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DETAILS WIN INSIDE
IBM AT or FAT MAG

FAMILY COMPUTING

Soup Up Your Computer: Add More Power!

- Last-Minute Tax Help
- Fantasy/Role-Playing Games
- Buyer's Guide to Monitors
- A Do-It-Yourself
Computer Check-Up
- War Games:
11 Winning Tips
- K-POWER:
for Kids



24 AT-A-GLANCE
SOFTWARE REVIEWS



ORIGINAL PROGRAMS
FOR ADAM, APPLE II SERIES
& MACINTOSH, ATARI 400,
800, 600/800XL & 130 XE,
COMMODORE 64/128 & VIC 20,
IBM PC & COMPATIBLES, TANDY
COCO & MODELS III & 4, TI-99/4A

FAMILY COMPUTING

FEATURES

29 HOW TO SOUP UP YOUR COMPUTER

by Karla Fisk

Give the computer you've got more get-up-and-go with memory, video, and print enhancements. This machine-by-machine guide sorts through what's best, what's available, and what's compatible.

PLUS: SOURCES AND CATALOGS

34 FROM TOWERS TO DUNGEONS: THE UNIVERSE OF FANTASY/ROLE-PLAYING SOFTWARE

by Shay Addams

Venture into fantastic realms for some firsthand dragon-slaying and first-class adventure. Magical worlds await beginning, intermediate, and advanced players.

PLUS: A SOFTWARE DIRECTORY

38 HANDS ON: SOOTHE YOUR TROUBLED COMPUTER

by Henry F. Beechhold

How to troubleshoot your ailing system. The last in a popular six-part series.

40 APRIL FOOLS! I'D LIKE YOU TO MEET MY COMPUTER

by Lorene Hanley Duquin

Connect computers by modem and make a little merry mischief for an April Fools party.

42 BUYER'S GUIDE TO MONITORS

by Phil Wiswell

Learn how to choose a monitor that best satisfies your needs. A chart details technical specifications, and the question-and-answer section explains the nuts and bolts of video display.

Page 83

K-POWER

69 The Official Special Ks' Guide to Hacker Snacks

There's more to a "byte" when it comes to a hacker's menu! More unofficial than official, this guide reviews various taboo temptations.

70 Dr. Cursor's Klinik

Dr. Cursor answers the two toughest technical questions from last fall's Stump Dr. Cursor contest. Each won \$25.

71 Game Strategies

Your mission: Traverse the four planes in search of an evil warlord in *Moebius: The Orb of Celestial Harmony*.

73 Microtones

Turkey in the Straw program for Adam, Apple, Atari, IBM PC & compatibles, and Tandy CoCo.

75 Compucopia

Bug out with this program for Apple and Atari.

75 Contest

The Special Ks put themselves on the line in this opinion poll.



Page 34

PROGRAMMING

49 THE PROGRAMMER

50 PUZZLE

Solve the subterranean *Plumber's Blues*—this month's puzzle program—and help old Luke through an underground maze of pipes. For Adam, Apple II series & Macintosh, Atari, C 64/128, IBM PC & compatibles, and Tandy CoCo & Models III & 4.

58 CREATIVITY PROGRAM

Create kaleidoscopic images with *Mirror Draw* on your Adam, Apple II series & Macintosh, Atari, C 64/128 & VIC 20, IBM PC & compatibles, TI-99/4A, and Tandy CoCo & Models III & 4.

62 PROGRAMMING P.S.

62 TIPS TO THE TYPIST

64 GAME PROGRAM

Gobble the geese or frustrate the fox: it all depends on your perspective in *Fox and Geese*. For IBM PC & compatibles.

WHAT'S IN STORE

76 NEW HARDWARE

77 SOFTWARE GUIDE AND REVIEWS

Brief reviews of 24 new and noteworthy programs.

Page 18

DEPARTMENTS

4 EDITOR'S NOTE

6 LETTERS

9 BEHIND THE SCREENS

People, news, and trends in high technology.

10 HOME-SCHOOL CONNECTION

by Ute Elisabeth Van Nuys

Find out how computers influence the way teenagers learn, and how they help boost teens' reading, writing, and math skills.

16 HOME/MONEY MANAGEMENT: TAXES

by Matthew Stern

Organize your receipts with a data base, calculate your taxes on a spreadsheet, get on-line tax help, and make that deadline!

18 GAMES

by James Delson

Eleven strategic and tactical hints to gaining the edge in war games.

22 TELECOMPUTING

by Nick Sullivan

New developments in on-line national networks.

26 COMPUTING CLINIC

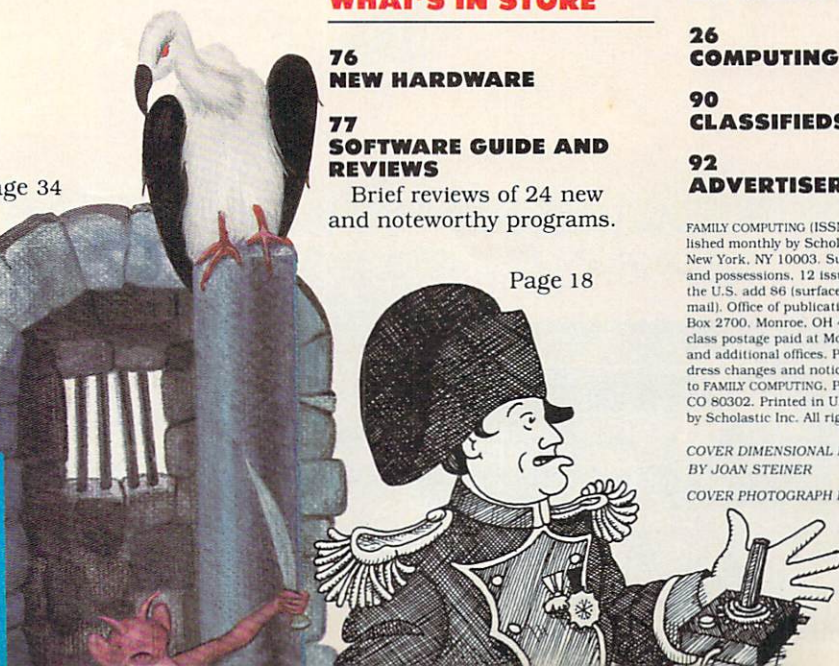
90 CLASSIFIEDS

92 ADVERTISERS' INDEX

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COVER DIMENSIONAL ILLUSTRATION
BY JOAN STEINER

COVER PHOTOGRAPH BY WALTER WICK



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COMPUTING CLINIC

COMMODORE PLUS 4 AND 128 • PANASONIC SR. PARTNER •
APPLE II PLUS SOFTWARE COMPATIBILITY • APPLESOFT BASIC
ON THE ADAM

Will Commodore 64 BASIC programs run on the Commodore Plus 4? Will Plus 4 programs run on the C 128?

D. WESTON
Westminster, Maryland

Most BASIC programs for the C 64 will not run on the Plus 4. The two machines and their BASICs differ too much. On the C 64, most graphics and sound effects are achieved with PEEKs, POKES and machine language subroutines specific to the C 64. That's because BASIC 2.0 has no commands for graphics and sound. On the Plus 4, BASIC 4.5 is a superior language with many more ready-made commands. However, the C 128's BASIC 7.0 is very similar to BASIC 4.5.

Tri Micro, a software company (14072 Stratton Way, Santa Ana, CA 92705; [714] 832-6707), has a monthly newsletter answering questions on the Plus 4. Commodore markets Plus 4 programs directly. Write to Commodore Direct Marketing, 1200 Wilson Drive, West Chester, PA 19380. —L.W.

I saw a Panasonic Sr. Partner the other day. It is perfect for my use. Do you think it's a good computer? Also, does it run 85-90 percent of IBM PC software?

C. JAMES PEARSON
Estes Park, California

The Panasonic Sr. Partner, an IBM compatible, is a fine computer that runs most IBM software. Putting a figure on exactly how much is impossible. It will run the standard business programs, such as *WordStar* and *Lotus 1-2-3*. But certainly check with the company to ensure that specific packages you have in mind will run.

When the transportable "Partner" was first introduced in mid '84, many dealers thought it would be a big hit, especially with its built-in thermal printer (it prints out from the top of the monitor!). However, it never sold well, perhaps because most users want a fast dot-matrix printer or a good letter-quality printer; or perhaps because "transportable" computers aren't as popular as they once were. At any rate, the computer works, so if it's perfect for you, it's a match. —N.S.

In the information I received with my Coleco Adam, it stated "compatible with Applesoft BASIC." Does this mean that with a disk drive I'll be able to run software created for Apple computers?

ANTHONY SEAMAN
Mt. Juliet, Tennessee

No. Since most computers use different disk-operating systems (DOS's), you can't just plug a disk made for one computer into another computer's disk drive and expect it to work. The main exceptions to this rule are with IBM-compatible computers, which are designed to run disks created for the IBM PC (see cover story in last month's issue); and with the Franklin 2000 series, which is designed to run Apple disks.

Some Applesoft BASIC programs, especially those that don't use graphics, will run on your Adam with little or no modification if you type them in. Notice that in our Programming section, some months the same program will run on both Apple and Adam computers. Other months, the programs differ for the two machines. —N.S.

Is there any way to cross over and use Apple software on an IBM PCjr?

KAREN KERSCHEN
Andale, Kansas

No. However, it is possible to use some Apple II plus software on an IBM PC or Tandy 1000. You need to install the Trackstar Apple II plus emulation board (\$375) in the PC or Tandy 1000. The board is made by Diamond Computer Systems, (415) 941-1221.

