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SPECIAL BONUS ARCADE GAME FOR C64/128: SPACE DEBRIS

24 AT-A-GLANCE SOFTWARE REVIEWS

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FAMILY COMPUTING

FEATURES

21 COMPUTING FAMILY OF THE YEAR CONTEST

Give your family the chance to win a complete computer system, add-ons, software, and more in our second annual contest. Enter now!

23 HOMEWORK FOR PROFESSIONALS

by Charles H. Gajeway
Increase both productivity and job satisfaction by putting your computer at home to work for you.
PLUS: WORK AT HOME VS. WORK AT THE OFFICE; HOW DOES YOUR JOB SCORE; GETTING STARTED

28 FRANKLIN ACE 2200

by Henry F. Beechhold
An in-depth review of this Apple-compatible computer.
PLUS: FRANKLIN ACE FACTS

30 BUYERS' GUIDE TO GRAPHICS SOFTWARE

by Abigail Reifsnyder
Create your own exciting visual images with graphics software for school, home, and professional applications or just for fun!
PLUS: GUIDES TO DRAWING, ANIMATION, BUSINESS AND PRINTING-PRESS PROGRAMS

35 COLOR PRINTERS

by Roger Hart
Get the most from your graphics software with the right color printer for your needs.

36 HANDS ON

by Henry F. Beechhold
Explore the ways computers communicate with peripherals and with each other.

PROGRAMMING

39 THE PROGRAMMER

40 TIPS TO THE TYPIST

41 BEGINNER PROGRAM

Get a handle on your figures with *Averaging*, for your Adam, Apple & Macintosh, Atari, C 64/128 & VIC-20, IBM PC & compatibles, Tandy CoCo & Models III & 4, and TI-99/4A. Includes tutorial on arrays.

48 ARCADE GAME

Space Debris is omnipresent in the universe! Fast-action arcade game for C 64/128 (C 64 mode).

54 PUZZLE

Can you take the *Uphill Drive* and come out alive? Solve this month's stumper on your Adam, Apple & Macintosh, Atari, C 64/128, IBM PC & compatibles, or Tandy Model III computer.

64 PROGRAMMING P.S.

K-POWER

65 Hail to Hacker Heroes!

Meet Cayce Happel and Jeff Mitchell, two computer users who are giving hacking a good name.

66 Game Strategies

Tips and tricks that give gamers the winning edge.

68 Microtones

Get a bang out of your computer with this month's *Explosion Machine* program.

WHAT'S IN STORE

72 NEW HARDWARE

74 SOFTWARE GUIDE AND REVIEWS

Twenty-four at-a-glance reviews.

DEPARTMENTS

2 EDITOR'S NOTE

4 LETTERS

6 HOME-SCHOOL CONNECTION

by Ann Sabatini Blask
Make report-writing more fun, more efficient, and more effective.
PLUS: TIPS FOR TROUBLE-FREE REPORT-WRITING

10 HOME/MONEY MANAGEMENT

by Lawrence J. Tell
Trade your calculator for a computer and save money on federal income taxes.
PLUS: A ROUND-UP OF TAX PREPARATION SOFTWARE

14 TELECOMPUTING

by Nick Sullivan
Team up your modem and credit card and get a new kind of charge!

18 GAMES

by James Delson
Discover how your computer can entertain you! Great games for beginners in eight categories.

20 COMPUTING CLINIC

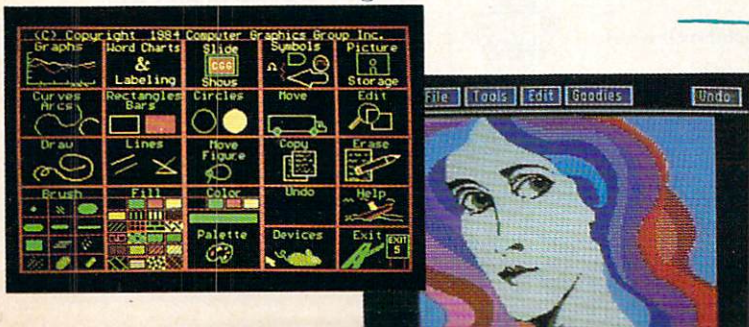
86 CLASSIFIED

88 ADVERTISERS' INDEX

Page 65



Page 30



COVER PHOTOGRAPH BY JOEL WHITE
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TIPS TO THE TYPIST

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

SOME GENERAL RULES

1. Do read instructions and program headings carefully. Make sure your computer has enough memory, the right version of BASIC, and the appropriate peripherals (joysticks, printers, disk drives, etc.) for a program.

2. Don't let fatigue and boredom contribute to inaccuracy. If you're new to programming, try typing in shorter programs first. Type in a longer program in easy stages, **SAVE**ing each installment as you go.

3. Until you are fairly familiar with BASIC, **do** assume that every word, number, letter, space, and punctuation mark in a program listing must be copied accurately if the program is to function as intended.

4. Do watch out for potential trouble spots. About 90 percent of all typing errors occur in **DATA** statements: long lines filled with numbers or incomprehensible secret codes. If possible, have someone else read **DATA** to you as you type, and help you proofread it if you have trouble later on. Proofreading from a printout is best.

5. Do be aware that program listings printed in FAMILY COMPUTING sometimes differ from what you will see on your computer's screen or in printouts you produce at home. Our program listings are printed 54 characters wide. Thus, a single BASIC program "line" (sometimes called a "logical line") may appear as several lines in our listing. If you are typing along and reach the right margin of the printed listing, don't press **RETURN** or **ENTER** until you've checked to see if the program "line" you're typing really ends there. The way to tell is to check if the line following begins with a multiple of 10 that follows in sequence from the previous logical line. **REM** statements are the exception and typing them in is optional.

Several computers (ADAM, Apple, Atari, and TI) format BASIC programs according to unique rules of their own. Don't let this throw you—just type in the listing exactly as printed in the magazine and your computer is guaranteed to accept it, even though it may end up looking a little different on your screen.

6. One foolproof way to correct an error in a BASIC program line is to type the line in again from the beginning, and press **RETURN** or **ENTER** to set it in place of the old one in your computer's memory.

WHICH PROGRAMS WILL RUN ON MY COMPUTER?

