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NUMBER 3

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FAMILY COMPUTING

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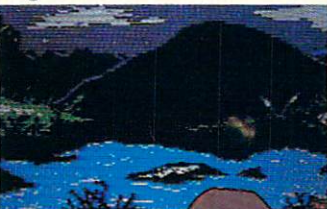
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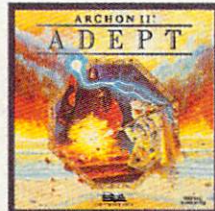
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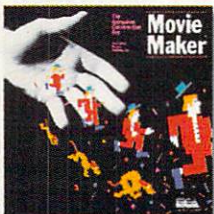
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CIRCLE READER SERVICE 21


ELECTRONIC ARTS™

EDITOR'S NOTE

THE A-MAZING IBM COMPATIBLES



Sometimes I feel as though the world of computing were an eternal series of mazes. We move from figuring out which computer seems right for us to actually getting it to function and testing the wisdom of our decision.

And, as the editor of a magazine about computing, I find that most people I know get around to calling for help when they find themselves in one kind of maze or another. The calls seem to come in waves. When we started the magazine in 1983, a lot of friends just wanted to know what they could do with a computer.

Lately, more and more callers know what they want a computer to do: their kids need it for schoolwork, they all want to play games on it (individually or as a family), and the parents expect it to meet the needs of a home business or to help with personal finances or work from the office. It's got a big job to do.

We find that people whose main interest is churning out a large volume of work often decide to go with the IBM standard, though not with "Big Blue's" brand name. They choose instead to go for one of the less expensive computers that run most IBM software. But the maze of IBM compatibility frequently proves to be more circuitous than they originally anticipated.

Those of you tempted to respond to the charms of Charlie Chaplin or his clones will want to turn to our

"Buyer's Guide to IBM Compatibles" (page 25). Going the MS-DOS, or IBM-compatibility route, still leaves the buyer with dozens of machines, diverse packages with varying components and bundled software, and degrees of compatibility to choose from. Freelance writer Phil Wiswell, working with senior editor Nick Sullivan, helped us wend our way through the many paths of major IBM work-alikes and look-alikes.

One of the big three of computer applications, especially in the work-related category (along with word processing and number-crunching with spreadsheets), is the use of a data-base program. Converting from paper and file cabinets to storing and retrieving information electronically certainly falls into the maze category. However, you'll find you've got a clear, concise guide in our article, "Get Organized for Good With Database Software" (page 30) by Steve Morgenstern, edited by reviews editor David Hallerman.

And for readers eager to learn more about the maze inside their computers, don't miss this installment of Henry Beechhold's "Hands On: Build a 'Home-Brewed' Logic Probe" (page 40). Technical editor John Jainschigg went so far as to buy his own supplies to test Beechhold's procedures. That's a maze I doubt I'll ever venture into, but readers have responded well to Beechhold's "Hands On" series, which concludes with the next installment.

While our goal at FAMILY COMPUTING is to see you through the mazes of computing, next month we get you into them. Watch for our maze puzzle in April and, in May, look for the related maze-generator program created by associate technical editor Steven Chen. You won't want to miss either of these issues!

Claudia Cohl

CLAUDIA COHL
EDITOR-IN-CHIEF

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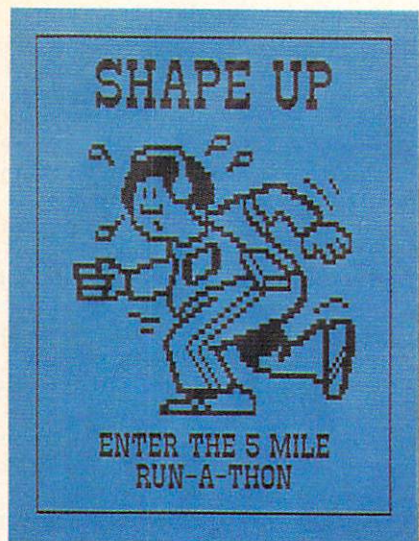
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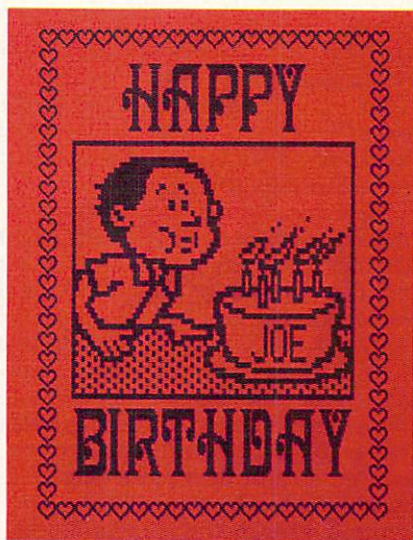
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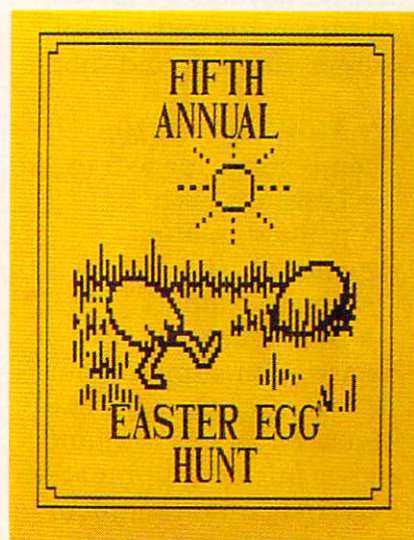
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CIRCLE READER SERVICE 33

LETTERS

SHOCKING SUGGESTIONS

Thank you for the warning about static electricity (*Computing Clinic*, page 25) in the December 1985 issue. I recently touched the joystick on my Apple IIe while the computer was turned on and damaged a chip. The computer is now in the shop having the chip replaced. Thank you for the great magazine.

BRENT BOXWELL
El Paso, Texas

In the article, "How to Keep Your Computer Healthy" (page 41, January 1986), the procedure outlined for the older "two-prong" convenience outlet works fine if the electrical system is of metallic raceway (conduit).

However, if the system is of ungrounded nonmetallic sheathed cable (Romex) or improperly installed metallic armored cable (BX), there would be no "ground path" or a high-resistance "ground path." In newer electrical systems, grounded Romex is the norm and the described system should function. In some areas, it is permissible to run an insulated conductor from a convenience outlet to a metallic cold-water line to achieve an acceptable ground. This method of grounding would allow the use of the scheme outlined in the article. As a licensed electrician, I would like to compliment the author of the article on recommending that power to the outlet be disconnected before starting any modifications.

RICHARD J. ANTI
Mulberry, Florida

BEST ADAM SOURCE

Thanks a lot! Your magazine is probably one of the best Adam resources that can be found. I've owned a Coleco Adam since it first came out, and I was one of the lucky few who hasn't had any problems with it. I'm quite an advanced computer user, as I use the TRS-80 and IBM PC every day in school.

ROSS GRAFFMAN
Orrington, Maine

TOE-TAPPING PROGRAMS

I'd like to tell you what a fine magazine you publish. It's fantastic! I particularly look forward to Microtones and The Programmer, and I also enjoy K-POWER. I was so impressed by Microtones in the January 1986 issue that I decided to write to you. Joey Latimer put together a super musical program called *Old-Time Rock 'n' Roll*. I like it so much that I'm listening to it as I write to you.

PETER ALBA
Equinunk, Pennsylvania

COMPUTER SUPPORT

This letter refers to the possibility of your magazine dropping coverage of the Adam computer. I feel this would be a serious mistake. I feel that if anything, coverage of the Adam should be upgraded because in the past six months, so many Adam peripherals have become available.

If dropping Adam coverage is in *FAMILY COMPUTING*'s plans, I hope you will reconsider because I really look forward to your magazine every month.

GUY CULP
Yeadon, Pennsylvania

In your January 1986 issue, in answer to a letter from a subscriber, you commented that because of the relatively small percentage of C 128 computers compared to the larger percentage of C 64s, your policy would be to publish programs that run on both machines.

Why can't you treat the C 128 as another computer? Many of your subscribers would upgrade from the C 64 to C 128 if they saw that you were including programs for it. I also am concerned whether or not you will take the same attitude toward the Amiga.

PETE HENDLER
Lillington, North Carolina

EDITOR'S NOTE: The articles regularly appearing in *FAMILY COMPUTING* are designed to provide general information both relevant and beneficial to all computer users. We're sure Adam and C 128 users, like owners of other computers, will continue to find valuable, practical information in *FAMILY COMPUTING* to help make their machines increasingly useful computing tools.

Our technical staff continues to develop and adapt original programs for the Adam (for example, see the program *Weight On Other Planets* on page 52 and the puzzle program in our April issue). Also, watch for items on the Adam in the *Computing Clinic* and *New Hardware* departments, and in the *FAMILY COMPUTING Forum* on CompuServe (GO FAMFORUM).

Both C 64 and C 128 owners can run the C 64 programs we publish already, and as the installed base of C 128s grows, we may publish programs specifically in 128 mode. Now, however, we can't meet the demands for specific programs for each machine. As for the Amiga, we don't have firm plans yet. Commodore is marketing it as a business machine, and we will postpone our decision until we see how many are bought for home and home/business use.

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You've just discovered the Eidolon—a curious 19th century machine whose inventor vanished without a trace. Only his journals and sketches remain. They tell of an incredible magical realm—a maze of caverns populated by strange creatures noted as Greps, Biter Birds and Bottlenecks. And “intelligent” Guardian Dragons—who hurl colored fireballs of energy?

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HOME-SCHOOL CONNECTION

DRILL-AND-PRACTICE WITH A DIFFERENCE

Studying Can Be Fun With This Easy-to-Customize Program

BY DIANA SALYERS



Drill-and-practice, drill-and-practice. Lots of teachers hate it, lots of kids hate it, lots of parents hate it. Yet it's one of the most effective ways to learn. Now, the growing availability of computers in classrooms and at home is making drill-and-practice more common and perhaps easier on teachers and parents as well.

"Infinite patience," is how Nancy Moore, an elementary school teacher in West Virginia, sums it up. "That machine can sit there for hours while the students go over the material again, and again. It never gets tired and it never runs out of patience."

A PROGRAM YOU CAN TAILOR TO YOUR CHILD'S NEEDS

Drill-and-practice, even when done with a computer, can have its drawbacks, however. Kids can get tired of a flat give-and-take format. And software is too often expensive or inappropriate.

Drill & Practice Outline is a program with game elements (in this case, a guessing game). And it is easy for parents (and teachers) to adapt for a variety of subjects. If your fifth-grader's history class is studying great American patriots, type the program in as is and run it. If he or she is also studying important organs of the body in health class, you can take advantage of the program's flexibility to change the questions (and answers) for that need, too.

Plus, the program can be customized for different age levels. If your second-grader is learning about animals, for example, while your sixth-grader is studying trees, you can tailor programs for each.

CHOOSING SUBJECTS

Drill & Practice Outline can be used to study a wide range of academic subjects. Science, social studies, vocabulary-building, and history are just a few of the areas you might consider. Try the program with spe-

cific subjects, such as countries, states, oceans, parts of the body, or planets in the solar system. My children came up with "Famous Rock Stars" and "Name the President." Talk to your children about what they're studying in school, then look through their textbooks to get an idea of what you might include in *Drill & Practice Outline*.

The program is designed to present three questions (one at a time), and then the answer if the correct response isn't given. If your subject is "Important Rivers of the World," for example, simply choose several rivers and then find three clues for each: one difficult, one medium-hard, and one very obvious.

Actually, once you've chosen the subject and picked your topics, deciding which clues are bad and which are good is half the fun. Go to the encyclopedia, other reference books, or your child's textbook for clue suggestions.

Pay attention to your child's grade level and reading ability, so you can phrase the questions and answers you enter, when creating your version of the program, in a way he or she will understand and enjoy.

Don't overestimate (or underestimate) your child's capabilities. Stick with the subjects being covered in school (certainly at first, anyway), since that will provide the child with a motive for working on the program while giving you guidelines on how difficult to make it. Keep playing time to a minimum. If the kids are studying facts on the 50 states, don't try to give them all 50 at once. Break the drills down into groups of 10 or 15 states. Thirty minutes is about as long as you're going to have to hold an older child's attention; 20 for the younger ones. The program, as it stands, takes fourth-graders about 15 minutes.

"I like it when I guess the right answer on the third try and the computer says, 'You finally got it, Anna,'" comments a fourth-grader from Walton Elementary School in Walton, West Virginia.

Another advantage, especially dur-

ing large family get-togethers, is that several children can play at the same time, with one child at the keyboard and others seated nearby. This ties up the computer for a shorter time and gives everyone a chance to play.

HOW THE PROGRAM WORKS

Drill & Practice Outline is a no-frills, no-fuss program written in BASIC and is easy to use and understand. The program structure is printed in black. The topic-specific information that you enter to customize the program is printed in red. To use the program in its current form, "People Who Made America Great," type in the listing (both black and red), and save it to disk or cassette. To start the game, set your computer to all caps and type RUN, then press ENTER (or RETURN).

The first thing you are asked to do is enter your name. Then you are given three chances to guess the famous American's identity, and praised according to your responses.

When guessing, the entire name must be typed in (e.g., THOMAS JEFFERSON). It must be spelled correctly and have no spaces added before or after the name for the computer to recognize it as the right answer. The first clue is the most difficult. If you have no idea whatsoever how to respond, make a wild guess or press ENTER (or RETURN). You will receive two more increasingly easy clues, and finally (if you have not already guessed the correct response), the right answer. Then the screen clears and the first clue for the next patriot is given. Play continues until all 10 items have been completed.

If the program is stopped midway through, it can be started again by typing RUN (and then pressing ENTER or RETURN), but will start again from the beginning, not from where the user left off. No score is given when the game is completed. Users will have to keep their own tally.

MAKING YOUR CHANGES

OK, you've decided on a subject, picked your topics, and lined up the clues. Now it's time to customize the

DIANA SALYERS is a teacher and programmer from West Virginia.

program. If your children are young (under 8 years old) or uninterested in the mechanics of programming, you might as well go ahead and make the changes yourself. If your children are older, some of the fun for them can be in the actual adapting. Of course, typing in the information itself is part of the learning process.

In order to adapt *Drill & Practice Outline* (the section in black) to your chosen topic (such as "Important Rivers of the World" or "Facts About the 50 States"), you will need to change the information (the part in red) contained in a few of the program's statements.

Line 40 contains the lead question of your program, and therefore should be changed to reflect your topic. Instead of reading SBS="THIS PERSON" it should read, for example SBS="THIS STATE" or SBS="THIS RIVER".

Line 50 should also be changed according to the title you have selected for your program. For example, MS="PEOPLE WHO MADE AMERICA GREAT" would change to read MS="GREAT RIVERS OF THE WORLD".

Next, you have to change the information in the DATA statements, which contain all the clues and answers. DATA is contained in lines 4000 to 4390. You must enter each clue on a separate line, and then give the answer on a fourth one. Your clues cannot exceed 240 characters (that includes spaces), except for the Commodore, which is limited to 70. Type in your clues without commas or semicolons.

The program is currently designed to ask 10 questions. If you wish to expand the number of questions to 20, for example, or reduce the number to five, you will need to make a change in line 120. If you have 20 questions, line 120 (which currently reads FOR ITEM=1 TO 10) would read FOR ITEM=1 TO 20. (Your number of DATA statements in that situation would go from 4000 to 4790). Alternatively, if you wish only to have five questions, you would change line 120 to read FOR ITEM=1 TO 5 (and your DATA statements would go from 4000 to 4190).

And there you have it! A custom-built program that will give your children a little extra practice in their studies, while providing you practice in programming skills. The most important thing is to spend some time with your kids and have fun. That's what computing at home is all about!

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HOME-SCHOOL CONNECTION

Base Version: IBM PC & compatibles (80-column version)/Drill & Practice Outline "People Who Made America Great"

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome/Printer Card, w/Disk BASIC D2.00 or Advanced BASIC A2.00, IBM PCjr w/128K RAM, w/Cartridge BASIC J1.00, Tandy 1000 w/GW-BASIC version 00.05.00 or 01.01.00. IBM PCjr owners with 64K RAM should use the 40-column version.

```
10 DEF SEG=0
20 DIM TITLES(4)
30 SW=80:TX=0:DL=4100:WIDTH SW
40 SB$="THIS PERSON"
50 MS="PEOPLE WHO MADE AMERICA GREAT"
60 GOSUB 1000:PRINT:FS=""
70 INPUT "WHAT IS YOUR FIRST NAME?";FS
80 IF FS="" THEN 60
90 RS(1)="YOU CAN BE PROUD OF YOURSELF, "+FS+"!"
100 RS(2)="YOU'RE PRETTY GOOD, "+FS+"!"
110 RS(3)="YOU FINALLY GOT IT, "+FS+"!"
120 FOR ITEM=1 TO 10
130 FOR X=1 TO 4:READ TITLES(X):NEXT X
140 FOR A=1 TO 3:GOSUB 3000
150 POKE 1050,PEEK(1052)
160 GS$="":INPUT "WHAT IS YOUR GUESS?";GS
170 IF GS<>TITLES(4) THEN 210
180 TS=RS(A):A=3:GOSUB 3000
190 MS=TITLES(4)+" IS CORRECT!":GOSUB 1010
200 PRINT:MS=TS:GOSUB 1010:GOTO 250
210 IF A<3 THEN 250
220 GOSUB 3000
230 MS="THE CORRECT ANSWER IS "+TITLES(4)+". "
240 GOSUB 1010
250 NEXT A:FOR D=1 TO DL:NEXT D:NEXT ITEM
260 MS="WE'LL PLAY MORE LATER, "+FS+"!"
270 GOSUB 1000:END
1000 CLS
1010 IF LEN(MS)<=SW THEN NS=MS:GOSUB 2000:RETURN
1020 Y=SW+1:FOR X=Y TO 2 STEP -1
1030 IF MID$(MS,X,1)=CHR$(32) THEN Z=0:Y=X:X=2
1040 NEXT X:NS=LEFT$(MS,Y-1):GOSUB 2000
1050 MS=RIGHT$(MS,LEN(MS)-Y+Z):GOTO 1010
2000 IF LEN(NS)=SW THEN PRINT NS:RETURN
2010 PRINT TAB((SW-LEN(NS))/2+TX);NS:RETURN
3000 MS=SB$:GOSUB 1000:PRINT
3010 IF A=1 THEN 3030
3020 FOR B=1 TO A-1:MS=TITLES(B)+";":GOSUB 1010:NEXT B
3030 MS=TITLES(A)+";":GOSUB 1010
```

MODIFICATIONS FOR OTHER COMPUTERS

Apple II series/Drill & Practice Outline "People Who Made America Great"

Use the base version with the following alterations: Delete line 10 and change lines 30, 70, 150, 160, and 1000 to read:

```
30 SW = 40:TX = 1:DL = 4800
70 INPUT "WHAT IS YOUR FIRST NAME? ";FS
150 POKE -16368,0
160 INPUT "WHAT IS YOUR GUESS? ";GS
1000 HOME
```

Commodore 64 & 128 (C 64 mode)/Drill & Practice Outline "People Who Made America Great"

Use the base version with the following alterations: Delete line 10 and change lines 30, 150, 1000, and 2010 to read:

```
30 SW=40:DL=4300
150 POKE 198,0
1000 PRINT CHR$(147);
2010 PRINT SPC(20-LEN(NS))/2;NS:RETURN
```

```
3040 PRINT:RETURN
4000 DATA HAS A STATE NAMED AFTER HIM
4010 DATA HAS HIS PICTURE ON THE DOLLAR BILL
4020 DATA WAS THE FIRST PRESIDENT OF THE U.S.
4030 DATA GEORGE WASHINGTON
4040 DATA WAS RAISED IN A STRICT QUAKER FAMILY
4050 DATA HAD A POSTAGE STAMP ISSUED ON HER 200TH BIRTHDAY
4060 DATA MADE THE FIRST AMERICAN FLAG
4070 DATA BETSY ROSS
4080 DATA WAS AN ITALIAN SEA CAPTAIN
4090 DATA TOOK 3 SPANISH SHIPS ON A VOYAGE
4100 DATA IS HONORED ON COLUMBUS DAY
4110 DATA CHRISTOPHER COLUMBUS
4120 DATA WAS A STUDENT OF HENRY DAVID THOREAU
4130 DATA WAS A NURSE IN THE CIVIL WAR
4140 DATA WROTE "LITTLE WOMEN"
4150 DATA LOUISA MAY ALCOTT
4160 DATA WAS BORN IN BOSTON IN 1735
4170 DATA ATTENDED THE BOSTON TEA PARTY
4180 DATA MADE A FAMOUS MIDNIGHT RIDE SHOUTING "THE BRITISH ARE COMING!"
4190 DATA PAUL REVERE
4200 DATA SERVED AS A SPY IN THE CIVIL WAR
4210 DATA HAD THE NICKNAME "MOSES"
4220 DATA WAS A FAMOUS "CONDUCTOR" ON THE UNDERGROUND RAILROAD
4230 DATA HARRIET TUBMAN
4240 DATA WAS A SCIENTIST AND A STATESMAN
4250 DATA INVENTED A STOVE MADE OF IRON
4260 DATA WROTE "POOR RICHARD'S ALMANAC"
4270 DATA BENJAMIN FRANKLIN
4280 DATA HELPED PRESIDENT JEFFERSON WITH IMPORTANT PARTIES
4290 DATA WAS THE FIRST TO SERVE ICE CREAM IN THE WHITE HOUSE
4300 DATA MARRIED THE 4TH PRESIDENT OF THE U.S.
4310 DATA DOLLY MADISON
4320 DATA WAS A STOREKEEPER AND A LAWYER
4330 DATA WAS THE 16TH PRESIDENT OF THE U.S.
4340 DATA WAS NICKNAMED "HONEST ABE"
4350 DATA ABRAHAM LINCOLN
4360 DATA WAS ARRESTED FOR VOTING
4370 DATA FOUGHT FOR WOMEN'S RIGHTS
4380 DATA HAD A DOLLAR RECENTLY NAMED FOR HER
4390 DATA SUSAN B. ANTHONY
```

IBM PC & compatibles (40-column version)/Drill & Practice Outline "People Who Made America Great"

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 base version, except change line 30 to read:

```
30 SW=40:TX=0:DL=4100:WIDTH SW
```

Tandy Color Computer/Drill & Practice Outline "People Who Made America Great"

Use the base version with the following alterations: Delete line 150 and change lines 10 and 30 to read:

```
10 CLEAR 1000
30 SW=32:TX=0:DL=2600
```

Tandy Models III & 4 (Model III mode)/Drill & Practice Outline "People Who Made America Great"

Use the base version with the following alterations: Delete line 150 and change lines 10 and 30 to read:

```
10 CLEAR 1000
30 SW=64:TX=0:DL=2000
```




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CIRCLE READER SERVICE 42

WORKING AT HOME

PLUGGING INTO THE JOB CIRCUIT Use Your Computer to Help Find Your Next Employer

BY BILL TOOHEY

I knew the unexpected call to meet with the division vice president was not good news. Good news was not usually delivered at 4 p.m. on Friday in the corner office, and that's where I was headed. When I came out of the session, I was out of work.

I bought my Apple IIc earlier in the year to help with my job as an on-air radio correspondent. It never dawned on me how important it would be when I had no job at all. But I was about to learn.

My job hunt began after five years with the same company, and many more years in the same industry. But the techniques I used may be valid for you, whether this is the latest of your career moves, or your first job right out of college.

You'll quickly discover, as I did, that finding employment can be a full-time job. It doesn't have to be, though. If you turn to your computer and the right software, you can save time and energy and impress a lot of potential employers to boot.

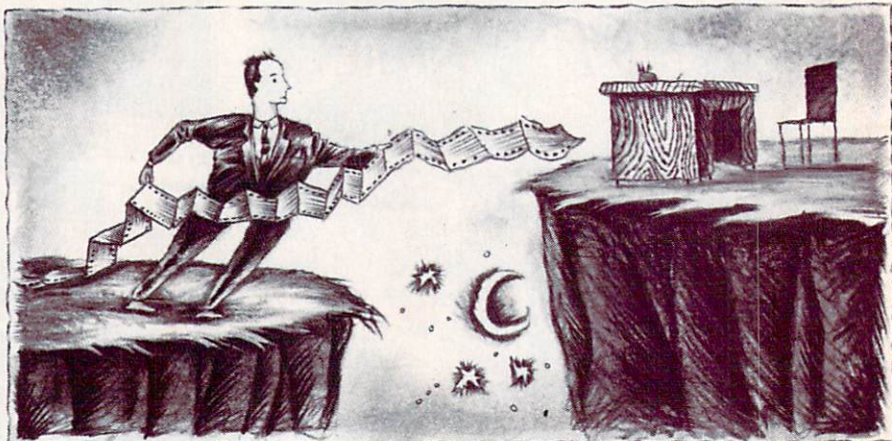
GETTING STARTED

A word processor and a data base are the minimal software required to set your job search in motion. I turned to the PFS series (by Software Publishing Corp.), an integrated system with word-processing and data-base programs. Its basic operations can be performed using everyday English, and the more sophisticated features, including mailmerge, are clearly explained in the manuals.

As for hardware, a letter-quality printer is virtually essential. Though you're basically putting out a mass-mailing, you don't want an executive on the receiving end to feel like one of the masses. You want that person to think you wrote personally, and a dot-matrix machine will not give that impression.

A modem, though not a necessity, is a nice frill that may open up electronic "networking" opportunities

Thanks, in part, to his computer, BILL TOOHEY recently landed a position as news correspondent at WNBC Radio in New York City.



that were once limited to business fraternities and the company lunchroom. And there are a number of good books to start you off—*What Color is Your Parachute* (Ten Speed Press, 1985; \$8.95), for example, is a useful reference.

WRITING THE RESUME

Now that you have the packaging tools, it's time to start selling yourself on paper in resume form.

I pulled out copies of my old resumes and updated the most recent one. It meant trimming here and expanding there, but it wasn't too difficult, since the basic framework was already in place.

If you're just starting out and don't have sample resumes to work from, head for your local public library for books describing how to put together an effective presentation on paper. *Resumes For Better Jobs* (Monarch Press, 1973; \$5.95) and *How to Get a Better Job Quick* (Mentor Books, 1980; \$4.50) are good reference guides. If you're a

member of The Source, you'll find it has a section on-line called The Job Hunter's Handbook (type PUBLIC), filled with tips on putting together a resume, interviewing techniques, and even selecting a career.

Use your word processor to develop the form and content that make you most comfortable. Once you have a final version, save it and run off as many copies as you need on your printer.

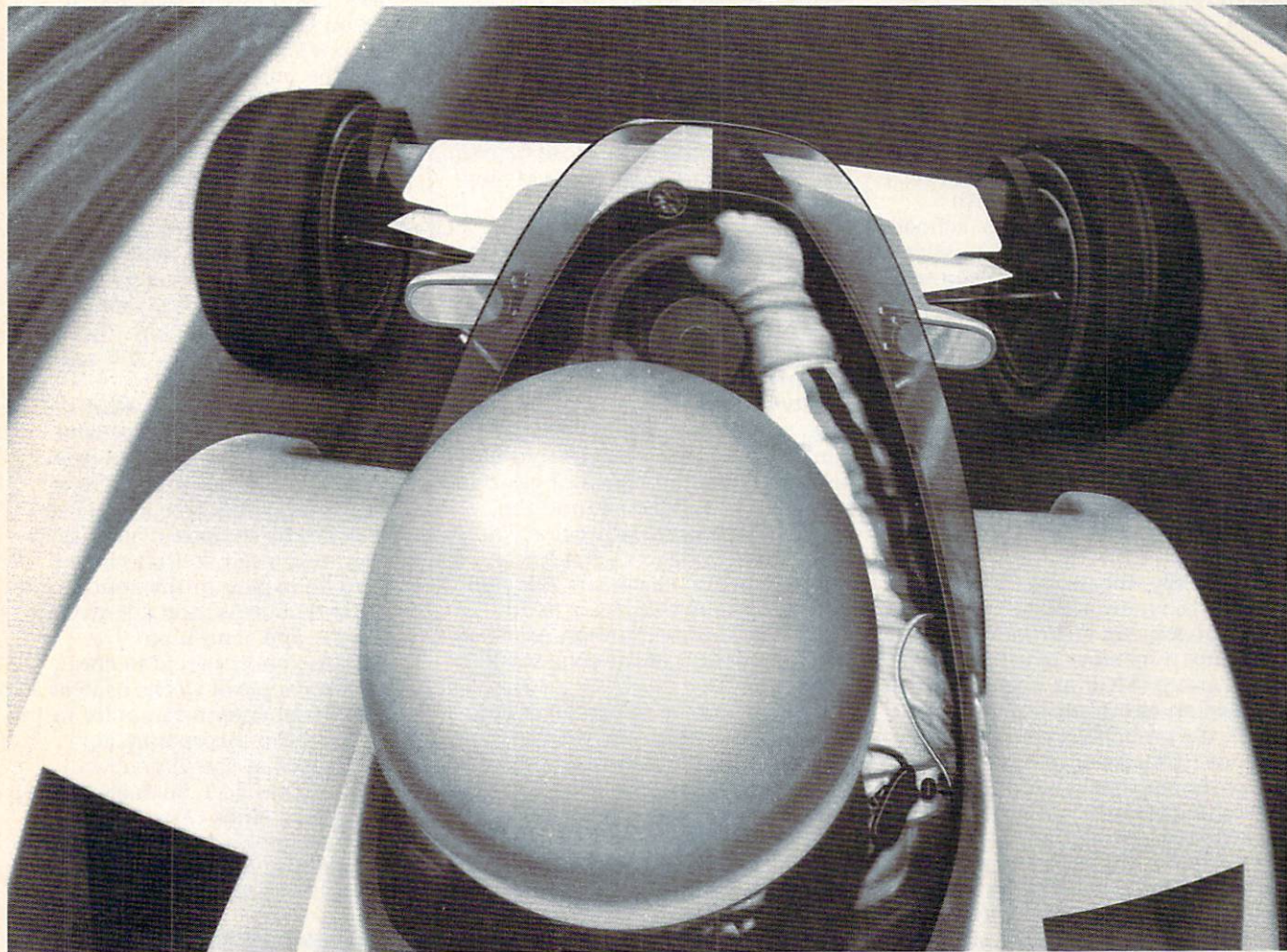
But don't limit your resume to this "assembly-line" model; it's easy enough to customize your resume to emphasize personal strengths and experiences that suit a particular employer. For example, I've had some experience working at the United Nations. I don't generally include this in my basic resume, but I added it to a resume sent to a firm with international connections. I knew they'd be more interested in that than other prospects would be. Rather than retype the whole resume, I simply called up my "master" resume and added a few lines of

NAME/TITLE: Bob Jones/News Director
ORGANIZATION: WOW Radio
ADDRESS: 111 W. 1 St.
CITY/STATE/ZIP: New York, NY 10000
PHONE: 212/555-1212
JOB SOUGHT: Newscaster
REFERRED BY: Rosemary Robin
RESUME SENT: 01-04-86

SUPPORT MATERIAL: Tape of sample broadcasts (01-06-86).
RESPONSE: Received call from Jones 01-15-86; interview 10 a.m., 01-21-86.
GENERAL COMMENTS: Hot prospect. Low salary, \$18,000, but great benefits.
MORE COMMENTS: Needs someone to start immediately.
INTERVIEW: Good feedback, liked sports experience. Jones will call back by
FOLLOWUP: Thank you note sent (01-22-86) along with taped coverage of Ro-

A sample printout of a file on a prospective employer.

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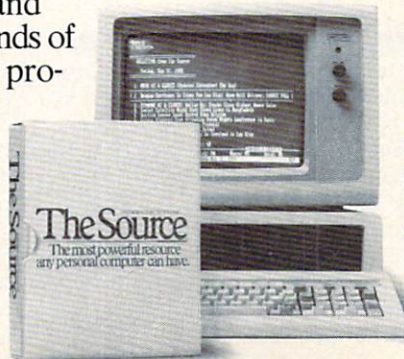
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WORKING AT HOME

United Nations data under my "experience" heading.

FINDING PROSPECTIVE EMPLOYERS

Once you have printed out your resume, you'll need to start getting it into the proper hands. To find prospective employers, check with friends, business associates, school placement offices, business publications, and the classifieds. Also turn to your computer—and your modem, if you are a member of an on-line network. CompuServe, for example, lists want ads from the *St. Louis Post-Dispatch* (GO SPD). The Source also has an on-line data base of jobs available throughout the country on its Career Network (type EMPLOY). You can use key words to find jobs by location, type, salary, and other categories.

Admittedly, those opportunities offered by the networks are fairly limited. But you can go beyond them. If you're not a member of a special interest group (SIG), or if you haven't yet used an electronic bulletin board, it's probably a good time to join one. (Your local computer store, computer magazines, and the major electronic networks are good places to start your search.) Try to find one that fits your interests and put the word out—the networks are always buzzing with "hot" information tips. Let other computer users know about your situation. Even if they're not in the same field, they might have read about a job in their local computer bulletin board newsletter.

FILE YOUR FACTS

Using a data base, you can create your own electronic filer for all of these potential employers. Begin by entering the NAME of the person you should apply to, that individual's TITLE, the COMPANY NAME and ADDRESS, with CITY, STATE, and ZIP CODE.

In addition, create fields for the JOB TITLE you're seeking, the person you were REFERRED BY (if anyone), and whether you found the opening in an ADVERTISEMENT. Make a listing of DATE RESUME SENT, and note any SUPPORTING MATERIALS you may have shipped. (This will help you avoid duplication of letters and effort.) Also, create headings for the company RESPONSE and your FOLLOW-UP. Leave ample room for GENERAL COMMENTS so you can enter information like salary offered, unlimited expense account, commuting time—factors that might influence your de-

cision if and/or when the job is offered to you. I found an EVALUATION field particularly useful as well; here I divided the employment prospects into three categories—hot prospects, maybes, and long shots.

Then begin filling in those blanks. (See the box for an example of what one of my files would look like.)

YOUR COVER LETTER

Next, turn to your word processor and create cover letters for the prospective interviewers. Check your data-base files for "referred" and "hot prospects." Obviously, you have one foot in the door at these companies, so put them at the top of your mailing list. Each letter should be tailored, depending on your relationship with the addressee and the stage of the interview process you have reached. (If you don't know where to begin, check out *The Robert Half Way to Get Hired in Today's Job Market* [Rawson Associates, 1981; \$5.95] at your local library.)

Whether long or short, all of your letters will include some of the same basic information (a brief review of what you are looking for, why you are interested in the company, and perhaps your salary requirements). So, set up the framework, save it, and use it again and again with personalized additions. One letter may open: "Dr. John Fields suggested I contact you." The second might begin "I'm applying in response to your advertisement in the *Chicago Post*." A third might indicate that you're "feeling out the job market." By changing the salutation and substituting a few words with a few keystrokes, you can produce a personal and professional cover letter geared specifically to each prospect.

Of course, not all resumes or letters will generate a positive response. You may get no answer at all from some. And some firms may send you their own form letters—politely turning you down.

INTERVIEW AND FOLLOW-UP

If you possess the skills you claim you have, somebody will bite your resume bait and call you for an interview. Your first rule of thumb for successful interviewing is "Be prepared!" Do research on the firm at the library or on the electronic networks, and plug the information into your data base. Before you go to the interview, pull a printout of your file on that particular company and

review it. You might even take it along on your interview and refer to it when it's your turn to ask questions. The interviewer will be impressed that you've taken time to do some homework.

The end of that interview doesn't mean the end of your work on the computer. Now you can use the FOLLOW-UP field in your data base. Summarize the interview. Include your basic impressions about the meeting, its length, specifics about the position and the company, the number of other candidates, and any additional details.

At the very least, you'll want to send a note to the executive who met with you, thanking him or her for the time and attention. The framework for this type of note can once again be composed and saved on your computer so that all you have to do is plug in the appropriate name and address, add a personalized note, and send it off.

Perhaps you were told to check back in a couple of weeks or next month. If so, enter a reminder in the company's file. Incorporate key phrases used at the interview in your COMMENTS field, such as "strong management skills essential" and "computer knowledge a plus." In your follow-up letter, reiterate your management and computer skills.

BEYOND THE SEARCH

All this may seem like enough activity to keep you busy full-time, but it's really not. Use your spare time to think about ways to earn money with your computer. If you're qualified, try your hand at freelance word processing or bookkeeping. You can find other ideas for home businesses in past issues of FAMILY COMPUTING. These activities can raise money—as well as your spirits—while you wait for a job. And the job will come—with patience, persistence, and the powerful help of your computer.

KEEP YOUR CONTACTS

Once you get on somebody's payroll, don't abandon your data base. You have created a list of some influential people in your field. Don't let it go to waste. Pull out the names of those who showed real interest, and drop them a line telling them where you've landed a position. It's just one more form letter for your word-processing and mailmerge capability and it could pay off nicely in the future—when you're ready for a move up the ladder. ☐

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TELECOMPUTING

COMMUNICATIONS SOFTWARE THAT WORKS

Dialing Another Computer Shouldn't Be Like Dialing Timbuktu. With the Right Software, It Isn't.

BY NICK SULLIVAN

Give me a call. Did she call? The phone's ringing. Take the call upstairs. Get on the line quick. Call the doctor. Honey, it's the repairman. What a phone bill!

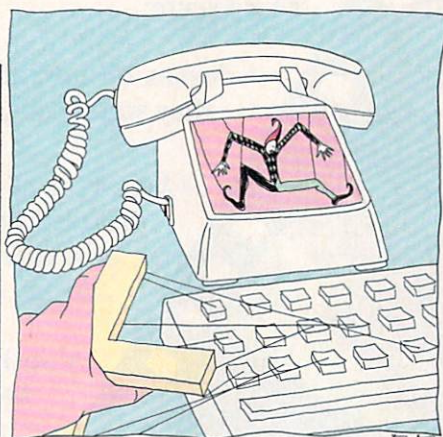
The telephone is so much a part of our daily lives that we never stop to think what we are doing or how. Fiber optics, packet-switchers, transformers, orbiting satellites, trans-Atlantic cables—we don't care. Just pick up the horn and dial.

Why can't using a modem be more like making a phone call? Easy, easy. Ma Bell worked on the telephone and its super-duper user-friendly interface for some years. Modems are relatively new to mankind. Anyway, it's not the modem's fault. Modems are dumb and do what you tell them. Software is the key. Get the right communications software and in a short time, using your modem will be like making a phone call. Which is what it is.

Here's a quick look at several pieces of communications (aka terminal) software that work well—for different reasons, and on different computers.