Commodore 64 owners who wish to use Apple II plus software may do so with the Spartan expansion device (\$599) from Mimic Systems, (800) MOD-ULAR.

However, Apple II plus software does not represent the latest in Apple software. Unless you know of specific "must have" programs, you can probably find equally good software for any of the above systems. —N.S.

Questions are answered by LOUIS WALLACE, contributing editor, and NICK SULLIVAN, senior editor.

can still use your old disks with US Doubler and it's fully compatible with all existing Atari software.

Transform your Atari XL/XE into two computers—an Atari and a CP/M computer—with SWP's ATR8000 (\$400). The ATR8000 includes a Z-80A chip and CP/M operating system; 64K RAM; an RS-232C serial printer or modem port; a parallel printer port with a 48K print buffer; an 80-column screen display; and the ability to run four 5.25-inch or 8-inch disk drives in any combination. Add SWP's CO-POWER-88 (\$350) to the ATR8000,

EQUIPMENT SOURCES/CATALOGS

ADAM

You can expand Adam's video display to 80 characters and add a variety of peripherals, including a tractor-feed mechanism for fanfold computer paper, an RS-232 serial port to hook up external modems and a wide line of printers, and a Commodore printer interface so you can use the Okimate 10 color printer. Here are a few of the main sources of information about products for the Adam:

Adamland, Wyoming Adam User's Group, 795 Garfield, Lander, WY 8250; (307) 332-9250. Coleco, 999 Quaker Lane S., West Hartford, CT 06110; (800) 842-1225. Eve Electronic Systems, 2 Vernon St., Suite 404, Framingham, MA 01701; (617) 653-3003. Niad Adam Users' Group, P.O. Box 114, Lisle, IL 60532; (312) 961-3529. The *Adam Resource Directory* is a 76-page book with listings of Adam users' groups and retailers (\$13.95; P.O. Box 90, Seelyville, IN 47878).

Sections 6 and 7 of the FAMILY COMPUTING Forum on CompuServe (GO FAMFORUM) are devoted to Adam users. You can be sure you'll find out about new products there. A file in Data Library 6 (DL6), called BBS, lists bulletin boards around the country that cater to Adam owners. John Mesivach is the Adam administrator.

IBM PCjr

The IBM PCjr isn't as easily expandable as the IBM PC, but you can pump the memory up to 640K and add a second disk drive and print buffers. The PCjr has only one internal slot (for a modem); other expansion units are attached externally on the side. And, while IBM doesn't make a second disk drive for the PCjr, third-party manufacturers do.

Besides IBM, the main companies that provide expansion products for the PCjr are Quadram, IQ Technologies, Racore, and Tecmar. (Refer to the manufacturers' box for telephone numbers.) The IBM Novice SIG on CompuServe is a good repository of PCjr product information and expertise.

TI-99/4A

Triton carries all TI and third-party hardware and software for the 99/4A, and publishes catalogs twice a year. Call (800) 227-6900 for a free catalog. Unisource Electronics (Lubbock, Texas; [806] 745-8834) is also a large TI dealer.

The 99/4A National Assistance Group has 35,000-plus members worldwide and offers more than 1,500 TI hardware and software accessories. A one-year membership, which includes a newsletter and catalog, costs \$10. (National Headquarters, P.O. Box 290812, Ft. Lauderdale, FL 33329; (305) 583-0467. Call Monday and Tuesday, 6:30 p.m.—9 p.m., EST, and Monday through Thursday 10 a.m.—1 p.m., EST.)

TIMEX SINCLAIR

The following companies sell software/hardware for the Timex 1000/1500/2068 and Sinclair QL (call or write for a catalog):

Curry Computer, Glendale, Arizona; (602) 978-2902. RMG Enterprises, Oregon City, Oregon; (503) 655-7484. Sunset Electronics, San Francisco, California; (415) 665-6161. T/S Connection, Cincinnati, Ohio; (513) 271-5575. Variety Sales, New Haven, Connecticut; (203) 387-8512. WMJ Data Systems, Hauppauge, New York; (516) 543-5252. Zebra Systems Inc., Woodhaven, New York; (718) 296-2385.

The Computer Club Forum on CompuServe (GO CLUB), managed by FAMILY COMPUTING, has an active group of Timex Sinclair users, and is a great source of product information. Here, also, you can get phone numbers of local Timex bulletin boards. A file in Data Library 4 (DL4) called VENDOR.CAT lists companies that carry Timex Sinclair and Sinclair QL products. The system operator is Pat Spera.

and you'll be able to run much of the MS-DOS software. The CO-POWER-Plus (\$495) does all this and is expandable to 1024K.

COMMODORE 64

The Commodore 64, which has nonstandard ports, 64K, a 40-column screen display, and a slow disk drive, can be improved in a variety of ways. Depending on what you're looking for, one way to soup up the C 64 in one fell swoop is to buy the Commodore 128, which will run all your existing C 64 software and use all peripherals, but give you more memory, a faster disk drive, and an 80-column screen display (in C 128 mode).

Memory: Get even more power from your C 64's memory with Cardco S'More (\$70). You can use it to program in BASIC (61K instead of 38K) and use additional BASIC commands.

Video: Batteries Included's B.I.-80 Column Display (\$170) transforms your 40-column screen into an 80-column display. You'll need a monochrome monitor to take advantage of this add-on. Batteries Included's *PaperClip* word-processing program and a handful of other programs work with this screen expansion.

Print: Use virtually any parallel printer with your Commodore and print hi-res graphics with Orange Micro's Grappler CD (\$119).

Cardco's parallel printer interface, the G-Wiz (\$70), connects Commodore computers to virtually any Centronics parallel printer.

Miscellaneous: Epyx's Fast Load Cartridge (\$40) speeds up the operation of the Commodore 1541 disk drive considerably, and also includes handy DOS utilities.

Make your C 64 act just like an Apple II plus with Mimic Systems' Spartan (\$599). It allows you to use all Apple II plus (and most Apple IIe) software and hardware. For C 64/128 and Plus 4, Arotek's Aprospan-64 (\$30) adds four extra cartridge slots and a reset switch so you can reboot without turning your computer off and on again.

IBM PC

Ever since IBM came out with an "open" computer that users could customize according to their needs, third-party manufacturers have been finding new and exotic ways to fill up the valuable expansion-slot "real estate." To use the IBM PC with a monitor, you need to add a monochrome or color video adapter. Because many users have filled up the IBM's five expansion slots by adding video adapters, memory beyond 256K, and printer interfaces, "multifunction" cards that are crammed with features but take up only one slot are the cards of choice. Many include printer interfaces, so we've bypassed that category. We concentrated on the most popular and best-supported of these multifunction cards. Lately, new graphic adapters and memory expanders beyond 640K have been the two hot areas.

Some of these cards also work on IBM PC-compatible computers. However, since most compatibles include video adapters, allow you to expand to 640K on the motherboard, and include printer and modem interfaces, multifunction cards are rarely necessary.

Memory: Quadram's Silver Quadboard (\$695) has 384K RAM (which brings a 256K PC up to 640K), a parallel port, a serial port, a game port, an optional second serial port, and a clock/calendar. *QuadMaster III* and *Polywindows Desk Plus* software are included. AST's Six Pak Plus allows you to add memory in increments (\$395, 64K; \$695, 256K; etc.) and also gives you a serial port, a parallel port, and a clock/calendar.

Video (Monochrome): The Hercules Graphics Card (\$499) displays 720 x 348-pixel high-resolution graphics and text, and also includes a parallel printer port.

