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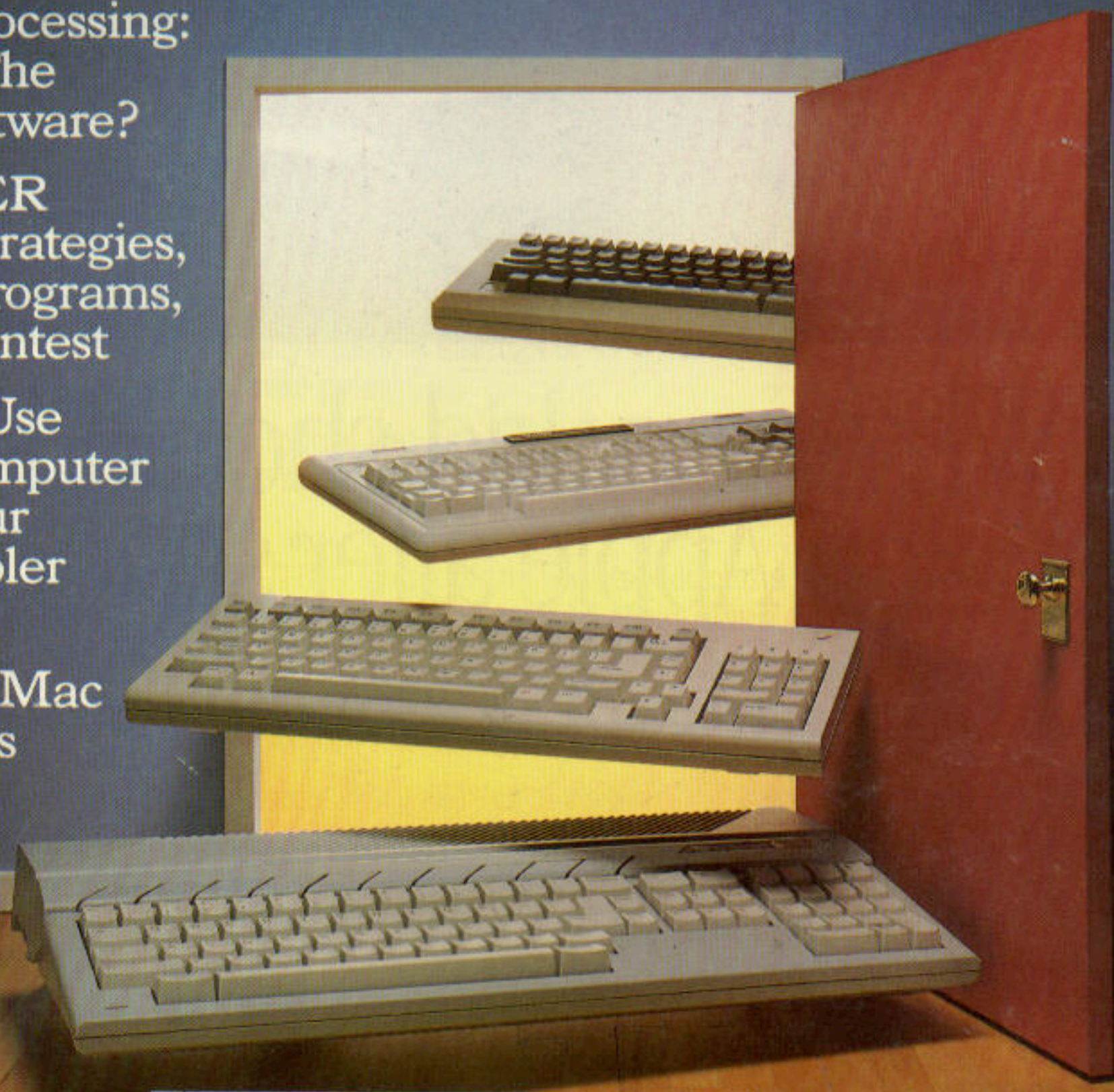

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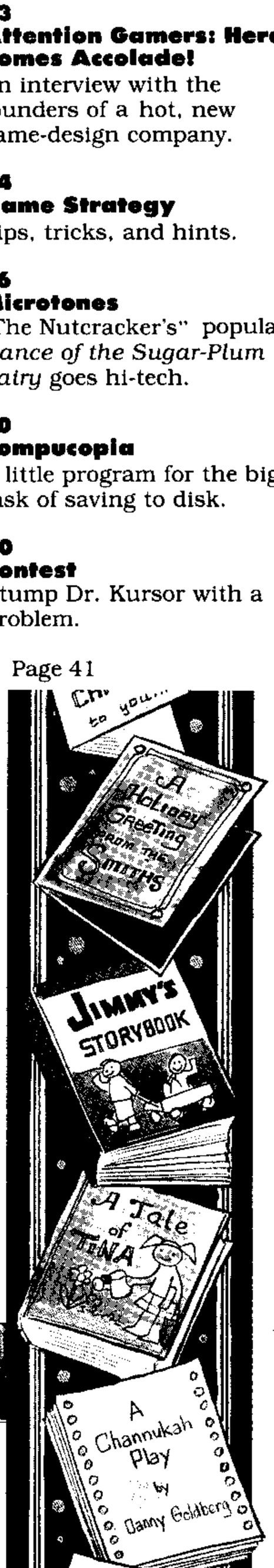