ASCII EXPRESS

ASCII Express is from the Pleistocene era of computer software (1980), and thus does not incorporate many of the hand-holding niceties (like menus) that mark today's consumer-oriented software. On the other hand, it's been updated several times, and isn't slow and awkward like most software of its generation. It was written by programmers who obviously wanted a tool that would work well and fast—and it does that. Almost all commands require two keys: a user-defined key, plus P for on-line printing or R for record (open the buffer), etc. A large buffer (24K on the Apple version, 28K on the IBM) lets you capture pages upon pages of text. A built-in editor



lets you prepare files for transmission, or edit them once received.

Setting up automatic log-in sequences ("macros") is not easy, but not impossible. You can also set up *ASCII Express* in a REMOTE mode, so outside callers with a password can send or receive files to or from your disk. Novice computer users might find the manual off-putting—it makes you think you need to

know more than you do. But if you're now using a slow and tedious communications package, or use your modem often, you'll appreciate the speed and capability of *ASCII Express*.

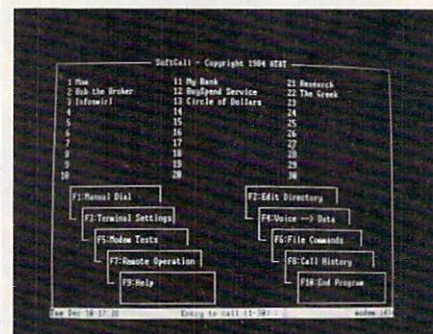
AT&T SOFTCALL

Believe it or not, the best piece of communications software I've seen is made by AT&T. When you use *SoftCall* you wonder what all the fuss is about. *SoftCall* turns your computer and modem into puppets, and you into a puppeteer. You do little more than tap the function keys on the IBM PC and compatibles. To write an automatic dialing or log-on sequence (for information services you call often), just tap the computer into LEARN NEW mode and make your call. The software records and files up to 90 such sequences, which can then be dialed by pushing 1, 2, 3, etc. To MOVE, COPY, or VIEW a disk file while on-line, tap a function key. Ditto to SEND or RECEIVE a file, to get HELP, or to make a VOICE-DATA switch.

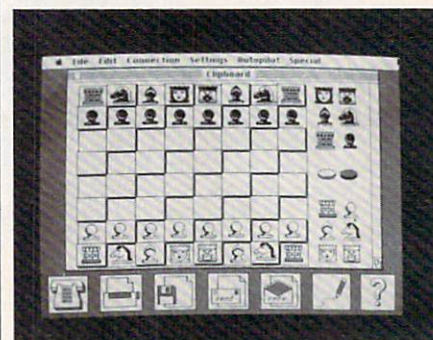
The CALL HISTORY function that lets you see at a glance the length and placement of your data calls is great for record-keeping. You can go to sleep (or Hawaii) and leave the computer in REMOTE mode, so outside callers can leave or receive messages. The program is effortlessly fluid from start to finish (tap a function key to END DATA CALL), and should be a model for software designers in any field.

Unfortunately, *SoftCall* works on with the AT&T 4000 modem (the only modem not disconnected by a call-waiting signal). In and of itself, this presents no problem—the modem communicates with any other modem or service. But for the many people who have non-AT&T modems, this beautiful software is a mirage.

(*SoftCall*: AT&T Consumer Products, 1776 On The Green, Morristown, NJ 07960; [201] 898-3736. For IBM PC and compatibles and AT&T 4000 modem. \$79.)



AT&T's *SoftCall*: Just push a function key.



Hayes' *Smartcom* II: Play chess on-line.

NICK SULLIVAN is senior editor of FAMILY COMPUTING.



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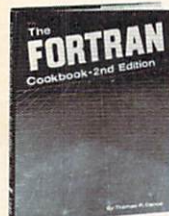
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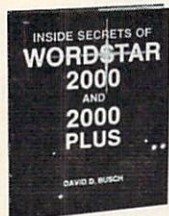
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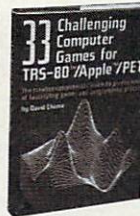
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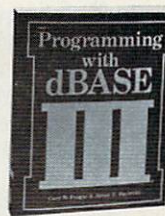
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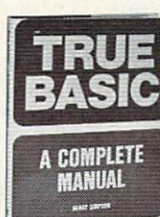
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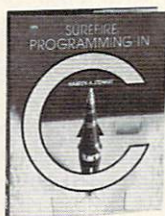
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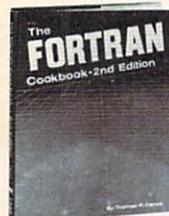
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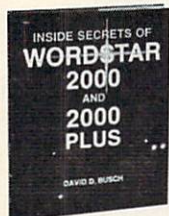
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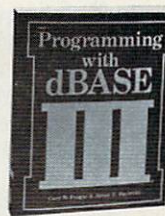
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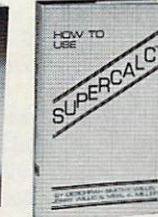
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TELECOMPUTING

HOMEPAK

One of the three programs in *HomePak* is called *HomeTerm* (the others are *HomeText* and *HomeFind*), and it's a little gem. A measure of *HomeTerm*'s class: the Atari XL/XE and Commodore 64 versions dance circles around some communications software written for more powerful computers. You can send and receive files a number of ways (Vidtext format, XModem), or just open the capture buffer and receive whatever's on the screen. Unfortunately, you cannot print while on-line and reading, say, your electronic mail, but you can print files once they're saved to a disk. Similarly, a built-in utility lets you COPY files from one disk to another. There's no on-line HELP, but after a few calls, you won't need the manual.

A "marquee" at the bottom of the screen keeps you informed about your status at all times. A clock tells you how long you've been connected to another computer. If you're sending or receiving a file, you're told how much room is left in the buffer,

and the form (ASCII, Vidtext, etc.) of the file. You always know whether you're in FULL or HALF duplex. These features aren't necessary, but they make using the program a pleasure.

(*HomePak*: Batteries Included, 30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5; [416] 881-9941. Reviewed on 48K Atari, C 64/128. Also for 48K Apple, Atari 520 ST, IBM PC/PCjr, and 512K Macintosh. \$50.)

SMARTCOM II

Most computer communications aren't visually exciting. You either see text on the screen, or some kind of hieroglyphics indicating that blocks of a binary file are being sent or received. With *Smartcom II* on a 512K Macintosh, however, you can step into a bold new world of interactive graphics. (*Smartcom II*, to be used with a Hayes Smartmodem, is also available for the IBM PC, but is an entirely different program.) A Mac user on one end can PICK UP a "pen" (read mouse) and draw, and the on-screen graphics will magically ap-

pear on the other computer (if that user also uses *Smartcom II*). The first user can then PUT BACK the pen, and the second user will PICK UP to make alterations to the drawing. During this artistic give-and-take, either user can type comments or questions on-screen. In addition, any *MacPaint* file can be manipulated on-line. Included in *Smartcom II* are chess- and checkerboards, for on-line gaming. And there's no reason why inventive users couldn't design their own gameboards and rules.

Smartcom II, which uses the familiar Macintosh icons (a ? for HELP, a letter with a stamp for SEND), allows on-line printing, supports the XModem file-transfer protocol, and has a SWITCH TO VOICE function. (*Smartcom II*: Hayes Microcomputer Products Inc., P.O. Box 105203, Atlanta, GA 30348; [404] 441-1617. Macintosh with Hayes Smartmodem. \$149.)

VIDTEX

Vidtext, like *ASCII Express*, has been around a long time. It's published by CompuServe (originally for Tandy's Model I), and intended for users of that service. But the only function that makes it CompuServe-specific is its B protocol for sending and receiving your files. Beyond that, it's a good general-purpose package that has, as they say, stood the test of time. While not as fluid as *HomePak*, on the Commodore version one- or two-key commands (the latter using the Commodore key) will get most jobs done. To go from the menu to terminal mode, hit RETURN; to go back, Commodore-M. You can print while on-line. The main drawback to *Vidtext* is the lack of an XModem protocol. So much software and so many information services (including CompuServe) support XModem that it's a good ace to have in your back pocket. But it's not crucial, as you can still receive a file by opening your buffer, and saving the contents to disk.

(*Vidtext*: CompuServe, 500 Arlington Centre Blvd., Columbus, OH 43220; [614] 457-8600. Apple IIe/IIc, C 64/128, Tandy Models I/II/III/4. \$40. Called *Professional Connection* for IBM PC. \$70.)

ELECTRONIC EDITION

The Family Computing Forum (GO FAMFORUM) and *the Computer Club Forum* (GO CLUB) are run with modems supplied by Hayes Microcomputer Products, Inc.

You may also leave mail for FAMILY COMPUTING on *The Source* (ID T15483)

COMMUNICATIONS SOFTWARE CHECKLIST

What's good software? Software that does everything you want, is easy to learn, and effortless to use once you learn it. That's asking for the moon, I know. Here's a checklist of desirable features to help you get there.

Autodial Sequences. Most programs allow you to store phone numbers and log-on sequences, which you can initiate with a simple keystroke or two. However, setting up the autodial sequences is not always so easy. Some programs, such as AT&T *SoftCall* and U.S. Robotics' *Telpac* (IBM PC and compatibles. \$149.) do the work for you. Make a typical call, and the programs record all your keystrokes. Then, they play them back at your request.

Disk/file Commands. Say you're on-line, and about to send a file called . . . called . . . you forgot the name! How long is it anyway? Some communications programs let you call up a catalog, and even view files. It's a big advantage to have these and other basic DOS commands built in to the program.

File Transfer. One of the main uses for a modem is to send a file from your disk to someone else's disk. To do so, your software must have "file-transfer" capability. The most popular method for sending and receiving files is with the XModem protocol (see *Telecom-*

puting in October 1985). You can live without XModem, but it's like having a good friend you can trust in an emergency.

On-Line Printing. When connected to another computer, you want to be able to print anything that comes across your screen. If you cannot print while on-line, you'll have to save text to disk, and print from there, or boot up a word processing program, and print from it. Either way, it's a nuisance.

Remote Control. Do you want to send files from your portable to your desktop system at home? Do you want to go to sleep and let a friend or client (with a password) send you a file? If your modem has auto-answer capability, and your communications software can operate in REMOTE mode, you can leave your computer on automatic pilot.

Text Editor. It's often easier to compose a short electronic-mail message off-line. If you do this from your word processing program, you then have to boot up a communications package to send the message. With a built-in editor, however, you can write and send with the same program. The reverse of this combo is the word processing program with built-in communications—*AppleWriter II* is one of the few in this elite class. (*AppleWriter II*: ProDOS version for the Apple IIe/IIc. \$149.)

How to turn your computer on.

(The following is an actual conversation between Bantam Software and an unusually talkative personal computer).

BANTAM SOFTWARE:
We always ask what turns people on. Now we want to know what turns you on.

PERSONAL COMPUTER:
It's about time someone asked the real expert. What turns me off is boring software. Boring, uninvolving, predictable software. And cold rooms. Why is it always so cold in here?

B: Games and *Ahoy* magazines called *Sherlock Holmes* in "Another Bow" one of the year's best.

PC: Let me decide. Okay? (Disk inserted.) Well, this is anything but elementary. You're Holmes. Watson's at your side. And you determine your own fate in case after case. And look, you run into the likes of Picasso, Gertrude

Stein, Henry Ford, Louis Armstrong. And such graphics! These derive from early 20th century photographs. I don't have a clue how you did it, but you have a winner. Next case.

B: *The Fourth Protocol*, from Frederick Forsyth's gigantic best-selling book. Games called it "nerve-tingling." Here you go. (Slides disk in.)
PC: You mean circuit-tingling. If I knew I had to save the world, I would have gotten more sleep. All kidding aside, this involves

nuclear weapons. A British traitor. The KGB. And the subversion of NATO. This is a challenge. Will it help if I read the book? (Loud explosion on screen.) Oh no! Does that mean I lost?
B: No, but losing's the whole point of the next one. *The Complete Scarsdale Medical Diet*. You know the bestseller.
PC: Why, do I look heavy?
Never mind, let's have a taste.

(Disk is inserted.) This is some menu. It helps you assess your goals.

Monitor your progress. Mix 'n match meals from all five Scarsdale diets. Even prepares your shopping list. It'll tell you how much exercise you need to work off certain foods. Let's see about kiwi tart...

B: We've got one other program.

PC: No more. I'm exhausted.

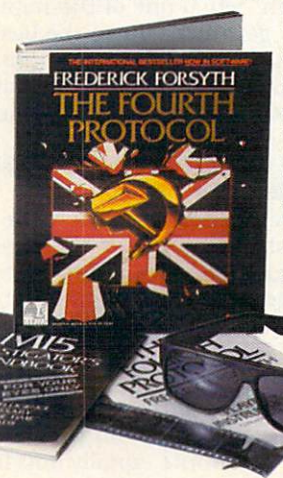
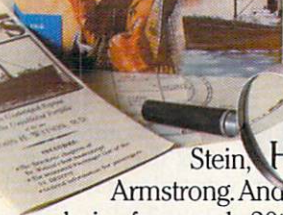
B: No...this is a rebate program. Just fill out the coupon and mail it with proof of purchase and you get \$5.00 back.


PC: Thank you. That's a nice offer.

B: So, did we turn you on?

PC: Yup. Now, please turn me off so I can rest. I've got to do some running later on to work off that kiwi tart.

Sherlock Holmes available for: Apple //Series, Commodore 64/128, IBM PC/PCjr, Macintosh.
Scarsdale Medical Diet available for: Apple //Series, IBM PC/PCjr.
The Fourth Protocol available for: Commodore 64/128. Available soon for Apple //Series and IBM PC/PCjr.





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GAMES

START YOUR OWN PLAYTESTING GROUP It's Not Just For the Pros!

BY JAMES DELSON

"Playtesting." Strange word, isn't it? Usually, tests are no fun, while play is certainly supposed to be. Play is playtesting's dominant half, however, since in order to test any game properly, it should be a pleasure for the players.

This pleasure needn't be restricted to lucky folks who play games for a living. If you enjoy playing in group situations and have considered gathering a throng of gamers, here's a primer on starting—and maintaining—your own playtesting group.

MY LIFE AS A PLAYTESTER

As part of my job reviewing games for FAMILY COMPUTING, I first organized our playtesters in March 1983. Since then, a mixed team of men, women, and children have visited my home several times a week to try out new games. Many came to our group as experienced gamers, but a few had never tried computer simulations. We figured that that was all to the good, since many of my readers are new to the field as well.

People come to my house to play for four to eight hours. Some days, we try only one game, especially if it's a role-playing adventure or a strategy and tactics simulation. Then there are times we play up to 10 games, mostly the arcade or strategy/arcade variety. There's food around for when people take breaks from playing.

Our group runs smoothly; once re-gimented, it's now more of a party. But what we've learned from our playtesting experiences can be guidelines for your gaming.

JAMES DELSON is games critic for FAMILY COMPUTING. His next column will examine strategy games.



MAKING UP YOUR GAME GUEST LIST

In choosing the members of your playtesting group, take into account each person's attention span and special likes or dislikes. Eclectic gamers who can move from arcade games to adventures to financial simulations are best, but not everyone is that experienced. Often, this gets sorted out over time, as players' abilities and interests progress from exposure to new types of games.

How many computers you have

will influence how many people you invite. Three players are a good-sized group if there's only one computer. With a second machine, you can host up to six friends.

If you want playtesting to be more than a once-in-a-while thing, plan on having backup members for your circle. These can be players who don't like to come every time, but might be counted on to "make up a fourth" when one of the regulars can't get there. Since the best part of group playtesting is the human interaction, stay on top of this; you can always play games by yourself.

SOME THINGS ARE ALWAYS TRUE

There are as many different game packages as there are ways to set up playtesting groups. But one rule must be strictly enforced in each group: *No eating, drinking, or cigarette smoking near the computers.* Any of the three can easily damage your game disks or equipment. If you make it an "all-the-time" rule, no one needs to apologize later. I've seen too many greasy crumbs and spilled drinks to think otherwise.

THE QUESTIONS OF MONEY AND TIME

Decide in advance how the group will share the cost of these get-togethers. One idea might be to have the group meet at a different house each week, with each host providing the groceries. That way, everyone takes a turn.

Another approach would be to have a group fund to which all members contribute equally and from which expenses are drawn. This can go beyond snacks toward buying

new games for group play. Appoint someone as "treasurer" to control the purse strings and to collect dues when fresh funds are needed.

Also remember that one or more of you need to take care of the detail work. This includes making phone calls to organize play sessions, helping with travel arrangements, and finding backup players.

Finally, try to decide ahead of time when to end each playtesting meeting, especially on busy weekdays. Knowing how long you have to play can also help you choose which games to boot up.

PLANNING YOUR SESSION

When possible, take time before anyone arrives to check out each game you want to play. This doesn't mean you need to learn every aspect of it, but look for three essential things: 1. make sure the game will boot, 2. be certain you have all necessary peripherals, like joysticks or reference materials, and 3. if the game is new to you, test to see if it's a good game for group members.

Consider the games you'll be playing. Natural multiplayer programs—text adventures and sports or political simulations, for example—are good for starters. In almost any genre, some games have more multiplayer options than others, but what you want from a play session may change. Sometimes it'll be fun to play solo games and compare each other's moves.

Remember to check what levels of expertise are required for the games you have in mind. If they're for beginners, then play is bound to be accessible to everyone. Are you ready for more sophisticated computer games? It might be wise to prepare a list of games you intend to play for the first several months. Prospective playtesters will then have an idea of what they're getting themselves into.

ONLY THE GAMES GET TESTED

Whether you do it for love or for money, playtesting doesn't work unless people are relaxed. The testing part of playtesting is fun when group members evaluate games, not each other. So don't put too much weight on winning or losing. There's often a breaking-in period while everyone gets to know each other. After the adjustments, you'll find that the "clubby" atmosphere of a playtesting group contributes to happy, growing experiences. **FC**

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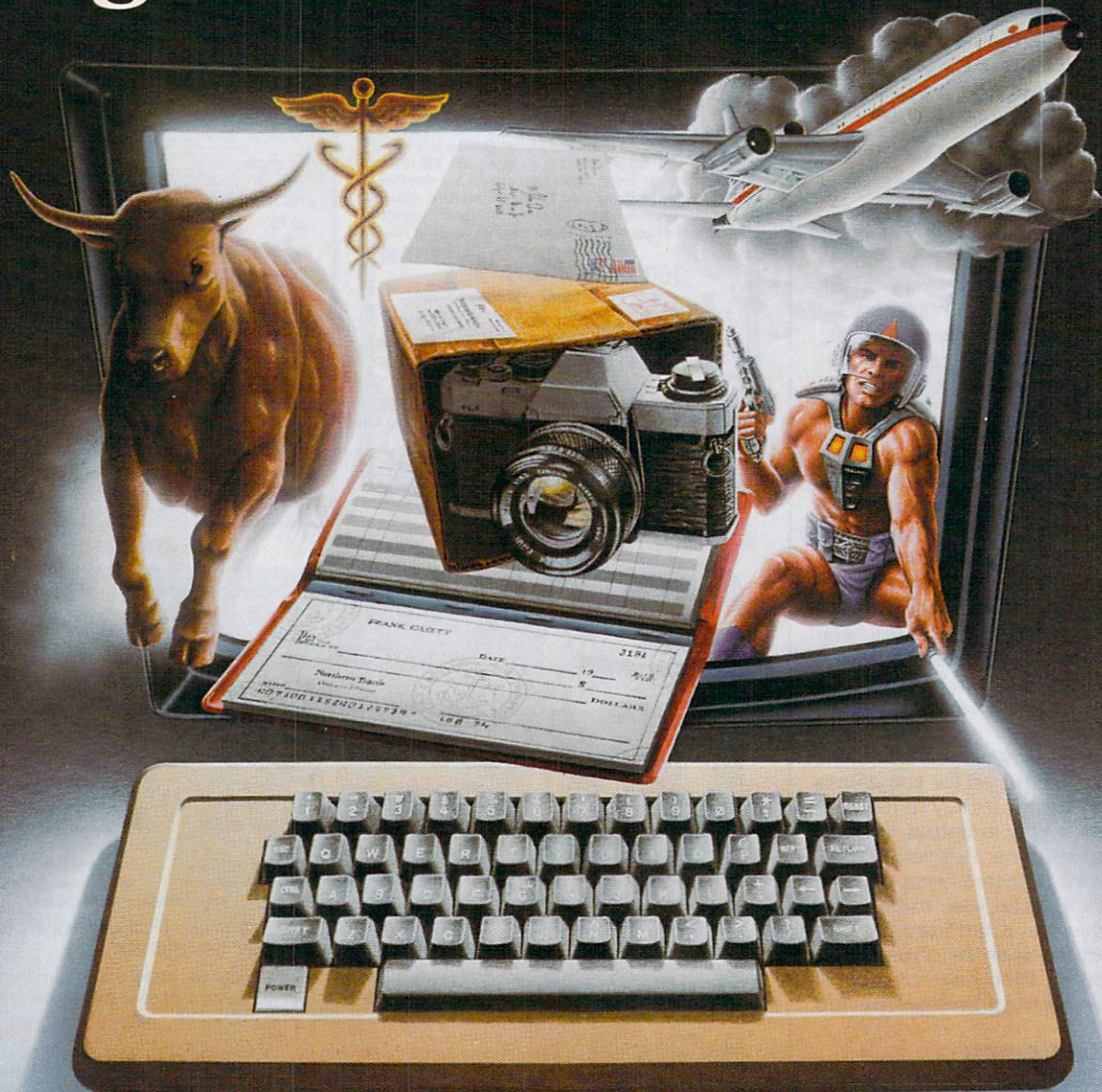
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Is it possible to use the Apple IIc's double high-resolution mode from BASIC? Also, are there any applications that take advantage of this mode?

S. ARAKI
Los Angeles, California

The double high-res mode on the Apple IIc and IIe (128K)—which gives you 16 colors and double the normal number of pixels on-screen—can be accessed from BASIC with machine-language routines. But it's a difficult and cumbersome project, and thus not really feasible except for experienced programmers. However, *Beagle Graphics* (\$60, Beagle Bros) has a built-in utility that lets you use double hi-res from BASIC.

In addition, several commercial programs take advantage of double hi-res mode. Scholastic's *Story Maker* (\$40), which allows you to create and print out a 12-page color storybook, was one of the first double hi-res programs for the IIc. Other double hi-res graphics programs include *The Graphics Magician* (\$60, Penguin Software), *Prince* (\$70, Baudville), and *Dazzle Draw* (\$60, Broderbund). —L.W.

How do I contact information services such as Dialog, CompuServe, Dow Jones/News Retrieval, and The Source? I have a Commodore 64 and am interested in any other on-line resources you might know about.

LYNEE DAVIS
Jacksonville, Florida

There are three ways to sign up for most information services: 1) Call an 800 number and request a "starter kit," which comes with password and sign-on information; 2) get the same starter kit from a computer dealer; or 3) buy a modem and get a "freebie" starter kit included with

Questions are answered by JEFFREY BAIROSTOW and LOUIS WALLACE, contributing editors; and NICK SULLIVAN, senior editor.

the modem.

Here are the toll-free numbers you requested: CompuServe, (800) 848-8199; Dow Jones/News Retrieval, (800) 257-5114; and The Source, (800) 336-3366. Probably the best way to reach Dialog and other research-oriented data bases is through EasyLink's InFact Service, (800) 527-5184 or through EasyNet, (800) 841-9553, (see *Telecomputing* in February's FAMILY COMPUTING).

These services cater to all kinds of computer owners. A made-for-Commodore service that can deliver color graphics to your C 64 is Commodore's Quantum Link [(800) 392-8200]. Knight-Ridder's Viewtron [(800) 543-5500] is designed for Apple II and Commodore computers (see the article on Viewtron in April's *Telecomputing* column).

Because telecommunications is a hot field, these services are scrambling madly to sign up customers, and all offer special incentives to join. Request and compare information before making your choice.

—N.S.

Do I need a surge protector and will it affect my programs?

LLOYD M. TAPPANA
Soldotna, Alaska

Unfortunately, you won't know until it's too late if you really need a surge protector or not. Surge protectors prevent power blips or surges from affecting your computer (e.g., by overloading it and thereby erasing the contents of computer memory). Unless the wiring in your house is suspect, you probably don't need a surge protector. You should save your data frequently, however, especially during electrical storms. If you're running a small business in which loss of any data would be disastrous, a high-quality surge protector might make sense. Some similar devices even act as generators if the power is knocked out. Surge protectors have no effect on your programs. —J.B.

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BUYER'S GUIDE TO

IBM-COMPATIBLE

COMPUTERS

IMITATION
IS THE
SINCEREST
FORM
OF FLATTERY



BY PHIL WISWELL

Apple IIs and Commodore 64s; Ataris and Adams; Tandy CoCos and little Timexes—all are great for most home computing applications. Without them, millions of people would still be watching reruns of "All in The Family" after dinner, unaware of how much fun and how useful a computer can be.

But when gearing up for serious business applications (even in the home), you might contemplate upgrading to the IBM PC world. These personal computers have become synonymous with business use. Because the IBM PC has been so successful, virtually every computer manufacturer has imitated it. Notable exceptions are Apple (Macintosh), Atari (520ST), and Commodore (Amiga)—each of which has powerful new computers that make a point of not imitating IBM. (See "Buyer's Guide to General-Purpose Computers," the cover story in the November 1985 issue of FAMILY COMPUTING.)

In the four years since IBM introduced the PC, more than 200 companies have brought out PC "look-alikes" or "work-alikes." Some add features and better performance; others undercut the price; still others have done

PHOTOGRAPH BY NEIL SLAMIN

PHIL WISWELL wrote "Buyer's Guide to Business Computer Systems" in the October 1985 issue.

both. But to one degree or another, these IBM compatibles run software written for the IBM PC family (including XT and AT) and use hardware built for it. Furthermore, the compatibles have brought the once-forbidding price of a PC down into the consumer's range.

Many of these IBM-compatible manufacturers went out of business as fast as they came in, while one—Compaq—is heading for the Fortune 500. Now, many major companies that long resisted the IBM surge—such as Tandy, Epson, Kaypro, and Wang—make IBM-compatible computers.

WHY IBM?

Why not do business tasks on an Apple II or Commodore 64, you say? After all, many people do. Moreover, many people claim their "souped-up" Tandy Color Computers and Timexes outperform IBM PCs. Whether that's true or not, the upgrade process is certainly a more difficult, time-consuming, and expensive route than buying an IBM or compatible. And, in the end, chances are the IBM will work more smoothly. Let's examine the design of the PC to see why.

- The first and foremost advantage to the PC (a term used generically to represent IBM PC and compatibles) is raw speed. Software generally runs faster than on 8-bit computers (Apple II, C 64, etc.) for several reasons: the PC's faster microprocessor and disk access, and larger user memory. The PC's speed is especially apparent when performing mathematical calculations, less so when word processing. Speed doesn't make a difference if you write an occasional term paper or calculate home finances on a spreadsheet. But when you're dealing with hundreds of documents, or thousands of records in a file, or large amounts of numerical data, the last thing you want is a slow computer system. The PC's speed truly increases productivity.

- The second advantage is permanent (disk drive) and temporary (RAM) storage space. The PC's disk drives store 360K a disk. Or you can upgrade to a hard disk drive that stores 10 or 20 megabytes (or more) of information—the equivalent of roughly 5,000 or 10,000 pages of typed text.

Standard memory on a PC is 256K, and it can be expanded to 640K or more. With this much memory, you can have two programs in RAM at once. While running

LEADING IBM PC- AND XT- COMPATIBLE COMPUTERS



Model	List Price	Hardware Included ¹	Software Included	RAM (K): Min. (Max.) ²	Micro-processor Speed (MHz)	IBM-compatibile? ³	Expansion Slots	Built-in Ports
IBM PC	\$2,295	Two 360K disk drives	BASIC	256 (640)	4.77	—	5 ⁴	None
IBM PC XT	\$2,570	Two 360K disk drives	BASIC	256 (640)	4.77	—	8 ⁴	None
AT&T 6300	\$3,010	Two 360K disk drives, monochrome monitor, color/graphics	BASIC, MS-DOS	256 (640)	8	Somewhat	7	Serial, parallel
COMPAQ DESKPRO MODEL 2	\$2,995	Two 360K disk drives, monochrome monitor, color/graphics	BASIC, MS-DOS	256 (640)	4.77/8.1	Highly	6	Parallel
EPSON EQUITY	\$1,295	Two 360K disk drives	BASIC, MS-DOS	256 (640)	4.77	Mostly	3	Serial, parallel
IBM PCjr	\$725	One 360K disk drive, color/graphics	BASIC	128 (512)	4.77	Somewhat	2 ⁵	Serial
KAYPRO PC	\$1,595	Two 360K disk drives, color/graphics, monochrome monitor	BASIC, MS-DOS, Star series, Mite, Poly-window	256 (640)	4.77	Mostly	6	Serial, parallel
LEADING EDGE MODEL D	\$1,495	Two 360K disk drives, color/graphics, monochrome monitor	BASIC, MS-DOS, Leading Edge Word Processor	256 (640)	4.77	Highly	4	Serial, parallel
SANYO MBC-775	\$2,599	Two 360K disk drives, color/graphics, RGB monitor	BASIC, MS-DOS, Easy-Writer II/Filter/Mailer/Planner	256 (640)	8	Somewhat	2	Parallel
TANDY 1000	\$1,199	Two 360K disk drives, color/graphics	BASIC, MS-DOS, Desk-Mate	128 (640)	4.77	Mostly	3	Parallel
TANDY 1200	\$1,589	Two 360K disk drives	BASIC, MS-DOS	256 (640)	4.77	Highly	7	Parallel
WANG PC-PK-5	\$3,300	Two disk drives, monochrome monitor, IBM emulation board	BASIC, MS-DOS, PC Advanced Word Processing	256 (768)	8	Somewhat	5	Serial, parallel
ZENITH Z-158	\$2,499	Two 360K disk drives, color/graphics	MS-DOS	256 (640)	4.77/8	Highly	6	Serial, parallel

Footnotes: ¹All computers display text at 80 columns by 24 or 25 lines, with 640x200 resolution in monochrome mode, except for the Leading Edge and Wang (640x225), and AT&T (640x400). ²The "Maximum RAM" heading indicates the current limit of manufacturers' support; third-party add-ons may exceed this limit. ³The "IBM-compatible" heading describes the degree to which IBM software and hardware work on a computer. ⁴The "Expansion Slots" heading indicates number of slots available. On the IBM PC and XT, some slots must be used for video adapters, extra memory, and interfaces. ⁵One internal, one expansion connector.

Lotus 1-2-3, you can quickly switch to a "background" program like *SideKick* to write a reminder to yourself or add a new phone number to your list. "RAM-resident" programs such as *SideKick* (Borland) and *Ready* (Living Videotext's outlining program) are becoming very popular, and are almost exclusively written for the PC.

The ample memory also means that programs for the PC can be very sophisticated. There is no way on an Apple II, for example, to run an integrated package of word-processing, spreadsheet, and file management such as *Symphony* (Lotus) or *Framework* (Ashton-Tate). While these programs may do more than most people need, there's no denying that they do it well. Good integrated programs for Apple (*AppleWorks*) and Commodore (*HomePak*) exist, but they cut corners on features and performance to fit into 64K or 128K.

• Thus, the second advantage of the PC—increased memory—is tied to the third advantage: the availability of workhorse business programs (see "High-Powered Software: The Main Reason to Think IBM"). *dBASE III*, *Lotus 1-2-3*, *MultiMate*, *Reflex*, *Harvard Project Manager*, *Dow Jones Prospect Organizer*, *RBase 5000*, *ProKey*,

SuperKey, *TopView*, and *Windows*—all these programs and many more are available only for the PC and compatibles. The long and growing list of productivity programs for the IBM represents one of the most compelling reasons to buy a PC. However, the Apple Macintosh is developing a list of its own.

• The fourth advantage of the PC is internal expansion. You want it—you got it. For example, the Hardcard (Plus Development Corp.), a circuit board, can replace an external 10-megabyte fixed disk. The Apple Turnover board lets a PC write and read data to or from Apple disks. Just entering the market are boards that let you expand the PC's RAM up to eight megabytes for working with enormous spreadsheets and data files. Other boards turn the PC into a high-powered animation machine or artist's studio.

• The fifth major advantage of the PC is its 83-key keyboard. "Isn't the IBM keyboard much maligned, with a small ENTER key and misplaced SHIFT key?" you might ask. These problems are real, but fortunately many of the PC compatibles have enlarged these keys and given them better placement. More important for many users are the



Sanyo MBC-775



Compaq Deskpro

Leading Edge Model D



PC's 10 function keys, numeric keypad, and a handful of other useful keys, including PRTSC (to print whatever's on the screen), INSert, ALtErnate, PGUP (page up), PGDN (page down), HOME, and END.

Just as its extra memory allows the PC to run powerful programs, the extra keys make these programs easier to use on the PC than on computers with fewer keys. Hard-to-remember, two-key commands are usually effortless, one-key taps on the PC. (Other computers—notably the Commodore 128—have advanced keyboards, but don't have powerful software for them.) In addition, the keyboard attaches by coiled cable to the system unit, so you can stretch it away from the screen and rest it in your lap (the compatibles' lighter keyboards are better for this than the IBM's) or move it aside to free up desk space.

WHAT'S COMPATIBLE?

Why have so many computer manufacturers changed their tune to the IBM theme by offering machines with varying degrees of PC compatibility? Because most users want and need the support of an established software market. Indeed, it is folly to buy a computer without knowing if it will run the programs you need. Thus, manufacturers are producing machines capable of tapping that huge IBM software base.

But buyer beware! There are varying degrees of "IBM compatibility." No one computer is 100 percent IBM compatible except an IBM computer; otherwise, IBM could sue for infringement of the proprietary ROM chips that control its operation. As computer pioneer Adam Osborne is said to have said, "IBM compatibility is like pregnancy—either you are, or you aren't." I believe any computer that runs all the IBM software you want to use can be considered IBM compatible. In other words, if a so-called compatible can't run 1,000 IBM programs, so what? Who can use 1,000 programs anyway? Or, if it can run 1,000 IBM programs but not the 1,001st that you need, who cares?

All the compatibles should run the heavyweight pro-

grams—*dBASE*, *Lotus 1-2-3*, *PFS:File*, *WordStar*, etc. But if you're looking for a specialized business package (such as one on mink farm management), or much-loved entertainment and educational programs, proceed with caution. Take a list of your chosen programs to a computer dealer and ask to see machines that run them. Alternatively, call various manufacturers and ask them if your programs will run on their computers. For instance, Compaq, Leading Edge, and Zenith publish lists of the IBM software that has been tested on their computers.

IBM VS. THE WORLD

Once you've found the computers that run your list of programs, you're ready to decide whether to buy an IBM or a compatible. If you want an IBM just because it's an IBM, go ahead and spend the money. You won't need to worry about what runs or doesn't run. But if you want to save money, and possibly gain features not offered with the PC, look at some of the computers in the accompanying chart.

The IBM PC comes without serial or parallel ports (\$100), a monochrome display and printer adapter (\$250), color graphics card (\$244), or PC-DOS (\$85). To run the computer and see anything displayed or printed out, you have to buy "accessories." Most of the compatibles include these necessary add-ons as part of their standard packages. Most also allow you to extend memory to 640K by installing chips on the motherboard; on the IBM PC, to get beyond 256K you've got to use up valuable "real estate" with a plug-in circuit board.

Furthermore, if you buy a monochrome adapter and monitor for the IBM PC, you won't be able to see graphics displayed unless you buy a color graphics adapter. This leads to an agonizing and potentially expensive decision: which adapter and monitor do you buy, or do you buy both color and monochrome? Most compatible manufacturers solve the problem by giving you both options to begin with.

They say in the corporate world that "no one ever got

HIGH-POWERED SOFTWARE: THE MAIN REASON TO THINK IBM

All the hoo-hah about IBM PCs and compatibles boils down to this: these computers run the most and best business software. Consider the advantages of these six sophisticated programs for the PC—representing just the tip of the iceberg—that are not available on noncompatible computers:

dBASE III Plus (Ashton-Tate). A data-base management program that can solve virtually any record-keeping need for the small business. Its power (1 billion records per data-base file; up to 15 files open simultaneously; numeric accuracy to 16 digits) is awesome. With *dBASE III's* fast record-sorting, indexing, and copying, you'll make mincemeat of complex chores.

Dow Jones Prospect Organizer (Dow Jones). A high-powered sales tool that has no equivalent on a non-PC computer, the program helps salespeople track prospective clients by recording all the information they would normally take down on paper. Information is indexed and cross-referenced so well, and can be retrieved so quickly on-screen when the phone rings, that the system literally replaces paper and pencil for the salesperson. The system is a combination data-base manager, word processor, and report generator.

1-2-3 (Lotus). This electronic spreadsheet program (a major improvement over ex-champ *VisiCalc*) takes great advantage of the PC's speed and storage capacities. If you've got numbers to crunch and lots of them, you need *Lotus 1-2-3 Release 2*. Its worksheet area covers 256 columns and 8,192 rows, yielding more than two million cells for your data and formulas. *1-2-3* also includes a data-base program and a graphing program that creates business charts for viewing or printing.

MultiMate (Ashton-Tate). Modelled on the Wang dedicated word-processing machines, which are designed to handle large

numbers of documents, *MultiMate's* powerful word-processing and text-searching capabilities can turn you and your computer into the equivalent of a small clerical staff. The program has all the features you could want in a word processor, including fancy on-screen text-formatting capability. File size is 128K—more words than you can chomp at one bite with most computers. A summary screen for each file lists authors, addresses, and subject matter.

ProKey (RoseSoft) and **SuperKey** (Borland). Need a time-saver? These handy utilities let you record sequences of frequently used keystrokes (macros) and "play them back" with the push of a single key. Using these two programs, macros on your PC can range from the incredibly simple (such as a keystroke to display a directory of the default disk drive) to the incredibly complex (such as building a complex spreadsheet, importing data on daily sales totals, and creating a graph)—all with a single key.

Reflex (Borland). This brand-new data-analysis tool is unique to the PC, and offers powerful querying capabilities at the touch of one or two keys. The program splits the computer screen into two windows—one of which contains your data in a tabular spreadsheet format. You can view your data seven ways to Sunday by asking *Reflex* to graph specific sections in the other window. Bar, line, pie, area, and scatter graphs (among others) are available. And you can change the "view" instantly. You can generate the data fresh or import it from *Lotus 1-2-3* and other data-base management programs. Either way, *Reflex* holds the data in RAM, so the more RAM you have, the faster *Reflex* works. The program also gives you very snazzy reports that you can customize in endless ways.

—P.W.

fired for recommending IBM." In the consumer world, when you're spending your own money and not someone else's, you've got the rent to consider. If several PCs meet your needs, choosing among them may be just a matter of money.