the PROGRAMMER

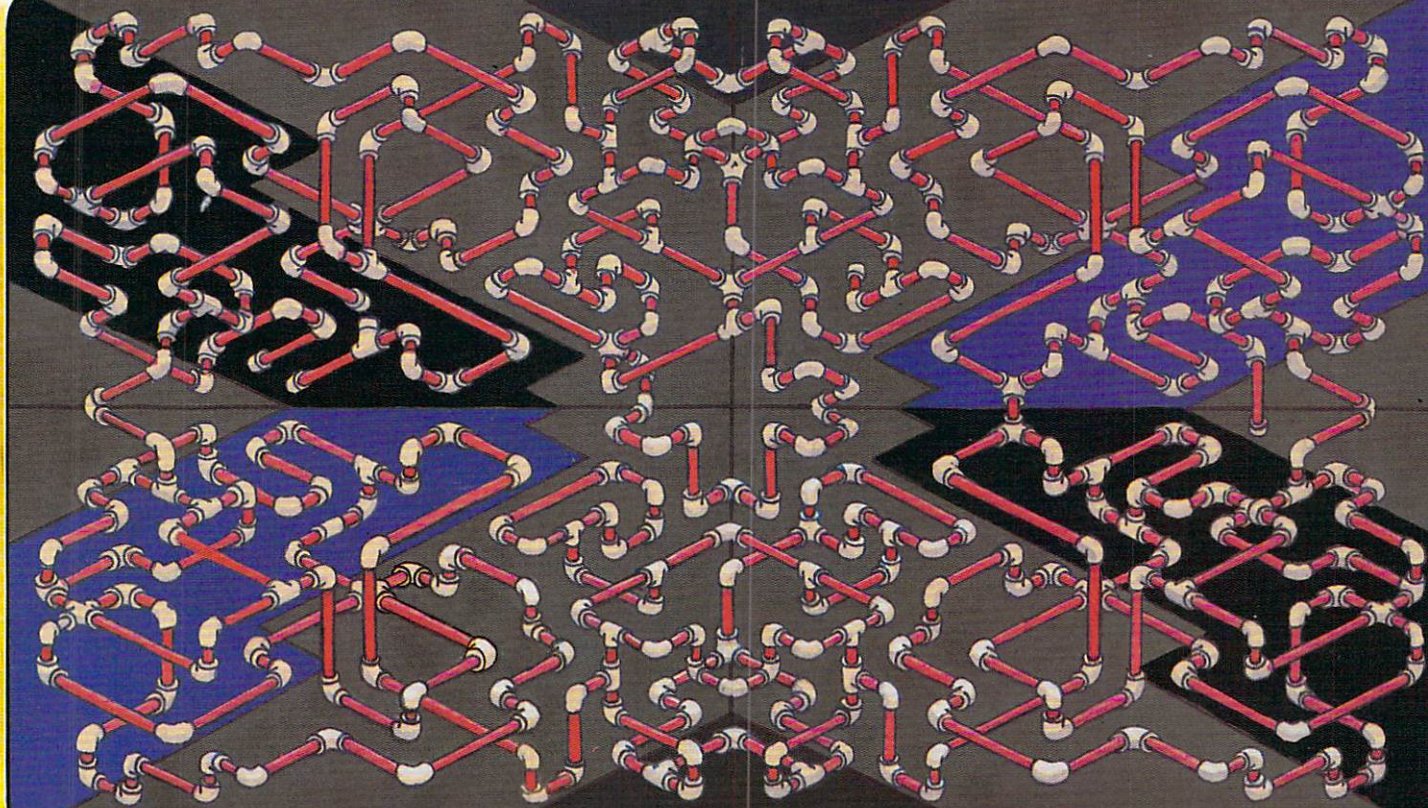


ILLUSTRATION BY BARTON STABLER



A P R I L



TIPS TO THE TYPIST

Page 62

PROGRAMMING P.S.

Page 62

MORE PROGRAMS IN K-POWER

Page 69

PUZZLE

Page 50

Luke's lost
in a labyrinth of
water pipes.
Can you keep
the new plumber from
getting fired?

CREATIVITY PROGRAM

Page 58

Type in *Mirror Draw*,
and create
tapestries
of color and form.

GAME PROGRAM

Page 64

Fox and Geese,
an intriguing
two-player game from
the Middle Ages
is presented here
for IBM PC
and compatibles.

ILLUSTRATION BY JIM CHERRY III

Cherry

SUBTERRANEAN PLUMBER'S BLUES

Will Luke Start a Leak?

PUZZLE BY SARAH KORTUM AND PETER FAVARO
PROGRAM BY STEVEN C.M. CHEN

If you like this month's puzzle, watch for Steven Chen's related Maze Creator program in the May issue. It'll generate thousands of different mazes on-screen or on paper.

The first week in April was unusually cold, even for Grindel, a quiet northern town by the sea. One freezing afternoon two old-timers dangled their feet in the deep end of the indoor pool at the Veterans' Club. One septuagenarian brushed his hand across two days' growth of wiry, spindle-like bristles, thrust his hands deep into the pockets of his terry-cloth robe, and reminisced to his cohort, "Hasn't been quite this chilly since '28."

"Nope, near's I can recall. Wasn't that the year Miller's dog froze solid outside Town Hall?"

"Nope. That was '29. Was pretty cold back then, too."

"Yup."

"Think that new plumber's got enough gumption to work that auxiliary system?"

The two looked at each other and had a good strong laugh.

The auxiliary plumbing system was an ancient labyrinth of pipes, levers, valves, and other contraptions that lay beneath the dusty streets of Grindel. Because the townspeople strongly resisted any new-fangled gizmos of modern technology, the auxiliary system was manual, and shunted extra water from the water source in the center of town to the outlying establishments that needed it most.

Each morning at dawn, the town plumber, Matt Pratt ("the water rat"),

would accommodate the town proprietors by descending into the dark and damp underground maze of tunnels. He would snake his way alongside the old rusty pipes, turning on a valve here and there and knowing—almost magically—which valves to open to release water in the direction of the proper establishments. At sundown, Matt would disappear one more time to turn the valves off until the next morning. Despite his peculiar love of underground travel, everyone felt sad when they heard that Matt Pratt was retiring after many long years of dedicated service.

LUKE'S DILEMMA

Minutes into his first day on the job, Luke Watermane, the new plumber, found himself in deep water (figuratively speaking, that is). He discovered that without the guidance of the old plumber, he was quickly lost in the dark and twisting subterranean passages. To make matters worse, his glasses fogged up from the moisture, rendering them useless immediately.

Anxious to exit from the slimy surroundings, Luke began to open every valve in sight, figuring that that way he was bound to satisfy those establishments really in need of extra water. Suddenly, he remembered a critical instruction handed down to him by Matt Pratt before the old plumber retired: "Do not open more than five valves at a time or the system will break down and the tunnels will flood." Luke quickly shut the valve he was in the

process of opening—his sixth!

Luke then settled down at a clammy intersection and scratched his head, trying to remember which establishments Matt said needed auxiliary water. Once he had that solved, all he had to do was select the five valves that would shunt water in the direction of all of those places. Luke thought hard; he didn't want to emerge blinking into the sunlight on his first day on the job, only to be greeted by a group of angry proprietors shouting, "Luke Watermane, YOU'RE FIRED!"

HOW TO PLAY

Type each line of the program into your computer exactly as shown, carefully making the appropriate modifications (if needed). (See "Tips to the Typist," page 62, for help with typing in programs.) Then SAVE the program to disk or cassette.

When you RUN the program, you'll see Grindel's complete network of underground pipes. There's a pipe running under every street in town. A plus sign (" + ") marks the water source (at the intersection of Main Street and Water Street). Those intersections where the flow of water is controlled by valves are marked O if the valve at that intersection is open or C if it's closed. E's mark the locations of the establishments shown on the map, some of which need water from the auxiliary system. Finally, a blinking asterisk marks Luke's position.

Apple II series/Plumber's Blues

```
20 AX = 7:DL = 1000:DM = 65:SW = 40
30 SP$ = CHR$(32):MX = AX+5+3
40 DIM MP(MX,23),V(5,2),Z$(3)
50 Z$(0) = "BLINKING":Z$(1) = "SOAKING"
```

Your job is to move Luke through the water system using the I, J, K, and L keys (I moves him "up" or north, K moves him south, J moves him west, and L moves him east). When he reaches a valve, you can press O to open it or C to close it. (Careful: remember the rule about having more than five valves open at once!) When you think the right combination of valves have been opened, press S (for surface) to exit from the underground labyrinth. And at any time you can press Q to quit.

You can better help Luke if you understand three things about the way water flows through the pipes:

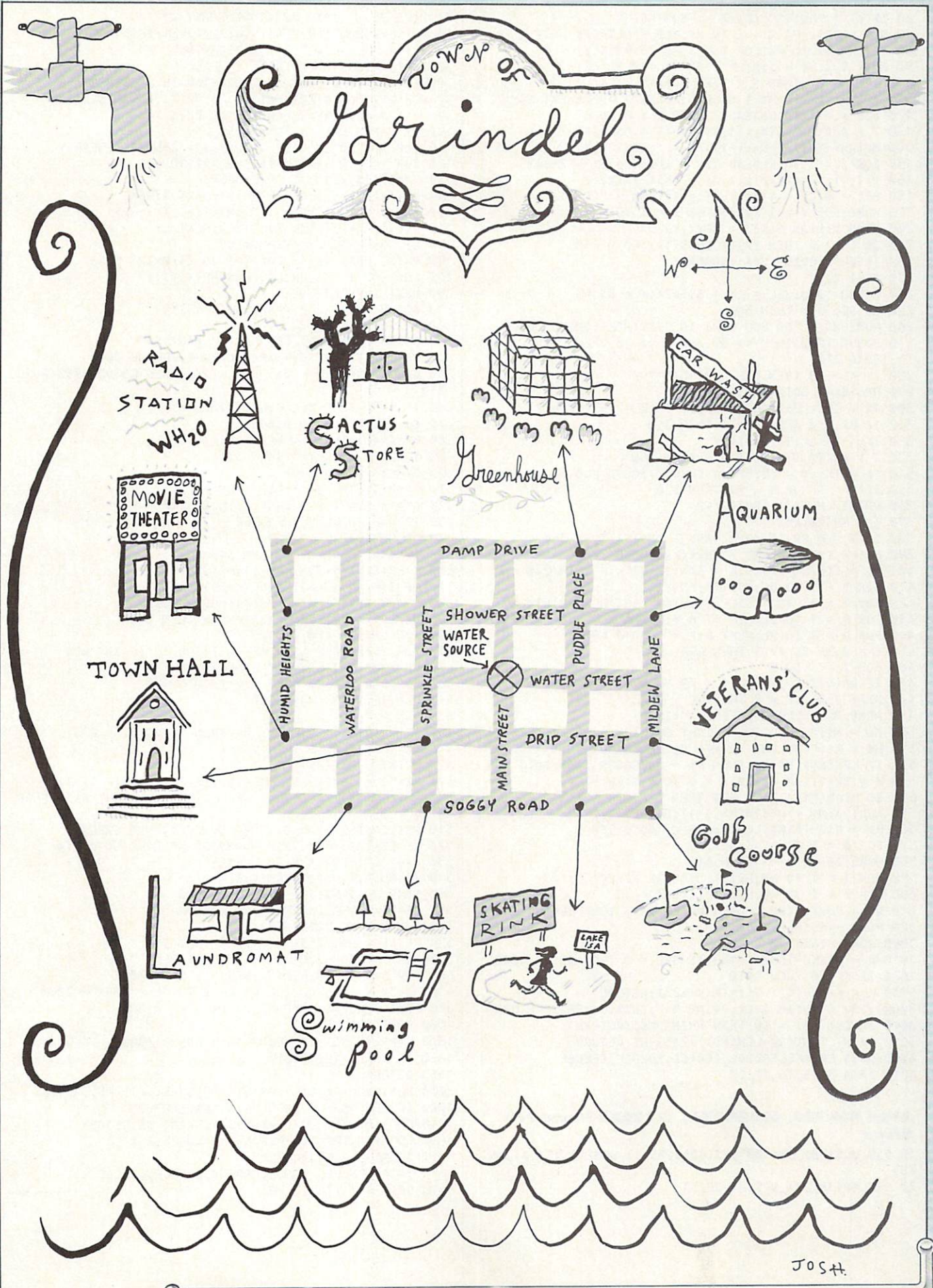
1. Water can flow out from the water source in any direction for any distance until it reaches an obstruction: either a closed valve or an establishment.