Unless a program heading indicates otherwise, programs

will run on any version of the computer specified, with the following exceptions:

- Apple programs run under Applesoft (*not* Integer) BASIC on the Apple II (with language card), II plus, IIe, and IIc.

- IBM compatibility of BASIC programs is determined by both the hardware and the version of BASIC used. Our programs for IBM PC & compatibles are composed on IBM PC & PCjr's, and tested under most versions of BASIC available for these machines. They are then tested on a variety of IBM-compatible machines under the versions of BASIC supplied with them. Each "IBM PC & compatibles" program listing is supplemented by a rundown of the machines and versions of BASIC under which the program is guaranteed to work. Most programs will probably run on many other PC Compatibles and under other versions of BASIC.

- TI programs not marked "w/TI Extended BASIC" should be run under standard (console) TI BASIC.

DEBUGGING HINTS

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

1. Write down any error messages you receive.

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

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

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

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

AVERAGING

Includes tutorial on Arrays

BY JOEY LATIMER AND JOHN JAINSCHIGG



Sooner or later, almost everybody needs to average a group of numbers. An average can help you get a "handle" on the statistics in your life, from bowling scores to test scores, from utility costs to stock prices.

This month's Beginner Program calculates the average of any group of figures you supply. Type in the program, save it to disk or cassette, and type RUN. The first thing the program does is ask how many figures you wish to average. (Note to TI owners: because of the limitations of TI console BASIC, the TI version of *Averaging* can accept no more than 100 figures.) Type in the number and press RETURN or ENTER. Next, the program will ask for

your actual values, one by one. Type these in, pressing RETURN or ENTER after each one.

When you've finished entering the values, the computer will redisplay them in the order entered, then tell you their average.

TUTORIAL: ARRAYS

The *Averaging* program has to remember all the values you enter so that it can redisplay them at the end of its run. To do this, the program stores your values in an array—a kind of variable that can contain more than one piece of data. Just as with regular variables, there are two kinds of arrays. Numeric arrays store groups of numbers, while string arrays store groups of strings (sets of one or more characters).

You can think of an array as a system of compartments, grouped together under a single name. The compartments lie in a row, each numbered according to its position. (Most computers also permit more complex arrays—those with several rows of compartments.) To view or change the contents of a particular compartment, you identify it first by its group name, then by its number. Thus, the first compartment of an array called ARRAY is referred to as ARRAY(0); the second, ARRAY(1); the third, ARRAY(2); and so on.

In computer terminology, these compartments are called *elements*, and their associated numbers, *indices* (singular: *index*). Each array element acts

like a simple variable. Numeric array elements can be given values and can be used in calculations; string array elements can be manipulated just like regular strings.

USING ARRAYS

A simple variable relates one piece of information to a particular name, while an array groups many pieces of information under a single name and relates each piece to a number. Arrays thus provide a convenient means of handling bodies of related information in the form of numbered lists or tables. For example, suppose you were writing a five-player game program, and needed a place to store five scores. At the beginning of each round, you'd want to set all players' scores at zero. Using simple variables, you might write:

```
10 S1=0
20 S2=0
30 S3=0
40 S4=0
50 S5=0
```

That's not too complicated, providing five scores is all you'll ever need. But what if you wanted to store 10 scores? Or 30? Imagine how many different variable names and assignment statements you'd need!

Using an array to store the scores lessens the number of statements required for this operation:

```
10 FOR I=0 TO 4
20 S(I)=0
30 NEXT I
```

See what's happening? The FOR/NEXT loop sets variable I equal to 0, 1, 2, 3, and 4 in turn. Line 20 uses I as an index (see *above*) to successive elements of the array S and sets each to zero. This approach saves two statements, even in our simplest example. Moreover, if we wanted to store 10, or 30, or more scores, we would only have to change the limit of the FOR/NEXT loop (currently, a

4), to 9, or 29, or whatever number we liked.

Similarly, the *Averaging* program requires only a few statements to accept any number of values you may wish to enter. A simple FOR/NEXT loop and INPUT statement serve to store the values in succeeding elements of an array (see lines 70–110, *opposite*). Another FOR/NEXT loop prints them out again when you're done (see lines 160–180). Just imagine trying to do this with regular variables. A separate INPUT statement and unique variable name would be required for each value. Many PRINT statements would be required to print the values out again.

DECLARING ARRAY SIZE

A simple variable can only store one number or one string, but an array can store as many elements—or as few—as you want it to. There's a catch, though. Unless you declare an array's size, your computer has no way of knowing how many elements your array will need. Arrays are declared with the DIM (for "dimension"—a word meaning "size") statement. For example, if you wanted to write a program using a numeric array AR, with 15 elements, you would declare it with the expression DIM AR(14) (elements zero to 14 comprise a total of 15 elements). This statement would probably be placed near the beginning of the program.