REVIEWS OF LEADING IBM PC COMPATIBLES

Some of the computers reviewed here are more properly IBM XT compatibles. The IBM XT is basically a PC often sold with a built-in hard disk drive and eight (vs. five) expansion slots. However, since both the IBM PC and many compatibles can be outfitted with a hard disk drive, and the XT runs virtually all PC programs, the distinction between the PC and XT is slim. The IBM PCjr, while not truly a compatible because it has a different keyboard and is not sold with two disk drives, does run much IBM software, and offers better sound and color than the PC.

To avoid comparing apples to oranges in the chart, we list systems with more or less equivalent configurations. Keep in mind that all these computers are sold in a variety of configurations, and can be customized to meet your needs.

AT&T PC 6300 (AT&T Consumer Products Division; [201] 898-6000). IBM is getting into communications (it bought Rolm), and the phone company is getting into computers—with IBM compatibles. The PC 6300 runs up to twice as fast as the IBM PC or XT. This extra speed spells some incompatibility with software designed for the PC, but most of the major business packages run on the 6300, and on these the extra speed is like gravy.

The AT&T monitors (you can't use any others) are excellent, and include tilt-and-swivel bases for easy viewing. The color monitor, in particular, is spectacular. For the professional with piles of work to churn out, the 6300's speed and display clarity are a boon. The AT&T PC 6300 is more than a name—it's a high-performance machine.

Compaq Deskpro Model 2 (Compaq Computer Corp.; [713] 370-7040). You don't have to worry about hardware or software compatibility with Compaq computers. From the Compaq Portable—which established the company's reputation—to the Deskpro, performance and reliability are so good the company is now one of the top four computer manufacturers (with Apple, IBM, and Tandy). The basic Deskpro is designed so you can install up to four separate storage devices. Thus, it's a breeze to upgrade this computer to a hard disk if you start out with just floppy drives.

The Deskpro has built-in ports for monochrome, composite color, and RGB monitors. A six-foot keyboard cable allows ample freedom of movement. The Deskpro's heart is the 8086 Intel chip, which allows it to run about twice as fast as the IBM PC with its 8088 chip. However, since this speed can cause trouble for some programs, Compaq lets you switch between its fast processing speed and the "slow" 4.77 megahertz-per-second speed of the PC.

Leading Edge Model D (Leading Edge Products; [617] 449-4655). This computer gives you more for your money than any other PC compatible. The entry-level price (\$1,495) includes color and monochrome monitor adapters, a good monochrome monitor (amber or green), and parallel and serial ports—all of which are extras on the IBM PC. With an RGB monitor, the Leading Edge system costs \$1,895; with a monochrome monitor and hard disk, \$1,895. The keyboard has improved SHIFT and ENTER keys, and the cable attaches to the front, rather than the back, of the system unit. A toggle switch on the back lets you switch between monochrome and color displays. The Leading Edge uses all IBM hardware, and runs most commercial IBM software. If you're wor-

ried because you've never heard of the company, there's a 15-month product warranty.

Sanyo MBC-775 (Sanyo Business System Corp., Computer Division; [201] 440-9300). Like the Leading Edge, this computer comes with everything you need to get started (except a printer) and is portable. (All other computers reviewed here are "desktops," i.e., not designed to snap together and move.) Actually, the Sanyo's known as a "transportable"—at about 36 pounds, you can lug it around if you have to. Packed up, with the keyboard covering the front panel screen and disk drives, the Sanyo resembles a sewing machine case. It has an excellent nine-inch RGB monitor built in.

Two half-height disk drives stand vertically, housed in a special mounting, so upgrading the machine to a hard disk is a major headache. If you think you might want to upgrade later on, buy a different computer. Due to the Sanyo's fast speed (8 MHz), not all IBM software runs. In my tests, however, the Sanyo did run *dBASE*, *WordStar*, *Lotus 1-2-3*, and *XyWrite II Plus*. Bundled software saves you a nice piece of change on the total system cost.

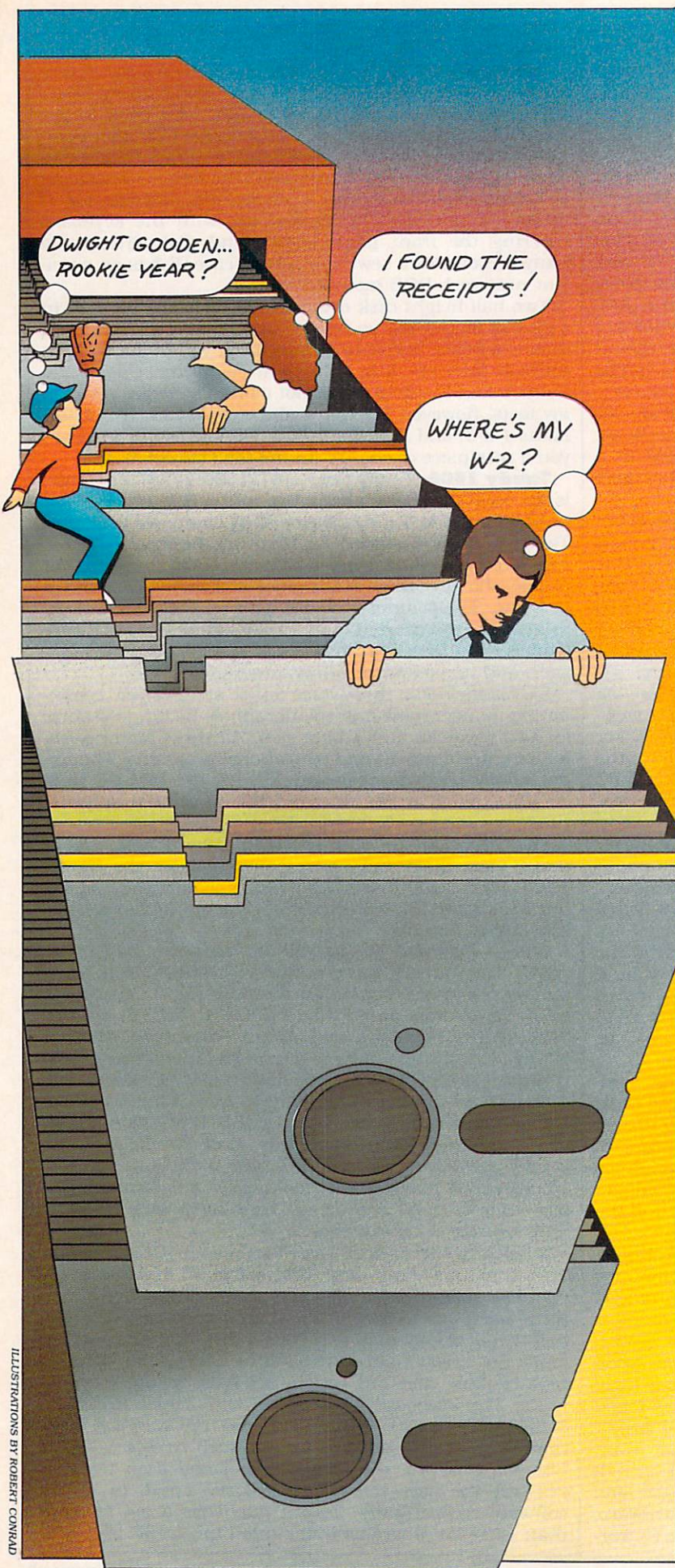
Tandy 1000 (Tandy Corp.; [817] 390-2728). The 1000 is the least expensive alternative to the IBM PC, and not coincidentally is Tandy's best-selling computer ever. The Tandy 1000 is designed for first-time buyers, for those who are upgrading from a smaller computer, and for people who have IBMs at the office and want a compatible at home. The computer comes with an excellent tutorial to help get you started, and Tandy's *DeskMate* software (which includes a word processor, spreadsheet, file manager, and telecommunications programs).

Extras include a three-voice music synthesizer, combination monochrome and color/graphics board, and ports for two joysticks and a light pen. All these features enhance entertainment and educational programs. Though not totally hardware compatible with the IBM PC (full-length expansion boards don't fit), most IBM software runs.

The 1000 can be outfitted with a hard disk, but if that's your main buying reason, consider the Tandy 1200. The 1200 lacks the 1000's color and sound, but runs more IBM software than the 1000, and accepts IBM circuit boards.

Wang PC-PK-5 (Wang Office Products; [617] 459-5000). The Wang PC has a wonderful keyboard that incorporates the most common word-processing commands as single keys—including FIND, REPLACE, MOVE, and INSERT. Since *PC Advanced Word Processing* software is included, the computer is a writer's fantasy come true. It runs at nearly twice the speed of an IBM PC. The heavy-duty unit is built to include Wang's special circuit boards. One of these boards must be the IBM Emulation board, or you have no IBM compatibility. Even so, the machine is only partially IBM compatible, due to its faster processor speed, so unless you're looking for a dedicated word processor or don't care about running a wide range of IBM software, look elsewhere.

Zenith Z-158 (Zenith Data Systems; [616] 982-3200). This computer runs most IBM software, and users applaud its smooth functioning. However, since it's nearly a third narrower than the PC, there's room for only two half-height floppy disk drives (the IBM PC has room for four). So, if you want to expand to a hard disk drive or tape backup later on, you might have to use external units. The keyboard is excellent, with larger RETURN, SHIFT, CTRL, INS, DEL, TAB, and BACKSPACE keys than the IBM has so it's better for touch typists. Like the Compaq Deskpro, the Zenith runs faster than the IBM PC, but the user can select a slower speed to insure software compatibility. Zenith publishes a list of more than 150 IBM programs that run on the Z-158. ☐



ILLUSTRATIONS BY ROBERT CONRAD

Get Organized for Good With Data-base Software

CREATE A COMPUTERIZED FILE CABINET THAT PLACES INFORMATION AT YOUR FINGERTIPS

BY STEVE MORGENSTERN

Don't look now, but your home is crawling with . . . data!

Yes, it's true: even in the most nontechnical home, there's data in every nook and cranny. Over there—in the desk drawer. That envelope crammed with receipts. What a load of data! And under it, your insurance policies, or your tattered address book, or the membership list from the P.T.A. . . it's a whole drawer simply filled with data.

Surely we can find some place without data. But no—in the kitchen there's a calendar, with data about birthdays and anniversaries scrawled here and there. How about the kids' rooms? Even here, data is rampant. Look at that checklist of baseball cards in Junior's collection, or the notes for Annie's school report about snakes.

It's time to face facts—"data" is nothing but information, and the amount of information we all deal with every day just keeps growing. What can we do about this dizzying deluge of data? We can tame it, organize it, and capture it in a form in which we can control it. That's where data-base software comes in.

YOUR DIGITAL FILING SYSTEM

You'll find literally dozens of programs designed to help you file information of all sorts. Some are called "filing programs," others, "data bases" or "data-base managers." For our purposes, the terms mean the same thing (see "Relational? What's That?").

You could spend \$600 or more for a data-base program designed for business use. Filing managers for home or small-business use,

on the other hand, are available for anywhere from \$20 to \$200.

Within this price range, there are plenty of titles from which to choose for most computers. Lots of choices means lots of decisions, so you'll need to know the right questions to ask when sorting through the alternatives. With that in mind, let's take a question-and-answer approach to the field of filing programs, starting with a very common question.

WHY BOTHER?

As we tried to indicate, most people have some kind of information they need to keep handy. Granted, there's nothing you can put into your filing program that you couldn't write down on paper. *The real difference comes when you try to find something.* Filing software gives you a way to make sense of your data—to put it in order, and pull the one tidbit you need from a mountain of information.

Take, for example, my taxes. For most of last year, my high-tech solution to this national problem was a shoebox. Then, as April 15 rolled closer, I took shoebox in hand, booted up a friendly data base, and entered the information from a year's worth of receipts into a computer file. I did not type the information in any particular order, or presort the scraps; I just sat down and typed away. Then, when all the information was entered, I could ask for all my postage receipts in chronological order, for instance, and print out the results. The same went for travel expenses, income, and interest earnings. All of it went jumbled into the computer; it came out neat, ready to be filled in on the IRS schedules and forms.

A data base listing your household possessions and their value can be extremely helpful if you ever have to file an insurance claim. The same thing is true with all your hardware and software purchases. A family medical history is another easy and potentially valuable use of a filing program (see the *Home/Money Management column* in the November 1985 FAMILY COMPUTING).

Seen as general purpose tools, filing software can answer many needs that might otherwise be filled by specialized packages. This can include home budgeting or a checkbook register, tracking stock and bond portfolios or recipe files, and organizing research notes for term papers or even doctoral dissertations.

WHAT'S A FILE, AND HOW DO I SET ONE UP?

While there's certainly plenty of variety among filing programs, the basic procedure for putting information in and getting it out again is fairly standard.

In setting up, decide which categories you want to include (like PHONE in an address file). Name each category, entering that name into the filing program to create a form—just like a blank form you might type out if you were creating a file on paper. Then, each time you

enter the data, you'll simply fill in the blanks.

The jargon is simple—with a data base, categories of information are called "fields," and a blank form is a "record." Together, all your records on one subject constitute a "file." Each record might contain data about one person in an address file, for example, or one source in your reference notes. Within every record there are separate fields for each category. In an address-file record, for instance, you'd likely have a NAME field, a PHONE field, a ZIP CODE field, and so on.

THE DATA DANCE—ARRANGING, CHANGING, AND REARRANGING

Imagine things the old way. Each record in your address file is on an index card. You can reshuffle the deck of cards into any order, according to any category on the card. Alphabetical order by last name? Birthday order? Take your choice—but be prepared to spend some time and effort reading and rearranging each card.

Now boot up a filing program. All of a sudden, it's easy to order your facts, to rearrange them whenever it suits you. This is the "sort" function, an especially handy tool when you're adding new information or changing old. Instead of trying to find the right spot for this new data, you simply add it to the file. Invoking your program's sort command makes all the data fall into place in your chosen—perhaps alphabetical—order.

Every filing program we've seen has some kind of sorting capability. At the simplest level, you can put words into alphabetical order or numbers into numerical order. For instance, a program such as *Friendly Filer* will sort information only from A to Z or smallest number to largest. If you want your file arranged so the bigger expenses come before the smallest, you're out of luck.

On the other hand, software like *Bank Street Filer* lets you sort from lowest to highest or from highest to lowest in at least three ways: alphabetically, numerically, and chronologically.

HOW DO I FIND SPECIFIC INFORMATION?

Finding a particular bit of information within your file is accomplished by a program's "search" feature. One example of a search feature is exact matching. If I'm looking for all the people named "Smith" in my file. I will ask the program to find every record with the name "Smith" in the LAST NAME field.

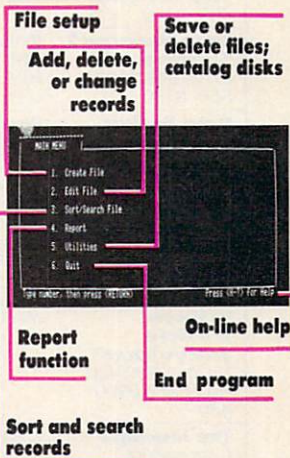
There are some kinks to consider. If you set up your data base with separate fields for LAST NAME and FIRST NAME, then you can pull out the Smiths with an exact match search under LAST NAME. But if you've used a NAME field and entered "John Smith," "Jane Smith," and so on, then "Smith" is not an exact match for either one. You'll need a different method for searching.

A MENU-DRIVEN DATA BASE

In data-base programs (as in many other types of software), you'll control the program in two main ways: through menus or through commands. With menu-driven software, you activate the program's functions by making choices from a menu. With the command-driven type, you need to remember what key(s) to press for any particular function. Menu-driven is easier (nothing to memorize); command-driven is faster (no menus need to be printed on-screen). Some filing programs (such as the data-base module in AppleWorks) combine menus for certain functions, with commands in other sections.

The representative screens on this page and the next few pages illustrate the menu-driven concept.

MAIN MENU



STEVE MORGENSTERN is a software reviewer for FAMILY COMPUTING. This is his first feature article for the magazine.

SELECTED FILING SOFTWARE FOR

On these two pages, you'll find a selection of filing software packages suitable for use by most families. In a few cases, data bases listed are powerful enough for small businesses; that's noted where appropriate. An explanation of the terms and criteria used in the chart follows.

Hardware Requirements: Unless otherwise stated, minimum memory requirements are 48K for Apple II series, 48K for Atari, 128K for IBM PC/PCjr and compatibles, and 128K for Macintosh. Of course, versions of the same title for different computers may vary.

Max. No. Records, Max. No. Fields, and Max. Size Record: The three "max" categories are interrelated. As the values in either of the last two go up, the maximum number of records in one file goes down. To wit: Even though the *AppleWorks*' data base allows each record to contain up to 1,024 characters, one file cannot hold the full 1,350 records if each record consists of the maximum number of characters.

As you set up more fields, your **Max. No. Records** decreases, too. (**Max. Size Record** is measured here in characters.)

Sort Types: "Alpha" means to sort mixed text (words alone in a field, or words and numbers); "numeric" refers to number sorts only. "Ascending" is A to Z or zero to nine, while "descending" is the reverse: Z to A or high number to low number.

Search Types: In order to best use limited space, the terms employed in this column are in verbal or symbolic shorthand. For instance, "match" refers to two different, but related methods of finding information: exact and embedded matches. Some match searches are also case-sensitive (upper- or lowercase). The numeric equivalent of match is "=". "Not match" is the same as "not =", but applied to words, rather than numbers. When applied to words, the numeric searches ">" (greater than) and "<" (less than) become a "range" search. A "wild card" search accepts any character in a given position.

Title/ Publisher/Price	Hardware Requirements	Max. No. Records	Max. No. Fields	Max. Size Record	Sort Types	Search Types	Entry/ Speed
AppleWorks Apple Computer (408) 996-1010 \$250	Reviewed on Apple IIc. Also for Apple IIe.	1,350	30	1,024 char.	Alpha/numeric/ date; ascending/ descending.	Match and not match. Range. Numeric: =, not =, >, <.	Entry extremely easy; speed unusually fast.
Bank Street Filer Broderbund Software (415) 479-1170 \$50-\$70	Reviewed on C 64/ 128. Also for 64K/ 128K Apple.	255	50	4,000 char.	Alpha/numeric/ date/time; ascending/ descending.	Match and not match. Numeric: =, not =, >, <.	Complete menus and prompts make it simple and quick.
Better Working: File & Report Spinnaker (617) 494-1200 \$50-\$60	Reviewed on Apple. Also for C 64/128.	2,000	20+	1,600 char.	Alpha/numeric; ascending/ descending.	Match and not match. Wild card. Numeric: =, not =, >, <.	Data entry relatively easy and reasonably rapid.
The Consultant Batteries Included (416) 881-9941 \$59-\$100	Reviewed on C 64. Also for C 128, IBM PC/PCjr.	Limited by disk capacity.	99	98,010 char.	Alpha/numeric; ascending.	Match. Wild card. Numeric: =, not =, >, <.	Good method of data entry. So-so speed.
Data Manager 2 Timeworks (312) 948-9200 \$50-\$130	Reviewed on C 64. Also for C 128, IBM PC/PCjr and compatibles.	2,000	20	230 char.	Alpha/numeric/ date; ascending/ descending.	Match. Record no. Numeric/date: >, <.	Setup OK, but slow in use.
Data Perfect LJK Enterprises (314) 962-1855 \$130	Reviewed on Apple. Also for Atari.	3,000	32	4,224 char.	Alpha/numeric/ date; ascending/ descending.	Match and not match. Wild card. Numeric: =, not =, >, <.	Fast setup with handy features. Quick, with data in RAM.
E-Z Base Spectrum Projects (212) 441-2807 \$25	32K Tandy Color Computer	500	15	256 char.	Alpha/numeric; ascending/ descending.	Match.	Setup and entry easy; slow in operation.
"I Know It's Here Somewhere!" Hayden Software (617) 937-0200 \$60	Macintosh.	Limited by Random Access Memory (RAM).	20	16,000 char.	Alpha/numeric; ascending.	Exact match. Wild card.	Easy to set up and use. Relatively quick.
The Manager Commodore (215) 431-9100 \$50	C 64/128.	2,000	250	1,500 char.	Alpha/numeric; ascending/ descending.	Match. Numeric: =, not =, >, <.	Good edit functions for record creation.
MasterType's Filer Scarborough (914) 332-4545 \$40	Reviewed on Apple. Also for Atari, C 64/128, IBM PC/PCjr.	250	11	330 char.	Alpha/numeric; ascending/ descending.	Match and not match. Numeric: =, not =, >, <.	Easy to do; moderately quick.
Microsoft File Microsoft Corp. (206) 828-8089 \$195	Macintosh.	65,535	1,023	Limited by disk capacity.	Alpha/numeric/ date; ascending/ descending.	Match and not match. Range. Numeric: =, not =, >, <.	Preset record format makes entry speedy.
PC File Computer Easy (612) 829-9614 \$20	IBM PC/PCjr and compatibles.	2,000	42	1,365 char.	Alpha/numeric; ascending/ descending.	Match and not match. Wild card. Numeric: =, not =, >, <.	Easy entry, but limited format. Operates quickly.
PFS:File Software Publishing (415) 962-8910 \$50-\$175	Reviewed on 128K Apple. Also for C 64, IBM PC/PCjr, Macintosh.	32,000	32,000	Limited by disk capacity.	Alpha; ascending.	Match and not match. Range. Wild card. Numeric: =, not =, >, <.	Data entry is quick. Acceptable speed in use.
SynFile+ Synapse/ Broderbund (415) 479-1170 \$50	Atari.	13,000	66	255 char.	Alpha/numeric; ascending/ descending.	Match and not match. Range. Wild card. Numeric: =, >, <.	On-screen prompts make setup/entry easy. Fast-running.

KEY—Numeric search types: = Equal; Not = Not Equal; > Greater than; < less than. **ON** On-line help screens.

FAMILY AND SMALL-BUSINESS USE

tion. For example, in a search for state abbreviations (where a question mark is the wild card), "N?" will deliver NH, NY, NJ, NM, ND, NC, NV, and NE. (See the main text for a complete explanation of searching.)

Entry/Speed: The information in this column has been subjectively determined by our reviewer. "Entry" refers to the ease of use (or lack of ease) in entering information. "Speed" means "How fast does this program operate (especially in the three areas of sorting, searching, and data entry)?"

Change Files/Records/Fields: What happens when you want to add or delete records after a file is created? Can you change records without disturbing the existing data? Is it possible to copy, move, or combine files, records, or fields? Look in this column for answers.

Report and Math Functions: Three major types of report formats are listed. "Tabular" means a format with lines (or rows) and columns. In almost all cases, math functions demand a tabular format; most

calculations are performed on a column, rather than on a line. The "list" report format can refer to a simple, top-to-bottom listing and/or a more complex, "free-form" page layout. "Labels" refers to mailing labels, usually one per line. "Printer codes" means you can send special control characters to your printer in the report mode. This allows a better command of your printer's particular features, including the compressed typeface.

"Four-function arithmetic" is a fancy way of saying addition, subtraction, multiplication, and division. "Logical functions" refer to "if/then" kinds of statements (see the *bowling example in main text*); this power is often found only in business-class data-base software.

Documentation: Like *Entry/Speed*, this is a reviewer's opinion category, as are the four columns of *Ratings*.

Further Notes and Comments: Here you'll find more facts (such as file compatibility), and additional thoughts from the reviewer.

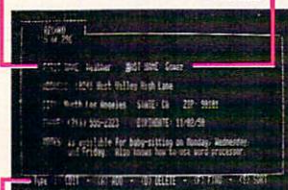
Change Files/Records/Fields	Report and Math Functions	ON	Documentation	RATINGS				Further Notes and Comments
				O	EU	EH	V	
Can add/delete fields after file is made, but you lose record formats. Makes subfiles.	Types: tabular, lists, and mailing labels. Totals, subtotals, 4-function arithmetic. Printer codes.	Y	Takes you from disk tutorial, to manual, to reference materials—a worthwhile arrangement.	★	★	★	@	Integrated software, including word processor and spreadsheet. Shares files with <i>VisiCalc</i> and most word processors. Good for business and home use.
Can change field names, types, and positions after file is made. Combines existing files.	Types: tabular, lists, and mailing labels. Totals, subtotals, 4-function arithmetic.	Y	Excellent disk tutorial lets you start without looking at good manual.	★	★	★	★	Enough power for most users, and very friendly throughout. Can append up to 7 lines of comments to each record. Shares files with <i>Bank Street Writer</i> and <i>Mailor</i> .
Cannot add/delete fields after file is made. Can copy record layout to new file.	Types: tabular and labels. Totals, subtotals, averages, max./min., 4-function arithmetic.	Y	Manual looks better than it reads; has weak instructions, such as its explanation of sorting.	★	★	★	★	Flexible search function, but can't save report layout and criteria—a big flaw. Shares files with <i>Better Working</i> word processor and spreadsheet.
Add/delete fields after file setup. Can create new file from existing data.	Types: lists and labels. 4-function arithmetic, record count. Printer codes.	Y	Some poor explanations detract from manual. Could explain in more depth.	★	★	★	★	Shares files with <i>PaperClip</i> word processor. Password protection available. Cannot back up single files—full disk only.
Add/delete fields to existing records. Can also change record sequence.	Types: lists and labels. 4-function arithmetic. With graphing feature.	N	Must jump back and forth between sections, and no index. Weak graphing explanation.	★	★	★	★	Shares files with <i>Word Writer</i> , <i>SwiftCalc</i> . Best for business; password mandatory. The graph function only special feature.
Add/delete/insert fields after setup. Can transfer selected info into new data base.	Types: tabular and labels. 4-function arithmetic, plus LOG, INT, ABS, EXP, and SQR math functions.	N	Clear reading in an extensive, step-by-step tutorial—a real strength.	★	★	★	★	Shares files with <i>Letter Perfect</i> word processor. For business as well as home. Helpful built-in calculator for entering numbers. Nice for novices and experts.
Add/delete fields, or change field names.	Types: none. Printer codes. No math functions.	N	Covers all the necessary information, but nothing more. Offset quality.	★	★	★	★	A good filing program for kids or beginners, but is limited in use (i.e., no report function). Shares files with <i>Telewriter-64</i> .
Cannot add/delete fields after data entry. Can change field size or field label.	Type: lists only. No real math or logical functions.	Y	A manual that is clear enough, but you wish there were more information.	★	★	★	★	Record size limited to one screen. Good enclosed sample files. Can have 5 files open at one time in separate windows. A beginner's file program.
Add/delete or rearrange fields after data entry. Can change files.	Type: lists only. Totals, 4-function arithmetic. If/then, and/or logic.	N	Skimpy and abstruse manual gives short shrift to program's powerful features.	★	★	★	★	For sophisticated home users or small businesses. Arithmetic calculations can be used for "what-if" planning.
Cannot add/delete fields after file is made. Can make new file based on data in original file.	Types: tabular, in lines as well as columns. Totals, but no logical functions or printer options.	N	A strong point of the package. The manual is clear and helpful, with cartoon illustrations.	★	★	★	★	40-column display; 80-column print-out. Good for children or adults who want an easy program. A limit of 10 files per disk.
Can add/delete fields after file is made. Easy to add data to existing records.	Types: tabular, lists, and mailing labels. Totals, averages, max./min., standard deviation, count.	Y	The manual is comprehensive, logically arranged, and has a good index.	★	★	★	★	Can include <i>MacPaint</i> images in file. Shares files with <i>Word</i> , <i>Multiplan</i> , <i>Chart</i> , and <i>MacWrite</i> . Reference card enclosed. Works well in offices or homes.
Add/delete fields. Change field names, but not positions. Can copy, rename, merge files.	Types: tabular and labels. Totals, subtotals, and 4-function arithmetic.	N	The manual gets the job done, but nothing more.	★	★	★	★	Straightforward filer, with some surprisingly powerful features. Includes password security. For business as well as home use.
You can do major redesign after file is made. Create subfiles and merge file data.	<i>PFS:Report</i> bought separately. Types: tabular and labels. Totals, subtotals, averages, 4-function arithmetic.	Y	Well-structured, with good examples. Aimed at mature user.	★	★	★	★	Shares files with other <i>PFS</i> titles. Especially useful with text-heavy files, thanks to flexible sizing of fields and records. For home and office. (Mac comes w/ <i>PFS:Report</i> .)
Add/delete fields. Create subfiles and merge file contents.	Types: tabular and labels. Printer codes. Totals, 4-function arithmetic, plus more math functions.	N	Complete tutorial on disk and a well-presented manual make this non-intimidating.	★	★	★	★	Shares files with <i>Atari Writer</i> , <i>SynCalc</i> , <i>VisiCalc</i> , <i>PaperClip</i> . A top-notch data base, with sophisticated features and good prompts for user.

RATINGS—O Overall performance; **EU** Ease of use; **EH** Error-handling; **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Very good; ★★★★★ Excellent; @ Excellent for data base only (if you need the integrated word processor and spreadsheet).

A SINGLE RECORD

Field labels

Fields



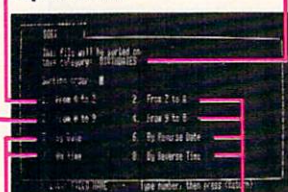
Menu choices

SORT FUNCTION

Numerical

Alphabetical

Key field for sort



Chronological

Reverse sorts

CONSIDER WHAT'S AVAILABLE: CHOOSING YOUR DATA BASE

The accompanying chart gives the "vital statistics" on more than a dozen filing programs, but that's just the tip of the iceberg. We chose these programs to provide a representative sample of what's out there. You'll find many more choices on the store shelves. Therefore, to help you make an informed selection, here are some guidelines for choosing a data base:

WHO WILL USE IT?

You'll find filing programs simple enough for everyone from about 8 years old and up, while others are highly technical. One key difference is the program's structure. Will you have to remember commands when you want to do something, or can you make choices from an on-screen menu? Working with a menu is certainly simpler, but it's often accompanied by less power.

EASE OF USE VS. POWER

Some of the simpler filing programs are so easy, you can master them in the course of a day. Others take weeks to understand all their capabilities—but if you need those features, that's time well spent. Of course, price is linked to power as well, although we found some very muscular data-base packages at very reasonable prices.

WHAT WILL YOU USE YOUR DATA BASE FOR?

What purpose will your data-base files serve? Odds are, you will have a specific task in mind when you decide to buy a data base. Will any program you're considering accommodate the type of data you'll be entering? Can it handle a large enough file? Will its search, sort, and report capabilities let you conveniently pull out information in the form you need it?

Consider all the ways you might possibly use the program in the future. Paying a few extra dollars for more flexibility now may be rewarded by greater use later on.

READ THE MANUAL

Take a look at the documentation. The fastest way to get a good picture of a filing program's capabilities is seeing it in black and white; it's better than a knowledgeable friend's well-meaning explanation, or a salesperson's quick pitch. Of course, if you can borrow a program from a friend and work with it for a while before purchasing, that's even better.

A significant question involves uppercase and lowercase letters. Usually, you are free to enter data in any mixture of capital and small letters you choose. But that can affect the way you search for the information later, since some search functions are case-sensitive. In a case-sensitive search for "Smith," the listings for "SMITH" or "smith" won't appear.

Another type of search looks for an embedded sequence of letters anywhere they occur. If you've put first and last names into a single NAME field, you could find all the Smiths by searching for the name wherever it exists, in that field or in the whole file.

Still another kind of search uses wild cards. A wild-card search accepts any letter or number in a particular position. For example, if an asterisk serves as a "wild card" in your program, then searching for "06/**/86" will give

you all the files dated June 1986.

Another common way of finding data is a range search, using "greater than" or "less than" (such as, find all the names greater than M, meaning those that start with letters from M to Z). There also are "not equal to" searches (find all states that aren't Iowa, for example).

What makes searching especially powerful is the ability to check more than one field in a record at the same time. This is a form of "and/or" logic. If you wanted to find all the people in your file whose last names start with W, who live in Nebraska, and who are more than 12 years old, the better data-base packages let you pick out only those records that satisfy all three conditions.

HOW DOES A DATA BASE DELIVER THE GOODS?

Any filing program we've tested lets you choose between reading the information you request on your monitor and having it printed out on your printer. Differences arise in such options as viewing one record at a time on-screen or several at once.

In addition to recreating the blank forms you've filled in, many programs let you print the information in the form of labels, or in a simple line-by-line listing. When you get into fancier formats, however (for instance, printouts which include only some of the fields in each record), then you are looking at a function called "reporting."

Report functions begin with designing your printout or the on-screen data display. One example: Does the phone number come after the name or after the address in an address file? It's usually your choice. Within the limitations imposed by your program and your printer, you can specify where you want each item of information printed, and what kind of headings you want for a column or report section.

Math capabilities are often part of the report feature. They're very useful. When I used a data base to help with my taxes, I had the program print a total of all my expense items in each category. Some report functions provide only a single total at the end of a report; others let you construct complex mathematical formulas.

HOW MUCH MATH WILL A DATA BASE DO?

One general difference between the relatively simple filing programs we've examined and expensive, business-oriented data-base managers is the complexity of the mathematical functions available. Even at the lower end of the price scale, though, you can find some sophisticated capabilities.

The Manager from Commodore is one package that lets you create fields that contain data calculated from information found in other fields. Let's say you put the scores of your bowling team into a file with *The Manager*. You could include a field in each team mem-

ber's record called "Average," and enter a formula for calculating averages. The program would automatically update this figure when you add each week's scores.

That just scratches the surface of mathematical reporting capabilities, though. *The Manager* actually lets you write short programs within the data base, basing its calculations and printouts on logical and arithmetic calculations. For instance, if a bowler scores over 200, then place his or her name in the honor-roll field.

These kinds of mathematical and logical abilities provide a lot of power, but they're not always easy to use. If you think you'll want to perform complicated manipulations of your information, then pick a filing program that offers these functions.

DO I HAVE TO PLAN AHEAD?

Most simply, the amount of planning required before creating a data-base file depends on the software you've chosen.

Generally speaking, you can add new fields to a file (up to its maximum capacity) even after you've started entering information, but you won't be able to move the fields around. That is, if you've created a file with NAME, ADDRESS, and PHONE fields, and you later decide you'd like an AGE field, you'll be able to add AGE at the end of each record, but you won't be able to tuck it in between ADDRESS and PHONE.

You may have to preplan your sorting needs as well. Filing programs sort your data into alphabetical or numerical order based on selected fields, known as "key fields." Generally, the key field can be changed whenever you like, but in some programs you must identify the key field when you first create the file.

WHAT ABOUT "INTEGRATED SOFTWARE"?

There exist two main methods of sharing information between applications. Truly integrated software combines a data base, a word processor, and (usually) a spreadsheet in a single package. Sometimes separate programs are file-compatible, meaning you can use data from one program in another. With filing software, "integration" of either kind will often allow you to take a report from a data base and place it in a word processor.

Because there's so much software to cover, we have included only one example of truly integrated software—*AppleWorks*. Some data bases, such as *PFS:File* and *Bank Street Filer*, are part of integrated software families; the individual elements are sold separately. In either case, trading information across program lines is easy.

WHAT CAN'T A FILING PROGRAM DO?

The borderlines separating filing programs, word processors, and spreadsheets can be fuzzy sometimes. Each has its strong suit,

RELATIONAL? WHAT'S THAT?

As you cruise your local software store in search of the ultimate data base, you're likely to run into the term "relational"—as in "powerful, versatile relational data-base manager." What is this? A data base to keep track of your relatives?

Not exactly. What makes a data-base program relational is the ability to grab information from more than one file at the same time. Regular filing software can use information from only one file at a time.

For example, a relational package could automatically pull Aunt Jennifer's address from your ADDRESS file, find out what she gave you for your birthday from a separate INCOMING GIFTS file, and then print a report as a perfect thank-you note.

Most relational data bases are quite expensive, although a few, like *PractiBase* from PractiCorp., now cost under \$100. However, they still require lots of memory (figure on 256K to start) and are more complicated than a simpler filing program.

but each also dabbles in the other's capabilities.

Word processors are designed to manipulate text. You can type information, move pieces of text around, and print out in a variety of formats. Most word processors have a search function like a data base, but your ability to organize and reorganize information is limited, and (almost always) you have no mathematical functions.

Spreadsheet software works best with numbers; words are generally inserted solely as labels. They are not usually strong with text manipulation, and the reporting function is limited in format choices.

A data base deals with words and numbers equally well—in either case, the letters or figures represent information to be put into categories. However, the amount of data (text or numbers) you can include in a single record varies widely from data base to data base. In some, you can fit only 24 characters into a single field. Others allow as much as four or five pages of text under a single heading. Still, document-length information often requires a word-processing program.

Similarly, the mathematical abilities of some data bases may be all you need to juggle numbers. But, if you'll be working with a lot of figures, changing some to find out what effect the change will have on others, then a spreadsheet is your tool of choice.

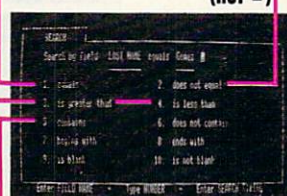
A QUESTION OF STYLE

Everyone deals with information in distinctive ways. Some well-organized souls have every name, date, and number carefully tucked away. Most of us "know it's here someplace" and rummage furiously for the crucial scrap of paper when we need it. A computer filing program makes sense, no matter which group you belong to. The organized individual achieves a loftier state of control, while the harried scrap-hunter enters a mound of data into the computer and lets the software sort it out. **FC**

SEARCH FUNCTION

Match (=)

Not match (not =)



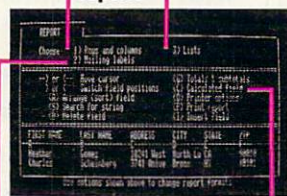
Embedded match

Range (> or <)

REPORTING

Tabular reports

Lists or free-form reports



Mailing label reports

Four-function arithmetic

LAST CHANCE TO WIN!

THE SECOND ANNUAL

COMPUTING FAMILY OF THE YEAR CONTEST

FIRST PRIZE

128K APPLE IIC
with color monitor and stand;
retails for \$1,249.

SECOND PRIZE

512K ATARI 520ST
computer, RGB monitor, and
360K disk drive; retails for
\$999.

THIRD PRIZE

HAYES SMART
MODEM 1200
with Smartcom II
telecommunications software;
retails for \$748.

FOURTH PRIZE

14-INCH THOMPSON
RGB MONITOR
(Apple/IBM); retails for \$499.

GRAND PRIZE



256K
TANDY
1000

with a CM4 RGB monitor,
two disk drives, and DeskMate
integrated software; retails for
\$1,650.

FIFTH PRIZE

\$250
WORTH OF SOFTWARE
from the following companies:
Activision; Avalon Hill; Bantam
Software; Batteries Included; Bet-
ter Working Software; CBS Soft-
ware; Davidson & Associates,
Inc.; Electronic Arts; Epyx; Fish-
er-Price; Gamestar; Hayden Soft-
ware; Infocom; Microprose; Mi-
crosoft Corp.; Mindscape Soft-
ware; Random House; Scholastic
Software; Sierra On-Line; Simon
& Schuster; Spinnaker; Spring-
board; Strategic Simulations
Inc.; subLOGIC; Telarium; and
Windham Classics (ten winning
families in this category).

