY TO GUESS MY NUMBER. AFTER EACH GUESS, I WILL"
230  PRINT "TELL YOU IF YOU HAVE GUESSED MY NUMBER OR IF YOUR"
240  PRINT "GUESS IS TOO SMALL OR TOO BIG."

300  REM *** COMPUTER 'THINKS' OF A NUMBER - CALL IT X
310  LET X=INT(100*RND(0))+1
320  PRINT
330  PRINT "OK, I HAVE A NUMBER. START GUESSING."

400  REM *** HUMAN STARTS GUESSING
410  PRINT
420  PRINT "WHAT IS YOUR GUESS";
430  INPUT G
440  IF G=X THEN 510
450  IF G>X THEN 480
460  PRINT "TOO SMALL. TRY A LARGER NUMBER."
470  GOTO 410
480  PRINT "TOO BIG. TRY A SMALLER NUMBER."
490  GOTO 410

500  REM *** HUMAN HAS GUESSED THE COMPUTER'S NUMBER
510  PRINT
520  PRINT "YOU GUESSED IT!!! LET'S PLAY AGAIN."
530  PRINT
540  GO TO 310

999  END
```

Bagels

```
10   REM *** BAGELS
20   REM *** MODIFIED BY FRED MOORE FOR
30   REM *** PEOPLES COMPUTER COMPANY
40   DIM N(3),A(3)
50   REM *** INSTRUCTIONS
60   PRINT "WANT THE RULES (1=YES,0=NO)";
70   INPUT R
80   IF R <> 1 THEN 150
90   PRINT
100   PRINT "I AM THINKING OF A THREE DIGIT NUMBER (NO DIGITS THE SAME)."
110  PRINT "TRY TO GUESS MY NUMBER.  AFTER EACH GUESS I WILL PRINT:"
120  PRINT "    'FERMI'  FOR EACH CORRECT DIGIT IN THE CORRECT PLACE,"
130  PRINT "    'PICO'   FOR EACH CORRECT DIGIT IN THE WRONG PLACE, OR"
140  PRINT "    'BAGELS' IF NO DIGIT IS CORRECT."
150  REM *** SELECT NUMBER AT RANDOM
160  N(3)=INT(RND(0)*9+1)
170  N(2)=INT(RND(0)*10)
180  IF N(2)=N(3) THEN 170
190  N(1)=INT(RND(0)*10)
200  IF N(1)=N(2) THEN 190
210  IF N(1)=N(3) THEN 190
220  PRINT
230  PRINT "OK, I HAVE A NUMBER."
240  G=0
250  REM *** A GUESS
260  PRINT
270  PRINT
280  PRINT "YOUR GUESS";
290  INPUT X
300  G=G+1
310  A(3)=INT(X/100)
320  A(2)=INT(X/10)-A(3)*10
330  A(1)=X-INT(X/10)*10
340  IF A(3)>9 THEN 410
350  IF A(3)<1 THEN 410
360  IF INT(X) <> X THEN 410
370  IF A(1)=A(2) THEN 410
380  IF A(2)=A(3) THEN 410
390  IF A(1)=A(3) THEN 410
400  GOTO 440
410  PRINT "   PICK A THREE DIGIT NUMBER FROM 102 TO 987"
420  PRINT "   HINT: IN MY NUMBER ALL THE DIGITS ARE DIFFERENT"
430  GOTO 270
440  REM *** COMPARE GUESS WITH SELECTED NUMBER
450  F=P=0
460  FOR I=1 TO 3
470  FOR J=1 TO 3
480  IF A(I)=N(J) THEN 540
490  NEXT J
500  NEXT I
510  IF F+P <> 0 THEN 590
520  PRINT "BAGELS";
530  GOTO 260
540  IF I=J THEN 570
550  P=P+1
560  GOTO 490
570  F=F+1
580  GOTO 490
590  IF P=0 THEN 633
600  FOR K=1 TO P
610  PRINT "PICO ";
620  NEXT K
630  IF F=3 THEN 263
640  IF F=3 THEN 690
650  FOR K=1 TO F
660  PRINT "FERMI ";
670  NEXT K
680  GOTO 260
690  PRINT
700  PRINT "YOU GOT IT IN";G;"GUESSES!!!"
710  PRINT
720  PRINT "YOU WANT TO PLAY AGAIN (1=YES, 0=NO)";
730  INPUT R
740  IF R <> 0 THEN 150
750  END
```

* Lawrence Hall of Science Berkeley, Ca.