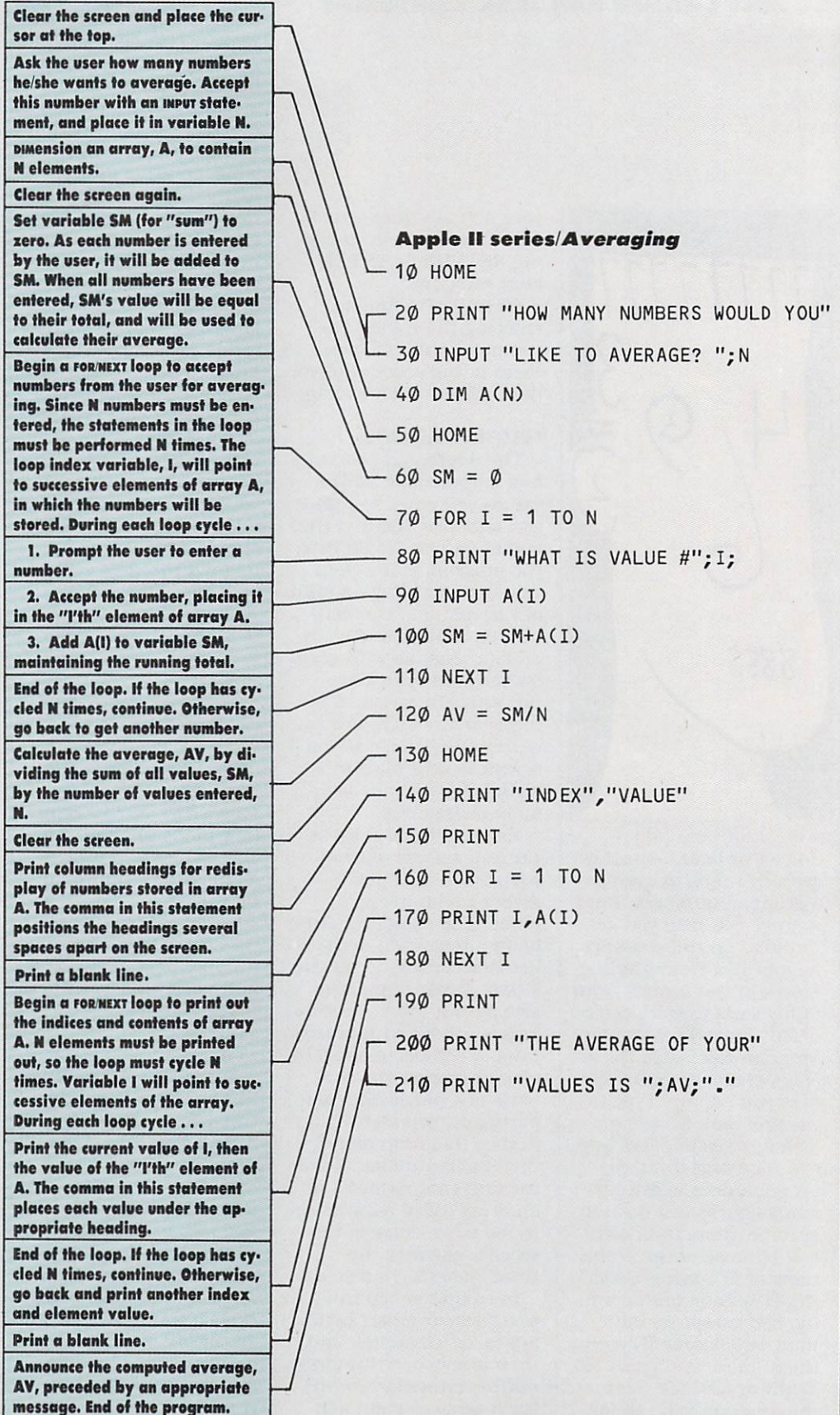
Dimensioning an array sets aside a block of memory to contain all its elements. If you forget to DIM an array before referring to one of its elements, your computer will probably give you an error message. (Note: Most versions of BASIC allocate memory automatically for arrays of up to 11 elements—so you don't absolutely have to DIMENSION such small arrays. However, it's considered good programming

practice to do so.) All versions of BASIC let you declare an array's size using a regular number, as shown above. Most (the TI being an exception) also let you declare array size with a variable's value. That means a program can declare an array's size according to conditions of a particular run. In *Averaging*, for example, it's impossible to anticipate how many numbers a user may wish to enter—hence how many array elements will be required to contain them. *Averaging* gets around this problem by asking the user how many numbers to expect, putting the response in a variable, and then DIMENSIONING the storage array with this value. In the TI console BASIC version, this approach isn't feasible. Instead, an array of 100 elements is declared in hope that most users won't want to enter more than this many figures. The drawback in this case is that if a user elects to enter only a few numbers, the remaining elements of the array are wasted space. Note that *Averaging* does not use the "0'th" element of its array.

Once an array is dimensioned to contain a particular number of elements, its size can't (practically speaking) be changed in the course of a program's run. That's why *Averaging* doesn't go back and start over automatically when it's finished working with one group of figures. (Note: There's one way around this limitation on most computers. Executing a CLR (clear) expression will dispose of all arrays and variables in a program. However, since CLR has such a radical effect, careful programmers don't often use it.) In most cases, it's best to plan ahead and make sure that your arrays are sufficiently large to contain all the values you'll need to store in a single run.

—J.J.

ANATOMY OF A PROGRAM



Apple II series/Averaging



BEGINNER PROGRAM

Adam/Averaging

```
10 HOME
20 PRINT "How many numbers would you"
30 INPUT "Like to average? ";n
40 DIM a(n)
50 HOME
60 sm = 0
70 FOR i = 1 TO n
80 PRINT "What is value #";i;
90 INPUT a(i)
100 sm = sm+a(i)
110 NEXT i
120 av = sm/n
130 HOME
140 PRINT "INDEX","VALUE"
150 PRINT
160 FOR i = 1 TO n
170 PRINT i,a(i)
180 NEXT i
190 PRINT
200 PRINT "The average of your"
210 PRINT "values is ";av;"."
```

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

```
10 PRINT CHR$(125);
20 PRINT "HOW MANY NUMBERS WOULD YOU"
30 PRINT "LIKE TO AVERAGE";
40 INPUT N
50 DIM A(N)
60 PRINT CHR$(125);
70 SM=0
80 FOR I=1 TO N
90 PRINT "WHAT IS VALUE # ";I;
100 INPUT V
110 A(I)=V
120 SM=SM+A(I)
130 NEXT I
140 AV=SM/N
```

```
150 PRINT CHR$(125);
160 PRINT "INDEX","VALUE"
170 PRINT
180 FOR I=1 TO N
190 PRINT I,A(I)
200 NEXT I
210 PRINT
220 PRINT "THE AVERAGE OF YOUR VALUES IS ";AV;"."
```

Commodore 64 & 128 (C 64 mode)/Averaging

```
10 PRINT CHR$(147);
20 PRINT "HOW MANY NUMBERS WOULD YOU"
30 INPUT "LIKE TO AVERAGE";N
40 DIM A(N)
50 PRINT CHR$(147);
60 SM=0
70 FOR I=1 TO N
80 PRINT "WHAT IS VALUE #";I;
90 INPUT A(I)
100 SM=SM+A(I)
110 NEXT I
120 AV=SM/N
130 PRINT CHR$(147);
140 PRINT "INDEX","VALUE"
150 PRINT
160 FOR I=1 TO N
170 PRINT I,A(I)
180 NEXT I
190 PRINT
200 PRINT "THE AVERAGE OF YOUR VALUES IS";AV
```

IBM PC & compatibles* & Tandy Models III & 4/ Averaging

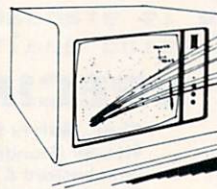
```
10 CLS
20 PRINT "HOW MANY NUMBERS WOULD YOU"
30 INPUT "LIKE TO AVERAGE";N
40 DIM A(N)
50 CLS
```

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About the Creator: *Marilyn Davis (Ph.D., UCSD, Radio Astronomy)* is also the author of the widely acclaimed *BASIC Primer*, published by IBM.