2. Important: Water cannot pass through an establishment to the pipes beyond it. Every establishment shown on the map (opposite), marked by an E on your screen, represents a water, not a human, roadblock. That is, following the same underground route, you can move Luke underneath an establishment and go on.

3. It's not necessary to create one long, continuous water flow. Water can flow out in many different directions from the water source in the center of town.

The solution to the puzzle is on page 62.

Town of
Grindel



ILLUSTRATIONS BY JOSH GOSFIELD

JOSH

PUZZLE

```

60 Z$(2) = "QUIT?":Z$(3) = "SURFACE?"
70 BL$ = SP$:FOR X = 2 TO MX:BL$ = BL$+SP$:NEXT X
80 FOR X = 1 TO MX:FOR Y = 1 TO 23:MP(X,Y) = 0
90 NEXT Y,X:VC = 5:RY = 2:FOR Y = 2 TO 22:S = AX
100 IF Y = RY THEN S = 1:RY = RY+5
110 FOR X = 2 TO MX-1 STEP S:MP(X,Y) = 32:NEXT X,Y
120 FOR Y = 1 TO 5:READ T$:FOR X = 1 TO 6
130 T = ASC(MID$(T$,X)):T = T-(T = 66)*34
140 MP(AX*(X-1)+2,5*(Y-1)+2) = T:NEXT X,Y
150 FOR Z = 1 TO 5:READ T:Y = INT(T/6):X = T-6*Y
160 V(Z,1) = X*AX+2:V(Z,2) = Y*5+2:NEXT Z
180 SEL = 0:CY = 4*AX+2:CY = 17:PMS = "C"
190 HOME:FOR Y = 1 TO 23:FOR X = 1 TO MX
200 VTAB Y:HTAB 1+X:T = MP(X,Y)
210 IF T <> 0 THEN PRINT CHR$(T);:GOTO 230
220 INVERSE:PRINT SP$;:NORMAL
230 NEXT X,Y
240 GOSUB 1000:SEL = (K = 81)*2+(K = 83)*3
250 IF SEL = 0 THEN 300
260 HOME:MS = "DO YOU WANT TO "+Z$(SEL):GOSUB 3000
270 GOSUB 1000:IF K <> 89 AND K <> 78 THEN PRINT CHR$(
7);:GOTO 270
280 IF K = 78 THEN SEL = 0:GOTO 190
290 ON SEL-1 GOTO 620,450
300 DX = (K = 76)-(K = 74):DY = (K = 75)-(K = 73)
310 IF DX = 0 AND DY = 0 THEN 350
320 TX = CX+DX:TY = CY+DY
330 T = MP(TX,TY):IF T = 0 THEN 360
340 CX = TX:CY = TY:PMS = CHR$(T):GOTO 240
350 IF K = 67 OR K = 79 THEN 370
360 PRINT CHR$(7);:GOTO 240
370 T = MP(CX,CY)
380 IF T = K OR (T <> 67 AND T <> 79) THEN 360
390 MP(CX,CY) = K:PMS = CHR$(K):GOSUB 2000
400 VC = VC+(K = 79)-(K = 67):IF VC < 6 THEN 240
410 FOR D = 1 TO DL:NEXT D:INVERSE
420 FOR Y = 23 TO 1 STEP -1:VTAB Y:HTAB 2:PRINT BL$
430 FOR D = 1 TO DL/3:NEXT D,Y:NORMAL
440 FOR D = 1 TO DL:NEXT D:F = 1:GOTO 490
450 F = 0:IF VC <> 5 THEN 490
460 FOR Z = 1 TO 5
470 IF MP(V(Z,1),V(Z,2)) = 79 THEN VC = VC-1
480 NEXT Z:IF VC = 0 THEN VC = -1
490 HOME:MS = "LUKE EMERGES "+Z$(F)
500 MS = MS+" INTO THE BRIGHT SUNLIGHT AND IS GREETED"
510 MS = MS+" BY THE TOWNFOLK, WHO SHOUT,"
520 IF LEN(MS) <= SW THEN NS = MS:GOSUB 3000:GOTO 570
530 B = SW+1:C = 1:FOR A = B TO 2 STEP -1
540 IF MID$(MS,A,1) = SP$ THEN C = 0:B = A:A = 2
550 NEXT A:MS = LEFT$(MS,B-1):GOSUB 3000
560 MS = RIGHT$(MS,LEN(MS)-B+C):GOTO 520
570 FOR D = 1 TO DL*3:NEXT D
580 HOME:IF VC = -1 THEN 610
590 FOR I = 1 TO DM:PRINT "YOU'RE FIRED! ";
600 FOR D = 1 TO 10:NEXT D,I:GOTO 620
610 NS = "WHY, YOU CLEVER WATER RAT, YOU!":GOSUB 3000
620 POKE -16368,0:END
1000 POKE -16368,0
1010 K = PEEK(-16384)-128:IF SEL = 0 THEN GOSUB 2000
1020 IF K < 0 THEN 1010
1030 K = K-32*(K > 96)*(K < 123):RETURN
2000 VTAB CY:HTAB 1+CX:PRINT "*";CHR$(8);PMS;:RETURN
3000 IF LEN(NS) = SW THEN PRINT NS;:RETURN
3010 PRINT TAB((SW-LEN(NS))/2+1);NS:RETURN
4000 DATA EBBCEE,EBCBOE,CCO+OC,EEOECE,CEECEE
4010 DATA 3,13,16,17,19

```

Atari 400/800, 600/800XL, & 130XE/Plumber's Blues

```

10 DIM BL$(38),MS(100),NS(40),PMS(1),SP$(1),T$(30),Z$(
28)
20 DIM MP(38,23),V(5,2),ZP(5)

```

```

30 POKE 752,1:POKE 82,0:SP$=CHR$(32)
40 ZP(1)=1:ZP(2)=9:ZP(3)=16:ZP(4)=21:ZP(5)=29
50 Z$(1)="BLINKING":Z$(9)="SOAKING"
60 Z$(16)="QUIT?":Z$(21)="SURFACE?"
70 BL$=CHR$(160):BL$(38)=CHR$(160):BL$(2)=BL$
80 FOR X=1 TO 38:FOR Y=1 TO 23:MP(X,Y)=160:NEXT Y
90 NEXT X:VC=5:RY=2:FOR Y=2 TO 22:S=7
100 IF Y=RY THEN S=1:RY=RY+5
110 FOR X=2 TO 37 STEP S:MP(X,Y)=32:NEXT X:NEXT Y
120 FOR Y=1 TO 5:READ T$:FOR X=1 TO 6
130 T=ASC(T$(X,X)):T=T-(T=66)*34
140 MP(7*(X-1)+2,5*(Y-1)+2)=T:NEXT X:NEXT Y
150 FOR L=1 TO 5:READ T:Y=INT(T/6):X=T-6*Y
160 V(L,1)=X*7+2:V(L,2)=Y*5+2:NEXT L
170 SEL=0:CY=30:CY=17:PMS="C"
180 PRINT CHR$(125);:FOR Y=1 TO 23:PRINT SP$;
190 FOR X=1 TO 38:PRINT CHR$(MP(X,Y));
200 NEXT X:PRINT :NEXT Y
210 GOSUB 1000:SEL=(K=47)*3+(K=62)*4
220 IF SEL=0 THEN 280
230 PRINT CHR$(125);NS="DO YOU WANT TO "
240 NS(16)=Z$(ZP(SEL),ZP(SEL+1)-1):GOSUB 3000
250 GOSUB 1000:IF K<>43 AND K<>35 THEN GOSUB 4000:GOTO
250
260 IF K=35 THEN SEL=0:GOTO 180
270 ON SEL-2 GOTO 620,440
280 DX=(K=0)-(K=1):DY=(K=5)-(K=13)
290 IF DX=0 AND DY=0 THEN 330
300 TX=CX+DX:TY=CY+DY
310 T=MP(TX,TY):IF T=160 THEN 340
320 CX=TX:CY=TY:PMS=CHR$(T):GOTO 210
330 IF K=8 OR K=18 THEN 350
340 GOSUB 4000:GOTO 210
350 IF K<>8 AND K<>18 THEN 340
360 K=67*(K=18)+79*(K=8):T=MP(CX,CY)
370 IF T=K OR (T<>67 AND T<>79) THEN 340
380 MP(CX,CY)=K:PMS=CHR$(K):GOSUB 2000
390 VC=VC+(K=79)-(K=67):IF VC<6 THEN 210
400 FOR D=1 TO 600:NEXT D
410 FOR Y=22 TO 0 STEP -1:POSITION 1,Y:PRINT BL$;
420 FOR D=1 TO 150:NEXT D:NEXT Y
430 FOR D=1 TO 600:NEXT D:F=1:GOTO 480
440 F=1:IF VC<>5 THEN 480
450 FOR L=1 TO 5
460 IF MP(V(L,1),V(L,2))=79 THEN VC=VC-1
470 NEXT L:IF VC=0 THEN VC=-1
480 PRINT CHR$(125);
490 MS="LUKE EMERGES "+MS(14)=Z$(ZP(F),ZP(F+1)-1)
500 MS(LEN(MS)+1)=" INTO THE BRIGHT SUNLIGHT AND IS GR
EETED"
510 MS(LEN(MS)+1)=" BY THE TOWNFOLK, WHO SHOUT,"
520 IF LEN(MS)<=40 THEN NS=MS:GOSUB 3000:GOTO 570
530 B=41:C=1:FOR A=B TO 2 STEP -1
540 IF MS(A,A)=SP$ THEN C=0:B=A:A=2
550 NEXT A:MS=MS(1,B-1):GOSUB 3000
560 MS=MS(B+1-C,LEN(MS)):GOTO 520
570 FOR D=1 TO 1800:NEXT D
580 PRINT CHR$(125);:IF VC=-1 THEN 610
590 FOR I=1 TO 62:PRINT "YOU'RE FIRED! ";
600 FOR D=1 TO 10:NEXT D:NEXT I:GOTO 620
610 NS="WHY, YOU CLEVER WATER RAT, YOU!":GOSUB 3000
620 POKE 764,255:POKE 82,2:POKE 752,0:END
1000 POKE 764,255
1010 K=PEEK(764):IF SEL=0 THEN GOSUB 2000
1020 IF K=255 THEN 1010
1030 RETURN
2000 POSITION CX,CY-1:PRINT "*";CHR$(30);PMS;:RETURN
3000 IF LEN(NS)=40 THEN PRINT NS;:RETURN
3010 POKE 85,INT(20-LEN(NS)/2):PRINT NS:RETURN
4000 SOUND 0,100,10,10:FOR D=1 TO 25:NEXT D
4010 SOUND 0,0,0,0:RETURN
5000 DATA EBBCEE,EBCBOE,CCO+OC,EEOECE,CEECEE
5010 DATA 3,13,16,17,19