Letter

```
100 REM *** LETTER - A LETTER GUESSING GAME
110 DIM A$(26)
120 LET A$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
200 REM *** PRINT INSTRUCTIONS ON HOW TO PLAY
210 PRINT "I WILL THINK OF A LETTER OF THE ALPHABET, A TO Z."
220 PRINT "TRY TO GUESS MY LETTER.  AFTER EACH GUESS, I WILL"
230 PRINT "TELL YOU IF YOU GUESSED MY LETTER OR IF YOUR GUESS"
240 PRINT "IS TOO HIGH OR TOO LOW. THE LOWEST LETTER IS 'A'"
250 PRINT "AND THE HIGHEST LETTER IS 'Z'."
300 REM *** COMPUTER THINKS OF A LETTER
310 LET X=INT(26*RND(0))+1
320 LET L$=A$(X,X)
330 PRINT
340 PRINT "OK, I HAVE A LETTER.  START GUESSING."
400 REM *** HUMAN STARTS GUESSING
410 PRINT
420 PRINT "WHAT IS YOUR GUESS";
430 INPUT G$
440 IF G$=L$ THEN 500
450 IF G$>L$ THEN 480
460 PRINT "TOO LOW. TRY A HIGHER LETTER."
470 GOTO 410
480 PRINT "TOO HIGH. TRY A LOWER LETTER."
490 GOTO 410
500 REM *** HUMAN HAS GUESSED THE LETTER
510 PRINT
520 PRINT "YOU GOT IT!  LET'S PLAY AGAIN."
530 PRINT
540 GOTO 300
999 END
```

Trap