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ARCADE GAME

```

3430 DATA AB3AAAAE,1AAAAAC8,AAA80AAA,A80AAAA8,2143
3440 DATA 1EAAB833,AAAC61AA,E6C0FBC3,801F0100,2072
3450 DATA 00000000,00000000,00000000,00000000,0
3460 DATA 00000000,00000000,00000000,00000000,0
3470 DATA 00000000,00000000,00000000,00000018,24
3480 DATA 00003C00,007E0000,7E00003C,00001800,396
3490 DATA FFFF0000,00000000,00000000,D9E40000,955
3500 DATA 0000013E,00410000,0E000000,0F070A0C,186
3510 DATA 04000000,090320E9,C3AD3D03,800000AD,1408
3520 DATA 3E038D01,D0AD4103,C900D016,A9F88DF8,1893
3530 DATA 07CE5503,AD55038D,0CD0A900,CD5503D0,1593
3540 DATA 0660A9F7,8DF807AD,00DCA000,A2004AB0,1879
3550 DATA 01884AB0,01C84AB0,01CA4AB0,01E84A8E,1740
3560 DATA 3F038C40,039008A9,018D4103,4C6C00A9,1337
3570 DATA 008D4103,AD3F03C9,FFD009CE,3D03CE3D,1658
3580 DATA 034C7AC0,C901D000,EE3D03EE,3D03AD40,1650
3590 DATA 03C9F000,A90320E9,C3AD3D03,800000AD,1408
3600 DATA D006EE3E,03EE3E03,A91ACD3D,0390068D,1575
3610 DATA 3D034CAB,C0A9DECD,3D03B003,8D3D03A9,1716
3620 DATA 32CD3E03,90068D3E,034CC2C0,A9C0CD3E,1766
3630 DATA 03B003E9,03A903D3,CAD303AD,4303D016,1493
3640 DATA A5A2CD4F,03D04D8D,02D08D42,03AD5403,1720
3650 DATA 8D28D020,DCC3EE43,03CE4203,AD42038D,1802
3660 DATA 02D0AD4F,07C9F7F0,19AD4203,8D5603AD,1996
3670 DATA 43038E57,03EA9008D,5A0320EA,C2AD5B03,1431
3680 DATA D007A9FE,CD4303B0,05A9008D,4303AD43,1714
3690 DATA 038D03D0,AD4503D0,19A5A2CD,5003D04B,1731
3700 DATA C91EB002,692CC9DC,90026964,8D04D08D,1824
3710 DATA 44038E57,03EA9008D,5A0320EA,C2AD5B03,1431
3720 DATA B0176930,CD440390,10AD3E03,CD4503B0,1479
3730 DATA 086914CD,45039001,60A9F0CD,4503B005,1518
3740 DATA A9008D45,03AD4503,8D05D0AD,4703D0E2,1468
3750 DATA A5A2CD4F,03D04D8D,02D08D42,03AD5403,1720
3760 DATA FB07A5A2,6964CD4F,039005A2,F88EFB07,2036
3770 DATA EE4703EE,4603AD46,038D06D0,ADF807C9,1853
3780 DATA F7F019A9,328D5A03,AD46038D,5603AD47,1685

```

```

3790 DATA 038D5703,20EAC2AD,5B03D007,A9F0CD47,1861
3800 DATA 03B005A9,008D4703,AD47038D,07D0AD4A,1418
3810 DATA 03D022A5,A2CD5203,D053C91E,B002694B,1742
3820 DATA C9DC9002,695A8D08,D08D4803,AD54038D,1736
3830 DATA 2BD020DC,C3EE4A03,EE4A03AD,F807C9F7,2204
3840 DATA F019A9FA,8D5A03AD,48038D56,03AD4A03,1646
3850 DATA 8D570320,EAC2AD5B,03D007A9,FACD4A03,1874
3860 DATA B005A900,8D4A03AD,4A038D09,D0AD4E03,1430
3870 DATA D022A5A2,C05303D0,56C91EB0,026955C9,1954
3880 DATA DC900269,5A8D0AD0,8D4B03AD,54038D2C,1584
3890 DATA D020DC3C,EE4E03AD,F807C9F7,F019A964,2384
3900 DATA 8D5A03AD,4B038D56,03AD4E03,8D570320,1232
3910 DATA EAC2AD5B,03D007A9,F5CD4E03,B00BA900,1966
3920 DATA 8D4E038D,0BD04C9B,C2AD4E03,8D0BD0EE,1859
3930 DATA 4F03A205,A9FECDF4,03B0038E,4F03EE50,1680
3940 DATA 03A203A9,D5CD5003,B0038E50,03EE5103,1564
3950 DATA A20BA9FA,CD5103B0,038E5103,EE5203A2,1771
3960 DATA 03A9F3CD,5203B003,8E5203EE,5303A20B,1608
3970 DATA A9EECD53,03B0038E,5303AC00,C060A900,1638
3980 DATA 8D5B03AD,3D03E905,CD5603B0,F06921CD,1763
3990 DATA 560390E9,AD3E03E9,08CD5703,B0DF690C,1756
4000 DATA CD570390,D8A9F78D,F807A901,8D5B03AD,2045
4010 DATA 5A03D024,A9118D12,D4EE5503,AD55038D,1622
4020 DATA 0CD0A23B,8E0FD4A2,BE8E0ED4,C9B990E4,2320
4030 DATA A9108D12,D4CE9C2,A200A921,8D12D4EE,2032
4040 DATA 5A03E8A9,1A8D0FD4,8A80ED4,EC5A03F0,1962
4050 DATA 4EE5C03,AD5C03C9,0AD008A9,008D5C03,1511
4060 DATA EE5D03AD,5D03C90A,D008A900,8D5D03EE,1674
4070 DATA 5E03AD5E,03C90AD0,08A9008D,5E03EE5F,1534
4080 DATA 03AD5F03,C90AD008,A9008D5F,03EE6003,1446
4090 DATA AD6003C9,0AD0ABA9,008D6003,4C4EC318,1644
4100 DATA AD600369,308DD905,AD5F0369,308DDA05,1576
4110 DATA AD5E0369,308DDB05,AD5D0369,308DDC05,1576
4120 DATA AD5C0369,308DD005,A9208D12,D44CE9C2,1863
4130 DATA EE5403A9,089005A9,018D5403,608D5903,1378
4140 DATA A00088D0,FDCE5903,D0F86000,00000000,1607

```

SOLUTION TO UPHILL DRIVE

the correct choice at each level.