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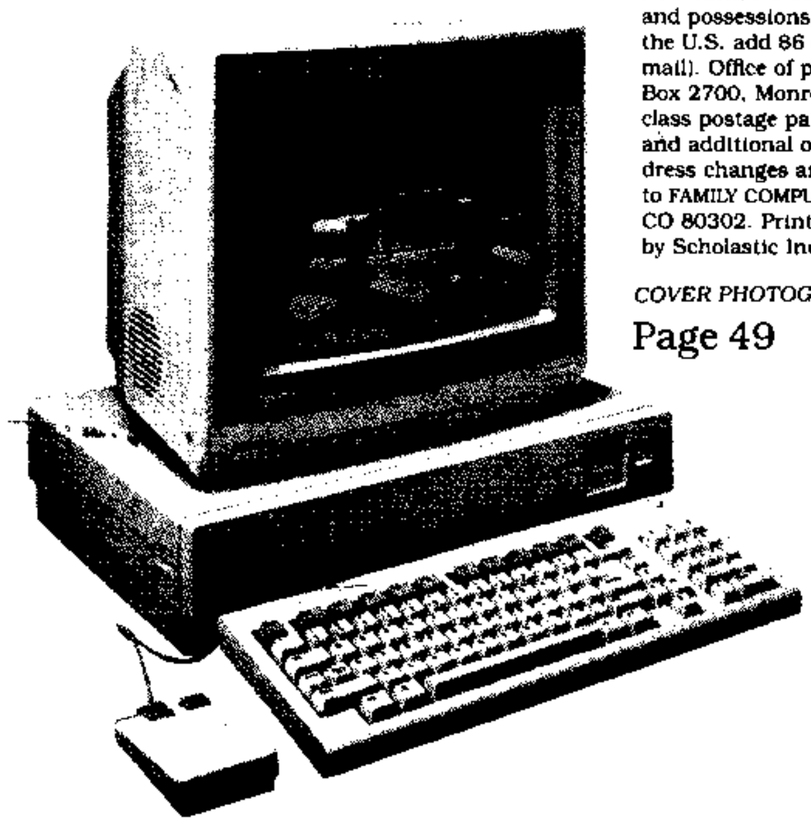

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$26	$26	$26	$26	e/h	Mastertype, New & Improved
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$44	...	$44	$44	e	Speedreader II (Davidson)
$26	...	$26	$26	e	Reader Rabbit (Learning Co)
...	...	...	$36	h	Sidekick (128k)
$31	...	...	$31	—	JOYSTICK: MACH 2 (Hayes)
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$28	$23	$23	$28	e/r	Seven Cities of Gold
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The following are for C/64 disk. Price is $9 each: 1985: The Day After; Quest for the Holy Grail; Kikstart (Offroad simulator); BMX Racers; Black Crystal; Se Kaa of Assiah; Starace; Chiller.

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CIRCLE READER SERVICE 19

COMPUTING CLINIC

DISK DENSITIES • KEYBOARD PROGRAMS • TERMINAL SOFTWARE

BY JEFFREY BAIRSTOW

What is the difference between single- and double-density disks? CHAD BAKER
Chicago, Illinois

Floppy disk drives come in several varieties—single-sided, double-sided, single-density, and double-density. This means they read and write on disks in those formats. Single-sided drives write on only one side of a disk, double-sided write on both sides. Naturally, more information can be stored on a disk used in a double-sided drive.

In addition, there are at least two ways of recording data on disks—single-density and double-density. Double-density recording packs about twice as much information on a disk as single-density does. For instance, Apple II drives, which store 143K, are single-density; IBM PC drives, which store 360K, are double. Some high-performance, double-sided, double-density disk drives can store nearly 1.6 megabytes (1600K) of data!

It's important to know which type of disk drive your computer has so you can buy the appropriate disk. For example, disks for double-sided, double-density drives are usually designated "2S/2D" on the box. This means that the manufacturer certifies that the magnetic coating on both sides of the disk is of high enough quality to record information at double density. If in doubt, ask before you buy. Be assured, however, that you can't harm the drive by using the wrong disk. It just might not work as well as you'd want.