```
100  REMARK *** TRAP *** TRAP *** TRAP *** TRAP *** TRAP *** TRAP
110  REMARK *** COPYRIGHT 1974 BY PEOPLE'S COMPUTER COMPANY
120  PRINT "DO YOU WANT INSTRUCTIONS";
130  INPUT Z$(1,1)
140  IF Z$ <> "Y" THEN 290
150  PRINT
160  PRINT "I WILL THINK OF A NUMBER FROM 1 TO 100."
170  PRINT "TRY TO GUESS MY NUMBER. ENTER TWO NUMBERS, TRYING"
180  PRINT "TO TRAP MY NUMBER BY YOUR TWO TRAP NUMBERS. I'LL"
190  PRINT "TELL YOU IF YOU HAVE TRAPPED MY NUMBER OR IF MY"
200  PRINT "NUMBER IS SMALLER THAN YOUR TWO TRAP NUMBERS OR"
210  PRINT "IF MY NUMBER IS LARGER THAN YOUR TWO TRAP NUMBERS."
220  PRINT "IF I TELL YOU THAT YOU HAVE TRAPPED MY NUMBER, I"
230  PRINT "MEAN THAT MY NUMBER IS *BETWEEN* YOUR TRAP NUMBERS"
240  PRINT "OR - PERHAPS MY NUMBER IS THE SAME AS ONE OF YOUR"
250  PRINT "TRAP NUMBERS."
260  PRINT
270  PRINT "!!!IMPORTANT!!! IF YOU THINK YOU KNOW MY NUMBER, THEN"
280  PRINT "ENTER YOUR GUESS FOR *BOTH* TRAP NUMBERS."
290  PRINT
300  LET X=INT(100*RND(0))+1
310  PRINT "I'M THINKING...THINKING...AH! I HAVE A NUMBER!"
320  LET K=1
330  PRINT
340  PRINT "FIRST TRAP NUMBER";
350  INPUT A
360  PRINT "SECOND TRAP NUMBER";
370  INPUT B
380  LET T=SGN(X-A)+SGN(X-B)
390  GOTO T+3 OF 430,410,400,410,450
400  IF A=B THEN 480
410  PRINT "MY NUMBER IS TRAPPED BY YOUR NUMBERS."
420  GOTO 460
430  PRINT "MY NUMBER IS SMALLER THAN YOUR TRAP NUMBERS."
440  GOTO 460
450  PRINT "MY NUMBER IS LARGER THAN YOUR TRAP NUMBERS."
460  LET K=K+1
470  GOTO 330
480  PRINT "YOU GOT IT IN";K;"GUESSES...LET'S PLAY AGAIN, LUCKY."
490  GOTO 290
500  END
```

Stars

```
100  REM *** STARS *** STARS *** STARS *** STARS *** STARS ***
110  REM *** COPYRIGHT 1974 BY PCC, P.O. BOX 310, MENLO PARK CA
120  PRINT "WELCOME TO MY GALAXY. I'M IN CHARGE OF THE STARS HERE."
130  PRINT "PLAY MY GAME *STARS* AND GET SOME STARS FOR YOURSELF!"
140  PRINT
150  PRINT "WANT TO KNOW HOW TO PLAY";
160  INPUT Z$(1,1)
170  IF Z$ <> "Y" THEN 280
180  REM *** HERE IS HOW TO PLAY
190  PRINT
200  PRINT "I WILL THINK OF A WHOLE NUMBER FROM 1 TO 100."
210  PRINT "TRY TO GUESS MY NUMBER. AFTER YOU GUESS, I"
220  PRINT "WILL TYPE ONE OR MORE STARS (*). THE CLOSER"
230  PRINT "YOU ARE TO MY NUMBER, THE MORE STARS WILL I TYPE."
240  PRINT "ONE STAR (*) MEANS YOU ARE FAR AWAY FROM MY"
250  PRINT "NUMBER. SEVEN STARS (*******) MEANS YOU ARE VERY,"
260  PRINT "VERY, VERY CLOSE TO MY NUMBER!!!"
270  REM *** COMPUTER 'THINKS' OF A NUMBER FROM 1 TO 100
280  LET X=INT(100*RND(0))+1
290  PRINT
300  PRINT "OK, STARSEEKER, I AM THINKING OF A NUMBER. START GUESSING."
310  REM *** GUESSING BEGINS
320  LET N=1
330  PRINT
340  PRINT "WHAT IS YOUR GUESS";
350  INPUT G
360  IF G=X THEN 550
370  LET D=ABS(G-X)
380  IF D >= 64 THEN 500
390  IF D >= 32 THEN 490
400  IF D >= 16 THEN 480
410  IF D >= 8 THEN 470
420  IF D >= 4 THEN 460
430  IF D >= 2 THEN 450
440  PRINT " *";
450  PRINT " *";
460  PRINT " *";
470  PRINT " *";
480  PRINT " *";
490  PRINT " *";
500  PRINT " *";
510  PRINT
520  LET N=N+1
530  GOTO 330
540  REM *** PLAYER HAS GUESSED THE GALACTIC NUMBER
550  FOR K=1 TO 15
560  PRINT " **";
570  NEXT K
580  PRINT "!!!"
590  PRINT "THAT'S IT!!! YOU GUESSED MY COSMIC NUMBER IN";N;"GUESSES."
600  PRINT
610  PRINT "WANT TO PLAY AGAIN";
620  INPUT Z$(1,1)
630  IF Z$="Y" THEN 280
640  PRINT "OK, GOODBYE FOR NOW. PLAY WITH ME AGAIN SOMEWHEN."
650  END
```

Snark