Here's what you have to do:

First, change SF=1 to SF=2 in line 20.

Second, in line 20, change the text between the quotes from "LAST NAME" to the kind of answer you'll be seeking at the checkpoint. . . . "STATE CAPITAL" in the case of our example. This item can be rather long (up to 80 characters). For example, "AMERICAN-LEAGUE TEAM THIS PLAYER PLAYED FOR IN 1975".

Third, delete lines 7000-7020 and 8000.

Fourth, type in your own new data statements. Enter lines numbered 7000, 7010, 7020, etc. Begin each with the word DATA and then enter the 18 "passwords," each corresponding in order to the "license plates" you entered above. For our exam-ple, your data would be:

```

7000 DATA NEW YORK,CALIFORNIA,FLORIDA,TEXAS,OHIO,PENNS
LVANIA
7010 DATA IDAHO,COLORADO,NORTH DAKOTA,SOUTH DAKOTA
7020 DATA NORTH CAROLINA,SOUTH CAROLINA,VERMONT,MAINE
7030 DATA MINNESOTA,NEW MEXICO,GEORGIA,WASHINGTON
Then, enter lines 8000, 8010, 8020, etc. Begin each with the word DATA and then enter the 18 "passwords," each corresponding in order to the "license plates" you entered above. For our exam-ple, your data would be:
```

```

8000 DATA ALABAMA,SACRAMENTO,TALLAHASSEE,AUSTIN,COLUMBU
S,HARRISBURG
8010 DATA BOISE,DENVER,BISMARCK,PIERRE
8020 DATA RALEIGH,COLUMBIA,MONTELEONE,AUGUSTA
8030 DATA ST. PAUL,SANTA FE,ATLANTA,OLYMPIA

```

Keep in mind that the computer is very literal and will ac-cept an answer only if it matches the correct answer character- by-character. For example, if the right answer is "25", the pro-gram will not recognize "twenty-five" or "25.0" as being correct. However, the program automatically converts all answers typed in at the checkpoints to uppercase, so if the answer is "VanWijck", the program will also accept "VANWYCK". "van-wijck", and even "vanwijck" (but not "Van Wijck").

Once you've solved the puzzle, by making a few changes you can customize the program into a simple quiz game in which you choose the license plates on the cars and the correct pass-words. For example, you might want the license plates to be the names of states and the correct passwords to be the corre- sponding state capitals. Then, to get to the top of the moun- tain, the player would have to name correctly the capitals of six states (out of a total of 18). This game differs slightly from the puzzle in that at each level the player can choose any of the three cars, and if he gets the password correct for that car he can proceed to the next level; in the puzzle, only one car is

BONUS PROGRAM

Each name sounds like a number: Wong (one); Tu (two); Tre (three); Ford (four); Fyfe (five); and Sticks (six). Don the dis- guises in ascending order on your route up the mountain (starting at the first checkpoint as Mr. Wong and ending at the sixth checkpoint as Dr. Sticks). One of the three license plates to form a common word or expression. The correct pairing of names and license plates is as follows: Wong/DERFUL ("won- deful"); Tu/NIGHT ("tough-t"); Tre/D ("3-D"); Ford/2BY ("2-by-4"); Fyfe/AND 10 ("5 and 10"); and Sticks/SENSE ("sixth sense").

CONCLUSION TO UPHILL DRIVE

. . . are greeted by Herr Heffer, a towering giant who holds out a plate upon which rest two crisp, freshly baked chocolate-chip cookies. "Just a final precaution," mentions Heffer, sug- gesting that anyone legitimately belonging at the factory would know which one to choose. You reach for a cookie, try- ing to wash the paint from your face with a nervous grin. The cookie is delicious and you seem none the worse for your un- expected snack.

You assume the identity of the new chef and successfully ac- complish your mission. As the afternoon passes peacefully, you take a deep breath of relief. Suddenly . . . SNAP! You've dropped a button on your pants. "It must have been a bit loose," you hope.