SIXTH PRIZE

SEIKO PC DATAGRAPH
MODEL RC-1000,
a multifunction quartz wrist
terminal which stores up to 2K of
data. Required software and cables
included; retails for \$150.

1985 WINNERS



1985 Grand Prize winners Rich and Kate
Mancini, with son Matt and daughters
Shannon and Tessa.

HOW TO ENTER

We're proud to announce our second annual nationwide search for the "Computing Family of the Year." Yours could be one of the winning families featured in the pages of FAMILY COMPUTING. You could win a computer, monitor, or any other of the valuable hardware or software prizes that can increase your whole family's computing enjoyment.

WHO'S ELIGIBLE

Any family that uses its computer in especially efficient, rewarding, and/or creative ways! Enter your own family, or perhaps that of a friend or a favorite teacher whose ability and versatility in computing you admire. Write and tell us why you nominate them as our "Computing Family of the Year."

HOW TO WRITE YOUR ENTRY

Answer the following questions. You can number the paragraphs if you'd like, but it's not mandatory.

1. When and why did the family decide to buy a computer? What kind of computer did the family purchase?
2. How does each family member use the computer? Include names and ages.

3. Do the children use a computer in school? Is the computer at home used for educational purposes? If so, how?

4. How does the family use the computer together?

5. Which are the most efficient, rewarding, and/or creative ways the family uses its computer? If software is used, tell us the kinds.
6. In what ways has the computer changed family members or the way they live?

7. Has the computer lived up to original expectations? Has the computer's use evolved with time?

Also, we'd love to see a family photo—of the family computing, of course. (A casual snapshot will do.)

CONTEST RULES

1. Your entry should run no more than 2,000 words, or about eight double-spaced, typewritten pages.
2. Scholastic Inc. employees, advisory board members, and members of their families are not eligible.
3. Previous winners of the "Computing Family of the Year Contest" are ineligible.
4. All entries and photographs become the property of Scholastic Inc., which reserves

the right to use them in publications and promotions. Unfortunately, Scholastic Inc. will not be able to acknowledge your entries. Entries and photographs will not be returned.

5. Include your address and phone number (or, if you are nominating another family, include its address and phone number).
6. No cash substitutions for prizes.

Deadline: All entries must be postmarked by March 31, 1986.

Judges: Entries will be judged by a panel of Scholastic employees. Judges' decisions are final.

Winners: The winners will be announced in the September 1986 issue of FAMILY COMPUTING.

FAMILY COMPUTING

Nominating letters should be mailed to:
Minerva Jimenez, Computing Family of the
Year Contest, c/o FAMILY COMPUTING, Scholastic
Inc., 730 Broadway, New York, NY 10003.

From Halley's Comet to the Stars

WITH ASTRONOMY SOFTWARE,
YOUR COMPUTER'S A PLANETARIUM

BY ROBIN RASKIN

Unless you've been living on another planet, you've probably had a healthy dose of Halley's comet fever. The comet's appearance in our skies has sparked a new interest in astronomy. Armed with binoculars, telescopes, and star-finder charts, people are hunting the heavens for stars. Whether you're a novice or a pro, there's astronomy software that can add a new dimension to your hobby.

With astronomy software, the computer turns into a living-room planetarium by simulating the night sky. With a modem, the computer can also introduce you to other amateur astronomers via computer "bulletin boards."

Though the majority of celestial software has a "plain vanilla" look without fancy packaging, and is not widely available at retail outlets, most are praised for technical accuracy. Hobbyists develop astronomy programs as a labor of love and distribute them however they can. Here's an example of how one such package evolved:

Eric Burgess, one of the founders of the British Interplanetary Society, wrote *Celestial BASIC: Astronomy on Your Computer* (Sybex Computer Books, 1982; \$17.95), a book of BASIC programs that calculates moon and planetary information. When Burgess' readers clamored for disk versions of his programs, he developed *Celestial BASIC* disks. Both *Celestial BASIC* and his newer program, *Halley's Comet*, are published (on disk) by American Only, Inc.

Some astronomy software (the *Zephyr* se-

ries, and *P.C. Planetarium*) includes the source code or program printouts. This unusual feature is invaluable to astronomers who enjoy customizing an existing program, or for those who like to learn how a program is put together.

SOFTWARE SIMULATIONS

"The best way to learn astronomy is to go outside and look," says John Mosley, program supervisor of the Griffith Observatory in Los Angeles. "But there are some things you can't easily see in the sky; for example, the way the planets move over time or how eclipse paths intersect the earth. Run through a software simulation, then go outside and look, and you'll get a better understanding."

Astronomy simulation software recreates the behavior of stars and planets on your computer. Some simulations require more imagination than others, but with a good program you get an intuitive feel for what's going on. There are simulation programs that display everything from eclipses to the birth of a planet.

"It's the only way to get so much information at one time," says Paul Roossin, a former student at Rockefeller University in New York and an amateur astronomer. "It's easy to look up one star in an almanac and calculate its position, but these simulation programs give you so much more than one star. They're the best way I can think of to calculate celestial objects from one point at any given time."

Sky simulations using computer graphics

ROBIN RASKIN is a
contributing editor of
FAMILY COMPUTING.

SOFTWARE FOR STARGAZERS

PUBLISHER/ADDRESS	PROGRAM/PRICE	HARDWARE REQUIREMENTS	COMMENTS
Charles Kluepfel 11 George St. Bloomfield, NJ 07003 (201) 338-0996	<i>Eclipse Map</i> , \$23	48K Apple II plus/IIe, C 64/128	Hi-res display of visibility for solar eclipses.
	<i>Orrery</i> , \$20	Same as above	Self-updating solar system diagram in hi-res display.
	<i>Planetarium</i> , \$23	Same as above	Stars and planets displayed in hi-res for any given time and date.
	<i>Planets</i> , \$23	Same as above	Gives coordinates of sun, moon, and planets for any given day; gives Julian, Gregorian, and Jewish calendar conversions.
	<i>World Map</i> , \$30	Same as above	Offers a hi-res map of the world, displaying progression of day and night sky.
Commodore Business Machines 1200 Wilson Drive West Chester, PA 19380 (215) 431-9100	<i>Visible Solar System</i> , \$30	C 64/128	Gives statistics and atmospheric conditions about major planets, and allows user to make comparisons.
	<i>Sky Travel</i> , \$50	C 64/128	Displays and tracks constellations, planets, and other objects; good documentation.
COMPRESS P.O. Box 102 Wentworth, NH 03282 (603) 764-5831	<i>Journey to the Stars</i> , \$60	96K IBM PC and compatibles	Nine different journeys (and a fabulous tutorial) explore 49 constellations and 42 major stars; 1,400 stars displayed. Excellent program for interested beginners.
Computer Assist Services 1122 13th St. Golden, CO 80401 (303) 279-8073	<i>The Sky</i> , \$60	256K IBM PC	Plots and computes coordinates of planets, 952 stars, 109 Messier objects, and nine nonstellar objects in full color. Incorporates your own data, scans and identifies objects, "scrolls" through the skies, and zooms in on constellations.
Eastbench Software 1290 Cliffside Drive Logan, UT 84321 (801) 753-1084	<i>The Constellation Finder</i> , \$17 (tape)	TI-99/4A w/Extended BASIC	Calculates times of rising, setting, and meridian transit for any of 45 constellations visible from Northern Hemisphere.
	<i>Moon Disk, Planet Disk, Star Disk, Sun Disk</i> (\$30 each)	TI-99/4A w/Extended BASIC	Four separate disks with up to six programs on each, including such information as ascension, declination, visibility, and distance from earth.
Educational Activities 1937 Grand Ave. Baldwin, NY 11510 (516) 223-4666	<i>Astronomy: Stars For All Seasons</i> , \$60	48K Apple II, C 64/128, Tandy Models III/4	For grades 5-12; program plots constellations and tracks them through each season by viewing monthly sky maps. User can get close-up view of 34 constellations. An astronomical chart displays coordinate information.
Light Software 1850 Union St. No. 252 San Francisco, CA 94123 (415) 788-4578	<i>P.C. Planetarium</i> , \$52	128K IBM PC/XT/PCjr with BASICA or GW-BASIC	Displays sky map for any point on earth at any moment in time. Can identify and locate local coordinates for celestial objects. Prints hi-res star maps.
Lightspeed Software 2124 Kittredge St. Suite 185 Berkeley, CA 94704 (415) 486-1165	<i>The Observatory</i> , \$50	64K Apple II, planned for IBM PC and Macintosh	Simulates a 512-power telescope with which you can explore the heavens. Point the telescope from anywhere on earth during a 10,000-year span. Includes 400 stellar objects. Simulates eclipses and the course of Halley's comet.
Millet Software 146 W. 255 S. Orem, UT 84058 (801) 224-6841	<i>The Solar System and Halley's Comet</i> , \$40	128K Macintosh	A graphic introduction to planetary movements; designed for young schoolchildren.
Prentice-Hall College Division Sylvan Ave. Englewood Cliffs, NJ 07632 (201) 592-2404	<i>Astronomy Disk</i> , \$40	48K Apple II/II plus/IIe	An introduction to important fundamentals of astrophysics and space exploration.
Spectrum HoleByte 1050 Walnut St., Suite 325 Boulder, CO 80302 (800) 443-HOLO; (303) 443-0191	<i>Tellstar Level 1 (Northern Hemisphere)</i> , \$50; <i>Tellstar Level 2 (Northern & Southern Hemisphere)</i> , \$80 (\$45 for update)	128K IBM PC, 512K Macintosh, 64K Apple II	Comprehensive and one of the best. Give <i>Tellstar</i> a date and location, and it will display a graphic representation of the constellations, planets, etc. For all eight compass points as well as directly overhead.
S&T Software 13361 Frati Lane Sebastopol, CA 95472 (707) 874-2352	<i>Celestial BASIC</i> , \$30 a disk; \$50 for two	48K Apple II, C 64/128, Timex Sinclair 1000	Astronomy programs in BASIC from Eric Burgess' <i>Celestial BASIC</i> book. The first disk contains programs to calculate moon and planetary locations. The second includes calendar programs, among others.
	<i>Halley's Comet</i> , \$50	64K Apple, C 64/128, 128K IBM PC, Timex Sinclair 2068	Complete with teachers' guide, this program plots Halley's comet from the year 1000 onward. Includes comet history.
StarSoft P.O. Box 2524 San Anselmo, CA 94960 (415) 453-1372	<i>Halley</i> , \$35	64K IBM PC and compatibles	Plots path of Halley's comet through the solar system from the perspective of earth or outer space. Has print option.
Visionary Software P.O. Box 1063 Midland, MI 48641 (517) 835-9025	<i>Starchart</i> , \$50	128K IBM PC/XT/AT, 64K Apple II and compatibles	Displays data on 1,476 stars and 184 deep-sky objects in tables and graphs. Displays stars for any date, indicating object magnitude and location. Has print option.
Zephyr Systems 306 S. Homewood Ave. Pittsburgh, PA 15208 (412) 247-5915	<i>Astro-aid, Astrobase, Astrocalc, Astrotell</i> , \$30	128K IBM PC/PCjr, Apple II, C 64/128	Programs provide common astronomical functions and conversion programs.
	<i>Cometwatch</i> , \$30	Same as above	Provides information on Halley's comet.

displays are the best bet for a novice astronomer. Programs like *Tellstar* and *Journey to the Stars* typify this genre. At the introductory level, they serve as your personal "interactive planetarium," answering your questions about the stars with fine graphic displays. Once you've learned the language and rules of astronomy, the sophisticated utilities and mathematical calculations of these programs help you continue your explorations.

Give *Tellstar* your latitude, longitude, and time of day, and in moments you'll find yourself studying an accurate representation of the night sky in your area. Choose from among nine different viewing positions, including an overhead view that's akin to lying in a field and gazing at the heavens. With a minimum of commands, the program allows you to move from screen to screen, gathering information. Just move a cross-hair cursor to an object about which you want more information, and press the space bar. After learning from *Tellstar's* display, you can gaze out your window and pinpoint the real stars.

While *Tellstar* pinpoints the location of objects in the sky, *Journey to the Stars* explains the fundamental concepts of the motions of the heavens. Included is a helpful tutorial that demonstrates how your position on earth and the earth's rotation affect what you see. *The Observatory* simulates a telescopic view of the heavens that can be magnified to suit your needs. *The Sky* recomputes the locations of objects in real time as you watch. That is, the computer screen changes at the same speed as the heavens.

Many simulations, such as *P.C. Planetarium*, allow you to make printouts, though a dot-matrix printer is usually required for the full effect. You can locate your favorite objects in space, make a printout, and take it with you on your next sky-watching journey.

ASTRONOMICAL CALCULATIONS

Astronomers now rely on computers to perform calculations that once required hand calculators or, in the more distant past, slide rules. They spend a great deal of time converting from the celestial realm to our own. The computer can be the astronomer's calculator. Equatorial, ecliptic, and precessional conversions are necessary to pinpoint an object's location. Sidereal, Greenwich, and local times unique to each location must be calculated. Calculating correct ascension and declination allows an astronomer to point the telescope toward an object. Some astronomers perform calendar conversions to pinpoint an historical event.

Tellstar, *Starchart*, and other programs act as software "ephemeris." An "ephemeris" is a table of values used to calculate the positions of the heavenly bodies at a particular date, time, and location. Before computer software, astronomers used almanacs that contained vast amounts of data. Using the almanacs required a certain amount of astronomical

know-how and mathematical interpolation. Both *Starchart* and *Tellstar* present much of this complex information in easy-to-understand tables and graphics.

Astrobase is a data base for faraway objects like stars and meteors. It's probably most useful for the hobbyist interested in maintaining long-term records. The user can search for astronomical information by using key words like "nebulae," "galaxies," and "double stars," or add facts not already in the data base.

TALK TO THE SKY WATCHERS

Avid astronomers are delighted to share the fruits of their labors. A recent visit to the Space Forum on CompuServe, an on-line information service, let me talk with amateurs all over the country to find out if they had seen Halley's comet. The Space Forum also contains a number of excellent astronomy programs for members to download.

Sky and Telescope, a monthly astronomy magazine, includes an astronomy program in each issue. These programs can also be found on the *Sky and Telescope* bulletin board on CompuServe. *Sky and Telescope* (GO ACCESS) posts messages that inform sky watchers about celestial sightings and events.

PLAYING AS YOU LEARN

Those who prefer a more playful introduction to astronomy will appreciate software such as *The Halley Project* (Mindscape) and *Astronomy Disk* (Prentice-Hall). *The Halley Project* puts you in the driver's seat. As you journey through the solar system, you have various missions to complete. Successful completion requires that you do some careful research through outside sources (such as encyclopedias or astronomy books). You'll have fun and learn something in the process.

Astronomy Disk guides you through a series of lessons illustrating concepts such as rocket thrusts, spiral galaxies, and the birth of a star. You can even design your own planet and determine its mass and size. The program is more fun than many arcade games, and provides a playful set of interactive programs and a delightful users' manual.

THE SKY'S THE LIMIT

Whether you're a casual, naked-eye observer, or the owner of a small telescope or a backyard observatory, there's a form of "astro-computing" for you. But where do you start? Robert Burnham, senior editor of *Astronomy Magazine*, advises the beginner to research amateur astronomy before running out to buy software. "The planetarium, a book from the library, and observation are excellent teachers," he notes. The next step will be to decide if you have a specific astronomical interest. Perhaps you want to limit your studies to the moon or a particular planet. From there, the search for programs begins. And, once you've found the right one, the sky's the limit. ☐

WORD WATCH



Azimuth: A star's compass point.

Celestial Equator: The stargazer's equivalent of the earth's equator.

Comet: A nucleus of small, solid particles and frozen gases surrounded by gas clouds.

Declination: The term for a star's latitude.

Deep Sky Object: An object beyond our solar system, such as a meteor or star.

Ecliptic Orbit: A plane of the earth's orbit around the sun.

Galaxy: Vast collection of stars, star clusters, nebulae, and interstellar matter.

Greenwich Time: Mean solar time at zero degrees longitude. An observatory in Greenwich, England, serves as the official mark.

Julian Date: The standard date notation used by astronomers, based on the calendar set by Julius Caesar in 46 B.C.

Magnitude: The apparent brightness of a star.

Meridian: An imaginary circle or half-circle in space that passes through the poles of the celestial sphere and zenith of a given place.

Nebula: Clouds of gas that reflect or emit light.

Perpetual Calendar: A table for finding the day of the week over a wide range of dates.

Precession: The shift of the earth's (or any spinning body's) axis in space.

Right Ascension: The term for a star's longitude.

Shooting Stars: Meteors or bits of cosmic matter that heat up and begin to glow when they hit our atmosphere.

Star Time (local sidereal time): The time according to the position of the star.

Zenith: The point directly overhead.

HANDS ON BUILD A "HOME-BREWED" LOGIC PROBE

BY HENRY F. BEECHHOLD

(Part Five of a Six-Part Series)

Happiness . . . must be something solid and permanent. . .

—Dr. Samuel Johnson
(*Rasselas*, Ch. XVII)

In the first installment of this series ("Hands On: Computer Maintenance Tips," October 1985) I told you about the multimeter: a useful tool for locating broken wires and isolating bad resistors—in short, for any kind of electronic troubleshooting that involves testing constant current and resistance. But current and resistance are only one aspect of electrical activity in a computer. Another important aspect is *logic*—digital signals that represent binary zeros and ones. Such signals are carried by currents whose voltage fluctuates between logical "lows" (zeros) and logical "highs" (ones).

To check if a circuit or component is functioning appropriately in a *digital* sense, you use a device designed specifically to detect digital signals—a logic probe, part of the well-prepared troubleshooter's toolkit. You can buy a logic probe for about \$20, but you can build one for about half that price.

The probe we're going to build is a simple circuit consisting of three resistors, a single integrated circuit (IC) chip, and two light-emitting diodes (LEDs): red and green. The probe draws its power directly from the circuit board you're testing. To use the logic probe, attach the power and ground leads to appropriate spots on the board (*see opposite*). Then, when you touch the probe tip to a location that's producing a digital signal (a CPU pin, for example), the red or the green LED will light up, depending on whether that signal is logically high or low.

If a component isn't producing the expected signals, either it needs replacing or there's a problem somewhere further up the line. In either case, you're closer to determining the source of your computer's ills than you were before you started probing around. Note, however, that

HENRY F. BEECHHOLD, professor of English and chairman of the Interdisciplinary Linguistics Program at Trenton State College, is a computer tinkerer and do-it-yourself-er par excellence. He is the author of *The Plain English Repair and Maintenance Guide for Home Computers*, and *The Plain English Maintenance and Repair Guide for IBM Personal Computers* (Simon & Schuster, 1984/85).

PARTS LIST FOR LOGIC PROBE

1. Integrated circuit: CMOS HEX. Buffer/converter, inverting type: RCA CD 4009 or GE-4049 (Digi-Key 4009A).
2. Resistor (R1): 150,000 ohms, 1/4 watt, 5 percent tolerance (gold band).
3. Resistor (R2): 47,000 ohms, 1/4 watt, 5 percent tolerance (gold band).
4. Resistor (R3): 100,000 ohms, 1/4 watt, 5 percent tolerance (gold band).
5. Light-emitting diode (LED), red (Radio Shack 276-026).
6. Light-emitting diode (LED), green (Radio Shack 276-037).
7. Integrated circuit socket, 16 pins (Radio Shack 176-1998).
8. Enclosure and perforated board (Radio Shack 270-291).
9. Probe set (Radio Shack 278-705, set of two: one red, one black).
10. Insulated alligator clips (Radio Shack 270-1545) or mini test clips (Radio Shack 270-372).
11. Hookup wire (22 gauge, solid, and 20 gauge, stranded; both insulated).
12. Epoxy, instant glue, or rubber cement.
13. Tinkering tools, rosin-core solder.

SOURCES

Digi-Key Corp., 701 Brooks Ave. S., Box 677, Thief River Falls, MN 56701; (800) 344-4539.
Jameco Electronics, 1355 Shoreway Road, Belmont, CA 94002; (415) 592-8097.
JDR Microdevices, 1224 S. Bascom Ave., San Jose, CA 95128; (408) 995-5430.
Radio Shack (stores nationwide).

since you'll be using the probe in a "live" computer, some knowledge and caution is required to prevent damage to the probe, to the circuit being tested, or (last, but not least), to yourself. This month, we'll concentrate on building the probe and making sure it works. Next month, we'll use it to do some actual troubleshooting. Stay tuned!

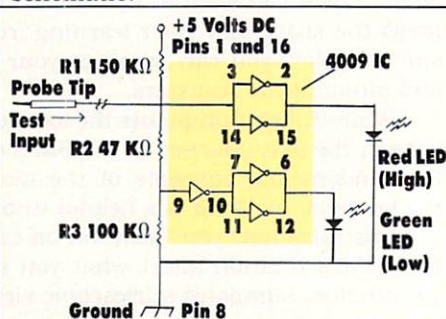
READING A SCHEMATIC

A "schematic" is a stylized picture of the electrical connections among various parts of an electronic device. Although it's not necessary to be able to read a schematic in order to build the device it represents, some familiarity with schematics certainly is necessary if you're ever going to do electronic troubleshooting. So, before we start to build, let's take this opportunity to learn a bit about schematics.

The schematic does not reveal how components should be laid out physically. In fact, a given schematic can

represent a number of different component arrangements. For example, the lines connecting parts on the schematic may be realized as actual, discrete wires, or merely as copper traces on a circuit board. Turning a schematic diagram into a circuit layout is actually a kind of art—experience and "talent" count. All of this means that the logic probe can be set up in a variety of ways, just as long as each part is correctly linked to the others.

Here, then, is the logic probe's schematic:

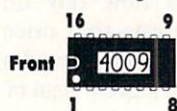


Legend

- Resistor
- Light-Emitting Diode (LED)
anode + — cathode
- Inverting Buffer
(4009 chip contains six)
- 1000
- Ohms

Numbers in schematic refer to IC pins.

4009 Inverting Hex Buffer



As in all schematics, each component in the circuit is represented by a standard symbol (*see "Legend"*). The lines between symbols represent electrical connections. Note that the five inverting buffers in the center of the schematic, though portrayed as discrete components, are actually parts of a single integrated circuit chip containing six inverters, one of which remains unused.

HOW IT WORKS

Like a computer program, an electronic circuit consists of three phases: input, processing, and output. In the logic probe's circuit, in-

put comes in through the probe as a digital signal; is processed by the resistors and inverters; and then emerges as output in the form of a flash from one or the other light-emitting diode.

When the +5 volt and ground leads are connected to appropriate spots on the circuit board being tested (see illustration, far right), the three resistors—R1, R2, and R3—hold back some of the voltage passing through them. As a result, the juncture of resistors R1 and R2 is held at a different voltage level from the juncture of R2 and R3. Specifically, R1–R2 is held at a logical high (a one) and R2–R3 at a logical low (a zero). A digital high is from two to five volts; a digital low is zero to .8 volts.

The high from the top juncture is passed through a pair of inverters wired in parallel that turn it into a logical low before it reaches the green LED. The LED can't light up because it's not receiving enough voltage. Similarly, the low from the bottom juncture is inverted *twice* before it reaches the red LED—first to a high, then back to a low—so the red LED can't light, either.

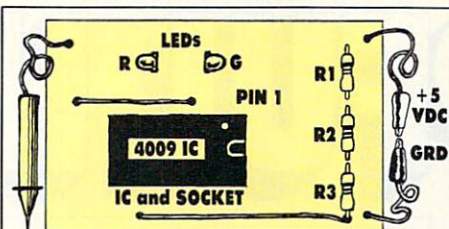
When a digital pulse enters the probe, however, it pulls both junctures either high or low, as appropriate to the point being tested. If high, the pulse is inverted to a low by the upper circuit, and the green LED won't turn on. But the lower circuit, with its double inversion, converts the pulse to a low, then to a high—and the red LED comes to life. Conversely, an entering low will be turned into a high by the upper circuit, causing the green LED to light; but the same low will simultaneously be turned into a high, then to a low by the lower circuit, so the red LED will not light. As you might expect, if there are no pulses at the test point, neither LED will light. There's a relentless logic about all this.

Enough! Rush out and buy parts (see "Parts List," opposite). Then we'll build. Parts for the logic probe can be purchased at your local Radio Shack or other electronics outlet, or by mail from one of the sources listed. If you've been following this series from the beginning, you've probably already acquired most of the tools needed for assembly. If not, you'll have to assemble a tinkerer's toolkit and learn how to solder. (See "Hands On," October 1985.)

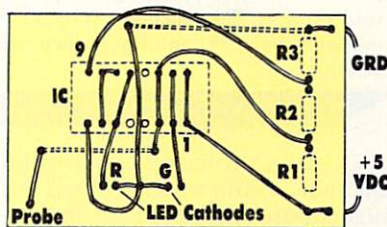
BUILDING THE PROBE

Before you start building, check out the parts layout, wiring diagram, and assembly details (right).

Instead of cramming everything

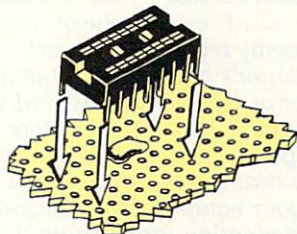


Test Probe TOP OF CIRCUIT BOARD (Showing Parts Layout)



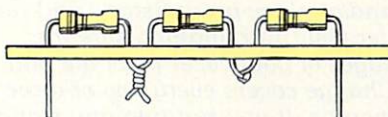
WIRING DIAGRAM (Underside of board)

- ===== = wires on this side of board.
- = wires on component side of board.
- = connection
- = no connection



INSTALLING THE IC SOCKET.

Place a dab of glue in center of perforated board. Press socket down so that pins go through holes.



INSTALLING RESISTORS.

Bend resistor leads carefully, and insert in holes of perf board. Twist leads together and solder. Remove excess lead with side-cutters. Resistors are nonpolar, so can be inserted facing either way.



ATTACHING WIRES TO IC SOCKET PINS.

Strip about one-eighth inch of insulation from wire and make small loop in end. Slip loop over pin. Heat joint briefly with soldering iron, then flow solder over joint. Don't use too much solder!

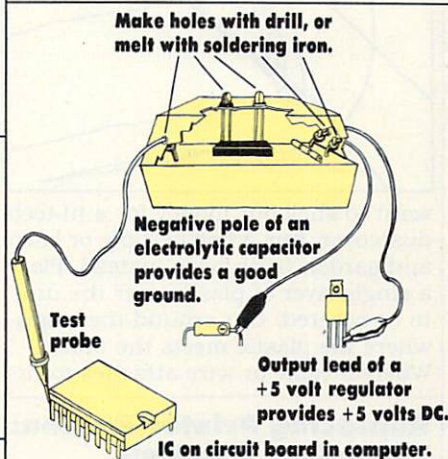
into a single, hand-held unit, I've opted for separating the circuitry from the actual probe. There are two reasons for this: ease of construction and ease of use. I find it easier to poke around in a live computer with a slim probe than with a fat gadget.

ICs are vulnerable to heat and static electricity. For this reason, an IC socket is used so you can do your soldering without getting the IC itself involved. Put a couple of drops of cement or glue on the underside of the socket, avoiding the pins, then seat the socket as shown. Attaching wires to the socket pins is a very delicate job and will require patience. As shown in the illustration, make a small loop at the end of each piece of wire and wrap it around the pin. Heat the joint briefly, and then touch the solder to it. Make neat bonds with small amounts of solder—no blobs, please. Dress the wires neatly, and don't allow them to short to one another.

The project requires only the red probe from the probe set. The plug end of the probe will have to be clipped off. Leave about two feet of wire attached to the probe.

The power and ground connections are made of insulated wire. Attach a red, insulated alligator clip to the power line (+5 volts), and a black alligator clip to the ground.

When you're finished assembling the probe, insert the IC in the socket. Make sure it's facing in the right direction, then seat the pins carefully in the socket holes and press down gently. Don't force.



Using the logic probe:

1. Computer must be turned on. Be careful!
2. Attach power and ground leads.
3. Touch probe tip to IC pin or other signal source. Avoid power-supply components.

You can then close up the project box, open up your computer, and test the probe according to the instructions above. Stick to probing around the large IC chips, such as the CPU, for now, and be sure never to let the probe tip touch more than one pin at a time (which may cause a short). Without too much trouble, you should be able to locate some logical lows and highs.

In the next exciting episode, we'll actually do some troubleshooting! **FC**

HELPFUL HINTS

COST-CUTTERS

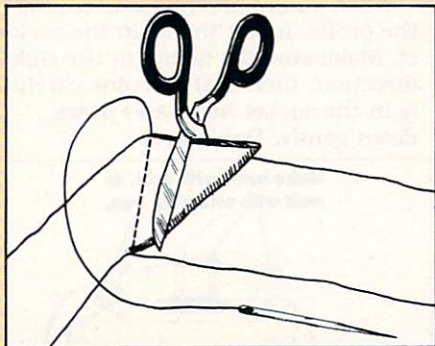
EDITED
BY ROXANE
FARMANFARMAIAN

Does it seem as though your printer's costing you an arm and a leg? Does your computer system rate as the world's greatest dust-catcher? Try these hints and you'll see how a bit of ingenuity can put an end to your woes without emptying your pockets. **Reminder:** Turn off your computer and peripherals before tinkering with them. Parental guidance recommended for children undertaking these activities.

Make A Dustcover The Cheap and Easy Way.

The lowly heavy-duty trash bag is coming into its own—it's even made it into some dress designers' new collections. As dress material, they might leave something to be desired, but for computer dustcovers, trash bags can't be beat.

If your computer, printer, and other peripherals are drowning in dust and catching spills, but you don't



want to shell out money for a hi-tech dustcover, buy a box of 3-ply or lawn and garden trash bags instead. Place a single layer of plastic over the unit to be covered. Cut around the edges where the plastic meets the table. Where a cable or wire attaches to the

unit, cut a slit in the plastic from the table to the wire and then cut a hole around the wire so it fits through easily. Use clothespins to pinch the corners of the plastic into darts. Carefully remove the bag from the unit and sew the darts closed, either on a sewing machine or by hand. Trim away the excess plastic at the seams (but don't get too close to the stitching). Turn the cover inside out. Presto! A cheap, made-to-fit, easily replaceable cover!

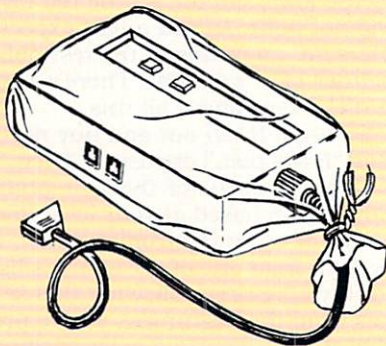
(Editor's note: Be sure your computer or peripheral has had time to cool down completely before placing your cover on it. This is to ensure that the plastic will not melt on your equipment, or accumulate condensation that can lead to rusting and other nasty side effects. It will also avoid heat damage. To stop static buildup, spray the inside of the cover with antistatic spray and/or place an antistatic pad under your unit, making sure the edges of your cover meet the pad. Change covers every two or three months. If you run into any static-generated problems, stop using the cover immediately.)

ANNA GREENHOUSE
Derwood, Maryland

No Need for a New Print-head: A Dab Will Do It.

When your dot-matrix printhead gets clogged with ink and starts printing blurry letters, there's no need to assume you need a new one (at up to \$100 a shot). A cotton swab and a bottle of rubbing alcohol are all you need to make it as good as new. Remove the ribbon cartridge first. Next, carefully snap out the printhead (some are released by pushing a lever, others require loosening a few screws—check your manual if you are unsure how your printer works in this regard). Be careful not to yank the head since it is attached to a short cable. Dip a cotton swab into the alcohol and roll it gently across the metal strip set into the head. Depending on how ink-saturated the head is, it might take two or three applications. When the swab no longer picks up any ink, the head is clean. Slip it carefully back into its casing, tighten the screws or close the lever, and replace the ribbon.

JOE GELMAN
Brooklyn, New York



A Super-Saver Dustcover for Your Modem.

Insert your modem in a plastic sandwich bag for an instant, ready-made dustcover. Wrap the open end of the bag around the modem cable(s) and fasten with a plastic tie. (See editor's note, in previous hint.)

JOHN UZZOLINO
Westfield, New Jersey

Replacing Printer Ribbon: The 2-Cent Solution.

Even if your printer takes a cartridge with a unique shape and size, you don't need to shell out \$12 each time your nylon or fabric ribbon wears out. Affordable alternatives do exist.

Buying ribbon cartridges through mail-order companies saves you money. Such businesses advertise in computer magazines or solicit directly through catalogs. Bottom line: \$6.49, in one case, for the same cartridge that cost \$12 in the store.

An even cheaper way? Pry open the cartridge, jettison the ribbon, and insert a replacement ribbon fully inked and ready for action (available at computer stores and

through mail order). Inserting it your first time might be tricky, but worth getting the hang of at a cost of only \$2-\$5.

Better yet: ink spray. Open the cartridge carefully and spray the ribbon evenly across the top, allowing the ink to sink in all the way to the bottom. Let dry, and . . . you're back in the black. One can of spray, selling for \$15, promises up to 20 re-inkings, or 70 cents a time.

Last and least—why spend \$15 a can when there's the old tinkerer's favorite, WD-40? Apply it like ink spray; it works like a dream and brings the cost down to an unbeatable 2 cents a shot!

JOHN LINCOLN
Santa Barbara, California

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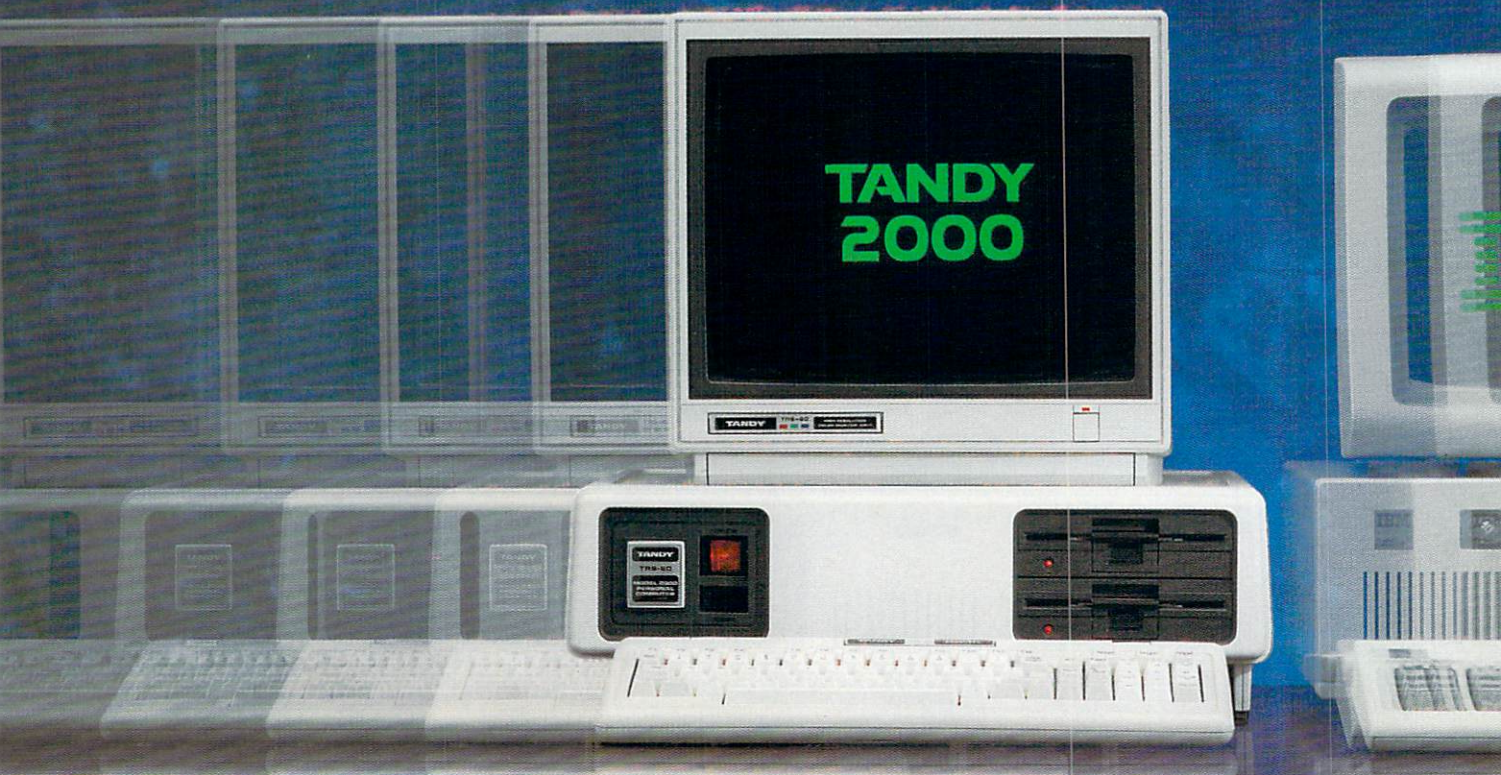
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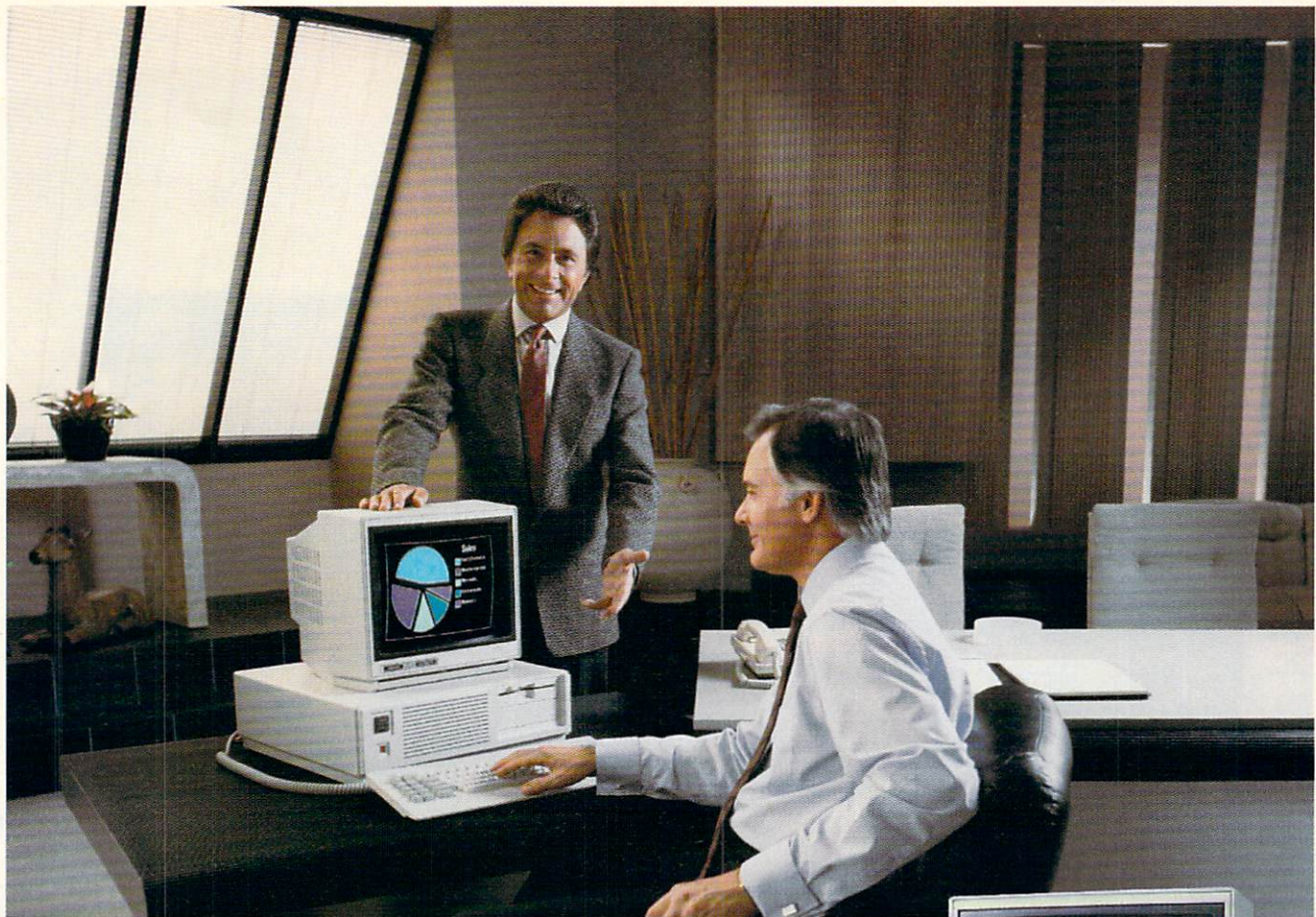
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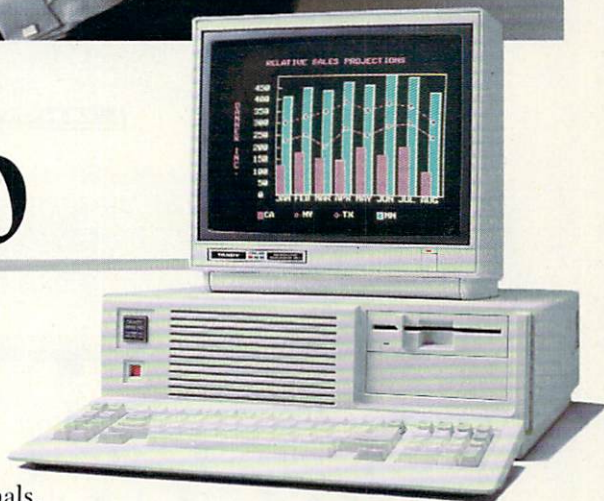
3000's high speed and storage simultaneously from low-cost data terminals. The Tandy 3000 is the total solution to office performance.