```
100  REM *** SNARK ... CATCH HIM WITH A WELL PLACED CIRCLE
110  REM *** PEOPLE'S COMPUTER COMPANY, MENLO PARK CA
120  PRINT "WANT THE RULES";
130  INPUT Z$(1,1)
140  IF Z$ <> "Y" THEN 390
150  REM *** HERE ARE THE RULES
160  PRINT
170  PRINT "A SNARK IS HIDING IN A 10 BY 10 GRID LIKE THE ONE"
180  PRINT "SHOWN BELOW:"
190  PRINT
200  PRINT " Y"
210  FOR Y=9 TO 0 STEP -1
220  PRINT Y;" . . . . . ."
230  NEXT Y
240  PRINT
250  PRINT TAB(6);" 0 1 2 3 4 5 6 7 8 9 X"
260  PRINT
270  PRINT "TRY TO CATCH HIM. HERE'S HOW ... WHEN I ASK, YOU TYPE"
280  PRINT "THE X,Y COORDINATES OF A GRIDPOINT (IF YOU DON'T KNOW"
290  PRINT "WHAT THAT MEANS, ASK SOMEONE!) AND PRESS THE RETURN"
300  PRINT "KEY. THEN, WHEN I ASK FOR 'RADIUS', YOU TYPE THE RADIUS"
310  PRINT "OF A CIRCLE CENTERED ON THE GRIDPOINT WHOSE X,Y"
320  PRINT "COORDINATES YOU JUST ENTERED. I WILL THEN TELL YOU"
330  PRINT "WHETHER THE SNARK IS 'INSIDE' YOUR CIRCLE, 'OUTSIDE'"
340  PRINT "YOUR CIRCLE, OR 'ON' YOUR CIRCLE."
350  PRINT
360  PRINT "!!! IMPORTANT !!! IF YOU THINK YOU KNOW WHERE HE IS"
370  PRINT "HIDING, ENTER 0 (ZERO) AS THE RADIUS. GOOD HUNTING."
380  REM *** HIDE THE SNARK
390  LET X=INT(10*RND(0))
400  LET Y=INT(10*RND(0))
410  PRINT
420  PRINT "SNARK IS HIDING ... START GUESSING!"
430  REM *** GUESSING BEGINS
440  K=1
450  PRINT
460  PRINT "COORDINATES";
470  INPUT A,B
480  IF A=INT(A) AND B=INT(B) THEN 510
490  PRINT "FORGOT TO TELL YOU - COORDINATES MUST BE INTEGERS!"
500  GOTO 450
510  LET D2=(X-A)*(X-A)+(Y-B)*(Y-B)
520  PRINT "RADIUS";
530  INPUT R
540  IF R=INT(R) AND R >= 0 THEN 580
550  PRINT "WHOOPS! THE RADIUS MUST BE A WHOLE NUMBER."
560  PRINT
570  GOTO 520
580  IF R <> 0 THEN 600
590  IF D2=0 THEN 710
600  IF D2<R*R THEN 630
610  IF D2>R*R THEN 650
620  IF D2=R*R THEN 670
630  PRINT "SNARK IS INSIDE YOUR CIRCLE"
640  GOTO 680
650  PRINT "SNARK IS OUTSIDE YOUR CIRCLE"
660  GOTO 680
670  PRINT "SNARK IS ON YOUR CIRCLE"
680  K=K+1
690  GOTO 450
700  REM *** WE GOT A WINNER
710  PRINT
720  PRINT "YOU CAUGHT HIM IN";K;"GUESSES!!!"
730  PRINT "GOOD SHOW!"
740  PRINT
750  PRINT "WANT TO PLAY AGAIN";
760  INPUT Z$(1,1)
770  IF Z$="Y" THEN 390
780  END
```

Hurkle