```

MODIFICATIONS FOR OTHER COMPUTERS

Adam/Plumber's Blues

Use the Apple version with the following alterations. Change lines 20, 620, and 1000-1020 to read as follows:

```
20 ax = 5:dl = 1500:dm = 50:sw = 31
620 CALL 28000:POKE 16953,95:END
1000 CALL 28000
1010 k = PEEK(64885):IF sel = 0 THEN GOSUB 2000
1020 IF k < 1 THEN 1010
```

Also, add lines 10, 170, and 5000:

```
10 LOMEM: 29000:POKE 16953,0
170 FOR x=28000 TO 28005:READ t:POKE x,t:NEXT x
5000 DATA 62,0,50,117,253,201
```

Note: The program begins by turning off the cursor; it turns it back on again when you "Q"uit. If you exit from the program abnormally (e.g., if you have a syntax error or press CONTROL-C), you can turn the cursor back on by typing POKE 16953,95 and pressing RETURN.

IBM PC & compatibles (40-column version)/Plumber's Blues

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter, w/Disk BASIC D2.00 or Advanced BASIC A2.00, IBM PCjr w/Cartridge BASIC J1.00, Tandy 1000 w/GW-BASIC version 00.05.00 or 01.01.00.

Use the IBM PC 80-column version, except change line 20 to read as follows:

```
20 LM=1:AX=7:AY=5:DL=1200:DM=44:SD=25:SW=40
```

Macintosh w/Microsoft BASIC 2.0/Plumber's Blues

Use the IBM PC 80-column version, except change lines 10-30, 370, 550, 560, and 580 to read as follows:

```
10 CALL TEXTFONT(4):CALL TEXTSIZE(9):CALL TEXTFACE(64)
:CALL TEXTMODE(2)
20 LM=15:AX=8:AY=5:SW=74:DL=2700:DM=110:SD=30
30 BK=218:BA$=CHR$(8)
370 CALL TEXTMODE(0):FOR D=1 TO DL:NEXT D:X=LM+1
550 FOR I=1 TO 22:FOR J=1 TO 5:PRINT "YOU'RE FIRED! ";
560 FOR D=1 TO SD:NEXT D,J:PRINT:NEXT I:GOTO 580
580 END
```

Tandy Color Computer/Plumber's Blues

Use the IBM PC 80-column version, except change lines 10-30, 80, 240, 330, 580, and 4000 to read as follows:

```
10 CLEAR 500
20 LM=1:AX=5:AY=3:DL=800:DM=31:SD=20:SW=32
30 BK=175:BA$=CHR$(8)
80 BL$=CHR$(BK):FOR X=2 TO MX:BL$=BL$+CHR$(BK):NEXT X
240 GOSUB 1000:IF K<>78 AND K<>89 THEN SOUND 100,2:GOTO 240
330 SOUND 100,2:GOTO 210
580 END
4000 PRINT@SW*(Y-1)+X,"";:RETURN
```

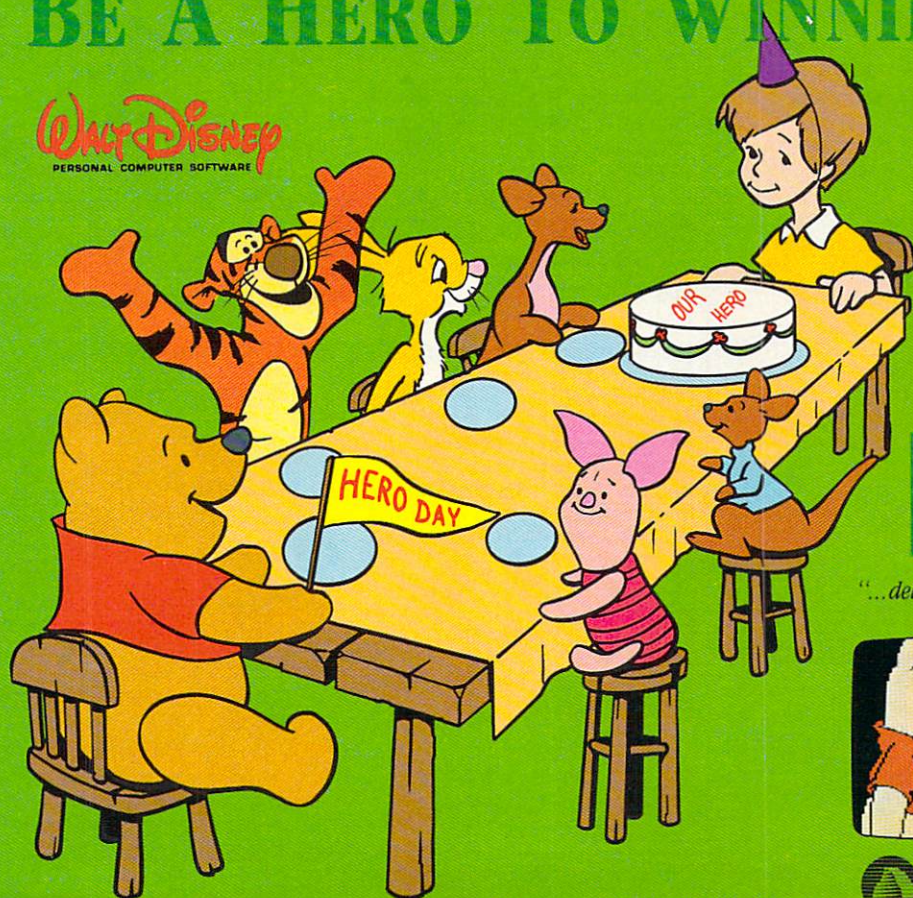
Tandy Models III & 4 (Model III mode)/Plumber's Blues

Use the IBM PC 80-column version, except change lines 10-30, 240, 330, 580, and 4000 to read as follows:

```
10 CLEAR 500
20 LM=12:AX=7:AY=3:DL=600:DM=64:SD=10:SW=64
30 BK=191:BA$=CHR$(24)
240 GOSUB 1000:IF K<>78 AND K<>89 THEN 240
330 GOTO 210
580 END
4000 PRINT@SW*(Y-1)+X,"";:RETURN
```

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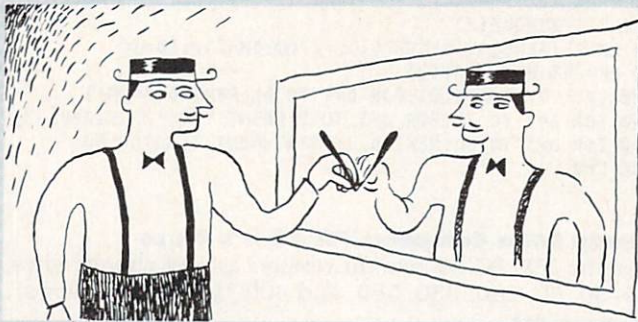
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SIERRA

MIRROR DRAW

BY JOEY LATIMER AND JOHN JAINSCHIGG



Have you ever been inside a house of mirrors and seen the weird effects that come from multiple reflections? *Mirror Draw* isn't exactly a "house of mirrors," but it comes pretty close to creating the same kind of kaleidoscopic images. By letting you draw on the screen and mirroring your design both vertically and horizontally, *Mirror Draw* lets you create beautifully symmetrical tapestries of color and form.

Type it in and SAVE it on disk or cassette. If you have a joystick, plug it into port 1 of your computer. Then type RUN. Make sure your computer is set for all capital letters. You'll be able to draw using the joystick (the mouse on the Macintosh)

or by pressing the U (up left), I (up), O (up right), J (left), L (right), M (down left), ".", (down), and "." (down right) keys. (Note: the Macintosh version doesn't use the keyboard and the Model III version uses keyboard only.) Press the joystick button or space bar to change the drawing color (the TI version lets you change color only with the space bar). The Model III version of *Mirror Draw* uses graphic characters instead of colors. The Mac version uses monochrome graphics. Pressing the space bar or single-clicking the mouse button on the Mac will change the figure currently being used to draw. Press the C key (double-click the mouse button) to clear the screen. Have fun!