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CALENDAR CALENDAR
FILE INVEN SALES WORK
DIR INVEN SALES WORK
TELECOM COST PROJECT RETAIL WORK
PLAN SCRAP

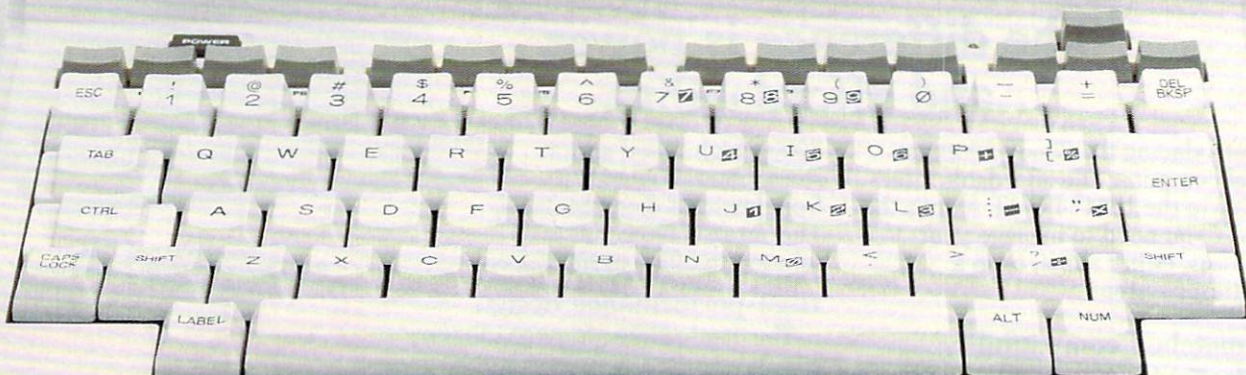
Microsoft(R) Works V1.20, Copyright (1984, 1985) Microsoft Corp.

> Copy Delete List Name Options Set

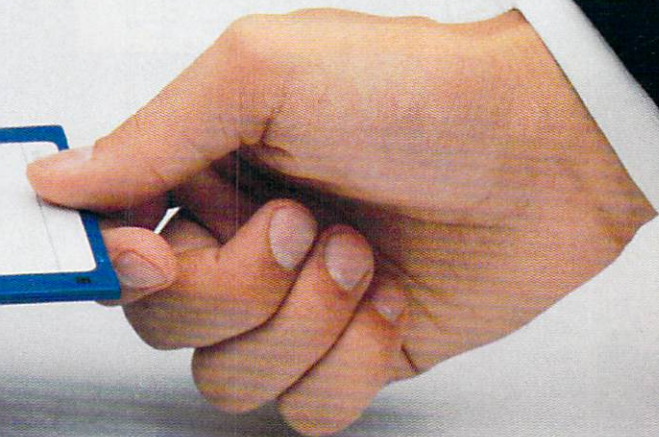
Select option or type command letter

System Manager: WOOD Bytes free: 5924 1/1/1985 5:29:52 AM

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the Tandy 600's built-in modem, you're able to communicate with other computers over phone lines and access national information networks. Telecom will even dial the phone number of anyone listed in the File program. Calendar helps you keep track of your daily tasks and activities.

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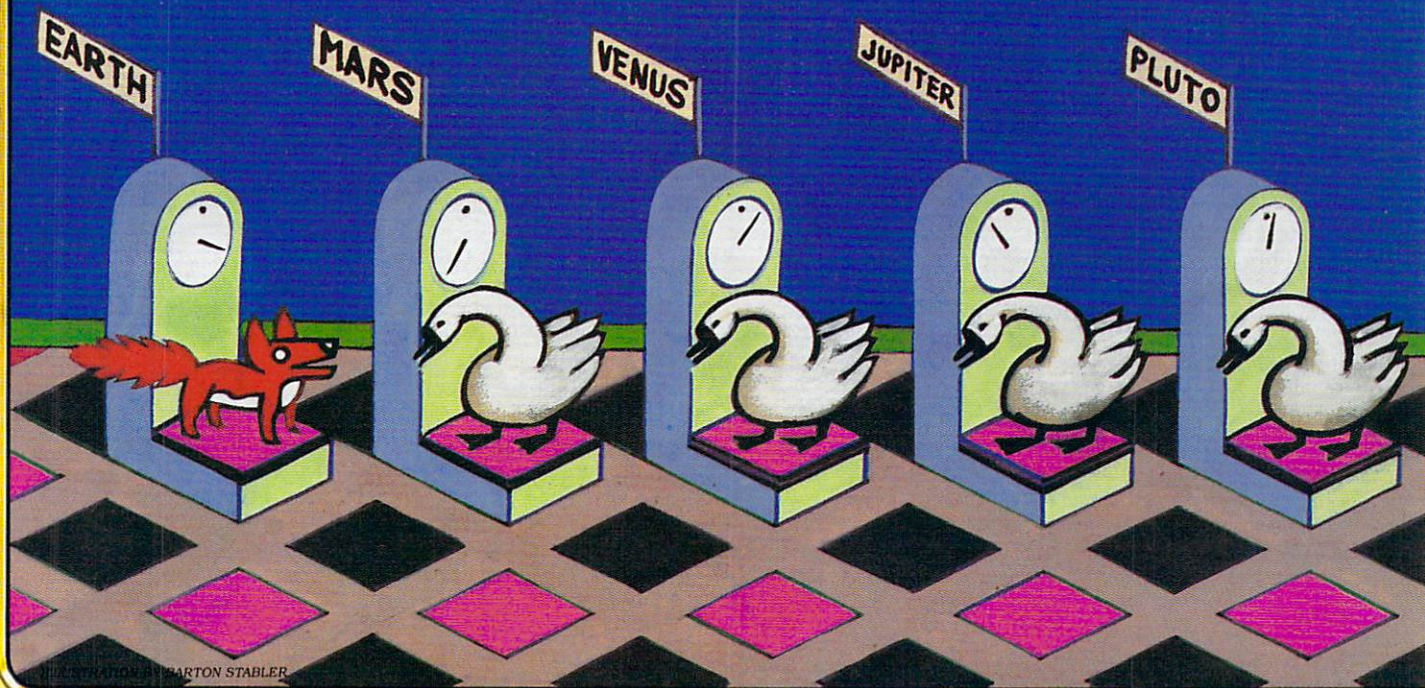
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CIRCLE READER SERVICE 66

the PROGRAMMER



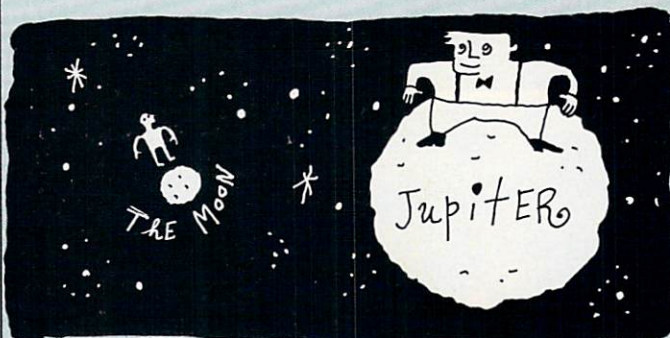
★	M A R C H	★
<p>TIPS TO THE TYPIST Page 65</p> <p>MORE PROGRAMS IN K-POWER Page 73</p> <p>AND HOME-SCHOOL CONNECTION Page 8</p>	<p>BEGINNER PROGRAM Page 52</p> <p>Ever wonder what your computer would weigh on the moon? Find out with <i>Weight on Other Planets</i>.</p>	<p>EDUCATIONAL PROGRAM Page 60</p> <p>What kind of computer are you? Add <i>Multimath's</i> drill-and-practice to your homework regimen, and watch skills multiply!</p> <p>GAME PROGRAM Page 66</p> <p><i>Fox and Geese</i> is an ancient game of strategy—with a new, computer twist! Versions for Apple II series and IBM PC and compatibles.</p>

ILLUSTRATION BY JAMES CHERRY III

Cherry

WEIGHT ON OTHER PLANETS

BY JOEY LATIMER



Do you know how much a 2,000-pound elephant would weigh on Neptune? Can you guess how much your computer would weigh on the moon? You can answer these and other questions by typing in our March Beginner Program, *Weight on Other Planets*.

Weight on Other Planets lets you see how much an object weighs on the moon or on any planet in our solar system. Type in the program as shown, and SAVE it to disk or cassette before typing RUN. Then enter the Earth weight of any object and select a "heavenly body" from the menu.

PROGRAM NOTES

When you drop an object on Earth, the speed at which it falls increases by 9.72 meters per second every second. This expression (9.72 m/sec²), called an "equatorial gravitational acceleration constant," is related to Earth's mass. The more massive the planet, the faster things accelerate as they fall toward it. Similar constants have been calculated for each major body in our solar system (some constants used in *Weight on Other Planets* are drawn from *The New Solar System* by Sky Publishing, 1983).

If you want to figure out

what an object would weigh on another planet, use the following formula, where EW is the Earth weight of the object (in pounds, kilos, or other units), G1 is Earth's gravitational constant (9.72 m/sec²), and G2 is the other planet's constant:

$$\begin{aligned} \text{New Weight} &= (G2/G1) \times EW \\ &= (G2/9.72) \times EW \end{aligned}$$

For example, if you wanted to find out what a 150-pound object weighed on the moon (where falling objects accelerate at 1.62 m/sec²), you'd calculate:

$$\begin{aligned} (1.62/9.72) \times 150 &= 0.166 \times 150 \\ &= 24.9 \text{ lbs.} \end{aligned}$$

This formula is expressed in line 190 of the Apple version of the program (the line number in other versions may differ). Note that no parentheses are needed to ensure that the computer performs the division before the multiplication. This is because multiplication and division, each having equal priority in the computer's scheme, are evaluated as they occur from left to right in an expression. In a future Beginner Program, we'll learn more about the computer's built-in priority system for ordering mathematical operations.

To handle the different conversions, *Weight on*

Other Planets stores the names and gravitational constants of each planet in the solar system (plus those of Earth's moon—although it is not, strictly speaking, a planet). A string array, PLS, stores the names of the planets for use in the main menu. Their respective constants are stored in numeric array G. This information is READ into PLS and G by a FOR/NEXT loop (see lines 20-40 of the Apple version, opposite). For a quick brushup on arrays, see last month's Beginner Program (*Averaging*, page 41, February 1986).

HACKERS' CHALLENGE

By modifying the program slightly (i.e., by changing the prompts and the data in the data statements), it's easy to use *Weight on Other Planets* to create many different kinds of "conversion utilities." For example, suppose you substituted BUSHELS, PECKS, GALLONS, QUARTS, PINTS, GILLS, FLUID OUNCES, FLUID DRAMS, and MINIMS for the planet names, and conversion factors 2219.36, 554.84, 277.42, 69.355, 34.678, 8.669, 1.7339, 0.216734, and 0.003612 for the planets' acceleration constants. Then, you could modify the prompts appropriately and substitute the formula P/G(N) for the gravity formula in line 190. You'd end up with a program that converted liquid volumes (expressed in cubic inches) to any of the listed measures. Try it, or make up your own conversion utility. Conversion factors and formulas can be found in most dictionaries and almanacs.

ATARI STRINGS AND STRING ARRAYS

The Atari version of *Weight on Other Planets* differs markedly from the other versions in the way it treats PLS. Atari BASIC doesn't have true string arrays capable of storing an entire word or phrase

in a single element. When you DIMENSION an Atari string with a statement like DIM AS(20), you're not creating a string array with twenty elements, but rather a simple string that can contain up to twenty characters (letters, numbers, punctuation marks, spaces, etc.).

Some programming savvy is required to use an Atari string to simulate a string array. The method we use here is to consider a string as a series of same-length fields, each of which contains one planet name. Since we want to store a total of nine planet names, the longest of which (THE MOON) contains eight characters (including the space), we begin by DIMENSIONING PLS to contain 72 characters in total—the equivalent of nine eight-character-long blocks laid end-to-end. Then, in the DATA statements, we "pad" each of the planet names with spaces, so each contains eight characters in all. Thereafter, when we READ in the planet names and add them to PLS, the spaces make each planet name begin on an even, eight-character boundary (PRINT PLS to see). The first block of the string, containing the name MERCURY, begins at character 1 and ends at character 8, and contains one trailing space; the second, VENUS, begins at character 9 and ends at character 16, and contains three trailing spaces, etc. In general terms, we can tell the ending character position of any element by multiplying its "number" by eight, and its starting position by subtracting seven from this figure. Unfortunately, this "simple" method of string-array simulation only works if you don't mind the extra spaces used to "pad" each element. More complex methods exist for eliminating excess spaces when storing elements of varying lengths.

ANATOMY OF A PROGRAM

Apple II series/Weight on Other Planets

Dimension two arrays, `PL$` and `G`, to contain planet names and gravitational constants.

Begin a `FOR/NEXT` loop to `READ` planet names and constants from the `DATA` statements (lines 1000-1020) into the storage arrays. Nine planets and their constants must be `READ` in so the loop will cycle nine times. The loop index, `I`, will point to successive elements of the two storage arrays.

Inside the loop: `READ` the name of a planet and its gravitational constant into the "I'th" elements of `PL$` and `G`.

End of the loop. If the loop has cycled nine times, continue; otherwise, go back and `READ` in another pair of elements.

Clear the screen.

Prompt the user to enter his or her weight. Accept this value via the `INPUT` statement, and place in variable `P`.

Clear the screen.

"Print" instructions for the user on the screen.

Leave one line blank for clarity.

Begin a `FOR/NEXT` loop to print out the planet names as a numbered "menu" of choices. Nine planet names must be printed out, so the loop will cycle nine times.

Print out the value of index `I`, followed by a parenthesis, a space, and the name of the planet contained in the "I'th" element of `PL$`.

End of the loop.

Leave a line blank.

Prompt the user to choose a planet by number. Accept this number and place it in variable `N`.

Check the value of `N` to make sure it's between 1 and 9. If not, go back to line 70, reprint the menu of choices, and ask the user to enter another number.

Clear the screen.

Calculate and print the equivalent weight on the planet chosen, along with an explanatory message. Use the planet's number, `N`, as a "pointer" to pull the correct gravitational constant out of storage array `G`, and use this value in the calculation.

Finish off the explanatory message, using `N` once more to pull the selected planet's name out of `PL$`.

Leave another line blank.

Print additional instructions. The semicolon (;) in line 240 holds the screen cursor at the end of the last line of text.

Accept one character from the user, and place it in `K$`.

Test to see which key was pressed, and respond appropriately. If a "P" or "p" was pressed (`CHR$(112)` refers to the ASCII code for lower case "p"), return to the planet menu.

If a "W" or "w" was pressed, return to the beginning of the program and let the user enter another weight.

If the key that was pressed wasn't a "Q" or a "q" (or a "P", "p", "W", or "w"), assume that an error was made and go back to let the user press another key.

If this line is reached, "Q" or "q" was pressed. End the program.

Data for planet names and gravitational constants.

```
10 DIM PL$(9),G(9)
```

```
20 FOR I = 1 TO 9
```

```
30 READ PL$(I),G(I)
```

```
40 NEXT I
```

```
50 HOME
```

```
60 INPUT "HOW MUCH DO YOU WEIGH IN POUNDS? ";P
```

```
70 HOME
```

```
80 PRINT "TYPE IN A NUMBER AND PRESS <RETURN>"
```

```
90 PRINT "TO SEE HOW MUCH YOU'D WEIGH ON"
```

```
100 PRINT "ANOTHER PLANET."
```

```
110 PRINT
```

```
120 FOR I = 1 TO 9
```

```
130 PRINT I;" ";PL$(I)
```

```
140 NEXT I
```

```
150 PRINT
```

```
160 INPUT "WHICH NUMBER DO YOU CHOOSE? ";N
```

```
170 IF N < 1 OR N > 9 THEN 70
```

```
180 HOME
```

```
190 PRINT "YOU WOULD WEIGH ";G(N)/9.72*P
```

```
200 PRINT "POUNDS ON ";PL$(N);"
```

```
210 PRINT
```

```
220 PRINT "PRESS <P> TO TRY ANOTHER PLANET,"
```

```
230 PRINT "<W> TO ENTER ANOTHER WEIGHT,"
```

```
240 PRINT "OR <Q> TO QUIT.";
```

```
250 GET K$
```

```
260 IF K$ = "P" OR K$ = CHR$(112) THEN 70
```

```
270 IF K$ = "W" OR K$ = CHR$(119) THEN 50
```

```
280 IF K$ <> "Q" AND K$ <> CHR$(113) THEN 250
```

```
290 END
```

```
1000 DATA MERCURY,3.78,VENUS,8.6,THE MOON,1.62
```

```
1010 DATA MARS,3.72,JUPITER,27.89,SATURN,12.831
```

```
1020 DATA URANUS,9.03,NEPTUNE,11.95,PLUTO,0.291
```


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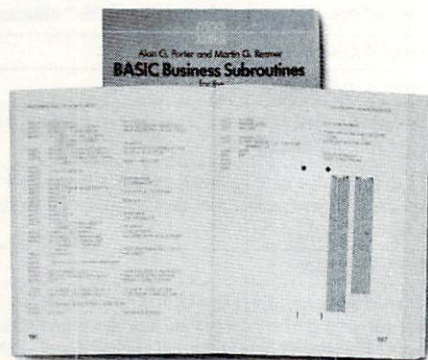
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THE WEIGHT CONSCIOUS STELLAR DELIGHT

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For the weight concious, Mercury is the hot spot during any season. On Mercury our friend James would only weigh a trim 116 pounds. Jupiter is definitely a place to stay away from if you're overweight. On the solar system's largest planet Jim's weight would balloon to over 860 pounds.

Have you ever wondered what something would weigh on the moon? Look around the room, what would your chair weigh on Pluto? What does the car left on the moon by American astronauts weigh?

These data strips contain the program called WEIGHT by Joey Latimer, reprinted from this issue of FAMILY COMPUTING. One of the data strips on the right is for Apple // Series and the other is for IBM PC fans.

APPLE users should read their data strip in their computer and follow the instructions on the screen. The program is menu-driven.

IBM users should read in their strip and then return to BASIC to RUN the program. It is also menu-driven.

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APPLE



Softstrip

IBM

BEGINNER PROGRAM

Adam/Weight on Other Planets

```

10 DIM PL$(9),G(9)
20 FOR i = 1 TO 9
30 READ PL$(i),G(i)
40 NEXT i
50 HOME
60 PRINT "How much do you weigh"
70 INPUT "in pounds? ";p
80 HOME
90 PRINT "Type in a number and press"
100 PRINT "<RETURN> to see how much"
110 PRINT "you'd weigh on another planet."
120 PRINT
130 FOR i = 1 TO 9
140 PRINT i;" ";PL$(i)
150 NEXT i
160 PRINT
170 INPUT "Which number do you choose? ";n
180 IF n < 1 OR n > 9 THEN 80
190 HOME
200 PRINT "You would weigh ";G(n)/9.72*p
210 PRINT "pounds on ";PL$(n);"."
220 PRINT
230 PRINT "Press <P> to try another"
240 PRINT "planet, <W> to enter another"
250 PRINT "weight, or <Q> to quit.";
260 GET K$
270 IF K$ = "P" OR K$ = "p" THEN 80
280 IF K$ = "W" OR K$ = "w" THEN 50
290 IF K$ <> "Q" AND K$ <> "q" THEN 260
300 END
1000 DATA Mercury,3.78,Venus,8.6,the Moon,1.62
1010 DATA Mars,3.72,Jupiter,27.89,Saturn,12.831
1020 DATA Uranus,9.03,Neptune,11.95,Pluto,0.291

```

Atari 400, 800, 600/800XL, & 130XE/Weight on Other Planets

```

10 OPEN #1,4,0,"K:"
20 DIM PL$(72),TS(8),G(9)

```

```

30 FOR I=1 TO 9
40 READ TS,V
50 PL$(LEN(PL$)+1)=TS
60 G(I)=V
70 NEXT I
80 PRINT CHR$(125);
90 PRINT "HOW MUCH DO YOU WEIGH IN POUNDS";
100 INPUT P
110 PRINT CHR$(125);
120 PRINT "TYPE IN A NUMBER AND PRESS <RETURN>"
130 PRINT "TO SEE HOW MUCH YOU'D WEIGH"
140 PRINT "ON ANOTHER PLANET."
150 PRINT
160 FOR I=1 TO 9
170 PRINT I;" ";PL$(I*8-7,I*8)
180 NEXT I
190 PRINT
200 PRINT "WHICH NUMBER DO YOU CHOOSE";
210 INPUT N
220 IF N<1 OR N>9 THEN 110
230 PRINT CHR$(125);
240 PRINT "YOU WOULD WEIGH ";G(N)/9.72*P
250 PRINT "POUNDS ON ";PL$(N*8-7,N*8)
260 PRINT
270 PRINT "PRESS <P> TO TRY ANOTHER PLANET,"
280 PRINT "<W> TO ENTER ANOTHER WEIGHT,"
290 PRINT "OR <Q> TO QUIT.";
300 GET #1,K
310 IF K=ASC("P") THEN 110
320 IF K=ASC("W") THEN 80
330 IF K<>ASC("Q") THEN 300
340 END
999 REM --INCLUDE SPACES IN DATA AS SHOWN!--
1000 DATA MERCURY ,3.78,VENUS ,8.6,THE MOON,1.62
1010 DATA MARS ,3.72,JUPITER ,27.89,SATURN ,12.831
1020 DATA URANUS ,9.03,NEPTUNE ,11.95,PLUTO ,0.291

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Commodore 64 & 128/Weight on Other Planets

```
10 DIM PL$(9),G(9)
20 FOR I=1 TO 9
30 READ PL$(I),G(I)
40 NEXT I
50 PRINT CHR$(147);
60 INPUT "HOW MUCH DO YOU WEIGH IN POUNDS";P
70 PRINT CHR$(147);
80 PRINT "TYPE IN A NUMBER AND PRESS <RETURN>"
90 PRINT "TO SEE HOW MUCH YOU'D WEIGH ON"
100 PRINT "ANOTHER PLANET."
110 PRINT
120 FOR I=1 TO 9
130 PRINT I;") ";PL$(I)
140 NEXT I
150 PRINT
160 INPUT "WHICH NUMBER DO YOU CHOOSE";N
170 IF N<1 OR N>9 THEN 70
180 PRINT CHR$(147);
190 PRINT "YOU WOULD WEIGH";G(N)/9.72*P
200 PRINT "POUNDS ON ";PL$(N);"."
210 PRINT
220 PRINT "PRESS <P> TO TRY ANOTHER PLANET,"
230 PRINT "<W> TO ENTER ANOTHER WEIGHT,"
240 PRINT "OR <Q> TO QUIT."
250 GET K$
260 IF K$="" THEN 250
270 IF K$="P" THEN 70
280 IF K$="W" THEN 50
290 IF K$<>"Q" THEN 250
300 END
1000 DATA MERCURY,3.78,VENUS,8.6,THE MOON,1.62
1010 DATA MARS,3.72,JUPITER,27.89,SATURN,12.831
1020 DATA URANUS,9.03,NEPTUNE,11.95,PLUTO,0.291
```

IBM PC & compatibles/Weight on Other Planets

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

```
10 DIM PL$(9),G(9)
20 FOR I=1 TO 9
30 READ PL$(I),G(I)
40 NEXT I
50 CLS
60 INPUT "How much do you weigh in pounds";P
70 CLS
80 PRINT "Type in a number and press <ENTER>"
90 PRINT "to see how much you'd weigh on"
100 PRINT "another planet."
110 PRINT
120 FOR I=1 TO 9
130 PRINT I;") ";PL$(I)
140 NEXT I
150 PRINT
160 INPUT "Which number do you choose";N
170 IF N<1 OR N>9 THEN 70
180 CLS
190 PRINT "You would weigh";G(N)/9.72*P
200 PRINT "pounds on ";PL$(N);"."
210 PRINT
220 PRINT "Press <P> to try another planet,"
230 PRINT "<W> to enter another weight,"
240 PRINT "or <Q> to quit."
250 K$=INKEY$
260 IF K$="" THEN 250
270 IF K$="P" OR K$="p" THEN 70
280 IF K$="W" OR K$="w" THEN 50
290 IF K$<>"Q" AND K$<>"q" THEN 250
300 END
1000 DATA Mercury,3.78,Venus,8.6,the Moon,1.62
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```

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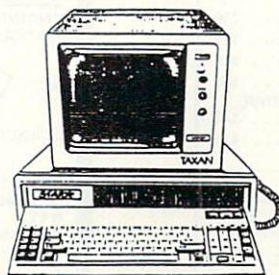
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BEGINNER PROGRAM

Macintosh w/Microsoft BASIC 2.0/Weight on Other Planets

```

DIM PL$(9),G(9)
FOR I=1 TO 9
  READ PL$(I),G(I)
NEXT I
WEIGHT:
CLS
INPUT "How much do you weigh in pounds";P
PLANETS:
CLS
PRINT "Type in a number and press <RETURN> to see
how"
PRINT "much you'd weigh on another planet."
PRINT
FOR I=1 TO 9
  PRINT I;" ";PL$(I)
NEXT I
PRINT
INPUT "Which number do you choose";N
IF N<1 OR N>9 THEN PLANETS
CLS
PRINT "You would weigh";G(N)/9.72*P;"pounds on ";P
L$(N);"."
PRINT
PRINT "Press <P> to try another planet, <W> to ent
er"
PRINT "another weight, or <Q> to quit.";
GETKEY:
K$=INKEY$
IF K$="" THEN GETKEY
IF K$="P" OR K$="p" THEN PLANETS
IF K$="W" OR K$="w" THEN WEIGHT
IF K$">"Q" AND K$"<"q" THEN GETKEY
END
DATA Mercury,3.78,Venus,8.6,the Moon,1.62
DATA Mars,3.72,Jupiter,27.89,Saturn,12.831
DATA Uranus,9.03,Neptune,11.95,Pluto,0.291
  
```

Tandy Color Computer/Weight on Other Planets

```

10 DIM PL$(9),G(9)
20 FOR I=1 TO 9
30 READ PL$(I),G(I)
40 NEXT I
50 CLS
60 PRINT "HOW MUCH DO YOU WEIGH"
70 INPUT "IN POUNDS";P
80 CLS
90 PRINT "TYPE IN A NUMBER AND PRESS"
100 PRINT "<ENTER> TO SEE HOW MUCH YOU'D"
110 PRINT "WEIGH ON ANOTHER PLANET."
120 PRINT
130 FOR I=1 TO 9
140 PRINT I;" ";PL$(I)
150 NEXT I
160 PRINT
170 INPUT "WHICH NUMBER DO YOU CHOOSE";N
180 IF N<1 OR N>9 THEN 80
190 CLS
200 PRINT "YOU WOULD WEIGH";G(N)/9.72*P
210 PRINT "POUNDS ON ";PL$(N);"."
220 PRINT
230 PRINT "PRESS <P> TO TRY ANOTHER"
240 PRINT "PLANET, <W> TO ENTER ANOTHER"
250 PRINT "WEIGHT, OR <Q> TO QUIT."
260 K$=INKEY$
270 IF K$="" THEN 260
280 IF K$="P" THEN 80
290 IF K$="W" THEN 50
300 IF K$">"Q" THEN 260
310 END
1000 DATA MERCURY,3.78,VENUS,8.6,THE MOON,1.62
1010 DATA MARS,3.72,JUPITER,27.89,SATURN,12.831
1020 DATA URANUS,9.03,NEPTUNE,11.95,PLUTO,0.291
  
```

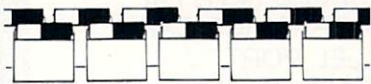
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BEGINNER PROGRAM

Tandy Models III & 4/Weight on Other Planets

```

10 DIM PLS(9),G(9)
20 FOR I=1 TO 9
30 READ PLS(I),G(I)
40 NEXT I
50 CLS
60 INPUT "How much do you weigh in pounds";P
70 CLS
80 PRINT "Type in a number and press <ENTER> to see ho
w"
90 PRINT "much you'd weigh on another planet."
100 PRINT
110 FOR I=1 TO 9
120 PRINT I;" "PLS(I)
130 NEXT I
140 PRINT
150 INPUT "Which number do you choose";N
160 IF N<1 OR N>9 THEN 70
170 CLS
180 PRINT "You would weigh";G(N)/9.72*P;"pounds on ";P
LS(N);"."
190 PRINT
200 PRINT "Press <P> to try another planet, <W> to ent
er"
210 PRINT "another weight, or <Q> to quit.";
220 KS=INKEY$
230 IF KS="" THEN 220
240 IF KS="P" OR KS="p" THEN 70
250 IF KS="W" OR KS="w" THEN 50
260 IF KS="Q" AND KS="q" THEN 220
270 END
1000 DATA Mercury,3.78,Venus,8.6,the Moon,1.62
1010 DATA Mars,3.72,Jupiter,27.89,Saturn,12.831
1020 DATA Uranus,9.03,Neptune,11.95,Pluto,0.291
    
```

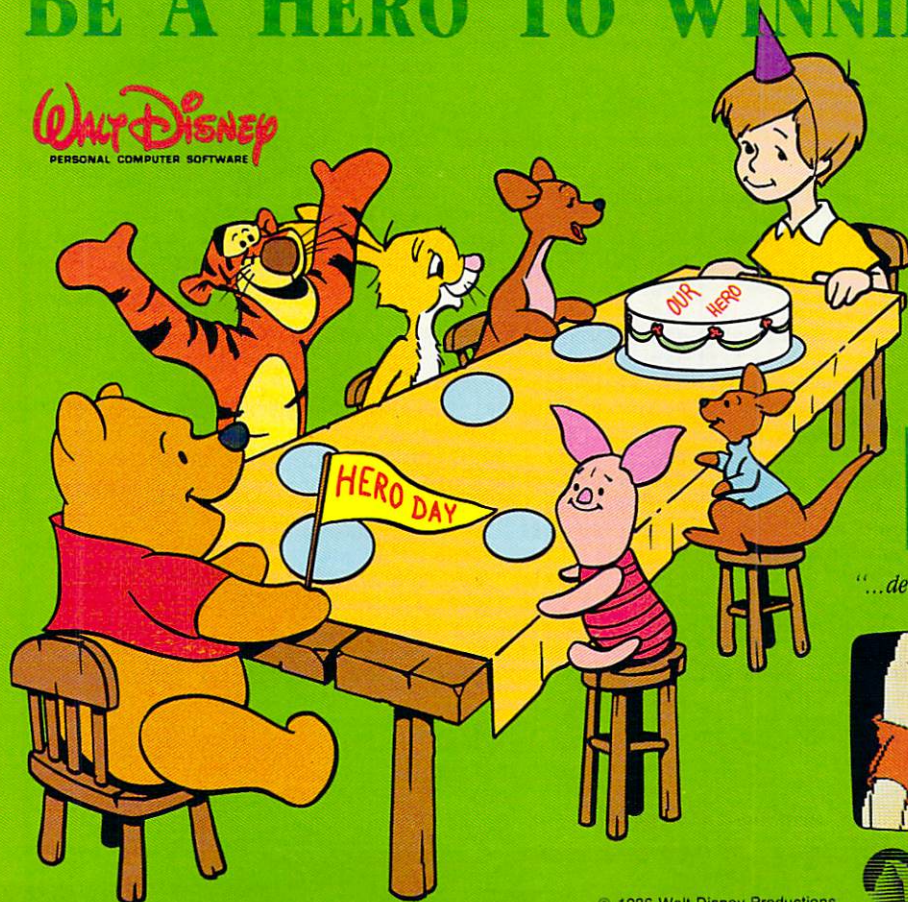
TI-99/4A/Weight on Other Planets

```

9 REM --MAKE SURE <ALPHA LOCK> IS DOWN--
10 DIM PLS(9),G(9)
20 FOR I=1 TO 9
30 READ PLS(I),G(I)
40 NEXT I
50 CALL CLEAR
60 PRINT "HOW MUCH DO YOU WEIGH"
70 INPUT "IN POUNDS? ":P
80 CALL CLEAR
90 PRINT "TYPE IN A NUMBER AND PRESS"
100 PRINT "<ENTER> TO SEE WHAT YOU'D"
110 PRINT "WEIGH ON ANOTHER PLANET."
120 PRINT
130 FOR I=1 TO 9
140 PRINT I;" "PLS(I)
150 NEXT I
160 PRINT
170 INPUT "WHICH DO YOU CHOOSE? ":N
180 IF N<1 THEN 80
190 IF N>9 THEN 80
200 CALL CLEAR
210 PRINT "YOU WOULD WEIGH";G(N)/9.72*P
220 PRINT "POUNDS ON ";PLS(N);"."
230 PRINT
240 PRINT "PRESS <P> TO TRY ANOTHER"
250 PRINT "PLANET, <W> TO ENTER A NEW"
260 PRINT "WEIGHT, OR <Q> TO QUIT.";
270 CALL KEY(3,K,S)
280 IF S=0 THEN 270
290 IF K=80 THEN 80
300 IF K=87 THEN 50
310 IF K<81 THEN 270
320 END
1000 DATA MERCURY,3.78,VENUS,8.6,THE MOON,1.62
1010 DATA MARS,3.72,JUPITER,27.89,SATURN,12.831
1020 DATA URANUS,9.03,NEPTUNE,11.95,PLUTO,0.291
    
```

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SIERRA

VIC-20/Weight on Other Planets

```

10 DIM PLS(9),G(9)
20 FOR I=1 TO 9
30 READ PLS(I),G(I)
40 NEXT I
50 PRINT CHR$(147);
60 PRINT "HOW MUCH DO YOU"
70 INPUT "WEIGH IN POUNDS";P
80 PRINT CHR$(147);
90 PRINT "TYPE IN A NUMBER"
100 PRINT "AND PRESS <RETURN>"
110 PRINT "TO SEE HOW MUCH"
120 PRINT "YOU'D WEIGH ON"
130 PRINT "ANOTHER PLANET."
140 PRINT
150 FOR I=1 TO 9
160 PRINT I;" ";PLS(I)
170 NEXT I
180 PRINT
190 PRINT "WHICH NUMBER"
200 INPUT "DO YOU CHOOSE";N
210 IF N<1 OR N>9 THEN 80
220 PRINT CHR$(147);
230 PRINT "YOU WOULD WEIGH"
240 PRINT G(N)/9.72*P
250 PRINT "POUNDS ON ";PLS(N);"."
260 PRINT
270 PRINT "PRESS <P> TO TRY"
280 PRINT "ANOTHER PLANET,"
290 PRINT "<W> TO ENTER"
300 PRINT "ANOTHER WEIGHT,"
310 PRINT "OR <Q> TO QUIT."
320 GET K$
330 IF K$="" THEN 320
340 IF K$="P" THEN 80
350 IF K$="W" THEN 50
360 IF K$="Q" THEN 320
370 END
1000 DATA MERCURY,3.78,VENUS,8.6,THE MOON,1.62
1010 DATA MARS,3.72,JUPITER,27.89,SATURN,12.831
1020 DATA URANUS,9.03,NEPTUNE,11.95,PLUTO,0.291

```

COMPUTERS WE COVER

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

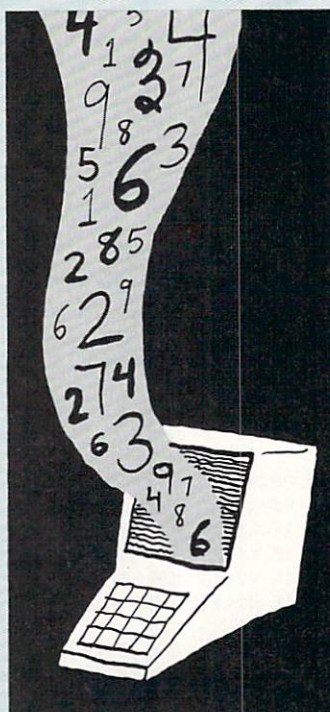
In addition, we publish at least one program each issue for the Adam, TI-99/4A, and VIC-20. In the future, we also hope to cover the Atari 520ST and the Amiga. This month, these programs can be found here in The Programmer and in Microtones (in the K-POWER section of FAMILY COMPUTING).