```
100  REM *** HURKLE - PEOPLE'S COMPUTER COMPANY, MENLO PARK, CA
110  PRINT "WANT THE RULES";
120  INPUT Z$(1,1)
130  IF Z$ <> "Y" THEN 450
140  REM *** HERE ARE THE RULES
150  PRINT "A HURKLE IS HIDING IN A GRID, LIKE THE ONE BELOW."
160  PRINT
170  PRINT
180  PRINT TAB(26);"NORTH"
190  PRINT
200  FOR K=9 TO 0 STEP -1
210  IF K <> 4 THEN 240
220  PRINT TAB(6);"WEST   4";TAB(28);". . . . . .  EAST"
230  GOTO 250
240  PRINT TAB(14);K;TAB(28);". . . . . ."
250  NEXT K
260  PRINT
270  PRINT TAB(28)"0 1 2 3 4 5 6 7 8 9"
280  PRINT
290  PRINT TAB(26);"SOUTH"
300  PRINT
310  PRINT "TRY TO GUESS WHERE THE HURKLE IS HIDING. YOU GUESS"
320  PRINT "BY TELLING ME THE GRIDPOINT WHERE YOU THINK THAT"
330  PRINT "THE HURKLE IS HIDING. HOMEBASE IS POINT  0,0  IN"
340  PRINT "THE SOUTHWEST CORNER. YOUR GUESS SHOULD BE A PAIR"
350  PRINT "OF WHOLE NUMBERS, SEPARATED BY A COMMA. THE FIRST"
360  PRINT "NUMBER TELLS HOW FAR TO THE RIGHT OF HOMEBASE AND"
370  PRINT "THE SECOND NUMBER TELLS HOW FAR ABOVE HOMEBASE YOU"
380  PRINT "THINK THE HURKLE IS HIDING. FOR EXAMPLE, IF YOU "
390  PRINT "THINK THE HURKLE IS 7 TO THE RIGHT AND 5 ABOVE"
400  PRINT "HOMEBASE, YOU ENTER  7,5  AS YOUR GUESS AND THEN"
410  PRINT "PRESS THE 'RETURN' KEY. AFTER EACH GUESS, I WILL"
420  PRINT "TELL YOU TRE APPROXIMATE DIRECTION TO GO FOR YOUR"
430  PRINT "NEXT GUESS. GOOD LUCK!"
440  REM *** HURKLE 'PICKS' A GRIDPOINT AND HIDES
450  LET A=INT(10*RND(0))
460  LET B=INT(10*RND(0))
470  PRINT
480  PRINT "THE HURKLE IS HIDING - TRY TO FIND HIM!"
490  REM *** GET A GUESS AND PRINT INFO FOR PLAYER
500  LET K=1
510  PRINT
520  PRINT "WHAT IS YOUR GUESS";
530  INPUT X,Y
540  IF ABS(X-A)+ABS(Y-B)=0 THEN 600
550  REM *** GO TO INFO SUBROUTINE
560  GOSUB 650
570  LET K=K+1
580  GOTO 510
590  REM *** HURKLE HAS BEEN FOUND!
600  PRINT
610  PRINT "YOU FOUND HIM IN";K;"GUESSES!!!"
620  PRINT "LET'S PLAY AGAIN."
630  GOTO 450
640  REM *** SUBROUTINE: PRINT INFORMATION FOR NEXT GUESS
650  PRINT "GO ";
660  IF Y=B THEN 710
670  IF Y<B THEN 700
680  PRINT "SOUTH";
690  GOTO 710
700  PRINT "NORTH";
710  IF X=A THEN 760
720  IF X<A THEN 750
730  PRINT "WEST";
740  GOTO 760
750  PRINT "EAST";
760  PRINT
770  RETURN
780  END
```


Mugwump