Adam/Mirror Draw

```

9 REM --FIRST COLOR AND STARTING POSITION--
10 C = 6:X = 11:Y = 11
19 REM --CLEAR SCREEN AND SET GRAPHICS MODE--
20 HOME:GR
29 REM --PRINT INSTRUCTIONS--
30 VTAB 21
40 PRINT "-----";
50 PRINT TAB(4);"Fire buttons change color."
60 PRINT TAB(2);"Any keypad key clears screen.";
69 REM --SET DRAWING COLOR--
70 COLOR= C
79 REM --PLOT 4 POINTS BASED ON X,Y--
80 PLOT X,Y
90 PLOT 39-X,Y
100 PLOT X,39-Y
110 PLOT 39-X,39-Y
119 REM --IF KEYPAD KEY PRESSED, START AGAIN--
120 IF PDL(11) <> 0 THEN 10
129 REM --READ CONTROLLER STICK--
130 D = PDL(5)
139 REM --COMPUTE NEW X,Y BASED ON STICK VALUE--
140 IF D = 4 OR D = 6 OR D = 12 THEN Y = Y+1
150 IF D = 1 OR D = 3 OR D = 9 THEN Y = Y-1
160 IF D = 2 OR D = 3 OR D = 6 THEN X = X+1
170 IF D = 8 OR D = 9 OR D = 12 THEN X = X-1
    
```

```

179 REM --KEEP X,Y ON SCREEN--
180 IF X > 39 THEN X = 0
190 IF X < 0 THEN X = 39
200 IF Y > 39 THEN Y = 0
210 IF Y < 0 THEN Y = 39
219 REM --IF NO COLOR CHANGE, GO BACK--
220 IF PDL(7) = 0 AND PDL(9) = 0 THEN 80
229 REM --CHANGE COLOR--
230 C = C+1
240 IF C = 15 THEN C = 1
250 GOTO 70
    
```

Apple II series/Mirror Draw

```

9 REM --FIRST COLOR AND STARTING POSITION--
10 C = 6:X = 11:Y = 11
19 REM --CLEAR SCREEN AND SET GRAPHICS MODE--
20 HOME:GR
29 REM --PRINT INSTRUCTIONS--
30 VTAB 22
40 PRINT "-----";
50 PRINT "<FIRE> OR <SPACE BAR> CHANGES COLOR;"
60 PRINT TAB(11);"<C> CLEARS SCREEN.";
69 REM --SET DRAWING COLOR--
70 COLOR= C
79 REM --PLOT 4 POINTS BASED ON X,Y--
80 PLOT X,Y
90 PLOT 39-X,Y
100 PLOT X,39-Y
110 PLOT 39-X,39-Y
119 REM --GET KEYPRESS--
120 K = PEEK(-16384)
130 POKE -16368,0
139 REM --IF "C" KEY PRESSED, START AGAIN--
140 IF K = 195 THEN 10
149 REM --COMPUTE NEW X,Y BASED ON STICK AND KEYS--
150 IF PDL(1) > 192 OR K = 205 OR K = 172 OR K = 174 THEN Y = Y+1
160 IF PDL(1) < 64 OR K = 213 OR K = 201 OR K = 207 THEN Y = Y-1
170 IF PDL(0) > 192 OR K = 207 OR K = 204 OR K = 174 THEN X = X+1
180 IF PDL(0) < 64 OR K = 213 OR K = 202 OR K = 205 THEN X = X-1
189 REM --KEEP X,Y ON SCREEN--
190 IF X > 39 THEN X = 0
200 IF X < 0 THEN X = 39
210 IF Y > 39 THEN Y = 0
220 IF Y < 0 THEN Y = 39
229 REM --IF NO COLOR CHANGE, GO BACK--
230 IF PEEK(-16286) < 128 AND K <> 160 THEN 80
239 REM --CHANGE COLOR--
240 C = C+1
250 IF C > 15 THEN C = 1
260 GOTO 70
    
```

Atari 400, 800, 600/800XL, & 130XE/Mirror Draw

```

9 REM --SET LEFT BORDER OF TEXT WINDOW TO ZERO--
10 POKE 82,0
19 REM --FIRST COLOR AND STARTING POSITION--
20 C=1:X=11:Y=6
29 REM --SET GRAPHICS MODE; TURN OFF CURSOR--
30 GRAPHICS 3:POKE 752,1
39 REM --PRINT INSTRUCTIONS--
40 PRINT "-----";
50 PRINT " FIRE BUTTON OR <SPACE> CHANGES COLOR."
60 PRINT " <C> CLEARS SCREEN.";
69 REM --SET DRAWING COLOR--
70 COLOR C
79 REM --PLOT 4 POINTS BASED ON X,Y--
80 PLOT X,Y
90 PLOT 39-X,Y
100 PLOT X,19-Y
110 PLOT 39-X,19-Y
119 REM --GET KEYPRESS--
    
```

```

30 POKE 214,19:PRINT
39 REM --PRINT INSTRUCTIONS--
40 PRINT "-----";
50 PRINT " <SPACE>/FIRE CHANGES"
60 PRINT " COLOR; <C> CLEARS.";
69 REM --PLOT 4 POINTS BASED ON X,Y--
70 POKE Y*22+X+38400,C
80 POKE Y*22+X+7680,160
90 POKE Y*22+(21-X)+38400,C
100 POKE Y*22+(21-X)+7680,160
110 POKE (19-Y)*22+X+38400,C
120 POKE (19-Y)*22+X+7680,160
130 POKE (19-Y)*22+(21-X)+38400,C
140 POKE (19-Y)*22+(21-X)+7680,160
149 REM --GET KEYPRESS--
150 GET K$
159 REM --IF "C" KEY PRESSED, START AGAIN--
160 IF K$="C" THEN 10
169 REM --PREPARE FOR JOYSTICK INPUT--
170 POKE 37154,127
179 REM --READ JOYSTICK LOCATION AND COMPUTE VALUE--
180 D=(PEEK(37137) AND 28)/4+(PEEK(37152) AND 128)/16
189 REM --RESET TO NORMAL AFTER READING JOYSTICK--
190 POKE 37154,255
199 REM --COMPUTE NEW X,Y BASED ON STICK AND KEYS--
200 IF D=9 OR D=13 OR D=5 OR K$="M" OR K$="," OR K$="."
    THEN Y=Y+1
210 IF D=10 OR D=14 OR D=6 OR K$="U" OR K$="I" OR K$="O"
    THEN Y=Y-1
220 IF D=6 OR D=7 OR D=5 OR K$="0" OR K$="L" OR K$="."
    THEN X=X+1
230 IF D=10 OR D=11 OR D=9 OR K$="U" OR K$="J" OR K$="M"
    THEN X=X-1
239 REM --KEEP X,Y ON SCREEN--
240 IF X>21 THEN X=0
250 IF X<0 THEN X=21
260 IF Y>19 THEN Y=0
270 IF Y<0 THEN Y=19
279 REM --IF NO COLOR CHANGE, GO BACK--
280 IF K$<>" " AND (PEEK(37137) AND 32) THEN 70
289 REM --CHANGE COLOR--
290 C=C+1
300 IF C>7 THEN C=1
310 GOTO 70
    
```

TIPS TO THE TYPIST

Typing in FAMILY COMPUTING's programs is a great way to become familiar with your computer and get some free software "to boot." But it's frustrating to type in a long program only to find it doesn't work as it should. When this happens, simple typing errors are most often the cause. So to help you gain greatest value from the time you spend computing with us, we've put together some tips on how to avoid typing errors—and what to do if a program doesn't run right. Read them carefully and you'll be up and running in no time!

SOME GENERAL RULES

- 1. Do** read instructions and program headings carefully. Make sure your computer has enough memory, the right version of BASIC, and the appropriate peripherals (joysticks, printers, disk drives, etc.) for a program.
- 2. Don't** let fatigue and boredom contribute to inaccuracy. If you're new to programming, try typing in shorter programs first. Type in a longer program in easy stages, SAVEing each installment as you go.
- 3.** Until you are fairly familiar with BASIC, **do** assume that every word, number, letter, space, and punctuation mark in a program listing must be copied accurately if the program is to function as intended.
- 4. Do** watch out for potential trouble spots. About 90 percent of all typing errors occur in DATA statements: long lines filled with numbers or incomprehensible secret codes. If possible, have someone else read DATA to you as you type, and help you proofread it if you have trouble later on. Proofreading from a printout is best.
- 5. Do** be aware that program listings printed in FAMILY COMPUTING sometimes differ from what you will see on your computer's screen or in printouts you produce at home. Our program listings are printed 54 characters wide. Thus, a single BASIC program "line" (sometimes called a "logical line") may appear as several lines in our listing. If you are typing along and reach the right margin of the printed listing, don't press RETURN or ENTER until you've checked to see if the program "line" you're typing really ends there. The way to tell is to check if the line following begins with a multiple of 10 that follows in sequence from the previous logical line. REM statements are the exception and typing them in is optional.
- Several computers (ADAM, Apple, Atari, and TI) format BASIC programs according to unique rules of their own. Don't let this throw you—just type in the listing exactly as printed in the magazine and your computer is guaranteed to accept it, even though it may end up looking a little different on your screen.
- 6.** One foolproof way to correct an error in a BASIC program line is to type the line in again from the beginning, and press RETURN or ENTER to set it in place of the old one in your computer's memory.

PROGRAMMING P.S.