DO OR DIET! A Drive Up Calorie Mountain

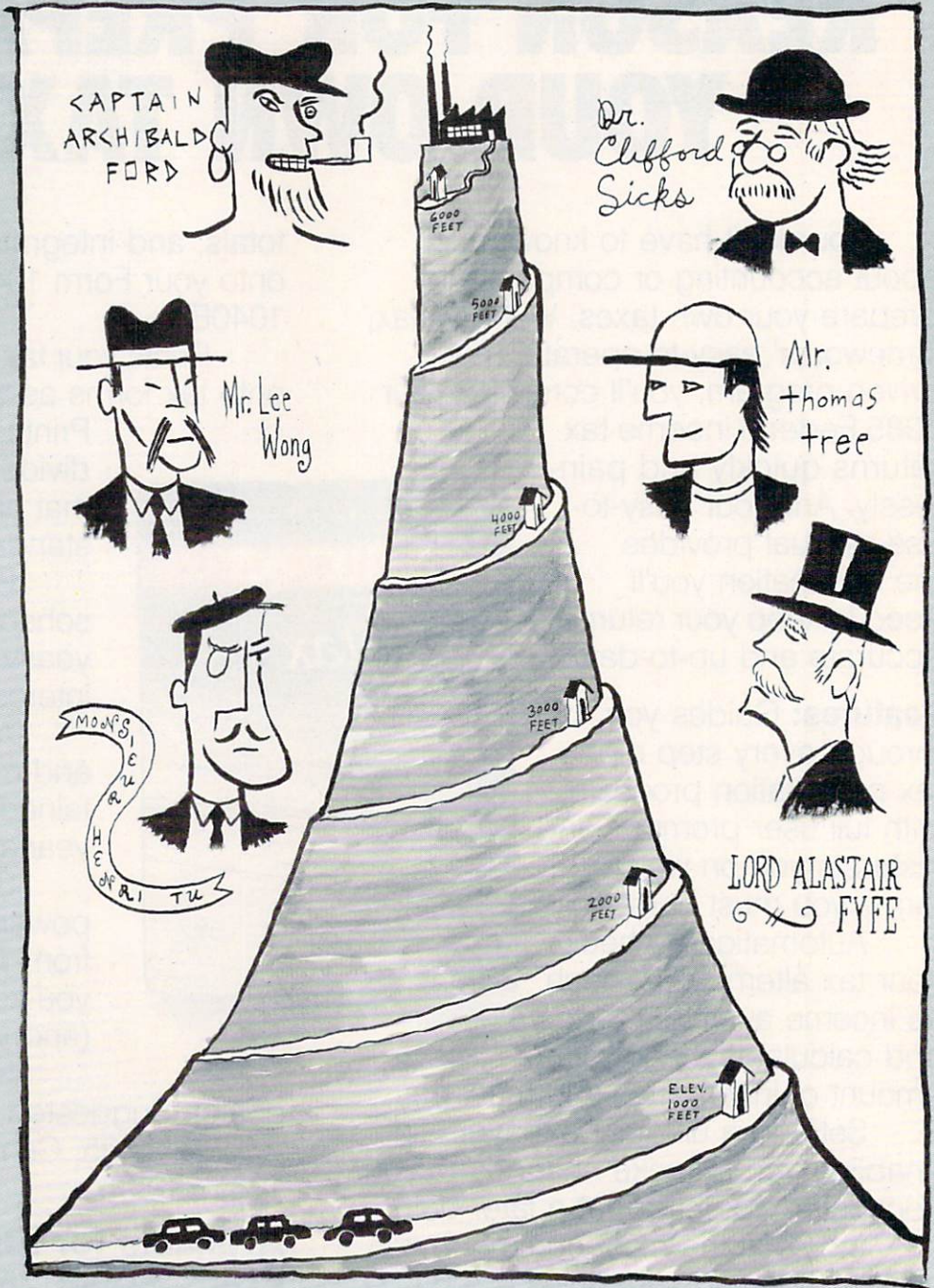
PUZZLE BY SARAH KORTUM AND PETER FAVARO
PROGRAM BY STEVEN C.M. CHEN

Once you've solved this puzzle, you can keep having fun with the program by making it into your own personalized quiz game. Details are given after the solution on page 52. But don't read them now unless you're sure you don't want to try the puzzle first.

The crisp atmosphere and beautiful snow-covered peaks of the Swiss Alps form the perfect cover for the diabolical workings of Herr Heiffer and his evil henchmen. After taking over the world's most famous chocolate factory, high atop Calorie Mountain, Heiffer devised a formula for a super-fattening but irresistible chocolate-chip cookie. His plan is to package complimentary samples of these cookies and distribute them to police, espionage, and secret service forces worldwide. Once every law enforcement official becomes too heavy to chase after Heiffer and his henchmen, the world will be at his mercy.

Your job, if you choose to accept it, is to infiltrate Heiffer's organization and thwart his plan. Your big break comes when you intercept a coded bulletin from Calorie Mountain. It seems that a new head chef is expected at the factory. The last cook mistakenly ate three of the cookies and had to be given a warehouse assignment because he could no longer fit through the factory doors. If you can impersonate the new chef and ensconce yourself in the factory, it will be easy for you to foil Heiffer by substituting less fattening ingredients.

The hard part will be



getting past the tight security on the way up Calorie Mountain. There are six checkpoints, each heavily patrolled by guards. As an extra precaution, visitors must switch into six disguises and change cars six times on their way up the mountain. Only invited visitors are informed of the six disguises to don.

THE SIX DISGUISES

Fortunately, the bulletin informs the new chef of the six disguises he should use: Captain Archibald Ford—a salty old mariner wearing a large gold hoop earring in his right ear; Mr. Lee Wong—a chocolate-chip fortune-cookie entrepreneur sporting a long, thin mous-

tache; Monsieur Henri Tu—a monocled French statesman wearing a beret; Dr. Clifford Sicks—a bespectacled nutritionist and famous author of the best-selling "Bavarian Junk-Food Diet"; Mr. Thomas Tree—wearing the uniform of a landscaping company hired to maintain the factory grounds; and Lord Alas-

PUZZLE

tair Fyfe—a British gentleman wearing a red sports jacket emblazoned with his family crest and a pair of shiny patent leather riding boots.

Unfortunately, the bulletin you intercepted does not inform the new chef of the order in which to don these disguises. But it does mention that when he arrives at the bottom of Calorie Mountain he will find three parked cars. One of the license plates will give him a clue as to the first disguise to don. The other two license plates will be red herrings, designed to throw off an impostor. After selecting a car and a matching disguise, the new chef should drive up to the first checkpoint at the 1,000-foot elevation. If his choices are correct, the guard will wave him on, and just around the next bend he will find three new cars. Again, he should switch disguises and cars and drive on to the next checkpoint at 2,000 feet. This procedure will be repeated four more times until he reaches the factory, just past the sixth checkpoint.

It will be difficult, but not impossible, for a spy of your caliber to make it up Calorie Mountain. You must think carefully; the steep mountain roads require a quarter-tank of gas between each checkpoint, and there are no gas stations on the mountain. Should you appear at a particular checkpoint driving the wrong car or using the wrong disguise, you will be turned back. There is gas enough for only a certain number of errors. If you do run out of gas, you're out of luck. The high altitude and freezing winds restrict walking on the mountain. Good luck, drive carefully, and for goodness' sake, don't stop for a snack of milk and cookies on the way up!

HOW TO PLAY

Type each line of the

program into your computer exactly as shown, carefully making the appropriate modifications (if needed). (See "Tips to the Typist," page 40, for help with typing in programs.) Then SAVE the program to disk or cassette.

When you RUN the program, you will see your elevation (which starts at zero) and the license-plate numbers of the three cars waiting for you. Type in the license plate of the car you want to drive, and press RETURN or ENTER. (If you make a mistake, the screen will clear and you'll be given another chance.) As long as the car you choose has some gas, you'll then drive up the hill to the next checkpoint. As you drive, you'll see the elevation increase and your gas supply (shown by an on-screen gas gauge) decrease.