```
100  REM *** MUGWUMP - A HIDE AND SEEK GAME
110  REM *** PEOPLE'S COMPUTER COMPANY, MENLO PARK CA
120  REM *** G=GRID SIZE  N=NUMBER OF GUESSES ALLOWED
130  PRINT "WANT THE RULES";
140  INPUT Z$(1,1)
150  IF Z$ <> "Y" THEN 410
160  REM *** HERE ARE THE RULES
170  PRINT "A MUGWUMP IS HIDING IN A GRID, LIKE THE ONE BELOW."
180  PRINT
190  FOR K=9 TO 0 STEP -1
200  PRINT TAB(14);K;TAB(28);". . . . . ."
210  NEXT K
220  PRINT
230  PRINT TAB(28);"0 1 2 3 4 5 6 7 8 9"
240  PRINT
250  PRINT "MUGWUMP WILL BE HIDING AT ONE OF THE GRIDPOINTS."
260  PRINT "YOU TRY TO FIND HIM BY GUESSING HIS GRIDPOINT."
270  PRINT "HOMEBASE IS POINT  0,0  IN THE LOWER LEFTHAND"
280  PRINT "CORNER OF THE ENTIRE GRID. YOUR GUESS SHOULD BE"
290  PRINT "A PAIR OF WHOLE NUMBERS SEPARATED BY A COMMA."
300  PRINT "THE FIRST NUMBER TELLS HOW FAR TO THE RIGHT OF"
310  PRINT "HOMEBASE YOU THINK MUGWUMP IS HIDING AND THE "
320  PRINT "SECOND NUMBER TELLS HOW FAR ABOVE HOMEBASE YOU"
330  PRINT "THINK MUGWUMP IS HIDING."
340  PRINT
350  PRINT "FOR EXAMPLE, IF YOU THINK MUGWUMP IS 8 TO THE RIGHT"
360  PRINT "OF HOMEBASE AND 3 ABOVE HOMEBASE, YOU ENTER  8,3"
370  PRINT "AS YOUR GUESS AND THEN PRESS THE 'RETURN' KEY."
380  PRINT "AFTER YOU GUESS, I WILL TELL YOU HOW FAR (IN A DIRECT"
390  PRINT "LINE) YOUR GUESS IS FROM WHERE MUGWUMP IS HIDING."
400  REM *** HIDE MUGWUMP AT RANDOM GRIDPOINT  A,B
410  LET A=INT(G*RND(0))
420  LET B=INT(G*RND(0))
430  PRINT
440  PRINT "MUGWUMP IS HIDING...TRY TO FIND HIM!!!"
450  LET T=1
460  PRINT
470  PRINT "WHAT IS YOUR GUESS";
480  INPUT X,Y
490  REM *** IF MUGWUMP NOT FOUND GO TO LINE 500
500  IF X <> A THEN 570
510  IF Y <> B THEN 570
520  PRINT "YOU FOUND HIM IN";T;"GUESSES!!!"
530  PRINT "LET'S PLAY AGAIN."
540  PRINT
550  GOTO 410
560  REM *** D=STRAIGHTLINE DISTANCE TO MUGWUMP
570  LET D=SQR((X-A)↑2+(Y-B)↑2)
580  REM *** THEN WE ROUND D TO ONE DECIMAL PLACE
590  LET D=INT(10*D)/10
600  PRINT "YOU ARE";D;"UNITS FROM THE MUGWUMP."
610  LET T=T+1
620  GOTO 460
630  END
```

* * * * * *

Want more information about these games? Then browse through back issues of P.C.C.

* * * *

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Bagels - Dec. 72 Vol. 1 No 2, page 18

Letter - Oct. 72 Vol. 1, No. 1, page 11

Trap - Feb. 73 Vol. 1, No 3, page 8

Stars - Dec. 72 Vol. 1 No. 2, page 3
May 73 Vol. 1 No. 5, page 19

Snark - May 74 Vol. 2, No 5, page 3

Hurkle - Feb. 73 Vol. 1, No. 3 page 8
April 73 Vol. 1 No. 4, page 22

Mugwump - Feb. 73 Vol. 1. No 3, page 8
April 73 Vol. 1 No 4, page 3

* * * * *

—Wm

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Computers and Computation

from: W.H. Freeman & Company
660 Market Street
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or

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$4.95
1971; 283 pages

This is the best book about computers . . . what they are, how they happened, how they work and how they are used. *Computers and Computation* consists of 26 articles from *Scientific American*, 1950 through 1971.

BASIC *by Albrecht, Finkel and Brown*

from: John Wiley & Sons, Inc.
605 Third Avenue
New York, NY 10026

or

PCC Bookstore

$3.95
1973; 325 pages

The following is an excerpt from EduHelp, September, 1973 . . . "The book is similar (in style only) to Albrecht's popular Teach Yourself BASIC, but it is much more thorough and better organized. It is designed as a self-teaching text. The self-tests at the end of each chapter are excellent and easily permit the user to review the text on any missed sections, as the answers refer back to the frame number in the chapter. The text is very suitable for any grade level, as the examples are not solely based on math, but are taken from business, social science, humanities and simple statistics. This reviewer believes it will be THE text used in the majority of schools. Get a copy and see for yourself."

See Review, PCC Vol. 1, No. 4

My Computer Likes Me *by Dymax*

from: Dymax

from: PCC
P.O. Box 310
Menlo Park, Calif. 94025

$1.49
1972; 64 pages

In an easy going, conversational style, this 64 page workbook introduces BASIC to young or old. Designed to be used with frequent access to a timeshare terminal (learn by doing!), we use this large format book in our introductory workshops for people with no previous computer experience or knowledge of programming. The teaching examples are oriented around population problems and demographic data. Over ~~20,000~~ 30,000 of this popular book now in use.