Corrections to previous months' programs

Explosion Machine (February 1986, page 68)

IBM PCjr & compatibles: Due to a difference between Tandy's GW-BASIC and IBM's BASIC, this program will not run on the Tandy 1000 unless you change line 1010 to read as follows:

```
1010 S=INT(RND*3)+4:D=INT(RND*5)+2:NOISE S,I,D
```

Multimath (March 1986, page 60)

Commodore 64 & 128 (C 64 mode): A printer's error introduced two splotches into line 590 that resemble a quotation mark. Here's that line again:

```
590 PRINT:PRINT:PRINT TAB(4);"DO YOU WANT TO ..."
```

SOLUTION TO PLUMBER'S BLUES

There are only four establishments in need of extra water: the greenhouse, the aquarium, the laundromat, and the Veterans Club (to fill the indoor swimming pool mentioned in the introduction). The outdoor ice-skating rink is on a natural lake and thus does not need extra water; the outdoor public swimming pool is not in use in freezing weather; and the car wash is out of business.

All values should remain closed, except for those at the following five intersections: Fuddle Place and Water Street; Mill Lane and Water Street; Damp Drive and Main Street; Waterloo Road and Water Street; and Waterloo Road and Drp Street.

WHICH PROGRAMS WILL RUN ON MY COMPUTER?

Unless a program heading indicates otherwise, programs will run on any version of the computer specified, with the following exceptions:

- Apple programs run under Applesoft (not Integer) BASIC on the Apple II (with language card), II plus, IIe, and IIc.
- IBM compatibility of BASIC programs is determined by both the hardware and the version of BASIC used. Our programs for IBM PC & compatibles are composed on IBM PC & PCjr's, and tested under most versions of BASIC available for these machines. They are then tested on a variety of IBM-compatible machines under the versions of BASIC supplied with them. Each "IBM PC & compatibles" program listing is supplemented by a rundown of the machines and versions of BASIC under which the program is guaranteed to work. Most programs will probably run on many other PC Compatibles and under other versions of BASIC.
- TI programs not marked "w/TI Extended BASIC" should be run under standard (console) TI BASIC.

DEBUGGING HINTS

Sometimes even the most careful typist makes a mistake. Don't expect your program to run right off the bat. If you have problems, remain patient and follow these general instructions for a probable quick fix.

1. Write down any error messages you receive.
2. If necessary, look these up in your manual, and check

the indicated lines for simple mistakes. Also check related lines (see No. 4, below), such as the DATA statements corresponding to a READ routine. Correct all the problems you can find, and SAVE a corrected copy of the program before typing RUN again. If you're lucky, all systems will be GO; if not

3. LIST the program in screen-size chunks (check your manual for instructions on how to LIST parts of a program). Even better, if you have a printer, get a printout. Compare what you've typed in—letter by letter—to the published program. Make sure that you haven't typed the numeral 0 (which is slashed in our listings) for the letter O (which isn't), swapped a small letter "l" for the numeral one, dropped or mixed up some punctuation, switched uppercase text for lowercase, or vice versa (particularly in DATA statements or within quotes), or miscounted the characters (and/or spaces) between a pair of quotes. Get someone to help you if possible.

4. Check your DATA statements—then check them again. Mistakes in DATA statements are the single most common cause of program failures. Bad data can cause a program to malfunction at any point, which can be misleading. If you can't find your error in the lines the computer specifies, check your DATA statements line by line, letter by letter, comma by comma. Then have someone else check it for you.

5. If all else fails, turn off your computer and relax. Then try again the next day—exhausted proofreaders are careless proofreaders.

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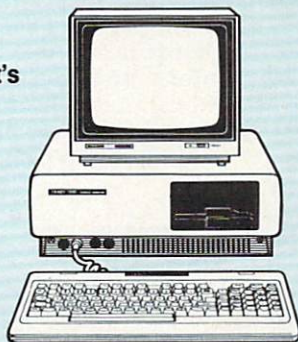
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MUSIC TUNES

MUSIC PROGRAMS BY JOEY LATIMER

One piece of Americana that's being lost to progress is the barn dance. For people in rural areas, Saturday night used to be the time for gathering in a large barn and dancing to an "orchestra" made up of such instruments as guitars, banjos, fiddles, and washboards.



One of the songs that comes to mind when I think of good ol' barn-dancing is *Turkey in the Straw*. While it's generally thought of as a fiddle tune, the song can be played by another instrument. And, if you're reading this, you probably have that instrument right in your home. That's right, it's your computer!

If you don't have anything else to do this Saturday night, make sure the animals are settled in for the evening, and then type *Turkey in the Straw* into your computer. Don't turn the volume up too loud, though, or you'll have all the neighbors knockin' on your barn door!

ADAM/TURKEY IN THE STRAW

```
10 LOMEM: 29000
20 DIM f(92),s(92),d(92)
30 FOR i = 28000 TO 28005:READ a:POKE i,a:NEXT i
40 FOR i = 1 TO 92:READ f(i),s(i),d(i):NEXT i
50 HOME:VTAB 10:HTAB 3:PRINT "--*-- Turkey in the Straw
--*"
60 FOR i = 1 TO 92
70 POKE 28006,f(i):CALL 28000
80 POKE 28006,s(i):CALL 28000
90 POKE 28006,144:CALL 28000
100 FOR d = 1 TO d(i)*100:NEXT d
110 POKE 28006,159:CALL 28000
120 NEXT i:GOTO 60
1000 DATA 58,102,109,211,255,201
1010 DATA 143,3,1,138,3,1,133,3,1,138,3,1
1020 DATA 133,3,1,143,2,1,133,3,1,135,4,1
1030 DATA 133,5,1,128,5,1,135,4,1,143,3,1
1040 DATA 135,4,1,133,5,1,135,4,2,133,3,1
1050 DATA 143,2,1,138,2,2,138,2,2,138,2,1
1060 DATA 143,2,1,133,3,1,143,2,1,138,2,2
1070 DATA 143,2,2,143,2,2,138,2,1,143,2,1
1080 DATA 133,3,1,138,3,1,133,3,1,143,2,1
```

```
1090 DATA 133,3,1,135,4,1,133,5,1,128,5,1
1100 DATA 135,4,1,143,3,1,135,4,1,133,5,1
1110 DATA 135,4,2,133,3,1,143,2,1,138,2,1
1120 DATA 131,2,2,143,1,1,131,2,1,138,2,1
1130 DATA 133,3,1,143,2,1,138,2,2,143,2,2
1140 DATA 133,3,4,138,2,1,131,2,2,138,2,1
1150 DATA 131,2,2,131,2,2,138,2,1,131,2,2
1160 DATA 138,2,1,131,2,4,136,2,1,143,1,2
1170 DATA 136,2,1,143,1,2,143,1,2,136,2,1
1180 DATA 143,1,2,136,2,1,143,1,2,143,1,1
1190 DATA 141,1,1,139,1,2,139,1,2,131,2,2
1200 DATA 131,2,2,138,2,2,138,2,2,143,2,2
1210 DATA 133,3,1,143,2,1,138,2,1,131,2,2
1220 DATA 143,1,1,131,2,1,138,2,1,133,3,1
1230 DATA 143,2,1,138,2,2,143,2,2,133,3,2
```

APPLE II SERIES/TURKEY IN THE STRAW

```
10 DIM P(98),D(98)
20 HOME:VTAB (10):HTAB (4)
30 PRINT "--*-- TURKEY IN THE STRAW --*--"
40 FOR I = 0 TO 36:READ A:POKE 768+I,A:NEXT I
50 FOR I = 1 TO 98:READ P(I),D(I):NEXT I
60 FOR I = 1 TO 98:POKE 6,2*0*(I):POKE 8,P(I)
70 CALL 768:NEXT I:GOTO 60
1000 DATA 165,8,201,2,176,2,169,2,74,133,10,164,8
1010 DATA 240,8,173,48,192,234,234,136,208,251,56
1020 DATA 165,7,229,10,133,7,176,235,198,6,208,231,96
2000 DATA 151,1,135,1,127,1,135,1,127,1,113,1
2010 DATA 127,1,170,1,202,1,191,1,170,1,151,1
2020 DATA 170,1,202,1,170,2,127,1,113,1,101,1
2030 DATA 0,1,101,1,0,1,101,1,113,1,127,1,113,1
2040 DATA 101,2,113,2,113,2,101,1,113,1,127,2
2050 DATA 135,1,127,1,113,1,127,1,170,1,202,1
2060 DATA 191,1,170,1,151,1,170,1,202,1,170,2
2070 DATA 127,1,113,1,101,1,85,1,0,1,75,1,85,1
2080 DATA 101,1,127,1,113,1,101,2,113,2,127,2
2090 DATA 0,2,101,1,85,2,101,1,85,2,85,2,101,1
2100 DATA 85,2,101,1,85,4,95,1,75,2,95,1,75,2,75,2
2110 DATA 95,1,75,2,95,1,75,2,75,1,67,1,63,2,63,2
2120 DATA 85,2,85,2,101,2,101,2,113,2,127,1,113,1
2130 DATA 101,1,85,1,0,1,75,1,85,1,101,1,127,1
2140 DATA 113,1,101,2,113,2,127,2,0,8
```