Is there any way to disable and reenable certain keys on the IBM PC, such as NUM LOCK or CAPS LOCK? STEVEN JAY BLATT
Mt. Shasta, California

A number of keyboard programs make it possible to change the key functions on the IBM PC. Two of the most popular are ProKey (RoseSoft) and SuperKey (Borland International). Both allow you to specify the use of every key on the board—changing NUM LOCK to BREAK, for example, or disabling the NUM LOCK key altogether. You can also change the letter and numeral keys—making 1 respond as 9, turning A into Z, etc. And ProKey and SuperKey also let you program keystroke sequences that can be recalled by pressing a two-key combination (e.g. CTRL D).

In BASIC, function keys are preprogrammed to represent keystroke sequences (for example, pressing F2 has the same effect as typing RUN and pressing ENTER). Using the BASIC KEY command, you can reprogram each function key to produce any series of up to 15 keystrokes.

In some versions of BASIC, the KEY command will also let you "trap" most keys, that is, branch to a special part of your program whenever a particular key is pressed. This method is often used to disable the FUNCTION-BREAK and CTRL-ALT-DEL key combinations.

What is "terminal software" and how is it used? TROY MONDAY
Oshkosh, Wisconsin

"Terminal software," short for "terminal emulation software," is really just communications software. The name dates back to the days when most computing was done on mainframe computers, accessed by so-called "dumb terminals." Terminal emulation software made it easy to connect a microcomputer to a mainframe by causing the micro to mimic, or "emulate," a dumb terminal.

Nowadays, terminal software is much more versatile. It allows your computer to communicate with your friend's micro down the street as well as with online services such as CompuServe or The Source. You can communicate via phone lines, or by cabling together the two computers' serial ports (if the machines are close enough to each other). And most terminal software goes a step beyond the old dumb terminals by permitting you to send or receive (upload or download) files.

For more information about terminal programs, I suggest you look at *Personal Computer Communications* by Alfred Glossbrenner (St. Martin's Press, New York), a comprehensive, readable book. You can also check out our "Tips on Buying Communications Software" in the March 1985 issue of FAMILY COMPUTING. FC

JEFFREY BAIRSTOW *is a contributing editor to* FAMILY COMPUTING.

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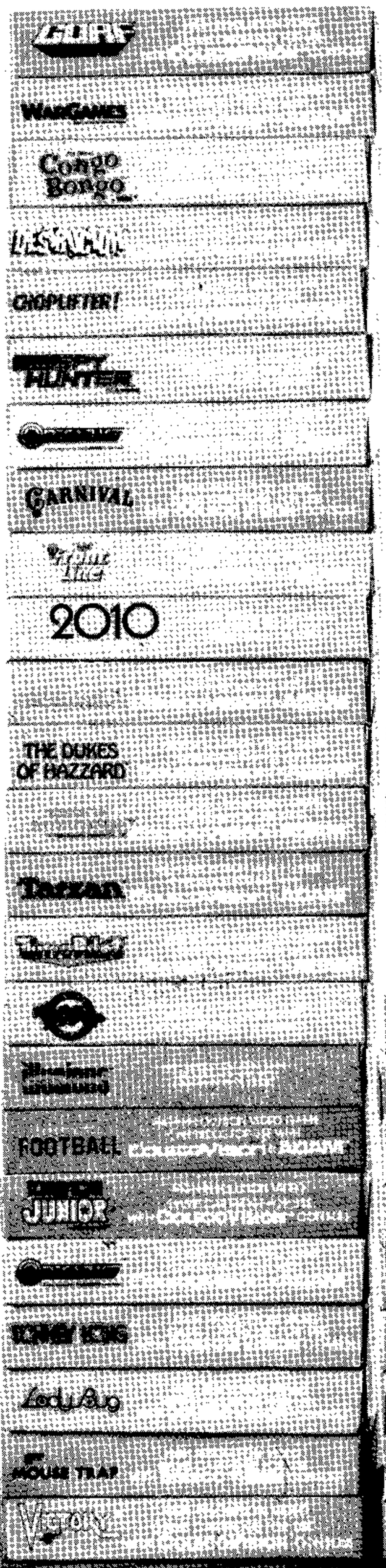