MULTIMATH

BY JOEY LATIMER

Multimath is a simple drill-and-practice program designed to help improve your addition and multiplication speed. *Multimath* has four difficulty levels from which to choose, and you can set the number of problems you want to include in a particular drill. One twist that makes *Multimath* different from other drill-and-practice programs you may have seen is that instead of asking you to add or multiply two numbers, *Multimath* requires you to add or multiply three numbers at a time. This means you have to perform two mathematical operations to find each answer.

HACKERS' NOTE: You may find it challenging to modify the program so it imposes a time limit for each answer. A further improvement might be to



add a musical and/or graphic "reward" for correct answers.

Apple II series/Multimath

```

10 DIM DL(4,2)
20 FOR I = 1 TO 4:READ DL(I,1),DL(I,2):NEXT I
30 HOME:HTAB 9:VTAB 10
40 PRINT "PRESS ANY KEY TO BEGIN.";
50 POKE -16368,0
60 IF PEEK(-16384) < 128 THEN N = RND(1):GOTO 60
70 POKE -16368,0
80 HOME:PRINT TAB(13);"*-MULTIMATH-*"
90 PRINT:PRINT:PRINT TAB(13);"DO YOU WANT TO ..."
100 PRINT:PRINT TAB(13);"(A)DD OR"
110 PRINT TAB(13);"(M)ULTIPLY? ";
120 GET T$:F = ASC(T$):IF F > 90 THEN F = F-32
130 IF F <> 65 AND F <> 77 THEN 120
140 PRINT T$:IF F = 65 THEN OPS = " + ":GOTO 160
150 OPS = " * "
160 PRINT:PRINT TAB(13);"WOULD YOU PREFER ..."
170 PRINT:PRINT TAB(13);"(E)ASY,"
180 PRINT TAB(13);"(M)ODERATE,"
190 PRINT TAB(13);"(H)ARD, OR"
200 PRINT TAB(13);"(V)ERY HARD PROBLEMS? ";
210 GET D$:DF = ASC(D$):IF DF > 90 THEN DF = DF-32
220 DC = (DF = 69)+2*(DF = 77)+3*(DF = 72)+4*(DF = 86)
230 IF DC = 0 THEN 210
240 PRINT D$:FOR DE = 1 TO 500:NEXT DE
250 HOME:PRINT "TYPE A NUMBER;"
260 PRINT "THEN PRESS <RETURN>."
270 PRINT:PRINT "HOW MANY QUESTIONS DO YOU"
280 INPUT "WANT TO TRY (1 TO 100)? ";N
290 IF N > 0 AND N < 101 THEN 330
300 PRINT
310 PRINT "1 TO 100 ARE VALID. PLEASE TRY AGAIN."
320 GOTO 270
330 PR = 1:SC = 0
340 M = ((F = 77)+(F = 65)*(INT(RND(1)*3+1)))*DC
350 A = (INT(RND(1)*DL(DC,1))+DL(DC,2))*M

```



```

360 B = (INT(RND(1)*DL(DC,1))+DL(DC,2))*M
370 C = (INT(RND(1)*DL(DC,1))+DL(DC,2))*M
380 HOME:PRINT:PRINT "TYPE THE ANSWER"
390 PRINT "(OR <E> TO END THE QUIZ);"
400 PRINT "THEN PRESS <RETURN>."
410 PRINT:PRINT "PROBLEM #";PR;" OF ";N
420 IF F = 65 THEN AN = A+B+C:GOTO 440
430 AN = A*B*C
440 HTAB 11:VTAB 10:PRINT A;OP$;B;OP$;C;" = ";
450 INPUT AS
460 IF AS = "E" OR AS = CHR$(101) THEN HOME:GOTO 600
470 IF VAL(AS) = 0 THEN 380
480 IF VAL(AS) <> AN THEN 500
490 PRINT:PRINT TAB(16);"RIGHT!":SC = SC+1:GOTO 510
500 PRINT:PRINT TAB(11);"SORRY ... IT'S ";AN;"."
510 FOR DE = 1 TO 1000:NEXT DE
520 IF PR < N THEN PR = PR+1:GOTO 340
530 HOME:HTAB 4:VTAB 2
540 PRINT "YOUR SCORE IS ";SC;" OUT OF ";PR;" ..."
550 PRINT
560 IF SC > PR*.9 THEN PRINT TAB(4);"A TRUE GENIUS!":
GOTO 600
570 IF SC > PR*.69 THEN PRINT TAB(4);"SHARP AS A TACK
!":GOTO 600
580 IF SC > PR*.49 THEN PRINT TAB(4);"JUST WARMING UP
!":GOTO 600
590 PRINT TAB(4);"THINK HARDER!"
600 PRINT:PRINT:PRINT TAB(4);"DO YOU WANT TO ..."
610 PRINT
620 PRINT TAB(4);"(R)EPEAT THE SAME TYPE OF QUIZ,"
630 PRINT TAB(4);"(T)RY ANOTHER TYPE OF QUIZ, OR"
640 PRINT TAB(4);"(Q)UIT? ";
650 GET KS
660 IF KS = "R" OR KS = CHR$(114) THEN 330
670 IF KS = "T" OR KS = CHR$(116) THEN 80
680 IF KS <> "Q" AND KS <> CHR$(113) THEN 650
690 END
1000 DATA 5,1,5,6,10,11,70,21

```

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

```

10 DIM DL(4,2),OPS(3),AS(10)
20 OPEN #1,4,0,"K:"
30 FOR I=1 TO 4:READ A,B:DL(I,1)=A:DL(I,2)=B:NEXT I
40 SETCOLOR 2,0,0:SETCOLOR 1,0,15
50 PRINT CHR$(125):POSITION 12,1:PRINT "*-MULTIMATH-*"
60 POSITION 13,4:PRINT "DO YOU WANT TO ..."
70 POSITION 13,6:PRINT "(A)DD OR"
80 POSITION 13,7:PRINT "(M)ULTIPLY?";
90 GET #1,F:IF F<>65 AND F<>77 THEN 90
100 PRINT CHR$(F):IF F=65 THEN OP$=" + ":GOTO 120
110 OP$=" * "
120 POSITION 13,9:PRINT "WOULD YOU PREFER ..."
130 POSITION 13,11:PRINT "(E)ASY,"
140 POSITION 13,12:PRINT "(M)ODERATE,"
150 POSITION 13,13:PRINT "(H)ARD, OR"
160 POSITION 13,14:PRINT "(V)ERY HARD PROBLEMS?";
170 GET #1,D
180 DC=(D=69)+2*(D=77)+3*(D=72)+4*(D=86)
190 IF DC=0 THEN 170
200 PRINT CHR$(D):FOR DE=1 TO 100:NEXT DE
210 PRINT CHR$(125):PRINT "TYPE A NUMBER;"
220 PRINT "THEN PRESS <RETURN>."
230 PRINT:PRINT "HOW MANY QUESTIONS DO YOU"
240 PRINT "WANT TO TRY (1 TO 100)";
250 TRAP 210:INPUT N
260 IF N>0 AND N<101 THEN 300
270 PRINT
280 PRINT "1 TO 100 ARE VALID. PLEASE TRY AGAIN."
290 GOTO 230
300 PR=1:SC=0
310 M=((F=77)+(F=65)*(INT(RND(0)*3+1)))*DC
320 A=(INT(RND(0)*DL(DC,1))+DL(DC,2))*M
330 B=(INT(RND(0)*DL(DC,1))+DL(DC,2))*M
340 C=(INT(RND(0)*DL(DC,1))+DL(DC,2))*M
350 PRINT CHR$(125):PRINT
360 PRINT "TYPE THE ANSWER"
370 PRINT "(OR <E> TO END THE QUIZ);"

```

BOLDLY GO WHERE NO MOUSE HAS GONE BEFORE

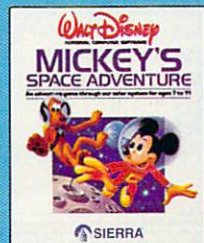
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SIERRA

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CIRCLE READER SERVICE 36

EDUCATIONAL PROGRAM

```

380 PRINT "THEN PRESS <RETURN>."
390 PRINT :PRINT "PROBLEM #";PR;" OF ";N
400 IF F=65 THEN AN=A+B+C:GOTO 420
410 AN=A*B*C
420 POSITION 10,10:PRINT A;OP$;B;OP$;C;" = ";
430 INPUT AS
440 IF AS="" THEN 480
450 IF AS="E" THEN PRINT CHR$(125):GOTO 580
460 TRAP 350:IF VAL(AS)<>AN THEN 480
470 POSITION 15,12:PRINT "RIGHT!":SC=SC+1:GOTO 490
480 POSITION 10,12:PRINT "SORRY ... IT'S ";AN;"."
490 FOR DE=1 TO 200:NEXT DE
500 IF PR<N THEN PR=PR+1:GOTO 310
510 PRINT CHR$(125):POSITION 4,1
520 PRINT "YOUR SCORE IS ";SC;" OUT OF ";PR;" ..."
530 POSITION 4,2
540 IF SC>PR*0.9 THEN PRINT "A TRUE GENIUS!":GOTO 580
550 IF SC>PR*0.69 THEN PRINT "SHARP AS A TACK!":GOTO 580
560 IF SC>PR*0.49 THEN PRINT "JUST WARMING UP!":GOTO 580
570 PRINT "THINK HARDER!"
580 POSITION 4,8:PRINT "DO YOU WANT TO ..."
590 POSITION 4,10
600 PRINT "(R)EPEAT THE SAME TYPE OF QUIZ,"
610 POSITION 4,11
620 PRINT "(T)RY ANOTHER TYPE OF QUIZ, OR"
630 POSITION 4,12:PRINT "(Q)UIT?";
640 GET #1,K:IF K=82 THEN 300
650 IF K=84 THEN 50
660 IF K>81 THEN 640
670 END
680 DATA 5,1,5,6,10,11,70,21

```

Commodore 64 & 128 (C 64 mode)/Multimath

```

10 DIM DL(4,2)
20 FOR I=1 TO 4:READ DL(I,1),DL(I,2):NEXT I
30 POKE 53280,0:POKE 53281,0
40 PRINT CHR$(147);CHR$(155)
50 PRINT TAB(12);"*-MULTIMATH-*"
60 PRINT:PRINT:PRINT TAB(13);"DO YOU WANT TO ..."
70 PRINT:PRINT TAB(13);"(A)DD OR"
80 PRINT TAB(13);"(M)ULTIPLY? ";
90 GET TS:IF TS<>"A" AND TS<>"M" THEN 90
100 PRINT TS:F=ASC(TS)
110 IF F=65 THEN OP$="+":GOTO 130
120 OP$="*"
130 PRINT:PRINT TAB(13);"WOULD YOU PREFER ..."
140 PRINT:PRINT TAB(13);"(E)ASY,"
150 PRINT TAB(13);"(M)ODERATE,"
160 PRINT TAB(13);"(H)ARD, OR"
170 PRINT TAB(13);"(V)ERY HARD PROBLEMS? ";
180 GET DS
190 IF DS<>"E" AND DS<>"M" AND DS<>"H" AND DS<>"V" THEN 180
200 PRINT DS:DF=ASC(DS)
210 DC=-(DF=69)-2*(DF=77)-3*(DF=72)-4*(DF=86)
220 FOR DE=1 TO 500:NEXT DE
230 PRINT CHR$(147):PRINT "TYPE A NUMBER;"
240 PRINT "THEN PRESS <RETURN>."
250 PRINT:PRINT "HOW MANY QUESTIONS DO YOU"
260 INPUT "WANT TO TRY (1 TO 100)";N
270 IF N>0 AND N<101 THEN 310
280 PRINT
290 PRINT "1 TO 100 ARE VALID. PLEASE TRY AGAIN."
300 GOTO 250
310 PR=1:SC=0
320 M=(-(F=77)-(F=65)*(INT(RND(1)*3+1)))*DC
330 A=(INT(RND(1)*DL(DC,1))+DL(DC,2))*M
340 B=(INT(RND(1)*DL(DC,1))+DL(DC,2))*M
350 C=(INT(RND(1)*DL(DC,1))+DL(DC,2))*M
360 PRINT CHR$(147):PRINT
370 PRINT "TYPE THE ANSWER"
380 PRINT "(OR <E> TO END THE QUIZ);"
390 PRINT "THEN PRESS <RETURN>."

```

```

400 PRINT:PRINT "PROBLEM #";PR;"OF";N
410 IF F=65 THEN AN=A+B+C:GOTO 430
420 AN=A*B*C
430 POKE 214,10:PRINT
440 PRINT TAB(10);A;OP$;B;OP$;C;" = ";:INPUT AS
450 IF AS="E" THEN PRINT CHR$(147):GOTO 590
460 IF VAL(AS)=0 THEN 360
470 IF VAL(AS)<>AN THEN 490
480 PRINT:PRINT TAB(16);"RIGHT!":SC=SC+1:GOTO 510
490 PRINT
500 PRINT TAB(11);"SORRY ... IT'S";AN;CHR$(20);"."
510 FOR DE=1 TO 1000:NEXT DE
520 IF PR<N THEN PR=PR+1:GOTO 320
530 PRINT CHR$(147):PRINT
540 PRINT TAB(4);"YOUR SCORE IS";SC;"OUT OF";PR;"..."
550 IF SC>PR*0.9 THEN PRINT TAB(4);"A TRUE GENIUS!":GO
TO 590
560 IF SC>PR*0.69 THEN PRINT TAB(4);"SHARP AS A TACK!"
:GOTO 590
570 IF SC>PR*0.49 THEN PRINT TAB(4);"JUST WARMING UP!"
:GOTO 590
580 PRINT TAB(4);"THINK HARDER!"
590 PRINT:PRINT:PRINT TAB(4);"DO YOU WANT TO ..."
600 PRINT
610 PRINT TAB(4);"(R)EPEAT THE SAME TYPE OF QUIZ,"
620 PRINT TAB(4);"(T)RY ANOTHER TYPE OF QUIZ, OR"
630 PRINT TAB(4);"(Q)UIT? ";
640 GET KS:IF KS="" THEN 640
650 IF KS="R" THEN 310
660 IF KS="T" THEN 40
670 IF KS<>"Q" THEN 640
680 END
1000 DATA 5,1,5,6,10,11,70,21

```

IBM PC & compatibles/Multimath

This program has been tested and found to work on the following computers and hardware configurations, using the BASICS shown: IBM PC w/Monochrome/Printer card or Color/Graphics Monitor Adapter, w/Disk BASIC D2.00 or Advanced BASIC A2.00 (BASICA); IBM PCjr w/Cartridge BASIC J1.00; Tandy 1000 w/GW-BASIC 2.02 versions 00.05.00 and 01.01.00. It should also work on many other IBM PC compatibles.

```

10 DIM DL(4,2):DEFDBL A-C
20 WIDTH 40:KEY OFF:RANDOMIZE
30 FOR I=1 TO 4:READ DL(I,1),DL(I,2):NEXT I
40 CLS:PRINT TAB(12);"*-MULTIMATH-*"
50 PRINT:PRINT:PRINT TAB(13);"Do you want to ..."
60 PRINT:PRINT TAB(13);"(a)dd or"
70 PRINT TAB(13);"(m)ultiply? ";
80 TS=INKEY$:IF TS="" THEN 80
90 F=ASC(TS):IF F>90 THEN F=F-32
100 IF F<65 AND F>77 THEN 80
110 PRINT TS:IF F=65 THEN OP$="+" ELSE OP$="*"
120 PRINT:PRINT TAB(13);"Would you prefer ..."
130 PRINT:PRINT TAB(13);"(e)asy,"
140 PRINT TAB(13);"(m)oderate,"
150 PRINT TAB(13);"(h)ard, or"
160 PRINT TAB(13);"(v)ery hard problems? ";
170 DS=INKEY$:IF DS="" THEN 170
180 DF=ASC(DS):IF DF>90 THEN DF=DF-32
190 DC=-(DF=69)-2*(DF=77)-3*(DF=72)-4*(DF=86)
200 IF DC=0 THEN 170 ELSE PRINT DS
210 FOR DE=1 TO 500:NEXT DE
220 CLS:PRINT "Type a number;"
230 PRINT "then press <ENTER>."
240 PRINT:PRINT "How many questions do you"
250 INPUT "want to try (1 to 100)";N
260 IF N>0 AND N<101 THEN 300
270 PRINT
280 PRINT "1 to 100 are valid. Please try again."
290 GOTO 240
300 PR=1:SC=0
310 M=(-(F=77)-(F=65)*INT(RND*3+1))*DC
320 A=(INT(RND*DL(DC,1))+DL(DC,2))*M
330 B=(INT(RND*DL(DC,1))+DL(DC,2))*M
340 C=(INT(RND*DL(DC,1))+DL(DC,2))*M
350 CLS:PRINT:PRINT "Type the answer"

```



```

360 PRINT "(or <E> to end the quiz);"
370 PRINT "then press <ENTER>."
380 PRINT:PRINT "Problem #";PR;"of";N
390 IF F=65 THEN AN=A+B+C ELSE AN=A*B*C
400 LOCATE 10,11
410 PRINT A;OP$;B;OP$;C;"=" ";:INPUT AS
420 IF AS="E" OR AS="e" THEN CLS:GOTO 560
430 IF VAL(AS)=0 THEN 350
440 IF VAL(AS)<>AN THEN 460
450 PRINT:PRINT TAB(16);"Right!":SC=SC+1:GOTO 480
460 PRINT
470 PRINT TAB(11);"Sorry ... it's";AN;CHR$(29);"."
480 FOR DE=1 TO 500:NEXT DE
490 IF PR<N THEN PR=PR+1:GOTO 310
500 CLS:LOCATE 2,4
510 PRINT "Your score is";SC;"out of";PR;"..."
520 IF SC>PR*.9 THEN PRINT TAB(4);"a true genius!":GOTO 560
530 IF SC>PR*.69 THEN PRINT TAB(4);"sharp as a tack!":GOTO 560
540 IF SC>PR*.49 THEN PRINT TAB(4);"just warming up!":GOTO 560
550 PRINT TAB(4);"think harder!"
560 PRINT:PRINT:PRINT TAB(4);"Do you want to ..."
570 PRINT
580 PRINT TAB(4);"(r)epet the same type of quiz,"
590 PRINT TAB(4);"(t)ry another type of quiz, or"
600 PRINT TAB(4);"(q)uit? ";
610 K$=INKEY$:IF K$="" THEN 610
620 IF K$="R" OR K$="r" THEN 300
630 IF K$="T" OR K$="t" THEN 40
640 IF K$<>"Q" AND K$<>"q" THEN 610
650 END
1000 DATA 5,1,5,6,10,11,70,21

```

Macintosh w/Microsoft BASIC 2.0/Multimath

```

DIM DL(4,2):DEFDBL A-C
RANDOMIZE
FOR I=1 TO 4:READ DL(I,1),DL(I,2):NEXT I
START:
CLS:PRINT TAB(22);"*-MULTIMATH-*"
PRINT:PRINT:PRINT TAB(22);"Do you want to ..."
PRINT:PRINT TAB(22);"(a)dd or"
PRINT TAB(22);"(m)ultiply? ";
OPER:
TS=INKEY$:IF TS="" THEN OPER
F=ASC(TS):IF F>90 THEN F=F-32
IF F<>65 AND F<>77 THEN OPER
PRINT TS:IF F=65 THEN OP$="+" ELSE OP$="*"
PRINT:PRINT TAB(22);"Would you prefer ..."
PRINT:PRINT TAB(22);"(e)asy,"
PRINT TAB(22);"(m)oderate,"
PRINT TAB(22);"(h)ard, or"
PRINT TAB(22);"(v)ery hard problems? ";
DIF:
DS=INKEY$:IF DS="" THEN DIF
DF=ASC(DS):IF DF>90 THEN DF=DF-32
DC=-(DF=69)-2*(DF=77)-3*(DF=72)-4*(DF=86)
IF DC=0 THEN DIF ELSE PRINT DS
FOR DE=1 TO 500:NEXT DE
CLS:PRINT "Type a number;"
PRINT "then press <RETURN>."
QUESTIONS:
PRINT:PRINT "How many questions do you"
INPUT "want to try (1 to 100)";N
IF N>0 AND N<101 THEN MAINLOOP
PRINT
PRINT "1 to 100 are valid. Please try again."
GOTO QUESTIONS
MAINLOOP:
PR=1:SC=0
INLOOP:
M=(-(F=77)-(F=65)*INT(RND*3+1))*DC
A=(INT(RND*DL(DC,1))+DL(DC,2))*M

```

WALT DISNEY
PERSONAL COMPUTER SOFTWARE

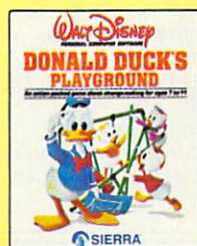


CAN YOU MAKE CHANGE FOR A DUCK?

Donald's mischievous nephews, Huey, Dewey and Louie, would love to have a playground. And you know kind-hearted Uncle Donald -- he has a soft spot for those rascals. Help Donald earn money to buy the necessary supplies. Visit several stores where you'll practice money-handling as you shop for playground equipment. If you don't have exact change, count out change from the cash drawer. Then go to the park and play with Donald's nephews on a playground of your own design.

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"Donald Duck's Playground is undoubtedly one of the best educational games ever devised."
- Commodore Microcomputers magazine



SIERRA

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CIRCLE READER SERVICE 37

EDUCATIONAL PROGRAM

```

B=(INT(RND*DL(DC,1))+DL(DC,2))*M
C=(INT(RND*DL(DC,1))+DL(DC,2))*M
PRESENT:
CLS:PRINT:PRINT "Type the answer"
PRINT "(or <E> to end the quiz);"
PRINT "then press <RETURN>."
PRINT:PRINT "Problem #";PR;"of";N
IF F=65 THEN AN=A+B+C ELSE AN=A*B*C
LOCATE 10,22
PRINT A;OP$;B;OP$;C;"=";:INPUT AS
IF AS="E" OR AS="e" THEN CLS:GOTO FINAL
IF VAL(AS)=0 THEN PRESENT
IF VAL(AS)<>AN THEN WRONG
PRINT:PRINT TAB(27);"Right!":SC=SC+1:GOTO DELAY
WRONG:
PRINT:PRINT TAB(24);"Sorry ... it's";AN
DELAY:
FOR DE=1 TO 2000:NEXT DE
IF PR<N THEN PR=PR+1:GOTO INLOOP
CLS:LOCATE 2,4
PRINT "Your score is";SC;"out of";PR;"..."
IF SC>PR*.9 THEN PRINT TAB(4);"a true genius!":GOT
O FINAL
IF SC>PR*.69 THEN PRINT TAB(4);"sharp as a tack!":
GOTO FINAL
IF SC>PR*.49 THEN PRINT TAB(4);"just warming up!":
GOTO FINAL
PRINT TAB(4);"think harder!"
FINAL:
PRINT:PRINT:PRINT TAB(4);"Do you want to ..."
PRINT
PRINT TAB(4);"(r)epet the same type of quiz,"
PRINT TAB(4);"(t)ry another type of quiz, or"
PRINT TAB(4);"(q)uit?";
RESP:
K$=INKEY$:IF K$="" THEN RESP
IF K$="R" OR K$="r" THEN MAINLOOP
IF K$="T" OR K$="t" THEN START
IF K$<>"Q" AND K$<>"q" THEN RESP
END
DATA 5,1,5,6,10,11,70,21

```

Tandy Color Computer/Multimath

```

10 DIM DL(4,2)
20 FOR I=1 TO 4:READ DL(I,1),DL(I,2):NEXT I
30 CLS:PRINT@165,"PRESS ANY KEY TO BEGIN."
40 K$=INKEY$:IF K$="" THEN N=RND(0):GOTO 40
50 CLS:PRINT TAB(8);"*MULTIMATH*"
60 PRINT:PRINT:PRINT TAB(8);"DO YOU WANT TO ..."
70 PRINT:PRINT TAB(8);"(A)DD OR"
80 PRINT TAB(8);"(M)ULTIPLY? ";
90 T$=INKEY$:IF T$="" THEN 90 ELSE F=ASC(T$)
100 IF F<>65 AND F<>77 THEN 90 ELSE PRINT T$
110 IF F=65 THEN OP$="+" ELSE OP$="*"
120 PRINT:PRINT TAB(8);"WOULD YOU PREFER ..."
130 PRINT:PRINT TAB(8);"(E)ASY,"
140 PRINT TAB(8);"(M)ODERATE,"
150 PRINT TAB(8);"(H)ARD, OR"
160 PRINT TAB(8);"(V)ERY HARD PROBLEMS? ";
170 D$=INKEY$:IF D$="" THEN 170 ELSE DF=ASC(D$)
180 DC=-(DF=69)-2*(DF=77)-3*(DF=72)-4*(DF=86)
190 IF DC=0 THEN 170 ELSE PRINT D$
200 FOR DE=1 TO 500:NEXT DE
210 CLS:PRINT "TYPE A NUMBER;"
220 PRINT "THEN PRESS <ENTER>."
230 PRINT:PRINT "HOW MANY QUESTIONS DO YOU"
240 INPUT "WANT TO TRY (1 TO 100)";N
250 IF N>0 AND N<101 THEN 290
260 PRINT
270 PRINT "1 TO 100 ARE VALID. TRY AGAIN."
280 GOTO 230
290 PR=1:SC=0
300 M=(-(F=77)-(F=65)*RND(3))*DC
310 A=(RND(DL(DC,1))+DL(DC,2))*M

```

```

320 B=(RND(DL(DC,1))+DL(DC,2))*M
330 C=(RND(DL(DC,1))+DL(DC,2))*M
340 CLS:PRINT:PRINT "TYPE THE ANSWER"
350 PRINT "(OR <E> TO END THE QUIZ);"
360 PRINT "THEN PRESS <ENTER>."
370 PRINT:PRINT "PROBLEM #";PR;"OF";N
380 IF F=65 THEN AN=A+B+C ELSE AN=A*B*C
390 PRINT@322,A;OP$;B;OP$;C;"=";
400 INPUT AS
410 IF AS="E" THEN CLS:GOTO 540
420 IF VAL(AS)=0 THEN 340
430 IF VAL(AS)<>AN THEN 450
440 PRINT TAB(4);"RIGHT!":SC=SC+1:GOTO 460
450 PRINT TAB(2);"SORRY ... IT'S";AN
460 FOR DE=1 TO 500:NEXT DE
470 IF PR<N THEN PR=PR+1:GOTO 300
480 CLS:PRINT
490 PRINT "YOUR SCORE IS";SC;"OUT OF";N;"..."
500 PRINT:IF SC>PR*.9 THEN PRINT "A TRUE GENIUS!":GOT
O 540
510 IF SC>PR*.69 THEN PRINT "SHARP AS A TACK!":GOTO 5
40
520 IF SC>PR*.49 THEN PRINT "JUST WARMING UP!":GOTO 5
40
530 PRINT "THINK HARDER!"
540 PRINT:PRINT "DO YOU WANT TO ..."
550 PRINT:PRINT "(R)EPEAT THE SAME TYPE OF QUIZ,"
560 PRINT "(T)RY ANOTHER TYPE OF QUIZ, OR"
570 PRINT "(Q)UIT? ";
580 K$=INKEY$:IF K$="" THEN 580
590 IF K$="R" THEN 290
600 IF K$="T" THEN 50
610 IF K$<>"Q" THEN 580
620 END
1000 DATA 5,0,5,5,10,10,70,20

```

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

```

10 DIM DL(4,2):DEFDBL A-C
20 RANDOM
30 FOR I=1 TO 4:READ DL(I,1),DL(I,2):NEXT I
40 CLS:PRINT TAB(18);"*MULTIMATH*"
50 PRINT:PRINT:PRINT TAB(19);"DO YOU WANT TO ..."
60 PRINT:PRINT TAB(19);"(a)dd or"
70 PRINT TAB(19);"(m)ultiply? ";
80 T$=INKEY$:IF T$="" THEN 80
90 F=ASC(T$):IF F>90 THEN F=F-32
100 IF F<>65 AND F<>77 THEN 80
110 PRINT T$:IF F=65 THEN OP$="+" ELSE OP$="*"
120 PRINT:PRINT TAB(19);"Would you prefer ..."
130 PRINT TAB(19);"(e)asy,"
140 PRINT TAB(19);"(m)oderate,"
150 PRINT TAB(19);"(h)ard, or"
160 PRINT TAB(19);"(v)ery hard problems? ";
170 D$=INKEY$:IF D$="" THEN 170
180 DF=ASC(D$):IF DF>90 THEN DF=DF-32
190 DC=-(DF=69)-2*(DF=77)-3*(DF=72)-4*(DF=86)
200 IF DC=0 THEN 170 ELSE PRINT D$
210 FOR DE=1 TO 250:NEXT DE
220 CLS:PRINT "Type a number;"
230 PRINT "then press <ENTER>."
240 PRINT:PRINT "How many questions do you"
250 INPUT "want to try (1 to 100)";N
260 IF N>0 AND N<101 THEN 300
270 PRINT
280 PRINT "1 to 100 are valid. Please try again."
290 GOTO 240
300 PR=1:SC=0
310 M=(-(F=77)-(F=65)*RND(3))*DC
320 A=(RND(DL(DC,1))+DL(DC,2))*M
330 B=(RND(DL(DC,1))+DL(DC,2))*M
340 C=(RND(DL(DC,1))+DL(DC,2))*M
350 CLS:PRINT:PRINT "Type the answer"
360 PRINT "(or <E> to end the quiz);"
370 PRINT "then press <ENTER>."
380 PRINT:PRINT "Problem #";PR;"of";N

```



```

390 IF F=65 THEN AN=A+B+C ELSE AN=A*B*C
400 PRINT@534,A;OP$;B;OP$;C;"=" ";;INPUT A$
410 IF A$="E" OR A$="e" THEN CLS:GOTO 540
420 IF VAL(A$)=0 THEN 350
430 IF VAL(A$)<>AN THEN 450
440 PRINT:PRINT TAB(27);"Right!":SC=SC+1:GOTO 460
450 PRINT:PRINT TAB(21);"Sorry ... it's";AN
460 FOR DE=1 TO 500:NEXT DE
470 IF PR<N THEN PR=PR+1:GOTO 310
480 CLS:PRINT
490 PRINT TAB(4);"Your score is";SC;"out of";PR;"..."
500 IF SC>PR*.9 THEN PRINT TAB(4);"a true genius!":GO
TO 540
510 IF SC>PR*.69 THEN PRINT TAB(4);"sharp as a tack!":
GOTO 540
520 IF SC>PR*.49 THEN PRINT TAB(4);"just warming up!":
GOTO 540
530 PRINT TAB(4);"think harder!"
540 PRINT:PRINT TAB(4);"Do you want to ..."
550 PRINT
560 PRINT TAB(4);"repeat the same type of quiz,"
570 PRINT TAB(4);"try another type of quiz, or"
580 PRINT TAB(4);"quit? ";
590 K$=INKEY$:IF K$="" THEN 590
600 IF K$="R" OR K$="r" THEN 300
610 IF K$="T" OR K$="t" THEN 40
620 IF K$<>"Q" AND K$<>"q" THEN 590
630 END
1000 DATA 5,0,5,5,10,10,70,20

```

VIC-20/Multimath

```

10 DIM DL(4,2)
20 FOR I=1 TO 4:READ DL(I,1),DL(I,2):NEXT I
30 POKE 36879,8
40 PRINT CHR$(147);CHR$(5)
50 PRINT TAB(4);"*-MULTIMATH-*"
60 PRINT:PRINT:PRINT "DO YOU WANT TO ..."
70 PRINT:PRINT TAB(4);"(A)DD OR"
80 PRINT TAB(4);"(M)ULTIPLY? ";
90 GET T$:IF T$<"A" AND T$<"M" THEN 90
100 PRINT T$:F=ASC(T$)
110 IF F=65 THEN OP$="+":GOTO 130
120 OP$="*"
130 PRINT:PRINT "WOULD YOU PREFER ..."
140 PRINT:PRINT TAB(4);"(E)ASY,"
150 PRINT TAB(4);"(M)ODERATE,"
160 PRINT TAB(4);"(H)ARD, OR"
170 PRINT TAB(4);"(V)ERY HARD"
180 PRINT TAB(7);"PROBLEMS? ";
190 GET D$
200 IF D$<"E" AND D$<"M" AND D$<"H" AND D$<"V" THE
N 190
210 PRINT D$:PRINT:DF=ASC(D$)
220 DC=-(DF=69)-2*(DF=77)-3*(DF=72)-4*(DF=86)
230 FOR DE=1 TO 500:NEXT DE
240 PRINT CHR$(147):PRINT "TYPE A NUMBER;"
250 PRINT "THEN PRESS <RETURN>."
260 PRINT:PRINT "HOW MANY QUESTIONS"
270 PRINT "DO YOU WANT TO TRY"
280 INPUT "(1 TO 100)";N
290 IF N>0 AND N<101 THEN 320
300 PRINT:PRINT "1 TO 100 ARE VALID."
310 PRINT "PLEASE TRY AGAIN.":GOTO 260
320 PR=1:SC=0
330 M=(-(F=77)-(F=65)*(INT(RND(1)*3+1)))*DC
340 A=(INT(RND(1)*DL(DC,1))+DL(DC,2))*M
350 B=(INT(RND(1)*DL(DC,1))+DL(DC,2))*M
360 C=(INT(RND(1)*DL(DC,1))+DL(DC,2))*M
370 PRINT CHR$(147):PRINT
380 PRINT "TYPE THE ANSWER"
390 PRINT "(OR <E> TO END QUIZ);"
400 PRINT "THEN PRESS <RETURN>."
410 PRINT:PRINT "PROBLEM #";PR;"OF";N
420 IF F=65 THEN AN=A+B+C:GOTO 440

```

```

430 AN=A*B*C
440 POKE 214,10:PRINT
450 PRINT A;OP$;B;OP$;C;"=" ";;INPUT A$
460 IF A$="E" THEN PRINT CHR$(147):GOTO 590
470 IF VAL(A$)<>AN THEN 490
480 PRINT:PRINT "RIGHT!":SC=SC+1:GOTO 500
490 PRINT:PRINT "SORRY ... IT'S";AN;CHR$(20);"."
500 FOR DE=1 TO 1000:NEXT DE
510 IF PR<N THEN PR=PR+1:GOTO 330
520 PRINT CHR$(147):PRINT
530 PRINT "YOUR SCORE IS";SC
540 PRINT "OUT OF";PR;"...":PRINT
550 IF SC>PR*.9 THEN PRINT "A TRUE GENIUS!":GOTO 590
560 IF SC>PR*.69 THEN PRINT "SHARP AS A TACK!":GOTO 5
90
570 IF SC>PR*.49 THEN PRINT "JUST WARMING UP!":GOTO 5
90
580 PRINT "THINK HARDER!"
590 PRINT:PRINT:PRINT "DO YOU WANT TO ..."
600 PRINT
610 PRINT "(R)EPEAT THE SAME"
620 PRINT "TYPE OF QUIZ, OR"
630 PRINT "(T)RY ANOTHER"
640 PRINT "TYPE OF QUIZ, OR"
650 PRINT "(Q)UIT? ";
660 GET K$:IF K$="" THEN 660
670 IF K$="R" THEN 320
680 IF K$="T" THEN 40
690 IF K$<>"Q" THEN 660
700 END
1000 DATA 5,1,5,6,10,11,70,21

```

TIPS TO THE TYPIST

SOME GENERAL RULES

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

WHICH PROGRAM WILL RUN ON MY COMPUTER?

- 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 and compatibles are composed on IBM PCs and PCjr's, and are tested under most versions of BASIC available for these machines. Each "IBM PC and compatibles" program listing is supplemented by a rundown of the machines and versions of BASIC under which the program is guaranteed to work.
- TI programs not marked "w/TI Extended BASIC" should be run under standard (console) TI BASIC.

FOX AND GEESSE

BY BRIAN FLYNN



Fox and Geese is an intriguing two-player game of skill and wits that has been popular for centuries. Queen Victoria and Prince Albert found it fun, and Edward IV is said to have purchased several silver game sets. In one form or another, Fox and Geese has appeared not only in Europe, but in the Orient and North America as well. The Japanese play a version that uses soldiers in place of fox and fowl. And the Cree and Chippewa Indians of Canada played a variation called "Musinaykahwhan-metowaywin." We'll stick to simply "Fox and Geese."

By typing in the appropriate version of the program below, you and a friend or family member can play *Fox and Geese* on your Apple II series computer.

HOW TO PLAY

Play begins with 17 geese and one fox, poised for combat, on a cross-shaped board (see illustration). The object of the game—for the geese—is to surround the fox so he can't move. The fox, on the other hand, must try to gobble up so many geese that capture is impossible.

Because he's grievously

outnumbered, the fox traditionally moves first. He may move to an unoccupied square in one of eight directions: up, down, left, right, or diagonal—one square at a time. Similarly, a goose may move one square per turn up, left, right, or diagonally (a total of five directions), but may not move down the board.

If the fox maneuvers to a square adjacent to a goose, he may jump over the goose and remove it from the board, if (as in checkers) the square beyond is unoccupied. If another goose is resting in the square he wishes to jump to, the fox is blocked. The fox is under no obligation to jump simply because an opportunity presents itself. Double (and triple, etc.) jumps are also permitted, though not obligatory. The fox must declare a multiple jump before moving.

PLAYING ON THE COMPUTER

The computerized version of Fox and Geese is easy to play. The computer will tell you whose turn it is to move, and will permit only legal moves. The fox, as tradition dictates, moves first. The computer will display a set of arrows on the right side of the screen that show the directions in which the fox may move. Blocked directions will be labeled as such, though opportunities for jumping will be shown only as arrows indicating a liberty. The fox

player may move or initiate a jump by pressing the number key (1 through 8) corresponding to the direction desired.