ATARI 400, 800, 600/800 XL, & 130XE/ TURKEY IN THE STRAW

```
10 DIM P(97),D(97)
20 FOR I=1 TO 97:READ P,D
30 P(I)=P:D(I)=D:NEXT I
40 PRINT CHR$(125):POSITION 4,10:POKE 752,1
50 PRINT "--*-- TURKEY IN THE STRAW --*--"
60 FOR I=1 TO 97:SOUND 0,P(I),10,8
70 FOR DE=1 TO D(I)*40:NEXT DE
80 SOUND 0,0,0,0:NEXT I:GOTO 60
1000 DATA 144,1,128,1,121,1,128,1,121,1,108,1
1010 DATA 121,1,162,1,193,1,182,1,162,1,144,1
1020 DATA 162,1,193,1,162,2,121,1,108,1,96,1
1030 DATA 0,1,96,1,0,1,96,1,108,1,121,1,108,1
1040 DATA 96,2,108,2,108,2,96,1,108,1,121,1
1050 DATA 128,1,121,1,108,1,121,1,162,1,193,1
1060 DATA 182,1,162,1,144,1,162,1,193,1,162,2
1070 DATA 121,1,108,1,96,1,81,1,0,1,72,1,81,1
1080 DATA 96,1,121,1,108,1,96,2,108,2,121,2
1090 DATA 0,2,96,1,81,2,96,1,81,2,81,2,96,1,81,2
1100 DATA 96,1,81,4,91,1,72,2,91,1,72,2,72,2
1110 DATA 91,1,72,2,91,1,72,2,72,1,64,1,60,2,60,2
1120 DATA 81,2,81,2,96,2,96,2,108,2,121,1,108,1
1130 DATA 96,1,81,1,0,1,72,1,81,1,96,1,121,1
1140 DATA 108,1,96,2,108,2,121,2
```



COMMODORE 64 & 128 (C 64 MODE)/ TURKEY IN THE STRAW

```

10 DIM H(98),L(98),D(98)
20 S=54272:POKE 53281,10:POKE 53280,2
30 PRINT CHR$(147);CHR$(144):POKE 214,10:PRINT
40 PRINT TAB(4)"---*--- TURKEY IN THE STRAW ---*---"
50 FOR I=0 TO 24:POKE S+I,0:NEXT I
60 POKE S+24,15:POKE S+5,68:POKE S+6,132
70 FOR I=1 TO 98:READ H(I),L(I),D(I):NEXT I
80 FOR I=1 TO 98:POKE S+4,33
90 POKE S,L(I):POKE S+1,H(I)
100 FOR D=1 TO 75*D(I):NEXT D
110 POKE S+4,32:NEXT I:GOTO 80
1000 DATA 14,24,1,15,210,1,16,195,1,15,210,1,16
1010 DATA 195,1,18,209,1,16,195,1,12,143,1,10,143
1020 DATA 1,11,48,1,12,143,1,14,24,1,12,143,1,10
1030 DATA 143,1,12,143,2,16,195,1,18,209,1,21,31
1040 DATA 1,0,0,1,21,31,1,0,0,1,21,31,1,18,209,1,16
1050 DATA 195,1,18,209,1,21,31,2,18,209,2,18,209
1060 DATA 2,21,31,1,18,209,1,16,195,1,15,210,1,16
1070 DATA 195,1,18,209,1,16,195,1,12,143,1,10,143
1080 DATA 1,11,48,1,12,143,1,14,24,1,12,143,1,10
1090 DATA 143,1,12,143,2,16,195,1,18,209,1,21,31
1100 DATA 1,25,30,1,0,0,1,28,49,1,25,30,1,21,31,1
1110 DATA 16,195,1,18,209,1,21,31,2,18,209,2,16
1120 DATA 195,2,0,0,2,21,31,1,25,30,2,21,31,1,25
1130 DATA 30,2,25,30,2,21,31,1,25,30,2,21,31,1,25
1140 DATA 30,4,22,96,1,28,49,2,22,96,1,28,49,2,28
1150 DATA 49,2,22,96,1,28,49,2,22,96,1,28,49,2,28
1160 DATA 49,1,31,165,1,33,135,2,33,135,2,25,30,2
1170 DATA 25,30,2,21,31,2,21,31,2,18,209,2,16,195
1180 DATA 1,18,209,1,21,31,1,25,30,1,0,0,1,28,49
1190 DATA 1,25,30,1,21,31,1,16,195,1,18,209,1,21
1200 DATA 31,2,18,209,2,16,195,3,0,0,0,3

```



IBM PC & COMPATIBLES/TURKEY IN THE STRAW

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome/Printer Card, w/Disk BASIC D2.00 or Advanced BASIC A2.00, IBM PCjr w/Cartridge BASIC J1.00, Tandy 1000 w/GW BASIC 2.02 version 00.05.00 or 01.01.00.

```

10 DIM P(98),D(98)
20 CLS:WIDTH 40:LOCATE 10,4,0
30 PRINT "---*--- TURKEY IN THE STRAW ---*---"

```

```

40 FOR I=1 TO 98:READ P(I),D(I):NEXT I
50 FOR I=1 TO 98:SOUND P(I),D(I)*2
60 NEXT I:GOTO 50
1000 DATA 220,1,247,1,262,1,248,1,262,1,294,1
1010 DATA 262,1,196,1,165,1,175,1,196,1,220,1
1020 DATA 196,1,165,1,196,2,262,1,294,1,330,1,30000
1030 DATA 1,330,1,30000,1,330,1,294,1,262,1,294,1
1040 DATA 330,2,294,2,294,2,330,1,294,1,262,1
1050 DATA 247,1,262,1,294,1,262,1,196,1,165,1
1060 DATA 175,1,196,1,220,1,196,1,165,1,196,2,262
1070 DATA 1,294,1,330,1,392,1,30000,1,440,1,392,1
1080 DATA 330,1,262,1,294,1,330,2,294,2,262,2,30000
1090 DATA 2,330,1,392,2,330,1,392,2,392,2,330,1,392,2
1100 DATA 330,1,392,4,349,1,440,2,349,1,440,2,440,2
1110 DATA 349,1,440,2,349,1,440,2,440,1,494,1,523,2
1120 DATA 523,2,392,2,392,2,330,2,330,2,294,2,262,1
1130 DATA 294,1,330,1,392,1,30000,1,440,1,392,1,330,1
1140 DATA 262,1,294,1,330,2,294,2,262,2,30000,4

```



TANDY COLOR COMPUTER/ TURKEY IN THE STRAW

```

10 DIM T(92),D(92)
20 FOR I=1 TO 92:READ T(I),D(I):NEXT I
30 CLS
40 PRINT@227,"*---TURKEY IN THE STRAW---*"
50 FOR I=1 TO 92
60 SOUND T(I),D(I)*2
70 NEXT I:GOTO 50
1000 DATA 159,1,170,1,176,1,170,1,176,1,185,1
1010 DATA 176,1,147,1,125,1,133,1,147,1,159,1
1020 DATA 147,1,125,1,147,2,176,1,185,1,193,2
1030 DATA 193,2,193,1,185,1,176,1,185,1,193,2
1040 DATA 185,2,185,2,193,1,185,1,176,1,170,1
1050 DATA 176,1,185,1,176,1,147,1,125,1,133,1
1060 DATA 147,1,159,1,147,1,125,1,147,2,176,1
1070 DATA 185,1,193,1,204,2,210,1,204,1,193,1
1080 DATA 176,1,185,1,193,2,185,2,176,4,193,1
1090 DATA 204,2,193,1,204,2,204,2,193,1,204,2
1100 DATA 193,1,204,4,197,1,210,2,197,1,210,2
1110 DATA 210,2,197,1,210,2,197,1,210,2,210,1
1120 DATA 216,1,218,2,218,2,204,2,204,2,193,2
1130 DATA 193,2,185,2,176,1,185,1,193,1,204,2
1140 DATA 210,1,204,1,193,1,176,1,185,1,193,2
1150 DATA 185,2,176,2

```

M I C R O N O T E S

The BASIC languages that come with Apple II and Coleco Adam computers don't include the easy-to-use sound commands built into the BASICs of other machines. To pick up the slack, third-party companies have stepped in with extended, add-on BASICs that give programmers new control over sound generation!

For the Apple, the folks at Roger Wagner Publishing (10761 Woodside Ave., Suite E, Santee, CA 92071; [619] 562-3670) have released *The Wizard's Toolbox, Assorted New Commands for Applesoft*, \$40, as part of the *Toolbox* series of software. *The Wizard's Toolbox* gives you tone and sound-effect commands, as well as new Applesoft options, such as turtle graphics, shape viewer, and print. Also available from Roger Wagner Publishing is *Assembly Lines: The Book*, \$20, which explains how to put together 6502 assembly-language routines for generating

music on an Apple II—all in easy-to-understand language.

Apple users who enjoy computer music but don't like to type programs will enjoy *The Magic Piano Music Learning System*, \$50, from EduSoft (P.O. Box 2560, Berkeley, CA 94702; [800] EDU-SOFT). The Magic Piano section turns your computer keys into piano keys, without requiring extra hardware. You can compose your own songs and see them instantly scored and printed. Also included in the package: a rhythm game, a melody game, and a 64-page music workbook.

For Adam computers, there's a \$29.95 add-on BASIC called *Auto Aid* from Futurevision (P.O. Box 34-FC, N. Billerica, MA 08162; [617] 663-8591) that will give you easy access to the sound registers through simple commands. Call or write for a free catalog explaining the features of *Auto Aid* and other Futurevision music products for the Adam.

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Here's software that helps students with essays and book reports, not only by being a word processor, but

by acting like a knowledgeable friend, one who asks good questions that get ideas flowing. This is the kind of help that teachers and parents can't complain about. As one of two titles in Spinnaker's new *Home-work Helper* series, *Writing* offers interactive aid that still makes students work through problems on their own.

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Essay

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Word Processor

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Use [↑] [↓] to select,
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Writing includes a surprisingly good word processor. You can move or delete blocks of text, perform a find-and-replace, and handle disk-formatting and file procedures. On-screen windows allow you to display your responses to the questions as you write an outline or your essay.

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