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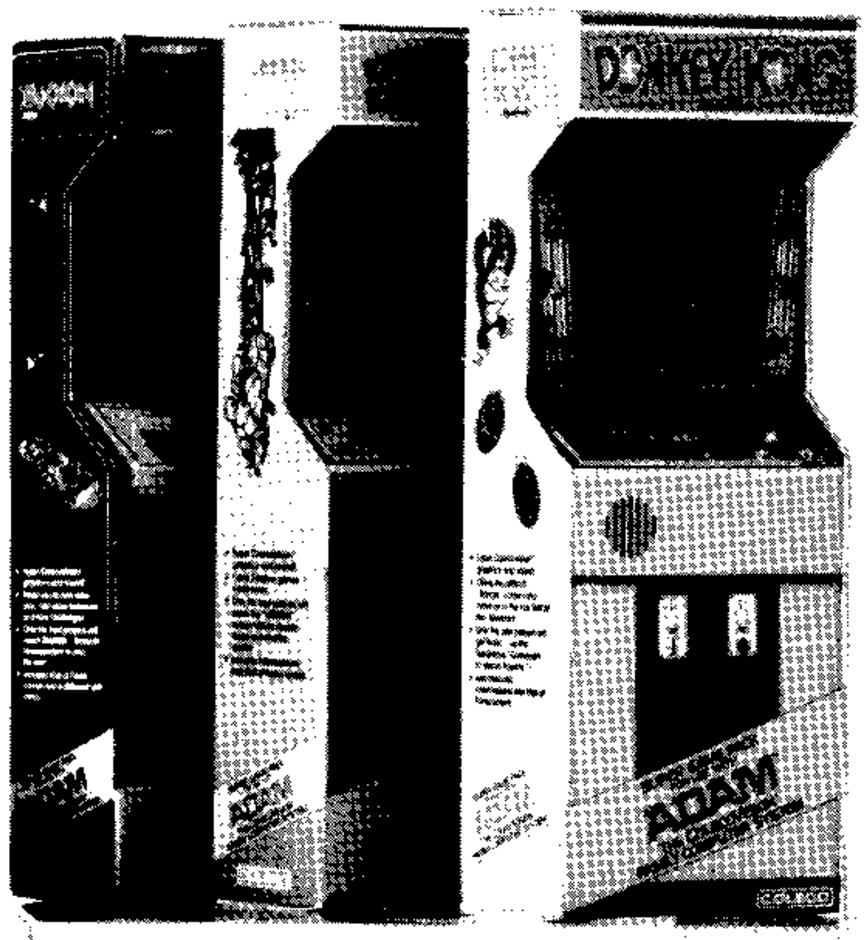