When you arrive at the next level, a guard will stop you at the checkpoint and ask for your name. Answer with the last name corresponding to the disguise you've chosen for this leg of your route, and press RETURN or ENTER. If you answer correctly—and are driving the correct car—you'll be allowed to continue around the bend to where the next set of three cars is waiting for you. If you give the wrong answer or are driving the wrong car, you'll have to drive back down to the previous level, where you can choose the same car again (but don a different disguise) or select a different car.

The last checkpoint is at elevation 6,000. If you're driving the right car and give the correct name at that point, you can drive right into the factory and the program is over.

Your mission, however, isn't quite complete. Once the program ends, you'll want to turn to page 52 and read the conclusion to *Uphill Drive*.

The solution to the puzzle is also on page 52.

Apple II series/Uphill Drive

```

20 SF = 1:SB$ = "LAST NAME"
30 IF SF = 1 THEN MYS = "MY":YOURS = "YOUR":GOTO 50
40 MYS = "THE":YOURS = "THE"
50 DIM AS(18),BS(18),ME(3)
60 CE = 4:DL = 100:LM = 8:SW = 40
70 NORMAL:SP$ = CHR$(32):SB$ = SP$+SB$
80 FL$ = SP$:FOR X = 2 TO 22:FL$ = FL$+SP$:NEXT X
90 FOR X = 1 TO 18:READ TS:GOSUB 4000:AS(X) = TS
100 NEXT X:IF SF = 1 THEN CK$ = "231323"
110 FOR X = 1 TO 6+12*(SF = 2):READ TS:GOSUB 4000
120 IF SF = 2 THEN BS(X) = TS:GOTO 160
130 MS = "":V = ASC(LEFT$(TS,1))-64
140 FOR Z = 2 TO LEN(TS):N = ASC(MID$(TS,Z,1))-V
150 MS = MS+CHR$(N+26*(N < 65)):NEXT Z:BS(X) = MS
160 NEXT X
170 FOR X = 768 TO 796:READ A:POKE X,A:NEXT X
180 FOR E = 0 TO 5:GA = 20-10*(E > 2)-5*(E > 4)
190 FOR X = 1 TO 3:ME(X) = GA:NEXT X
200 V = E:GOSUB 1000
210 MS = "YOU HAVE A CHOICE OF THREE CARS."
220 MS = MS+" THEIR LICENSE PLATES ARE ..."
230 GOSUB 2010:PRINT:FOR X = E+3+1 TO (E+1)*3
240 MS = AS(X):GOSUB 2010:NEXT X:PRINT
250 INPUT "SELECT A CAR: ";TS:IF TS = "" THEN 200
260 GOSUB 4000:C = 0:FOR X = E+3+1 TO (E+1)*3
270 IF TS = AS(X) THEN C = X-E+3:X = 18
280 NEXT X:IF C = 0 THEN 200
290 F = 0:FOR X = 1 TO 3:IF ME(X) = 0 THEN F = F+1
300 NEXT X:IF F < 3 THEN 330
310 MS = "ALL THE CARS ARE OUT OF GAS."
320 MS = MS+" YOU'LL HAVE TO START AGAIN.":GOTO 470
330 IF ME(C) > 0 THEN 360
340 MS = "SORRY! THAT CAR IS OUT OF GAS."
350 GOSUB 2000:GOSUB 6000:GOTO 200
360 DR = CE:GOSUB 5000
370 V = E+1:GOSUB 1000
380 MS = "HALT! YOU'VE REACHED A CHECKPOINT."
390 MS = MS+" WHAT IS "+YOURS+SB$+"?":GOSUB 2010
400 PRINT:PRINT MYS;SB$;
410 INPUT " IS ";TS:IF TS = "" THEN 370
420 GOSUB 4000:IF (SF = 1 AND TS = BS(E+1) AND C = VAL(MID$(CK$,E+1,1))) OR (SF = 2 AND TS = BS(C+E*3)) THEN 490
430 MS = "SORRY, I CANNOT LET YOU THROUGH. GO BACK."
440 GOSUB 2000:GOSUB 6000
450 IF E <> 5 AND ME(C) > 0 THEN 480
460 MS = "YOU'RE OUT OF GAS. START AGAIN."
470 GOSUB 2000:END
480 DR = -CE:GOSUB 5000:GOTO 200
490 MS = "YOU'RE CLEAR!":GOSUB 2000
500 MS = "GO AHEAD.":GOSUB 2010:GOSUB 6000:NEXT E
510 MS = "CONGRATULATIONS! YOU MADE IT!"
520 GOSUB 2000:IF SF = 2 THEN 550
530 PRINT:MS = "YOU ENTER THE FACTORY DOORS AND ..."
540 GOSUB 2010:PRINT:MS = "(SEE CONCLUSION).":GOSUB 2010
550 END
1000 MS = "ELEVATION: "+STR$(V*1000)
1010 GOSUB 2000:PRINT:RETURN
2000 HOME
2010 IF LEN(MS) <= SW THEN NS = MS:GOSUB 3000:RETURN
2020 Y = SW+1:Z = 1:FOR X = Y TO Z STEP -1
2030 IF MID$(MS,X,1) = SP$ THEN Z = 0:Y = X:X = 2
2040 NEXT X:NS = LEFT$(MS,Y-1):GOSUB 3000
2050 MS = RIGHT$(MS,LEN(MS)-Y+Z):GOTO 2010
3000 IF LEN(NS) = SW THEN PRINT NS:RETURN
3010 PRINT TAB((SW-LEN(NS))/2+1);NS:RETURN
4000 MS = "":FOR S = 1 TO LEN(TS):K = ASC(MID$(TS,S,1))
4010 IF K > 96 AND K < 123 THEN K = K-32
4020 MS = MS+CHR$(K):NEXT S:TS = MS:RETURN
5000 HOME:ALT = V*1000
5010 VTAB 10:HTAB LM+4:PRINT "ELEVATION: ";ALT
5020 VTAB 19:HTAB LM:PRINT "EMPTY";SPC(15);"FULL"
5030 INVERSE:HTAB LM+1:PRINT FL$:HTAB LM+1
5040 PRINT SP$:LEFT$(FL$,ME(C));