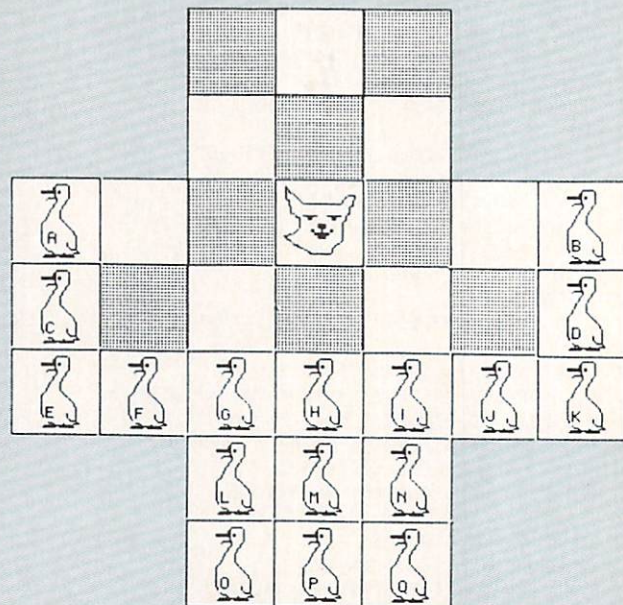
Jumps will be made (and "jumped" pieces removed from the board) automatically—just indicate the direction. Multiple jumps, however, as stated earlier, must be declared before the first jump. Just press the D key before indicating a direction, and the computer will permit the fox to jump until it can't (or chooses not to) jump any further. After each jump in a declared series, if the computer finds another jump is possible, it will ask the fox player if he or she wishes to continue jumping.

When it's the geese's turn, the geese player first will be asked to indicate which goose he or she wants to move. Geese are labeled with letters "A" through "Q." When the player presses the appropriate letter key, the goose he or she has selected will

begin to flash, and a set of numbered arrows will be displayed on the right side of the screen that indicate moves the piece can make. Blocked directions will be labeled thus. To move, simply press the number key (1 through 5) corresponding to the direction desired.

If the player selects a goose but hasn't moved it yet, and decides to move another, the selection may be withdrawn by pressing the 6 key (for "redo"). Thereafter, another goose may be selected and moved.

After each turn, the computer scans the board to determine if the game is over. The fox wins if fewer than six geese remain (a minimum of six geese are required to trap the fox); if it's the flock's turn, but no goose can move; or if all geese are above the fox (since geese can't move downward, trapping a sane fox in this situation is impossible). The geese win if (and only if) it's the fox's turn and it can't move.



Apple II Series w/48K RAM/Fox and Geese

```
10 LOMEM: 16384:HIMEM: 34816
20 DIM BD(9,9,4),GS(17,4),AM(8,2),AD(8)
30 FG = 0: BPS = CHR$(7)+CHR$(7)+CHR$(7)
40 FOR I = 34816 TO 35284:READ A:POKE I,A:NEXT I
50 BS = 35285:FOR I = 0 TO 1:FOR J = 0 TO 19
60 READ A:FOR K = 0 TO 180 STEP 20
70 POKE BS+J+K,A:NEXT K
80 NEXT J:POKE BS+200,0:BS = BS+201:NEXT I
90 FOR I = 1 TO 17
100 READ GS(I,3),GS(I,4):NEXT I
110 FOR I = 1 TO 8:READ AM(I,1),AM(I,2):NEXT I
```

BRIAN FLYNN is an operations research analyst with the Naval Center for Cost Analysis. Author of several books on microcomputers, he most recently cowrote (with his brother Chris) Apple Applications: 40 Programs for the Apple (COMPUTE! Books, 1985).

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SPECIFICATIONS

(Apple — Atari — Etc.)

Size/Weight

Height 5.04" Width 16.7"
Depth 13.4" Weight 18.7 lbs.

Internal Char. Coding

ASCII Plus ISO

Print Buffer Size

120 CPS: 132 Bytes (1 line)
120/160 CPS Plus LQM: 2K

No. of Char. in Char. Set

96 ASCII Plus International

Graphics Capability

Standard 60, 72, 120 DPI
Horizontal 72 DPI Vertical

Pitch

10, 12, 16.7, 5, 6, 8.3, Proportional Spacing

Printing Method

Impact Dot Matrix

Char. Matrix Size

9H x 9V (Standard) to 10H x 9V
(Emphasized & Elongate)

Printing Features

Bi-directional, Short line seeking, Vertical
Tabs, Horizontal Tabs

Forms Type

Fanfold, Cut Sheet, Roll (optional)

Max Paper Width

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Character Set

96 ASCII
11 x 7 International Char.

Line Spacing

6/8/12/72/144 LPI

Character Spacing

10 cpi normal; 5 cpi elongated normal; 12 cpi
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16.7 cpi condensed; 8.3 cpi elongated
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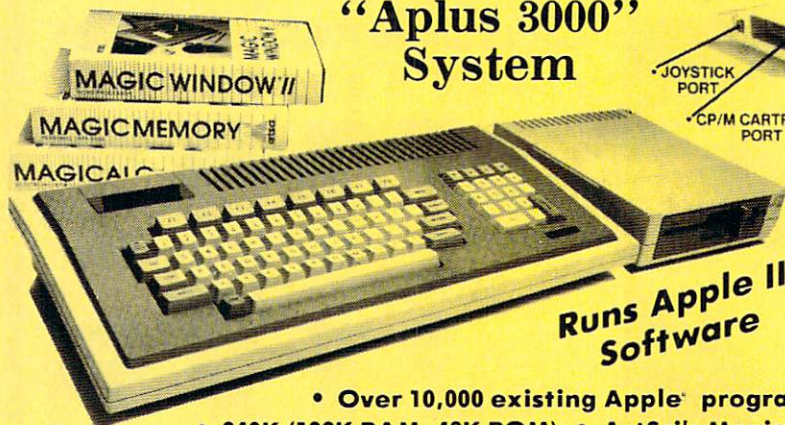
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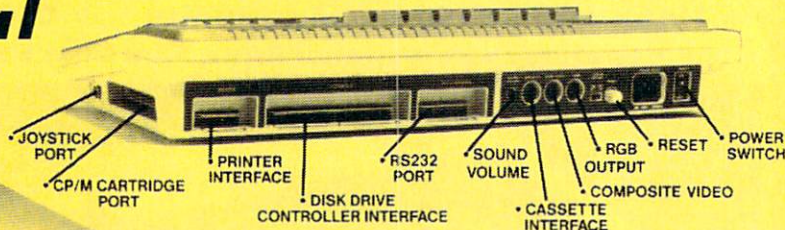
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SPECIFICATIONS

A plus 3000 is a complete, self-contained computer based on the popular 6502A microprocessor and can tap into the tremendous software library of Apple II. Features include 192K Bytes RAM, 32KB Enhanced Microsoft BASIC, 80 column text, 560H X 192V color graphic display, 81 key sculptured keyboard and high efficiency switching power supply. Also included as standard are Centronics bus printer interface, Cassette interface, 4 channel sound generator, and 5 1/4" Apple Compatible Disk Drive.

• TEXT

- 40 columns X 24 rows or 80 columns X 24 rows software selectable.
- 5 X 7 characters in 7 X 8 matrix.
- Upper and lower case characters.
- One of Eight colors for characters/graphics and background, Red, Green, Blue, Cyan, Magenta, Yellow, Black and White.
- Character set with normal, inverse and flashing capabilities.

• GRAPHICS

- 280H X 192V 6 colors — Black, White, Violet, Green, Blue, Orange.
- 280H X 192V 8 colors bit image — Black, White, Red, Green, Blue, Cyan, Magenta, Yellow.
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Runs Apple II Software	Yes	Yes	No
Function Keys	24	None	16
4 Voice, 6 Octave Sound	Yes	No	Yes
Composite Video	Yes	Yes	Yes
Disk Drive	included	Extra Cost	Extra Cost
Numeric Keypad	included	Extra Cost	Included
Video Cable	included	Extra Cost	Extra Cost
RGB Color Card	included	Extra Cost	Included
80 Column Card	included	Extra Cost	Included
Centronics Printer Interface	included	Extra Cost	Extra Cost
Drive Controller	included	Extra Cost	Included
\$150 Wordprocessor (Magic Window)	included	Extra Cost	Extra Cost
\$150 Spreadsheet (MagiCalc)	included	Extra Cost	Extra Cost
\$60 Database prg. (Magic Memory)	included	Extra Cost	Extra Cost
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R/F Modulator (TV hookup)	\$ 29.95	\$ 19.95
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GAME PROGRAM

```

120 POKE 232,0:POKE 233,136
130 NG = 17:FX = 5:FY = 4
140 HOME:HGR:HCOLOR= 3:SCALE= 1:ROT= 0
150 FOR I = 1 TO 9:FOR J = 1 TO 9
160 BD(I,J,2) = 0:NEXT J:NEXT I
170 FOR I = 1 TO 17
180 GS(I,1) = GS(I,3):GS(I,2) = GS(I,4)
190 BD(GS(I,1),GS(I,2),2) = I+2:NEXT I
200 BD(FX,FY,2) = 1:C = 1
210 FOR X = 2 TO 8:W = 1+2*(X > 3 AND X < 7)
220 FOR Y = 5-W TO 5+W
230 IF FG THEN 260
240 BD(X,Y,1) = C:BD(X,Y,3) = X*21+15
250 BD(X,Y,4) = Y*21-30:C = -C
260 DRAW 21 AT BD(X,Y,3),BD(X,Y,4)
270 IF BD(X,Y,2) = 1 THEN GOSUB 2000:GOTO 300
280 IF BD(X,Y,2) > 1 THEN GOSUB 3000:GOTO 300
290 IF BD(X,Y,1) = 1 THEN GOSUB 7000
300 NEXT Y:NEXT X
310 DC = 0
320 X = FX:Y = FY:P = 1:GOSUB 4000
330 IF NL = 0 THEN 1080
340 IF NOT DC THEN 450
350 HOME:VTAB 22
360 IF NJ > 0 THEN 400
370 DC = 0
380 PRINT "NO MORE JUMPS."
390 GOSUB 11000:GOTO 750
400 PRINT "WILL YOU JUMP AGAIN? ";
410 GET K$:K = ASC(K$):IF K > 90 THEN K = K-32
420 IF K = 89 THEN 450
430 IF K <> 78 THEN 410
440 DC = 0:GOTO 750
450 GOSUB 5000
460 HOME:VTAB 22:PRINT "FOX'S MOVE? ";
470 GOSUB 12000
480 IF MD > 0 AND MD < 9 THEN 530
490 IF MV$ <> "D" OR (MV$ = "D" AND DC OR NOT NJ) THEN
470
500 PRINT MV$
510 PRINT "MULTIPLE JUMP DECLARED.";BPS
520 DC = 1:GOSUB 11000:GOTO 460
530 PRINT MV$:CHR$(7)
540 IF DC AND AD(MD) <> 2 THEN 580
550 IF AD(MD) <> 0 THEN 640
560 PRINT "THAT MOVE IS BLOCKED.";BPS
570 GOSUB 11000:GOTO 460
580 IF NOT DC THEN 620
590 PRINT "THAT'S NOT A JUMP."
600 PRINT "YOU'VE FORFEIT YOUR DECLARATION.";BPS
610 DC = 0:GOTO 550
620 PRINT "HAVING DECLARED, YOU CAN ONLY JUMP.";BPS
630 GOSUB 11000:GOTO 460
640 GOSUB 8000:IF BD(X,Y,1) = 1 THEN GOSUB 7000
650 BD(X,Y,2) = 0
660 X = X+AM(MD,1):Y = Y+AM(MD,2)
670 GOSUB 8000:IF AD(MD) = 1 THEN 730
680 GP = BD(X,Y,2)-2
690 GS(GP,1) = 0:GS(GP,2) = 0:NG = NG-1
700 BD(X,Y,2) = 0:IF BD(X,Y,1) = 1 THEN GOSUB 7000
710 X = X+AM(MD,1):Y = Y+AM(MD,2)
720 GOSUB 8000
730 GOSUB 2000:FX = X:FY = Y:BD(X,Y,2) = 1
740 HOME:GOSUB 9000
750 IF NG < 6 THEN 1200
760 GOSUB 10000
770 IF NOT LB THEN 1170
780 IF NOT GB THEN 1180
790 IF DC = 1 THEN 320
800 HOME:VTAB 22
810 PRINT "SELECT A GOOSE BY LETTER (A-Q). ";
820 GET K$:K = ASC(K$):IF K > 90 THEN K = K-32
830 GP = K-64:IF GP < 1 OR GP > 17 THEN 820
840 PRINT K$:CHR$(7)
850 IF GS(GP,1) <> 0 OR GS(GP,2) <> 0 THEN 880
860 PRINT "THAT GOOSE IS COOKED!";BPS
870 GOSUB 11000:GOTO 800
880 X = GS(GP,1):Y = GS(GP,2):P = 2:GOSUB 4000
890 IF NL > 0 THEN 930
900 HOME:VTAB 22
910 PRINT "THAT GOOSE IS TRAPPED.";BPS
920 GOSUB 11000:HOME:GOTO 800
930 GOSUB 5000
940 HOME:VTAB 22
950 PRINT "GOOSE'S MOVE? ";
960 GOSUB 12000
970 IF MD < 1 OR MD > 6 THEN 960
980 IF MD = 6 THEN HOME:GOSUB 9000:GOTO 800
990 PRINT MV$:CHR$(7)
1000 IF AD(MD) <> 0 THEN 1030
1010 PRINT "THAT MOVE IS BLOCKED.";BPS
1020 GOSUB 11000:GOTO 940
1030 GOSUB 8000:IF BD(X,Y,1) = 1 THEN GOSUB 7000
1040 BD(X,Y,2) = 0
1050 X = X+AM(MD,1):Y = Y+AM(MD,2)
1060 GS(GP,1) = X:GS(GP,2) = Y
1070 BD(X,Y,2) = GP+2
1080 GOSUB 8000:GOSUB 3000
1090 HOME:GOSUB 9000
1100 GOSUB 10000
1110 IF NOT LB THEN 1170
1120 IF NOT GB THEN 1180
1130 GOTO 320
1140 HOME:VTAB 22:PRINT "THE FOX IS TRAPPED!"
1150 PRINT "THE GEESE HAVE WON!"
1160 GOTO 1310
1170 HOME:VTAB 22:PRINT "NO GOOSE CAN MOVE!";GOTO 1230
1180 HOME:VTAB 22
1190 PRINT "ALL GEESE ARE ABOVE THE FOX!";GOTO 1230
1200 HOME:VTAB 22
1210 PRINT "THERE ARE TOO FEW GEESE"
1220 PRINT "TO TRAP THE FOX!"
1230 PRINT "THE FOX HAS WON!"
1240 PRINT BPS:BPS;
1250 GOSUB 11000:GOSUB 11000
1260 HOME:VTAB 22
1270 PRINT "WILL YOU PLAY AGAIN? ";
1280 GET K$:K = ASC(K$):IF K > 90 THEN K = K-32
1290 IF K = ASC("Y") THEN FG = 1:GOTO 130
1300 IF K <> ASC("N") THEN 1280
1310 END
2000 DRAW 1 AT BD(X,Y,3)+2,BD(X,Y,4)+1:RETURN
3000 DRAW 2 AT BD(X,Y,3)+5,BD(X,Y,4)+3
3010 DRAW BD(X,Y,2) AT BD(X,Y,3)+9,BD(X,Y,4)+14:RETURN
4000 DR = 5+3*(P = 1):NL = 0:NJ = 0
4010 FOR LP = 1 TO DR:AD(LP) = 0
4020 X1 = X+AM(LP,1):Y1 = Y+AM(LP,2)
4030 IF BD(X1,Y1,1) = 0 THEN 4110
4040 FP = (BD(X1,Y1,2) <> 0)
4050 IF P = 2 THEN 4080
4060 X2 = X1+AM(LP,1):Y2 = Y1+AM(LP,2)
4070 SL = (BD(X2,Y2,1) <> 0):SP = (BD(X2,Y2,2) <> 0)
4080 AD(LP) = NOT FP+2*(P = 1 AND FP AND SL AND NOT SP)
4090 IF NOT AD(LP) THEN 4110
4100 NL = NL+1:IF AD(LP) = 2 THEN NJ = NJ+1
4110 NEXT LP:RETURN
5000 MS = "BLOCKED":FOR LP = 1 TO DR
5010 DRAW LP+23 AT 220,LP*15+17
5020 DRAW 32 AT 225,LP*15+17
5030 IF AD(LP) = 0 THEN GOSUB 6000:GOTO 5070
5040 ROT = INT(LP/2)*16
5050 DRAW 22+(LP/2 = INT(LP/2)) AT 240,LP*15+19
5060 ROT = 0
5070 NEXT LP:IF P = 1 THEN RETURN
5080 DRAW 29 AT 220,107:DRAW 32 AT 225,107
5090 MS = "RED0":GOSUB 6000:RETURN
6000 FOR LI = 1 TO LEN(MS)
6010 LT = ASC(MID$(MS,LI,1))-62
6020 DRAW LT AT 230+LI*6,LP*15+17:NEXT LI:RETURN
7000 DRAW 33 AT BD(X,Y,3)+1,BD(X,Y,4)+1:RETURN
8000 HCOLOR = 0:DRAW 34 AT BD(X,Y,3)+1,BD(X,Y,4)+1
8010 HCOLOR = 3:RETURN
9000 HCOLOR = 0:FOR LP = 220 TO 279
9010 HPLT LP,15 TO LP,150:NEXT LP
9020 HCOLOR = 3:RETURN

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10000 P = 1:LB = 0:GB = 0:FOR IT = 1 TO 17
10010 X = GS(IT,1):Y = GS(IT,2)
10020 IF X = 0 AND Y = 0 THEN IT = IT+1:GOTO 10060
10030 GB = GB+(Y > FY)
10040 GOSUB 4000:LB = LB+NL
10050 IF GB AND LB THEN IT = 17
10060 NEXT IT:RETURN
11000 FOR DE = 1 TO 1000:NEXT DE:RETURN
12000 POKE -16368,0
12010 IF PEEK(-16384) >= 128 THEN 12090
12020 HCOLOR= 0:IF P = 1 THEN GOSUB 2000:GOTO 12040
12030 GOSUB 3000
12040 FOR DE = 1 TO 50:NEXT DE
12050 HCOLOR= 3:IF P = 1 THEN GOSUB 2000:GOTO 12070
12060 GOSUB 3000
12070 FOR DE = 1 TO 50:NEXT DE
12080 GOTO 12010
12090 M = PEEK(-16384)-128:POKE -16368,0
12100 IF M > 90 THEN M = M-32
12110 MV$ = CHR$(M):MD = VAL(MV$):RETURN
13000 DATA 34,0,70,0,134,0,173,0,183,0,192,0,200
13010 DATA 0,208,0,218,0,226,0,234,0,243,0,250
13020 DATA 0,0,1,9,1,14,1,22,1,31,1,39,1,47,1,56
13030 DATA 1,64,1,107,1,126,1,144,1,150,1,159,1
13040 DATA 167,1,176,1,184,1,193,1,199,1,208,1
13050 DATA 213,1,158,2,21,21,21,21,45,45,45
13060 DATA 45,45,5,40,40,48,54,54,30,246,54
13070 DATA 54,246,30,30,30,63,63,63,56,56
13080 DATA 7,56,56,32,45,40,32,36,63,32
13090 DATA 28,36,164,146,146,73,9,45,77,41
13100 DATA 245,223,219,78,45,62,255,106,105
13110 DATA 241,55,39,55,7,56,0,45,45,13,220,103
13120 DATA 41,45,21,54,246,246,30,54,14,14,117
13130 DATA 14,54,45,246,23,63,63,63,63,224,36,36
13140 DATA 100,12,12,100,100,228,62,23,6,0
13150 DATA 41,21,223,110,49,63,55,77,5,0
13160 DATA 45,21,223,46,173,223,46,45,0
13170 DATA 41,21,223,54,77,30,63,0
13180 DATA 45,21,54,30,63,36,36,0
13190 DATA 45,245,27,46,173,219,46,45,5,0
13200 DATA 45,245,27,46,245,51,6,0
13210 DATA 41,21,223,54,13,245,63,0
13220 DATA 77,254,51,45,53,223,110,41,0
13230 DATA 45,30,54,23,45,5,0
13240 DATA 73,54,246,63,32,0
13250 DATA 77,30,31,46,21,31,110,41,0
13260 DATA 54,54,45,45,0
13270 DATA 77,62,63,54,110,33,36,0
13280 DATA 77,254,55,13,53,254,35,4,0
13290 DATA 41,21,54,30,63,32,36,0
13300 DATA 34,45,21,30,63,54,6,0
13310 DATA 41,21,54,230,62,7,32,36,0
13320 DATA 45,54,30,14,31,36,36,0
13330 DATA 45,45,45,45,45,45,45,45,45,53
13340 DATA 54,54,54,54,54,54,54,54,54
13350 DATA 63,63,63,63,63,63,63,63,63,39
13360 DATA 36,36,36,36,36,36,36,36,36,0
13370 DATA 219,219,99,12,12,150,146,7
13380 DATA 56,56,40,45,45,45,45,45,5,0
13390 DATA 146,18,63,63,39,36,36,150,10
13400 DATA 5,40,40,40,40,40,40,40,0
13410 DATA 41,54,54,111,5,0
13420 DATA 42,40,21,30,30,23,45,45,0
13430 DATA 45,245,23,45,54,63,63,0
13440 DATA 73,54,54,28,63,12,12,4,0
13450 DATA 73,63,118,173,30,63,7,0
13460 DATA 73,63,23,46,173,30,63,32,0
13470 DATA 45,53,23,23,54,0
13480 DATA 41,21,223,14,173,30,63,32,0
13490 DATA 113,54,30,7,0
13500 DATA 13,13,13,13,13,13,13,13,21
13510 DATA 31,31,31,31,31,31,31,31,23
13520 DATA 45,45,45,45,45,45,45,45,45
13530 DATA 53,63,63,63,63,63,63,63,63,55
13540 DATA 2,4,8,4,2,5,8,5,2,6,3,6,4,6,5,6
13550 DATA 6,6,7,6,8,6,4,7,5,7,6,7,4,8,5,8,6,8
13560 DATA -1,0,-1,-1,0,-1,1,-1,1,0,1,0,1,-1,1

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MUSIC LOVERS:
Become
an Armchair Arranger.
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POKER

FOR THE COMPUTER GENERATION

Classroom Adventures: From Werewolves to Math Tests

"What do you think we should do, go east or examine the cabinet?"

"There's probably something in the cabinet, but with that werewolf chasing us we'd better keep going."

"We'll go east then, but what do we do about the werewolf?"

"I once heard that a werewolf could be killed by a wooden stake driven through its heart."

"That's how you kill a vampire. It's time to stop for today, but why don't you think about it at home?" asks Ellen Borges, a third-grade teacher in East Freetown, Massachusetts.

Doesn't sound like a typical lesson at school, does it? It is, however, for students in Borges' class at the Freetown Elementary School in East Freetown. "Adventure games are a learning experience; they help students think logically and creatively," Borges says.

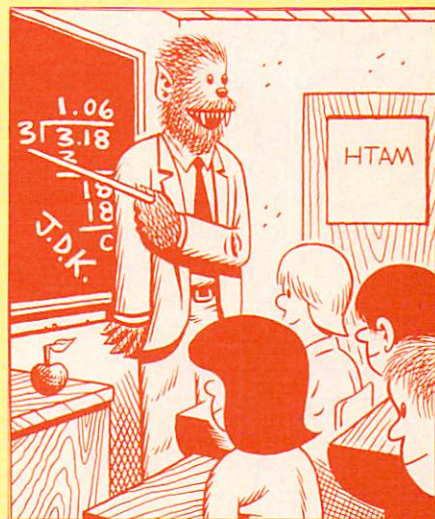
Of course, it requires planning to work computer games into her lessons. "When people first hear the word 'game' it is often met with a negative reaction," Borges says. "It can take a long time to convince parents and faculty that games are educationally useful in the classroom. Games such as *Transylvania* (Penguin Software) or *Sherwood Forest* (Phoenix Software) can help teach

map-making skills and compass directions. A game like *Mystery House* (Sierra On-Line), with its limited vocabulary, helps the kids learn synonyms. They start realizing that if the word 'leap' doesn't work, they should try 'jump.'

"But more importantly, the games teach these things in a way that the kids *enjoy*," she adds. "They even like taking math tests, as long as it's on the computer."

Jay Riggan, 10, one of Borges' former students, comments, "Using the computer is the best part of class. When we come across a problem in a game, the whole class gets fidgety. During lunch, we'll talk about the problem and see if we can solve it."

Borges uses the computer in her classroom for more than just teaching with games. She spends half an hour a week going over basic computer skills, such as operating the machine, and teaching BASIC and Logo. Some parents may not feel comfortable with the idea of their children knowing more than they do about computers. "But fortunately, they understand the necessity of a computer education, especially since their kids are going to be living in the heart of a computer-oriented world," Borges adds.



Jennifer Comeau, 10 (another of Borges' former students), says, "I've learned a lot with and about computers, like spelling, typing, and how to write programs. Computers are fun. They make class interesting."

When we asked Borges if she thought computers might eventually take over her role as a teacher, she said, "No. I believe computers will become more like teaching assistants—taking care of the more unsavory aspects of the job, such as keeping records, writing tests, and other paperwork. This will leave the teacher free to interact more with students. Probably the most important aspect of teaching is human contact. Kids need the personal attention that a human can give but a computer can't."—SPECIAL KS

Software Scoop

It's a bird! It's a plane! No, it's **Superman—The Game!** Yup, **First Star Software Inc.** has just released a new game starring none other than that famed flying comic character we all love and admire. In this first of the "Super Powers" series, our favorite Superperson is up against another **DC Comics** creation—mega-villain

Darkseid. The game was conceived by designers **Fernando Herrera** and **Richard Spittain** in conjunction with DC Comics, and was programmed by Herrera and **Jim Nangano**. Players assume the identity of Superman or Darkseid, and can play against each other or against the computer. As Superman, you dart around Metropolis using your powers of flight, strength, and "superbreath" (yes,

breath). Darkseid has some super tricks up his sleeve, too—like the powerful Omega beams he shoots out of his eyes! The game is \$29.95. (Only the Atari and C 64/128 versions are out now, but an Apple version is planned for later this spring.) First Star has rights to more tough comic cookies: **Wonder Woman** and the **New Gods**. Who knows what kind of game they'll release next! . . .

STRATEGY

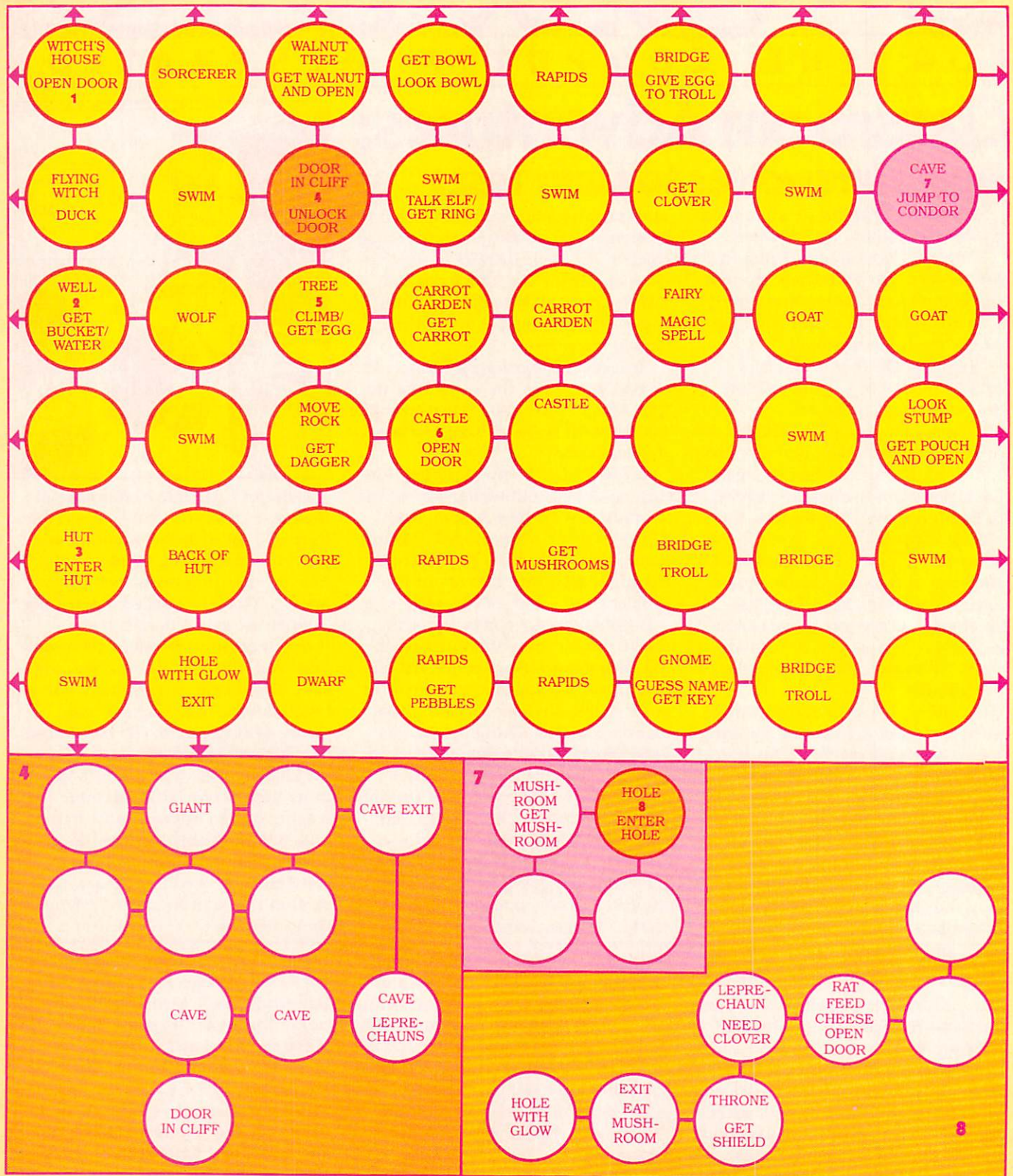
TIPS, TRICKS, AND HINTS

KING'S QUEST

Sierra On-Line. Graphic adventure. Your mission: to find the treasures of the Kingdom of Davenport and return them to the king, so that you may inherit the throne.

Here is our map of the world of *King's Quest*. Each area of the world is represented by a circle. Hints and noteworthy objects are shown in the corresponding circles. Empty circles contain nothing of in-

terest. The numbers refer to the respective sub-areas. Note: Not all sub-areas are included, such as the castle and the hut. (Hints and game for Apple)—SPECIAL Ks; SHIRREL RHOADES, publisher of FAMILY COMPUTING.



Q and A

What is the answer to the riddle of the Sphinx in *Knight of Diamonds* (Sirtech Software)? —DARREN NOLEN, 15, Eudora, Kansas

The answer is right on the game's title page, as well as on the package and throughout the documentation.

In *Dallas Quest* (Datasoft), how do I get by the rat? —CHERYL JOHNSON, 27, Bartonville, Illinois

The owl will take care of the rat, but before the *light-hating* owl will help, you must give it something.

How do you get by the menhir in *Zork II* (Infocom)? Could you also print a list of treasures? —CHIP TRIP-LETT, 15, Newport News, Virginia; KRISTIN HUETTER, 15, Chatham, Massachusetts

You need the wizard's wand, and once you have it, CHANT FLOAT. The treasures are as follows: gold statue, portrait, \$200 in Zorkmids, rare stamp, coin, violin, pearl necklace, small gold key, crown, and ruby.

In *Zork III*, how do you get past the panel in the hall? —RICK DUNBAR, 11, Mount Vernon, Indiana

Try fiddling with the pole in the paneled room, then moving the entire room by pushing the wall.

In *Zork I*, how do I get the canary out of the egg without damaging the bird? —CHRIS GUNTHER, 13, Rupert, Idaho

Give the egg to someone who has nimbler fingers and is used to picking locks. To get it back, you have to kill this person in the Treasure Room.

In *King's Quest* (Sierra On-Line), what is the old gnome's name? —BRENT DOMBROSKI, 14, Hillsdale, Michigan

Write the alphabet forwards and then directly below write it out backwards, so that the Z is under the A, the Y under the B, etc. Then take the word "Rumplestiltskin" and translate it, using the code you wrote down. The R will be an I, the U will be an F, etc. This will give you the gnome's name.

How do I get the platinum bar in *Zork I*? —CHRIS KEEN, 14, Austin, Texas

You must SAY ECHO in the room with the bar.

MISSION IMPOSSIBLE. Adventure International (all computers). Graphic adventure. Your mission: Find and disarm a bomb hidden inside a nuclear reactor.

🔑 The mop is your key to success.

🔑 Take the saboteur's body as well as his badge.

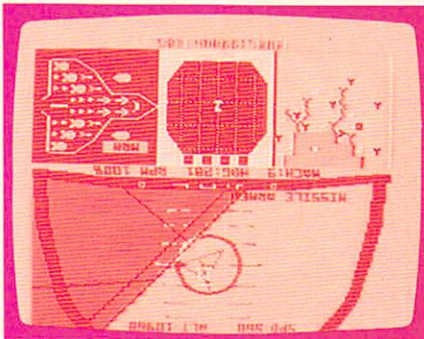
🔑 Red and white will let you visit; yellow, red, and white will maintain appearances; and blue, red, and white will assure security. —JAY DESMARAI, 13, Auburn, New Hampshire

PHANTASIE. SSI (Apple). Role-playing adventure. Your mission: With a band of six adventurers, seek out the Dark Lord and slay him.

🔑 Make sure you include a Minotaur in your party; you'll need it to solve the game. —SPECIAL Ks



F-15 STRIKE EAGLE. MicroProse Software (C 64). Simulation. Your mission: to maneuver an F-15 fighter plane in multiple combat scenarios to prove your skill as an Eagle fighter pilot.



🔑 If you need to get back to base and are running short of fuel, hit the A key a few times. This will increase your speed. When your speed starts dropping again, repeat the process. You'll be able to return to base as if you had full afterburners going.

—JONATHAN HAYNES, 15, Ooltewah,

Tennessee; ALBERT SO, 14, San Rafael, California

MAIL ORDER MONSTERS. Electronic Arts (C 64). Your mission: Create the monster of your dreams, then enter it into gladiatorial combat against computer- or human-controlled beasts.



🔑 Short of psychons? Follow these directions to gain more than you should need for a long time: 1. Create a new player on a blank disk. 2. Once the disk has been initialized and the new player created, turn the computer off and on again (leaving the new disk in the drive) and type the following program:

```
10 OPEN 1,8,15
20 OPEN 2,8,2,"#"
30 PRINT#1,"U1 2 0 17 0"
40 PRINT#1,"B-P 2 29"
50 NS="(PI)(PI)"
60 PRINT#2,NS;
70 PRINT#1,"U2 2 0 17 0"
80 CLOSE 2
90 PRINT#1,"I0":CLOSE 1
```

3. Once this is done, reload the game with the new disk and you should be ready to go. —JAHAN LACKPOUR, 14, Yardley, Pennsylvania

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



MUSIC PROGRAMS BY JOEY LATIMER

Arranging pop music on a computer can be as easy as 1-2-3. At least, it can be if you've typed this month's Microtones program into your machine. *Armchair Arranger* lets you arrange songs by typing numbers into your computer. The numbers (1 through 5) represent chords (C, A minor, F, G, and B flat). Thus, when you string a group of numbers together, you're actually arranging a modern-sounding song—complete with a bass line and melodic arpeggios. We kept the parts fairly sparse for the sake of musical clarity, so if you play an instrument, you should be able to play along with your computer and fit right in. Five different tempos are available—if your composition doesn't sound great as a slow blues, try it as a head-banging slam dance! Keep on playing with the numbers, and you're sure to find something that sounds good.

Hackers' note: By changing numbers in the DATA statements, it's possible to alter the notes in the bass and chord patterns. We've labeled the data to make this easier. Also, note that on the Atari we achieved a sort of digital delay/flanging effect (kind of like a phase-shifter) by assigning two voices to play the same note. A slight interference between the voices produces the effect.



ATARI 400, 800, 600/800XL, & 130XE/ ARMCHAIR ARRANGER

```
10 DIM V1(20,2),V2(20),AR(56)
20 OPEN #1,4,0,"K:"
30 FOR I=1 TO 20 STEP 4:FOR J=0 TO 3:READ A,B
40 V1(I+J,1)=A:V1(I+J,2)=B:NEXT J:NEXT I
50 FOR I=1 TO 20:READ A:V2(I)=A:NEXT I
60 GOSUB 1000:PRINT
70 PRINT "CREATE A SONG PATTERN BY ENTERING"
80 PRINT "UP TO 56 NUMBERS BETWEEN 1 AND 5"
90 PRINT "(EXAMPLE: 1 1 3 3 2 2 4 5)."
```

```
100 PRINT :PRINT "USE <BACK S> TO FIX MISTAKES."
110 PRINT :PRINT "PRESS <RETURN> WHEN DONE.":PRINT
120 C=1:PRINT ">";
130 GET #1,K:IF K=155 AND C>1 THEN 170
140 IF K>48 AND K<54 AND C<57 THEN AR(C)=K-48:C=C+1:PR
INT CHR$(K);" ";
150 IF K=126 AND C>1 THEN C=C-1:PRINT CHR$(K);CHR$(K);
160 GOTO 130
170 PRINT
180 PRINT :PRINT "SET THE TEMPO BY TYPING A NUMBER"
190 PRINT "BETWEEN 1 (FASTEST) AND 5 (SLOWEST).":PRINT
200 PRINT ">";
210 GET #1,K:IF K<49 OR K>53 THEN 210
220 T=K-48:GOSUB 1000
230 PRINT :PRINT "YOUR PATTERN IS ...":PRINT
240 FOR I=1 TO C-1:PRINT AR(I);" ";NEXT I
250 PRINT :PRINT
260 PRINT "AND IS BEING PLAYED AT TEMPO ";T;".":PRINT
270 PRINT :PRINT "PRESS ANY KEY TO STOP THE MUSIC.";
280 POKE 764,255:AP=1
290 T1=0:P1=0:P2=0
300 S1=V1(AR(AP)*4-3+P1,1):S2=V2(AR(AP)*4-3+P2)
310 SOUND 0,S1,10,3:SOUND 1,S1,10,8
320 SOUND 2,S2,10,8:SOUND 3,S2,10,3
330 T1=T1+1:IF T1=V1(AR(AP)*4-3+P1,2) THEN P1=P1+1:T1=
0:SOUND 1,0,0,0
340 P2=P2+1-4*(P2=3):T2=0:SOUND 2,0,0,0
350 FOR DE=1 TO T*3:NEXT DE
360 IF PEEK(764)<>255 THEN 400
370 IF P1<4 THEN 300
380 AP=AP+1:IF AP=C THEN AP=1
390 GOTO 290
400 SOUND 0,0,0,0:SOUND 1,0,0,0
410 SOUND 2,0,0,0:SOUND 3,0,0,0
420 POKE 764,255:PRINT CHR$(125)
430 PRINT "PRESS <T> TO TRY ANOTHER TEMPO,"
440 PRINT "<S> TO ENTER A NEW SONG PATTERN,"
450 PRINT "OR <Q> TO QUIT.";
460 GET #1,K
470 IF K=ASC("T") THEN 170
480 IF K=ASC("S") THEN 60
490 IF K>ASC("Q") THEN 460
500 END
1000 PRINT CHR$(125):POSITION 10,0
1010 PRINT "ARMCHAIR ARRANGER*":PRINT
1020 PRINT "-----CHORD PALETTE-----"
1030 PRINT
1040 PRINT " 1=C 2=A MINOR 3=G 4=F 5=B FLAT"
1050 PRINT
1060 PRINT "-----"
1070 RETURN
1999 REM --BASS NOTES: TONE, DURATION--
2000 DATA 243,3,243,1,193,2,162,2
2010 DATA 144,3,144,1,121,2,193,2
2020 DATA 162,3,162,1,128,2,108,2
2030 DATA 182,3,182,1,144,2,121,2
2040 DATA 136,3,136,1,217,2,182,2
2999 REM --MELODY NOTES: TONE ONLY--
3000 DATA 60,47,40,47
3010 DATA 60,96,72,121
3020 DATA 81,64,47,53
3030 DATA 60,72,91,47
3040 DATA 68,53,45,53
```



COMMODORE 64 & 128 (C 64 MODE)/ ARMCHAIR ARRANGER

```
10 DIM V1(5,4,3),V2(5,4,2),AR(100)
20 S=54272:FOR I=0 TO 24:POKE S+I,0:NEXT I
30 POKE S+5,28:POKE S+6,133
40 POKE S+12,28:POKE S+13,133:POKE S+24,15
```



```

50 FOR I=1 TO 5:FOR J=1 TO 4:FOR K=1 TO 3
60 READ V1(I,J,K):NEXT K:NEXT J:NEXT I
70 FOR I=1 TO 5:FOR J=1 TO 4
80 READ V2(I,J,1),V2(I,J,2):NEXT J:NEXT I
90 POKE 53281,12:POKE 53280,4:GOSUB 1000
100 PRINT "CREATE A SONG PATTERN BY ENTERING"
110 PRINT "UP TO 100 NUMBERS BETWEEN 1 AND 5"
120 PRINT "(EXAMPLE: 1 1 3 3 2 2 4 5)."

```



IBM PCjr & COMPATIBLES/ARMCHAIR ARRANGER

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PCjr w/Cartridge BASIC J1.00 and TV or monitor w/speaker; Tandy 1000 w/GW-BASIC 2.02 versions 00.05.00 and 01.01.00 and TV or monitor w/speaker.