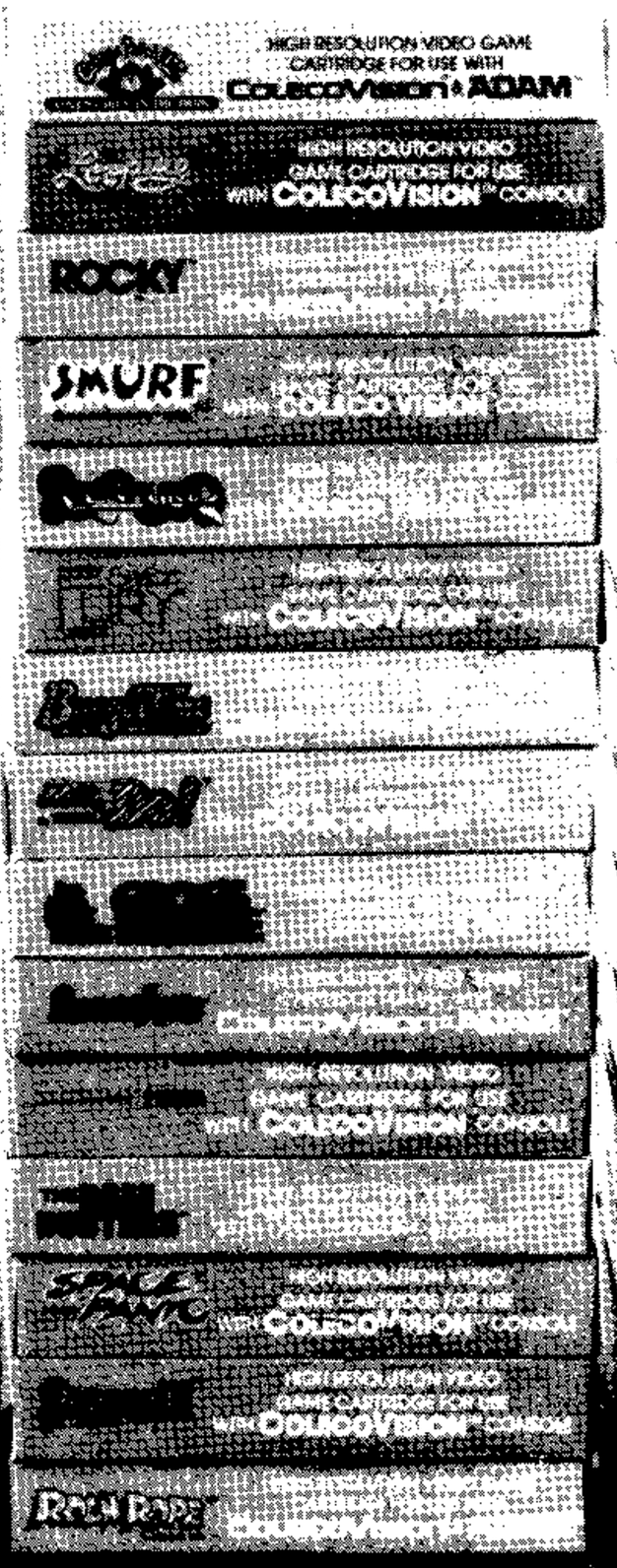
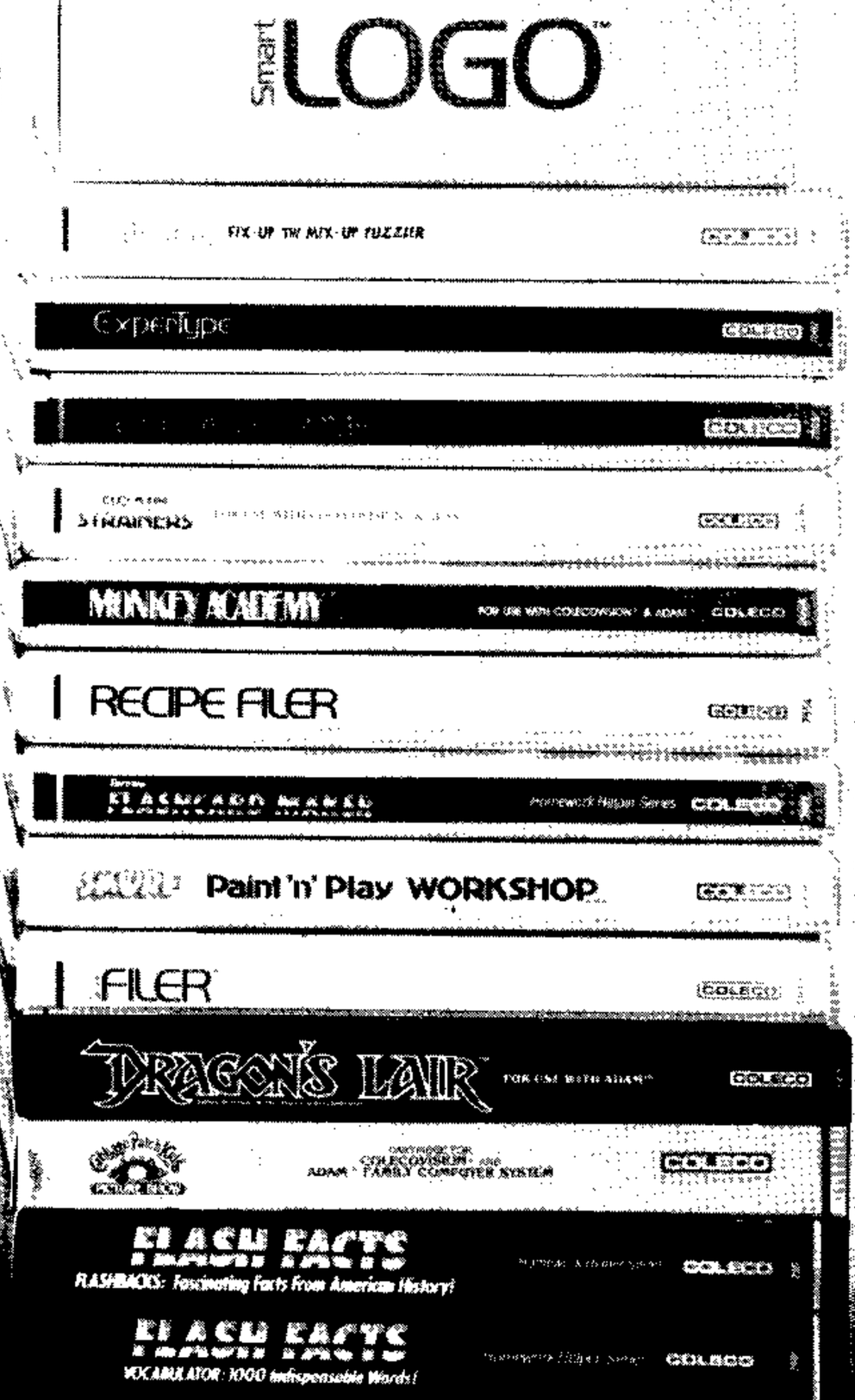