Games, Tricks and Puzzles for a Hand Calculator

Wallace Judd

from: Dymax
P.O. Box 310
Menlo Park, Ca. 94025

or

PCC Bookstore

$2.95
1974, 100 pages

This book is a necessity for anyone who owns or intends to purchase a hand calculator, from the most sophisticated (The HP-65, for example) to the basic "four banger."

Please see review on page 11.

Problems for Computer Solution

by Fred Gruenberger & George Jaffray

from: John Wiley and Sons, Inc.
605 Third Avenue
New York, NY 10016

or PCC Bookstore

$6.95
1965; 401 pages

After you learn to talk to computers, what do you talk about? If you want inspiration, try this book. 92 problems, something for everyone — easy, hard, math, non-math, all beautifully written.

TTL Cookbook

Donald E. Lancaster

from: PCC Bookstore
P.O. Box 310
Menlo Park, CA. 94025

$7.95
1974, 335 pages

TTL Cookbook is an excellent book if you have just run into transistor-transistor logic. It is predominatly about digital logic. See review on page 12.

BASIC Programming *by Kemeny and Kurtz*
(2nd Edition)

from: John Wiley and Sons, Inc.
605 Third Avenue
New York, NY 10016

or PCC Bookstore

$6.95
1967, 1971; 150 pages

On the first day, Kemeny and Kurtz invented BASIC. Then they wrote a book. We don't recommend this book for learning BASIC but we do recommend it as a reference guide . . . applications resource . . . idea generator for people who already know a little BASIC.

Here is a sampling of section titles —

What is BASIC? What is Timesharing? **String Variables** Curve Plotting **Prime Numbers** Random Numbers **Dealing a Bridge Hand** Knight's Tour **Tic-Tac-Toe — A Heuristic Approach** Tax Depreciation **Critical Path Analysis** String Files **Linear Regression** Electrical Networks **Markov Chains** Polynomials **Marriage Rules in a Primitive Society** A Mode from Ecology **Harmony in Music**

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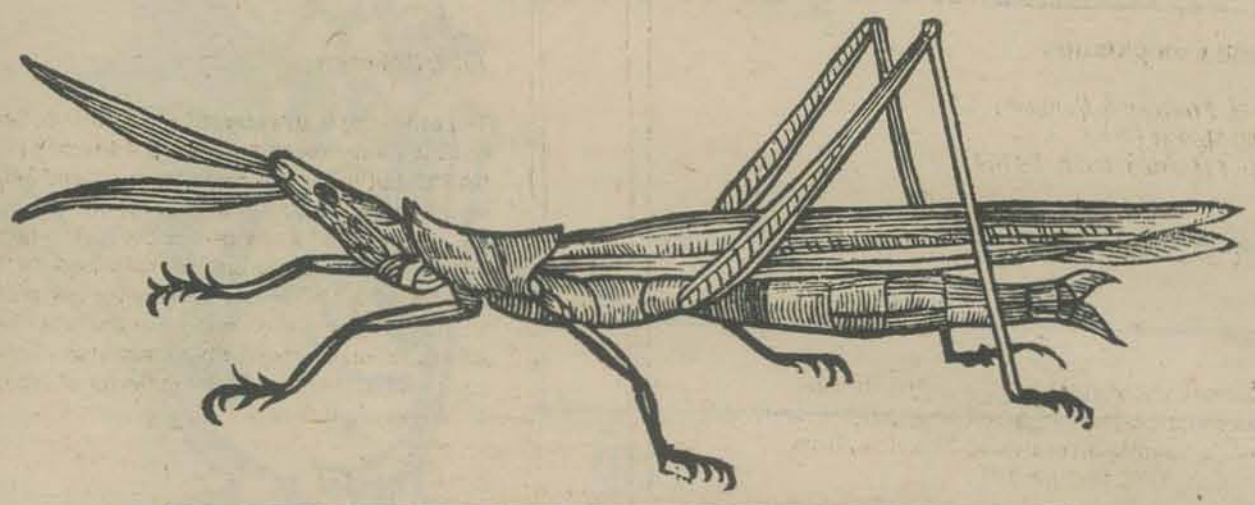

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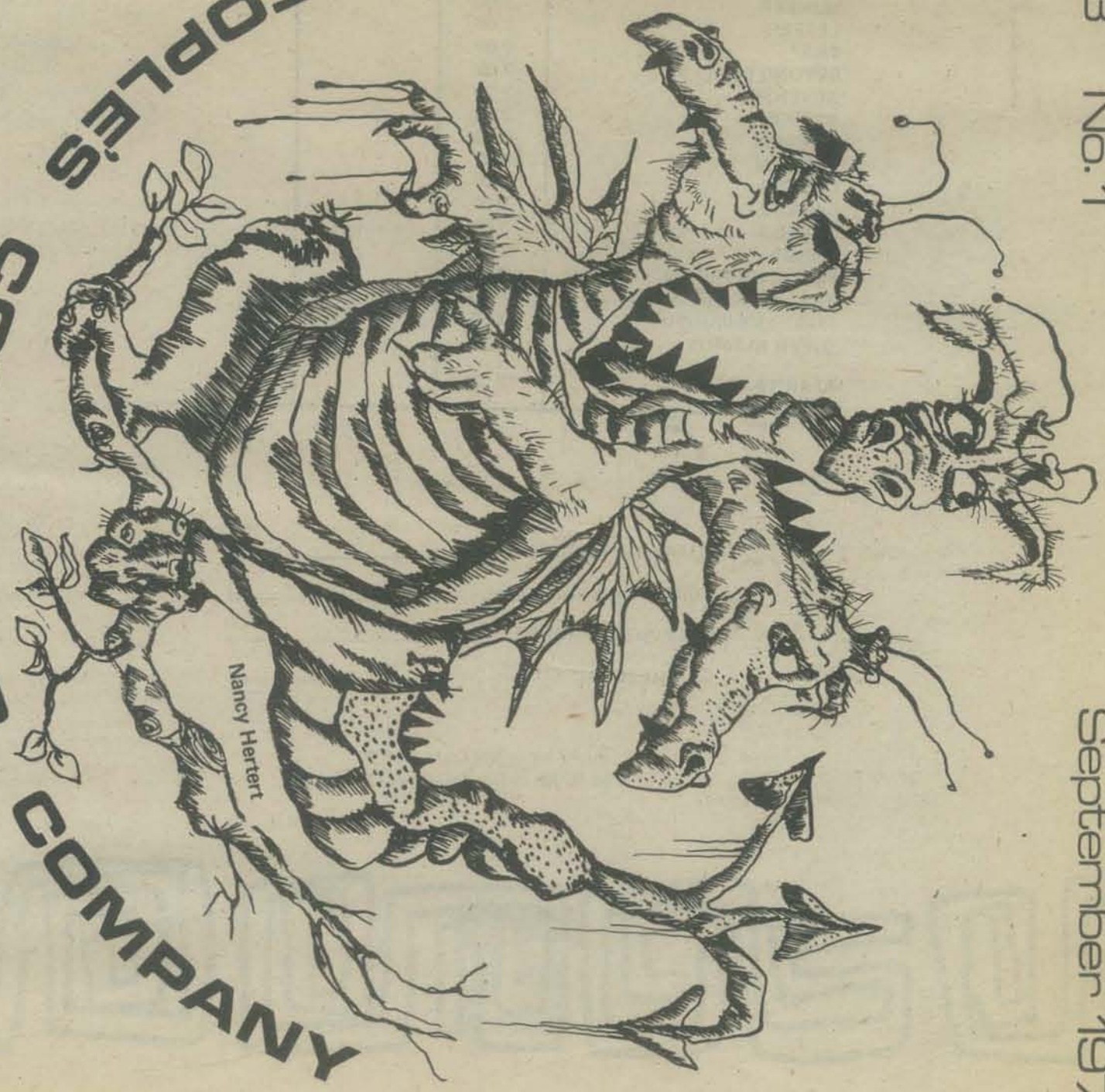

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