```

10 DIM V1$(5),V2$(5),AR(99)
20 FOR I=1 TO 5:READ V1$(I):NEXT I
30 FOR I=1 TO 5:READ V2$(I):NEXT I
40 WIDTH 40:KEY OFF:SCREEN 0,1:COLOR 14,1,0
50 SOUND ON:BEEP OFF
60 GOSUB 1000
70 PRINT "Create a song pattern by entering"
80 PRINT "up to 99 numbers between 1 and 5"
90 PRINT "(example: 1 1 3 3 2 2 4 5)."

```


WHAT'S IN STORE

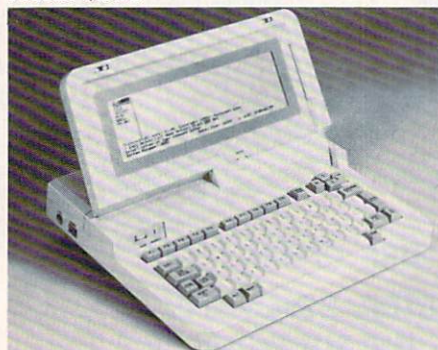
NEW HARDWARE ANNOUNCEMENTS

HEATH ZP-150 • TANDY 600 • EPSON AP-80
• JUKI 5510 • CARDCO DIGI-CAM

COMPUTERS

Heath ZP-150

MANUFACTURER: Heath Co.
ADDRESS: Dept. 150-586, Benton Harbor, MI 49022; (616) 982-3200
PRICE: \$999



The ZP-150 computer is a "lap-top" that comes with 32K of user memory. The flip-top Liquid Crystal Display (LCD) screen shows 16 lines at a time, with a maximum of 80 characters per line. *Microsoft Works*, ROM-based software designed for portable computers, is built in and includes several programs: Plan, a spreadsheet; Word, a word-processing program; File, a data-base management system; Calendar, an appointment book; Telcom, a communications program; a calculator; and BASIC.

The battery-operated computer has a built-in 300-baud modem, a parallel printer port, and an RS-232 port (so you can connect an external 1200-baud modem or serial printer). There's a port to connect a cassette player, but none for a disk drive.

Tandy 600

MANUFACTURER: Tandy/Radio Shack
ADDRESS: 1800 One Tandy Center, Fort Worth, TX 76102; (817) 390-2728
PRICE: \$1,599



Tandy, the acknowledged sales leader in the laptop computer market, has extended its 100/200 line with the Tandy 600. The 600 comes with 32K user memory that is expandable to 224K. The built-in 3.5-inch disk drive has a capacity of 360K, and the 80-character by 16-line screen display flips up and down. Like the new Heath (see above), the battery-operated Tandy lap-top includes *Microsoft Works* with several application programs and a 300-baud modem.

PRINTERS

Epson AP-80

MANUFACTURER: Epson America
ADDRESS: 2780 Lomita Blvd., Torrance, CA 90505; (213) 539-9140
PRICE: \$379

The Epson AP-80 printer, with a built-in serial interface, is designed to be used with the Apple IIe/IIc and Macintosh, which have serial printer ports. The AP-80 is less expensive than Apple's ImageWriter II (an other printer designed for the Apple serial computers), but it is also considerably slower. The ImageWriter II prints at 250 characters per second; the AP-80 at 75. In near letter-quality mode the AP-80 prints at 15 cps. Unlike the low-cost Epson Homewriter, which includes a Printer Interface Cartridge (PIC) for the Apple IIe/IIc and Macintosh, the AP-80 prints graphics. Front-panel selectors allow the user to select different type styles and set left and right margins.

Juki 5510

MANUFACTURER: Juki Office Machine Co.
ADDRESS: 299 Market St., Saddle Brook, NJ 07662; (201) 368-3666
PRICE: \$499; with optional serial interface, \$582; Color Conversion Kit, \$149

Juki, known for its reasonably priced "daisywheel" (letter-quality) printers, has broken into the dot-matrix market with the 5510. In draft mode the 5510 is fast (180 characters per second). In near letter-quality mode it prints at 30 cps. The printer comes with a parallel interface, but a serial interface costs extra. With both friction-feed and tractor-feed mechanisms, you can



use either single-sheet or fanfold paper. You can get seven-color printing with the optional Color Conversion Kit and a color ribbon. The printer has a 3K buffer (about 1.5 pages) that is expandable to 15K, and can print graphics.


MISCELLANEOUS

Digi-Cam

MANUFACTURER: Cardco
ADDRESS: 300 S. Topeka, Wichita, KS 67202; (316) 267-3807
PRICE: \$250 (includes Panasonic 12mm camera)



Cardco, which calls itself the world's largest manufacturer of Commodore accessories, plans to market a video digitizer, Digi-Cam, for the Commodore 64 and 128. A "digitizer" takes a video image and converts it into digital format, so the image can be viewed and manipulated on a computer screen.

Train the Panasonic camera at an object or scene, and in three seconds the image will be digitized and on your computer screen, according to Cardco. The digitized image is available in five shades of gray, but no color. *Paint Now* software (included) allows manipulation of the captured image. The final product may be sent by telephone and modem and viewed by another Commodore owner. 

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learn to program in BASIC and machine language. You'll use utility programs to check out the Sanyo 8088 microprocessor (the same chip used in the IBM PC). And you also get over \$1,000 worth of software, including WordStar and CalcStar.

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WHAT'S IN STORE SOFTWARE GUIDE

QUICK TAKES ON SOFTWARE— NEW AND NOTEWORTHY

Welcome to FAMILY COMPUTING's Software Guide, the most comprehensive listing available of two dozen of the newest, most noteworthy, and/or best programs on the market. Our reviewers include families from all over the country who have judged the software according to the following criteria: long-term benefits and applications, adaptability, and advantages of using a computer for a given task. More detailed reviews follow the chart. Unless otherwise noted, all programs are in disk format. Minimum memory requirements are 48K for Apple II series, 48K for Atari, 128K for IBM PC/PCjr or compatibles, and 128K for Macintosh.

Here's a rundown of the rating categories and what they mean: **O** = Overall performance, given the limitations and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions and literature that accompany a program. **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users. **PS** = Play system, in the games reviews, the quality of the game design and the game's playability. **GQ** = Graphics quality, also evaluated in light of each particular brand's graphics capabilities. **EU** = Ease of use after the initial learning period, which varies from computer to computer. **V** = Value for money, or how the software measures up to its price.

HOME BUSINESS & PRODUCTIVITY

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings					
				O	D	EH	GQ	EU	V
BANK STREET FILER Broderbund Software 17 Paul Drive San Rafael, CA 94903 (415) 479-1170 \$50-\$70 ©1985	Beginners will like this data-base package because it's menu-driven, making it easy to use. Flexible on-screen categories and an on-disk tutorial are two more good features. —FLESCHER	Reviewed on 128K Apple IIe/IIc. Also for 64K Apple; C 64/128.	90-day warranty. \$7.50 thereafter. Backup disk included.	★ ★ ★	★ ★ ★	★ ★ ★	N/A ★ ★	E ★ ★	★ ★ ★
COCO MAX Colorware 78-03 Jamaica Ave. Woodhaven, NY 11421 (718) 647-2864 \$70 ©1985	Powerful graphics program that virtually transforms the CoCo into a color Mac. Easy-to-use, icon-based menu offers all basic drawing functions, plus pull-down windows of multiple fonts and brush widths. —FARMANFARMAIAN	64K Tandy Color Computer. Joystick, mouse, or KoalaPad, and "Y" cable or Multi-Pak interface.	90-day warranty. User makes backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E ★ ★	★ ★ ★
MACPUBLISHER Boston Software Publishers, Inc. 1260 Boylston St. Boston, MA 02215 (617) 267-4747 \$100 ©1984	Mix text and graphics freely with this page-layout program. Great for professional-looking newsletters, signs, brochures, or simply inventive letters. Difficult at first, but easier once you get the hang of it.† —AKER	Macintosh. Printer.	90-day warranty. \$10 thereafter or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	N/A ★ ★	A ★ ★	★ ★ ★
WORDPERFECT Satellite Software Inc. 288 W. Center St. Orem, UT 84057 (801) 227-4370 \$180 ©1985	If you need a quality word processor with dozens of features, this new Apple version of an IBM PC program may be for you. A great manual makes learning relatively easy.† —SOLOMON	128K Apple IIe/IIc.	30-day warranty. \$15 thereafter. User makes backup.	★ ★ ★	★ ★ ★	★ ★ ★	N/A ★ ★	A ★ ★	★ ★ ★
THE WORKS! First Star Software 18 E. 41st St. New York, NY 10017 (212) 532-4666 \$50 ©1985	A sampler's delight, with 13 programs integrated on one disk. Includes simple word processor, drawing program, and typing teacher. Suitable for all ages and experience levels.† —SOLOMON	Reviewed on 64K Apple. Also for C 64/128. Joystick optional.	90-day warranty. \$7 thereafter. \$4 for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E ★ ★	★ ★ ★

RATINGS KEY **O** Overall performance; **D** Documentation; **EH** Error-handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

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WHAT'S IN STORE SOFTWARE GUIDE

EDUCATION/FUN LEARNING

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings						
				O	D	EH	GQ	EU	V	
ALGE-BLASTER! Davidson & Associates 3135 Kashiwa St. Torrance, CA 90505 (800) 556-6141 \$50 ©1985	Provides instruction and practice in 21 concepts of algebra, from negative numbers to factoring equations. Over 600 quiz problems provided (or make your own). Supplements classroom work. —MORRIS	Reviewed on 64K Apple. Also for IBM PC/PCjr. Planned for C 64/128.	One-year warranty (includes user-damaged). \$10 for backup.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	A	★ ★ ★	
BATAILLE DE MOTS Gessler Educational Software 900 Broadway New York, NY 10003 (212) 673-3113 \$50 ©1984	This French version of the vocabulary game <i>Word Attack</i> is also available in Spanish and German. Includes on-line help screens. Often exciting and always worthwhile.† —MORRIS	Reviewed on Apple. Also for C 64/128; IBM PC/PCjr and compatibles.	90-day warranty. \$12 for backup; user can make one backup (Apple only).	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
COMPARISON KITCHEN DLM Software One DLM Park Allen, TX 75002 (214) 248-6300 \$30 ©1985	By using colorful cookies, cakes, and breads, children learn about opposing ideas, such as "same" and "different," "least" and "most," and "greater than" and "less than." Good for ages 5-8. —BUMGARNER ELTGROTH	Apple. Color monitor recommended. Joystick optional.	Six-month warranty (includes user-damaged). \$15 thereafter or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
CONCEPTOR Mentor Learning Systems 1825 De La Cruz Blvd. Santa Clara, CA 95050 (408) 988-4114 \$50-\$60 ©1985	A series of brainteasers, such as identifying and matching shapes. This intellectual game is challenging, but may be too abstract for some. Play alone or in groups; for ages 12+. —DELSON	Reviewed on IBM PC/PCjr and compatibles. Also for Apple; C 64/128; Macintosh.	30-day warranty (includes user-damaged). \$8.50 thereafter. \$25 for backup.	★ ★	★	★ ★ ★	★ ★ ★	D	★ ★	
CONCEPTS COMPUTERIZED ATLAS Software Concepts, Inc. 1116 Summer St. Stamford, CT 06905 (203) 357-0522 \$70 ©1984, 1985	The world on a screen. Using arrow keys, move the cursor to all points on various maps. Uncover information about cities, states, provinces, and nations. Useful for all ages.† —BUMGARNER ELTGROTH	Reviewed on IBM PC/PCjr and compatibles. Also for 64K Apple.	30-day warranty. \$5 thereafter or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	
CREATE WITH GARFIELD! DLM Software (See above for address and phone) \$30 ©1986	Starring Garfield, the popular fat cat in the comic strips, this humorous utility lets you design and print original cartoons, posters, and labels. Family fun to be used over and over. —FRANK	Reviewed on 64K Apple. Also for C 64/128. Printer recommended.	Six-month warranty (includes user-damaged). \$15 thereafter or for backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★	
GEARS Sunburst Communications 39 Washington Ave. Pleasantville, NY 10570 (914) 796-5030 \$59 ©1985	Connect various sizes and types of gears. By interpreting the results, learn how to develop logical formulas. Conceptually similar to <i>Rocky's Boots</i> , but less compelling for children ages 10+. —MORRIS	Reviewed on Apple. Also for Tandy Color Computer. Color monitor recommended.	Lifetime warranty (includes user-damaged). Backup disk included.	★ ★	★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	
MR. PIXEL'S CARTOON KIT Mindscape, Inc. 3444 Dundee Road Northbrook, IL 60062 (312) 480-7667 \$35 ©1985	An animation tool kit. Plan a character's moves against one of three backgrounds, then save to disk. Finished cartoons range from simple to complex. For ages 8+. —BUMGARNER ELTGROTH	Reviewed on C 64/128. Also for 64K Apple; IBM PC/PCjr. Joystick optional.	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★	
SNOOPY WRITER Random House Software 201 E. 50th St. New York, NY 10022 (212) 872-8035 \$30 (C 64/128) \$40 (Apple) ©1985	Children can learn to write easily with this illustrated word processor. The enclosed "story starters" help stimulate ideas, but that feature has its limitations. Best for ages 6-8. —BUMGARNER ELTGROTH	Reviewed on 64K Apple IIe/IIc. Also for C 64/128. Color monitor, joystick, or mouse optional.	90-day warranty. \$5 thereafter up to one year. \$10 for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	

RATINGS KEY O Overall performance; D Documentation; EH Error-handling; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

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GAMES REVIEWS BY JAMES DELSON

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings						
				O	D	PS	GQ	EU	V	
ALCAZAR Activision 2350 Bayshore Frontage Road Mountain View, CA 94039 (415) 960-0410 \$30-\$35 ©1985	Seek the throne of Alcazar in this exciting solo strategy/arcade game. Battle monsters through a series of castles and discover useful objects along the way. Fast-paced amusement for ages 8+.	Reviewed on C 64/128. Also for Apple. Joystick.	90-day warranty. \$7 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
BATTALION COMMANDER Strategic Simulations 883 Stierlin Road Mountain View, CA 94043 (415) 964-1353 \$40 ©1985	Command U.S., Soviet, or Chinese tank battalions in real time. A tactical simulation with great flexibility, the game's options include adjustable levels of difficulty. Suitable for experienced gamers ages 12+.	Reviewed on 64K Apple. Also for Atari; C 64/128. Joystick (optional on Apple).	30-day warranty. \$10 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★	
THE CAVE OF TIME Bantam Software 666 Fifth Ave. New York, NY 10103 (212) 765-6500 \$35 ©1985	Youngsters resolve fantastic or historic adventures. Fun for ages 6+ to play without needing parents' aid. Some arcade action, but this is chiefly a fine, simple text/graphic adventure.	Reviewed on 64K Apple. Also for C 64/128. Joystick optional.	90-day warranty. \$5 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
CARRIERS AT WAR Strategic Studies Group, distributed by Electronic Arts 2755 Campus Drive San Mateo, CA 94403 (415) 571-7171 \$50 ©1984	You control American or Japanese units and play a complex simulation of aircraft carriers in World War II. There's also a construction set for making your own scenarios. Takes some time to learn, but worth the effort. For ages 12+.	Reviewed on Apple. Also for C 64/128.	Unlimited warranty (includes user-damaged). User makes backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★	
FAST TRACKS Activision (See above for address and phone) \$30 ©1985	Create different racetracks from "spare parts" kit, then play game. Perfect for kids ages 8+, but adults can also enjoy this slot-car simulation.	C 64/128. Joystick.	90-day warranty. \$7 thereafter.	★ ★ ★	★ ★ ★	@ ★ ★	★ ★ ★	E	★ ★ ★	
JET COMBAT SIMULATOR Epyx 1043 Kiel Court Sunnyvale, CA 94089 (408) 745-0700 \$35 ©1985	This latest flight simulator is fast-paced and beautifully detailed. Ages 10+ can take the controls of an F-15 Eagle. Comparable, but not as good as <i>Skyfox</i> , <i>Jet</i> , or <i>F-15 Strike Eagle</i> .	C 64/128. Joystick.	90-day warranty. \$5 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★	
KUNG-FU UXB, a division of Spinnaker One Kendall Square Cambridge, MA 02139 (617) 494-1200 \$30 ©1985	You'll need excellent reflexes in order to take full advantage of this martial arts program's lightning-fast response system. With 16 joystick-controlled commands, here's a nonstop action fest for ages 12+.	C 64/128. Joystick.	90-day warranty. \$5 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
LAW OF THE WEST Accolade, Inc. 20863 Stevens Creek Blvd. Cupertino, CA 95014 (408) 446-5757 \$30-\$35 ©1985	Here's a new concept—an arcade text/graphic adventure with multiple-choice answers. You're the frontier-town sheriff in the Old West. Fun solo game for ages 10+, but especially suitable for groups.	Reviewed on C 64/128. Also for Apple. Joystick.	90-day warranty. \$6 thereafter. \$10 for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
STAR RANK BOXING Gamestar 1302 State St. Santa Barbara, CA 93101 (805) 963-3487 \$30 ©1985	Play alone or one-on-one in this joystick-operated boxing simulation. In solo game, boxers' attributes develop as you take them on the circuit. A hit for ages 10+.	C 64/128. Joystick(s).	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
TREASURE ISLAND Windham Classics, a division of Spinnaker One Kendall Square Cambridge, MA 02139 (617) 494-1200 \$27-\$40 ©1985	Colorful graphics, a fast-moving play system, and a clever hint feature make this a good intro to text/graphic adventures for children ages 10+ and adults. Based on the classic tale by Robert Louis Stevenson.	Reviewed on C 64/128. Also for Apple; Atari 520ST; IBM PC/PCjr.	30-day warranty. \$5 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	

RATINGS KEY O Overall performance; D Documentation; PS Play system; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★★ Excellent; @ ★★★★★ for construction set, ★★ for game itself; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart



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WHAT'S IN STORE SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 82 for information such as backup policies and addresses of software publishers.

HOME BUSINESS & PRODUCTIVITY

MacPublisher

HARDWARE REQUIREMENTS: Macintosh.
PUBLISHER: Boston Software Publishers, Inc.
PRICE: \$100

Did the variety of fonts and the ease of graphics on the Macintosh lead to visions of newsletters dancing in your head? If so, you were probably disappointed when you found out *MacWrite* couldn't handle multi-column printouts for your brochures and that once you pasted in a *MacPaint* image, nothing could be written on either side of it.

This frustration will end once you insert *MacPublisher* into your disk drive. In almost no time you can make up professional-looking printed pages with multiple columns and mixed text and graphics. *MacPublisher* may be a little confusing at first because there is so much on the "desktop," but it's fairly easy once you get the hang of it.

You must write directly to *MacPublisher* (you cannot transfer text from *MacWrite* or *Word*). A special ruler lets you measure both the available space and the length of your piece. If you use only part of any work on a page, *MacPublisher* saves the remainder of the text for a different page. When an article spreads across columns or pages, *MacPublisher* automatically notes the continuing page and column.

MacPublisher supplies many font, size, and style options for your writing. Unfortunately, you are limited to only one type of typeface in each piece. This is not a severe limitation, since you can treat headlines or subheads as separate items and make them larger or smaller than the main text. It's frustrating, though, to find that you can't italicize or boldface a few words here or there.

To transfer *MacPaint* graphics to *MacPublisher*, you use *MacPublisher's* "camera" that copies images from the Clipboard or a Scrapbook of compiled pictures. Then you drag them into position on the layout.

When it's time to get the presses

rolling, you can print all your newsletters on your *ImageWriter*. Or, for often better quality (and less strain on your printer), print only one copy, then have it photo-offset.

MacPublisher is not the best page-layout program available for the Mac. It is very good, however. And, considering the fact that the best one costs five times as much, *MacPublisher's* limitations are very easy to live with.

(*MacPublisher's* publishers have just released a separate, advanced version, *MacPublisher II*. It offers several new features, including direct entry of *MacWrite* files and *MacPaint* images. The price is \$150.)

—SHARON ZARDETTO AKER

WordPerfect

HARDWARE REQUIREMENTS: 128K Apple IIe/IIc.
PUBLISHER: Satellite Software Inc.
PRICE: \$180

Many of us like the word processor we already use. We praise its advantages, complain about its faults, and rarely look for a new one. Yet, at the same time, we may still be searching for the "ultimate" writing tool: one that does everything imaginable.

WordPerfect—while it doesn't do windows or integrate with a data base or spreadsheet—is a powerful word processor with the feel of a professional system. The package comes with a utility disk for manipulating files, a work-space disk for editing documents, a disk of files for the tutorial, and the word processor itself. A reference card, an excellent manual, and a tutorial all make learning this complex program easy. Plus, for a minimal price (\$30), a 50,000-word spelling checker is available separately.

All the usual word-processing features are here (like search and replace or on-line help screens), and some less usual ones, too. These include statistical typing, the use of multiple fonts, and macros that boil down repetitive words and phrases into single keystrokes. Other good functions for small-business use are mailmerge and the ability to print mailing labels and envelopes.

In *WordPerfect*, the computer screen looks like a printed page. The program inserts hyphens automatically, and displays printer codes only when wanted. If you're stapling a document, you can print with special binding widths. Footnotes are also available.

Many of these features can be found individually on other word processors, but not that many in one place—especially on an Apple. This version of *WordPerfect* is the new sibling of the IBM PC version, and it comes close to equalling the features of its more expensive (and often praised) predecessor.

When considering a new word processor, you first have to decide which functions are essential. If you write a lot and have complex formatting needs, you'll want a full-featured, powerful program. *WordPerfect* may not be the perfect answer, but it's a very fine one.

—GWEN SOLOMON

The Works!

HARDWARE REQUIREMENTS: Apple, C 64/128.
PUBLISHER: First Star Software
PRICE: \$50

I've always loved "assortments" of things, like the packs of breakfast cereals or assorted chocolates. *The Works!* is an assortment, too: a sampler's delight. For a moderate price, my family has 13 programs—easy to learn, with similar commands and practical for home use—all on one floppy disk.

With *The Works!*, you begin to discover what computers are capable of. That discovery can help you decide just what you want from your machine. Should more sophistication be needed, you can always upgrade (at this price, that's not a major sacrifice). But, in many cases, these programs will suffice. Best yet, *The Works!* is an integrated package; with the word processor, you can merge information from most of the other programs on the disk.

My 13-year-old daughter Debbie created her own shapes, patterns, and designs with *Graphics Painter*, and composed a simple musical arrangement with *Music Composer*. Both *Math Formulas* and *Letter Writer* helped her with homework.

I found *Letter Writer* to be a solid little word processor. Working with that module and the *Address Book* program, I sent several letters that I'd been meaning to write. The *Calendar Pad* is designed to track appointments.

Debbie and I used *Weights and Measures* to increase a recipe by two-thirds. My husband Stan balanced the checkbook with *Calculator*, and then reviewed our income

and expenses with Family Finances.

There's more, too, such as math learning games (Math Races), improving typing skills (Typing Teacher), controlling finances (Loans and Investments), and following the stock market (Stock Portfolio).

We learned that most of these programs are adequate for our needs. In fact, since we probably wouldn't have bought this much software separately, our usable software library is far richer than it once was. So *The Works!* could be subtitled *Our Money's Worth*, for all we learned and for all we could do with that delightful assortment of programs.

—GWEN SOLOMON

EDUCATION/ FUN LEARNING

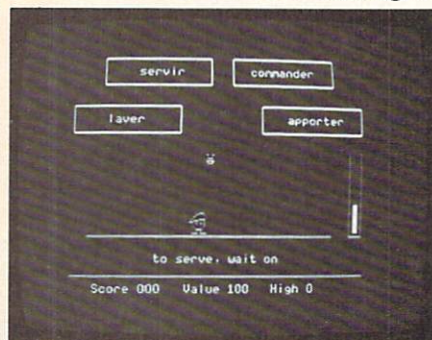
Bataille de Mots (Word Attack)

HARDWARE REQUIREMENTS: Apple, C 64/128, IBM PC/PCjr and compatibles.

PUBLISHER: Gessler Educational Software

PRICE: \$50

PUBLISHER'S SUGGESTED AGES: All ages



On the screen you see four French words and an English word. Quickly, you try to remember the French word for "news." With only two seconds left on the timer, you fire a shot at *les nouvelles*. You're right! The computer bursts into fanfare; your score increases by 100 points. But there's no time to relax. The next set of words is already on-screen; the timer is counting down. Suddenly, an unidentified object darts across the screen. You rush to shoot it down and earn bonus points, before turning back to the vocabulary problems.

Not all of *Bataille de Mots* is this exciting, but all is worthwhile. If you study Spanish or German, there are versions for those languages as well. Those three games are translations of Davidson & Associates' program *Word Attack*.

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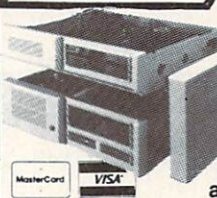
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WHAT'S IN STORE SOFTWARE REVIEWS

You begin *Bataille de Mots* by picking one of 18 lists of words and their definitions to study. When you've learned all the lists of adjectives, nouns, and verbs, move on to a multiple-choice quiz, a sentence completion test, or the arcade game, also called "Bataille de Mots." Have you mastered all the words on the disk? Use the editing function to save your own word lists on disk.

Nice options abound. If you have trouble during the sentence completion test, the program will give you four possible hints, only one of which is correct. When you get a multiple-choice question right, you're greeted with excerpts from popular French songs. And, what may be nicest, you can use the editing function to create lists of objects other than French vocabulary words (important dates and events in history, for example, or minerals and their properties). The editing function is very flexible.

The disadvantages of *Bataille de Mots* are relatively few. Many sentence completions are too difficult, and some words are hard to read on the monitor. Once you elect to include sound effects, you can't turn them off without starting over. But for foreign language students of any age, this word game *c'est très bon*.

—TONY MORRIS

Concepts Computerized Atlas

HARDWARE REQUIREMENTS: Apple, IBM PC/PCjr and compatibles.

PUBLISHER: Software Concepts, Inc.

PRICE: \$70

PUBLISHER'S SUGGESTED AGES: All ages

Concepts Computerized Atlas gives you the world on a screen, and offers exquisite color graphic maps of the continents. Pressing the arrow keys to move the cursor around these maps produces an information line identifying the nearest city and its coordinates. Windows containing information such as population, area, currency, and language enhance



your knowledge of major cities, states, and nations.

You can also call up a city or a country by typing in its name. The program then draws a new map, if the city does not appear on the current one. Pull-down menus allow the user to alter the size of the maps, request facts about individual cities, determine distances between two cities, and save or recall specific on-screen views. You can "flip" through an alphabetically arranged data base of cities throughout the world (which is a big help if you can't spell a city name), or superimpose a grid of longitude and latitude lines over any of the maps.

I spent a long time playing with the *Atlas*, watching the continents being drawn and redrawn, and enjoying its graphic effects. However, there are several drawbacks that restrict the *Atlas*' usefulness.

For instance, you can't display a map with all its cities shown at once. I felt as if I was playing "Blind Man's Bluff" when I moved the cursor around a map with no place names on it. The graphics effects are also very slow. Each time you change maps, the computer tediously draws the new map line by line.

In general, while the concept is excellent, I fear that the utility of this program is limited by its available features. For the same price, you could purchase a very fine, full-color, hardcover world atlas that contains far more information.

—MARLENE BUMGARNER ELTGROTH

GAMES

Battalion Commander

HARDWARE REQUIREMENTS: Apple, Atari, C 64/128.

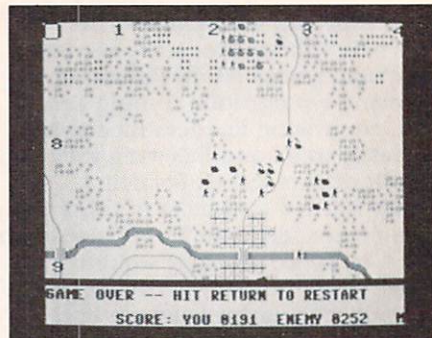
PUBLISHER: Strategic Simulations Inc.

PRICE: \$40

CRITIC'S SUGGESTED AGES: 12+

If you enjoy outstanding real-time, tactical simulations, you'll be happy to know that game designer David Hille is back with *Battalion Commander*. Like his breakthrough game *Combat Leader*, this new program demands a player's active participation in on-screen battles as they happen. Contrast that to the board-game inspired style of making all your moves, then waiting a set amount of time for the outcome. With *Battalion Commander*, there are no pauses between turns because there are no turns.

In this flexible simulation of mod-



ern armored warfare, a solitary player or team chooses command of U.S., Soviet, or Chinese battalions. Then the players mastermind joystick-controlled confrontations in five types of action over 40 different terrain maps. Options include adjustable computer play levels, a handicapping system, and various command levels (from a full battalion down to a platoon). *Battalion Commander* is for experts only. Its high complexity, however, brings more of a "you are there" feeling than advanced gamers usually experience.

The Cave of Time

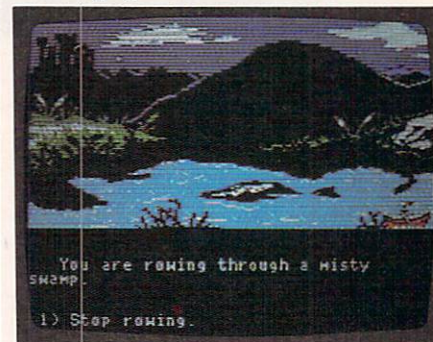
HARDWARE REQUIREMENTS: 64K Apple, C 64/128.

PUBLISHER: Bantam Software

PRICE: \$35

CRITIC'S SUGGESTED AGES: 6+

Adapted from Bantam Books' long-running "Choose Your Own Adventure" children's series, *The Cave of Time* is Bantam Software's well-done translation to the electronic medium of text/graphic adventures.



In the books, and now in the games (this title is one of a software series), gamers take on the role of time travelers. Players visit fanciful versions of history: saying things to Abe Lincoln that were never said, for example, or spending time with prehistoric man.

You pick from simple multiple-choice options when making moves. The program then delivers one of

three responses. Either it advances you to the next step in the story; it sends you back one or more steps (sometimes all the way back to the start); or it informs you that you're dead, gives you a score, and asks if you want to start again.

By learning the correct answers to each question, players gradually piece together the proper sequence of events required to solve the game. *The Cave of Time* is designed primarily for children, and adults will find it easy—yet many can still enjoy it. Sometimes it's fun playing games that let you think, but do not demand total concentration or resolve to win.

The Cave of Time is lots of fun for parties and is ideal for kids ages 6 and older. It's also good for gaming newcomers and parents who want to share the enjoyment of computer games with their children.

Fast Tracks: The Computer Slot Car Construction Set

HARDWARE REQUIREMENTS: C 64/128.

PUBLISHER: Activision

PRICE: \$30

CRITIC'S SUGGESTED AGES: 8+

Even better than a straightforward car-racing game, *Fast Tracks* is also an excellent slot-car construction set. Individual players create race tracks from scratch and save them—or give the finished, working products to friends on separate disks.

Fast Tracks is easy to use, requiring only a joystick and a sense of direction. It offers you tools for building an endless variety of small, medium, and large tracks. The "parts box" contains over 20 different sections of track, including straight roads (which can be s-t-r-e-t-c-h-e-d), curves, underpasses and overheads, switches, crossovers, bottlenecks (where one car can't pass another), and forks in the road.

After building your course, the racing game is for one player only. It's no match for the excitement gen-

erated by the construction kit module; when compared to pure racing games, it's plainly inferior. That's due, of course, to the current limitations of computer memory.

Fast Tracks is a fair match for all other road-race game/construction sets except Electronic Arts' *Racing Destruction Set*, which still offers the most options. It's perfect for kids, yet can also beguile adults by reminding them of toy cars and train sets from years ago.

Star Rank Boxing

HARDWARE REQUIREMENTS: C 64/128.

PUBLISHER: Gamestar

PRICE: \$30

CRITIC'S SUGGESTED AGES: 10+

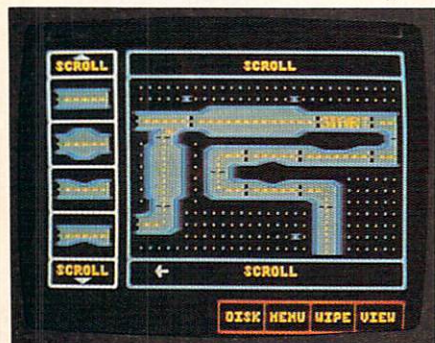


Hey, sports fans! Here's a detailed, joystick-operated boxing simulation which tops all its competitors by far. One or two gamers can play. In the solo version, you create a stable of up to 40 potential champions, using methods similar to *Wizardry* or *Competition Karate*. Then take them on the championship circuit, matching your team against computer-controlled boxers of similar abilities.

As fighters rise through the ranks, players can watch their personal attributes develop as they build reputations and vanquish their opponents. In the two-player version, each gamer is restricted to choosing from an existing roster of boxers. However, this mode offers invaluable help in mastering the skills needed to best the computer opponents in the ring.

Star Rank Boxing lets you issue all commands to your pugilist through combinations of joystick movements and pressing the fire buttons. This makes for an exciting, easy-to-use play system, similar to Gamestar's fine *On-Court Tennis* and *On-Field Football*. If the company hadn't already sewn up the title as leading publisher of sports programs, Gamestar now holds the belt.

—REVIEWS BY JAMES DELSON



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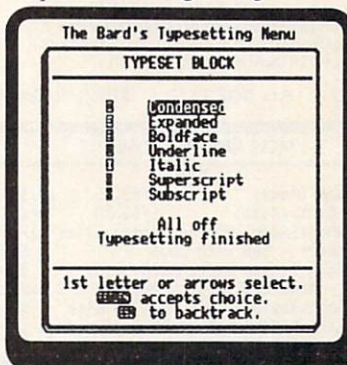
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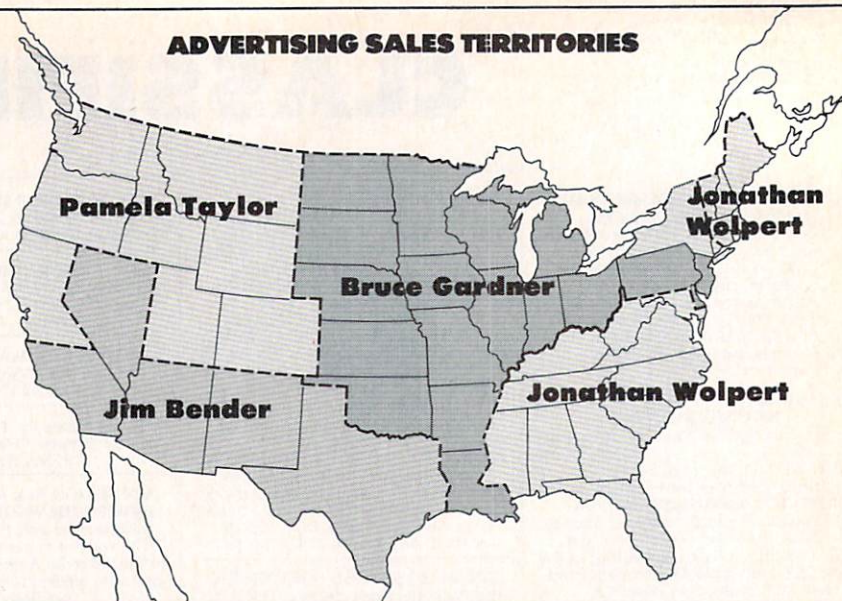
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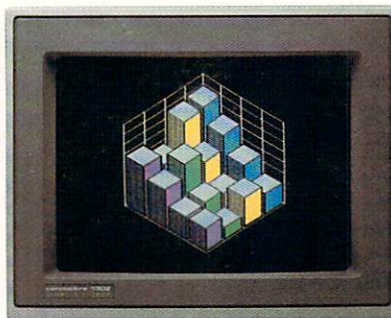
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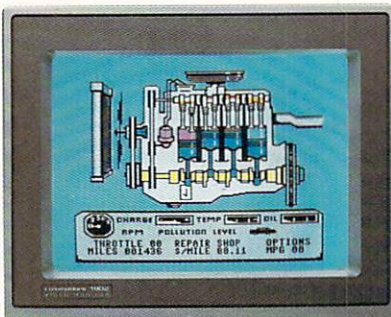
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