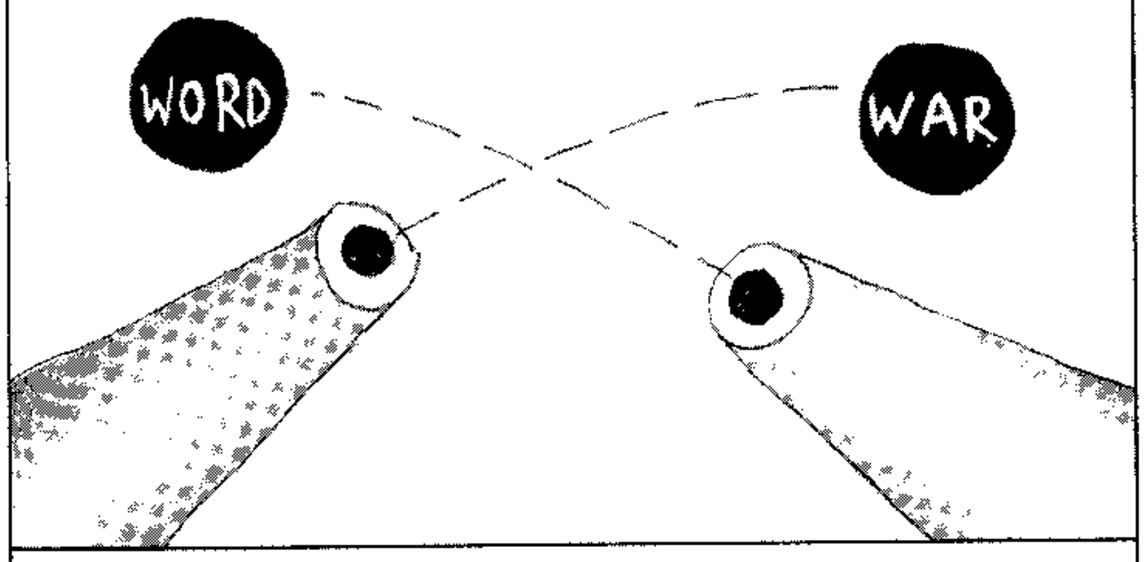




*Availability of some software programs subject to change.

WORD WARS

BY JOEY LATIMER



Pit yourself against a friend in a battle of words—play *Word Wars*! The object of the game is to type in a word with either a lower or higher value (the computer decides which) than the word the other player chooses. The computer, acting as judge and referee, also adds challenge to the game by deciding how many letters should be in each word and what the first letter should be. After you've each typed in a word of the right length, beginning with the proper letter, the computer figures out their values. Depending on whether the goal was to produce a lower- or a higher-valued word, one player wins the round. In the rare case that both players' words have equal value, the round is considered a tie.

The computer determines the value of each word by adding up the "ASCII" codes of each letter. ASCII (American Standard Code for Information Interchange) is the numeric code your computer uses internally to represent letters, numbers, and other characters. In ASCII, the capital letter "A" is represented by the number 65, "B" with 66, on up to "Z"—which is coded as 90. Lowercase letters, punctuation marks, etc., are represented by different ranges in the ASCII code, and minor details may vary from one type of computer to another. (Check your computer manual for an ASCII table.)

However, you don't have to think in terms of ASCII codes to play *Word Wars*. All a player *really* has to remember is that an "A" counts for less than a "B," which counts for less than a "C," etc. Note also that *Word Wars* won't work reliably unless you enter words (and answer the computer's questions) in all capital letters and avoid using punctuation. Make sure the CAPS LOCK key (or equivalent) is down before you play!

To make the game fair, *Word Wars* will ask players to verify that the words they enter are actually in the dictionary. Players should agree to accept whatever dictionary they have on hand as an authority.

THE LOGIC OF *WORD WARS*

At the beginning of each round, the computer decides randomly if players should aim for lower- or higher-valued words. The statement that makes the decision looks something like this:

```
HL = (RND>=0.5)
```

This strange-looking statement is really a simple assignment statement (it *assigns* the value on the right to the variable on the left), just like X=1. In other words, the expression inside the parentheses has an actual numeric value that is assigned to variable HL.

Such an expression, called "Boolean" after the 19th-century mathematician George Boole, is either true or false. In this case, the random number RND either *is* greater than or equal to (>=) 0.5 (and the expression is true) or it is *not* (and the expression is false). Other examples of Boolean expressions are (X=Y) and (A<2 OR B>3).

How does BASIC represent the logical value (true or false) of a Boolean expression as a number? On many computers, the value −1 stands for "true" and 0 stands for "false." We say these computers have "negative logic." Others (e.g., ADAM, Apple II series, and Atari) use +1 to mean "true" and, again, 0 to mean "false." We say those computers have "positive logic." To find out which your computer has, just type in something like PRINT (3=3)—without a line number—at your BASIC prompt, and press RETURN or ENTER. It's certainly true that 3 equals 3, so either 1 or −1 will be displayed on your screen.

The Boolean expression (RND>=0.5) uses the RND function to generate a random decimal fraction between 0 and 1, and compares it to 0.5. If the random number *is* greater than or equal to 0.5, the expression is true and variable HL is given the value −1 (or +1 on systems using positive logic). This makes the higher-valued word win the current round. If the random number is less than 0.5, the expression is "false" and HL gets the value 0, making the lower-valued word win.

At each round's conclusion, the values calculated for each player's word are compared by another Boolean expression:

```
CM = (L(2)>L(1))
```

Here, L(1) is the value of the first player's word, and L(2) the value of the second player's. The variable CM is given the value −1 (or +1) if the second player's word has a higher value than the first player's. Otherwise, it's given the value 0.

Using the values for HL and CM, we can create a table that anticipates all possible outcomes of a round. Each value is expressed in terms of negative logic (−1="true"). (*See below.*)

Note that when HL and CM differ, player 1 wins, whereas when HL and CM are the same, player 2 wins. A third Boolean expression makes use of this fact:

1−(HL=CM) (on systems with negative logic), or
1+(HL=CM) (on systems with positive logic).

The expression (HL=CM) has the value −1 (or +1) when HL and CM are the same, 0 when they differ. Thus, the expression 1−(HL=CM) (or 1+(HL=CM) on positive systems) produces a value of 1 when player 1 wins, and 2 when player 2 wins!

OTHER FEATURES

Most versions of *Word Wars* use a RANDOMIZE statement or randomizing procedure to make sure the game doesn't play the same way each time. Readers unfamiliar with the use of random numbers in computer programs may wish to refer to *Character Race* in last month's issue.

As always, if you come up with a good enhancement or modification of one of our Beginner programs, we'd like to see it, and maybe mention it in a future issue. Send a printout (no tapes or disks, please) to:

Beginner Programs
FAMILY COMPUTING
730 Broadway
New York, NY 10003

If HL has value. . .	. . .and CM has value. . .	. . .then:
0 (low wins)	0 (player 1 high)	player 2 wins
0 (low wins)	−1 (player 2 high)	player 1 wins
−1 (high wins)	0 (player 1 high)	player 1 wins
−1 (high wins)	−1 (player 2 high)	player 2 wins

ILLUSTRATIONS BY JOSH GOSFIELD

TI-99/4A/*Word Wars*

```
10 DIM S(2)
20 R=1
30 RANDOMIZE
40 CALL CLEAR
50 PRINT TAB(9);"*WORD WARS*"
60 PRINT
70 PRINT "ROUND #";R
80 PRINT
90 HL=(RND>=0.5)
100 LN=INT(RND*3)+5
110 AL=INT(RND*26)+65
120 IF HL THEN 150
130 D$="LOWER-"
140 GOTO 160
150 D$="HIGHER-"
160 PRINT "IN THIS ROUND, PLAYERS WILL"
170 PRINT "AIM FOR ";D$;"VALUED"
180 PRINT "WORDS.  THE WORDS MUST"
190 PRINT "BE";LN;"LETTERS LONG AND"
200 PRINT "MUST BEGIN WITH THE"
210 PRINT "LETTER ";CHR$(34);CHR$(AL);CHR$(34);"."
220 FOR J=1 TO 2
230 PRINT
240 PRINT "YOUR WORD,"
250 PRINT "PLAYER";J;
260 INPUT W$
270 IF LEN(W$)<>LN THEN 240
280 IF SEG$(W$,1,1)<>CHR$(AL)THEN 240
290 S(J)=0
300 FOR K=1 TO LN
310 S(J)=S(J)+ASC(SEG$(W$,K,1))
320 NEXT K
330 NEXT J
340 PRINT
350 PRINT "ARE BOTH THESE WORDS IN"
360 PRINT "YOUR DICTIONARY";
370 INPUT YN$
380 IF SEG$(YN$,1,1)<>"Y" THEN 40
390 PRINT
400 IF S(1)<>S(2)THEN 440
410 PRINT "BOTH THESE WORDS HAVE THE"
420 PRINT "SAME VALUE."
430 GOTO 470
440 CM=(S(2)>S(1))
450 PRINT "PLAYER";1-(HL=CM);"WINS, WITH A"
460 PRINT D$;"VALUED WORD."
470 PRINT
480 PRINT "PRESS ANY KEY TO PLAY"
490 PRINT "ANOTHER ROUND."
500 CALL KEY(3,KP,ST)
510 IF ST=0 THEN 500
520 R=R+1
530 GOTO 40
```

TRS-80 Color Computer/*Word Wars*

```
10 CLEAR 500
20 DIM S(2)
30 R=1
40 CLS
50 PRINT TAB(10);"*WORD WARS*"
60 PRINT
70 PRINT "ROUND #";R
80 PRINT
90 HL=RND(2)-2
100 LN=RND(4)+4
110 AL=RND(26)+64
120 IF HL THEN D$="HIGHER-" ELSE D$="LOWER-"
130 PRINT "IN THIS ROUND, PLAYERS WILL AIM"
140 PRINT "FOR ";D$;"VALUED WORDS."
150 PRINT "THE WORDS MUST BE";LN;"LETTERS"
160 PRINT "LONG AND MUST BEGIN WITH THE"
170 PRINT "LETTER ";CHR$(34);CHR$(AL);CHR$(34);"."
180 FOR J=1 TO 2
190 PRINT
200 PRINT "YOUR WORD, PLAYER";J;
210 INPUT W$
220 IF LEN(W$)<>LN OR LEFT$(W$,1)<>CHR$(AL) THEN 200
230 S(J)=0
240 FOR K=1 TO LN
250 S(J)=S(J)+ASC(MID$(W$,K,1))
260 NEXT K
270 NEXT J
280 PRINT
290 PRINT "ARE BOTH THESE WORDS IN YOUR"
300 INPUT "DICTIONARY";YN$
310 IF LEFT$(YN$,1)<>"Y" THEN 40
320 PRINT
330 IF S(1)<>S(2) THEN 370
340 PRINT "BOTH THESE WORDS HAVE"
350 PRINT "THE SAME VALUE."
360 GOTO 400
370 CM=(S(2)>S(1))
380 PRINT "PLAYER";1-(HL=CM);"WINS, WITH A"
390 PRINT D$;"VALUED WORD."
400 PRINT
410 PRINT "PRESS ANY KEY TO PLAY ANOTHER"
420 PRINT "ROUND."
430 IF INKEY$="" THEN 430 ELSE R=R+1:GOTO 40
```

TRS-80 Models III & 4 (w/Model III BASIC)/*Word Wars*

```
10 CLEAR 500
20 DIM S(2)
30 R=1
40 CLS
50 PRINT TAB(27);"*WORD WARS*"
60 PRINT
70 PRINT "ROUND #";R
80 PRINT
90 HL=RND(2)-2
100 LN=RND(4)+4
110 AL=RND(26)+64
120 IF HL THEN D$="HIGHER-" ELSE D$="LOWER-"
130 PRINT "IN THIS ROUND, PLAYERS WILL AIM FOR"
140 PRINT D$;"VALUED WORDS.  THE WORDS MUST"
150 PRINT "BE";LN;"LETTERS LONG AND MUST BEGIN"
160 PRINT "WITH THE LETTER ";CHR$(34);CHR$(AL);CHR$(34
);"."
170 FOR J=1 TO 2
180 PRINT
190 PRINT "YOUR WORD, PLAYER";J;
200 INPUT W$
210 IF LEN(W$)<>LN OR LEFT$(W$,1)<>CHR$(AL) THEN 190
220 S(J)=0
230 FOR K=1 TO LN
240 S(J)=S(J)+ASC(MID$(W$,K,1))
250 NEXT K
260 NEXT J
270 PRINT
280 INPUT "ARE BOTH THESE WORDS IN YOUR DICTIONARY";YN
$
290 IF LEFT$(YN$,1)<>"Y" THEN 40
300 PRINT
310 IF S(1)=S(2) THEN PRINT "BOTH THESE WORDS HAVE THE
 SAME VALUE.":GOTO 350
320 CM=(S(2)>S(1))
330 PRINT "PLAYER";1-(HL=CM);"WINS, WITH A"
340 PRINT D$;"VALUED WORD."
350 PRINT
360 PRINT "PRESS ANY KEY TO PLAY ANOTHER ROUND.";
370 IF INKEY$="" THEN 370 ELSE R=R+1:GOTO 40
```

VIC-20/*Word Wars*

```
10 DIM S(2)
20 R=1
30 PRINT CHR$(147);
```

Earth will be destroyed in 12 minutes to make way for a hyperspace bypass.

Should you hitchhike into the next galaxy? Or stay and drink beer?

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