```

PUZZLE

```

5050 HTAB LM+22:PRINT SP$:HTAB LM+1:PRINT FL$
5060 NORMAL:FOR D = 0 TO DL*3 STEP SGN(DR):NEXT D
5070 FOR Z = 1 TO 5:ME(C) = ME(C)-1
5080 FOR D = 0 TO DL/2 STEP SGN(DR):NEXT D
5090 VTAB 21:HTAB LM+2+ME(C):PRINT SP$:
5100 R = 255-INT(RND(1)*10):IF DR > 0 THEN R = R-75
5110 FOR S = R TO R-49 STEP -1
5120 POKE 6,3+INT(RND(1)*5):POKE 8,S:CALL 768
5140 ALT = ALT+DR:VTAB 10:HTAB LM+15:PRINT ALT:SP$:
5170 NEXT S:NEXT Z:FOR D = 1 TO DL*4:NEXT D:RETURN
6000 VTAB 22:HTAB 1:M$ = "PRESS ANY KEY TO CONTINUE."
6010 GOSUB 2010:POKE -16368,0
6020 K = PEEK(-16384)-128:IF K < 0 THEN 6020
6030 POKE -16368,0:RETURN
7000 DATA FREDLU,DERFUL,RULFED,MOON,STARS,NIGHT
7010 DATA D,M,L,BY2,B2Y,2BY,MINUS10,AND10,PLUS10
7020 DATA CENTS,SCENTS,SENSE
8000 DATA SPHGZ,HBC,KECPP,SYHKW,CIBIH,JCSMUC
9000 DATA 165,8,74,133,10,164,8,173,48,192,136,234
9010 DATA 234,208,251,165,7,56,229,10,133,7,176,237
9020 DATA 198,6,208,233,96
    
```

Atari 400/800, 600/800XL, & 130XE/Uphill Drive

```

10 DIM A$(750),B$(750),BK$(1),SB$(80),SP$(1)
20 SF=1:SB$="LAST NAME"
30 DIM CK$(6),FL$(22),M$(120),MYS(3),NS(40),TS(40)
40 DIM YOUR$(4),PA(19),PB(19),ME(3)
50 POKE 752,1:POKE 82,0
60 IF SF=1 THEN MYS="MY":YOUR$="YOUR":GOTO 80
70 MYS="THE":YOUR$="THE"
80 PA(1)=1:PB(1)=1:BK$=CHR$(160)
90 SP$=CHR$(32):TS=SB$:SB$=SP$:SB$(2)=TS
100 FL$(1)=CHR$(160):FL$(22)=FL$(1):FL$(2)=FL$
110 FOR X=1 TO 18:READ TS:GOSUB 3020
120 A$(PA(X))=TS:PA(X+1)=LEN(A$)+1:NEXT X
130 IF SF=1 THEN CK$="231323"
140 FOR X=1 TO 6+12*(SF=2):READ TS:GOSUB 3020
150 IF SF=2 THEN B$(PB(X))=TS:GOTO 190
160 M$="" :V=ASC(T$(1,1))-64
170 FOR Z=2 TO LEN(T$):N=ASC(T$(Z,Z))-V
180 M$(Z-1,Z-1)=CHR$(N+26*(N<65)):NEXT Z:B$(PB(X))=M$
190 PB(X+1)=LEN(B$)+1:NEXT X
200 FOR E=0 TO 5:GA=20-10*(E>2)-5*(E>4)
210 FOR X=1 TO 3:ME(X)=GA:NEXT X
220 V=E:GOSUB 1000
230 M$="YOU HAVE A CHOICE OF THREE CARS."
240 M$(33)=" THEIR LICENSE PLATES ARE ..."
250 GOSUB 2010:PRINT :FOR X=E*3+1 TO (E+1)*3
260 M$=A$(PA(X),PA(X+1)-1):GOSUB 2010:NEXT X:PRINT
270 PRINT "WHICH CAR DO YOU WANT";
280 POKE 752,0:INPUT TS:POKE 752,1:IF TS="" THEN 220
290 GOSUB 3020:C=0:FOR X=E*3+1 TO (E+1)*3
300 IF TS=A$(PA(X),PA(X+1)-1) THEN C=X-E*3:X=18
310 NEXT X:IF C=0 THEN 220
320 F=0:FOR X=1 TO 3:IF ME(X)=0 THEN F=F+1
330 NEXT X:IF F<3 THEN 360
340 M$="ALL THE CARS ARE OUT OF GAS."
350 M$(29)=" YOU'LL HAVE TO START AGAIN.":GOTO 540
360 IF ME(C)>0 THEN 390
370 M$="SORRY! THAT CAR IS OUT OF GAS."
380 GOSUB 2000:GOSUB 6000:GOTO 220
390 DR=8:GOSUB 4020
400 V=E+1:GOSUB 1000
410 M$="HALT! YOU'VE REACHED A CHECKPOINT."
420 M$(36)=" WHAT IS ":M$(46)=YOUR$:M$(LEN(M$)+1)=SB$
430 M$(LEN(M$)+1)="" :GOSUB 2010
440 PRINT :PRINT MYS:SB$;" IS ";
450 POKE 752,0:INPUT TS:POKE 752,1:IF TS="" THEN 400
460 GOSUB 3020:T=C+E*3:IF SF=2 THEN 490
470 IF TS=B$(PB(E+1),PB(E+2)-1) AND C=VAL(CK$(E+1,E+1)
) THEN 560
480 GOTO 500
490 IF TS=B$(PB(T),PB(T+1)-1) THEN 560
500 M$="SORRY, I CANNOT LET YOU THROUGH. GO BACK."
510 GOSUB 2000:GOSUB 6000
520 IF E<>5 AND ME(C)>0 THEN 550
530 M$="YOU'RE OUT OF GAS. START AGAIN."
    
```

```

540 GOSUB 2000:GOTO 620
550 DR=-8:GOSUB 4020:GOTO 220
560 M$="YOU'RE CLEAR!":GOSUB 2000
570 M$="GO AHEAD.":GOSUB 2010:GOSUB 6000:NEXT E
580 M$="CONGRATULATIONS! YOU MADE IT!"
590 GOSUB 2000:IF SF=2 THEN 620
600 PRINT :M$="YOU ENTER THE FACTORY DOORS AND ..."
610 GOSUB 2010:PRINT:M$="(SEE CONCLUSION).":GOSUB 2010
620 POKE 752,0:POKE 82,2:END
1000 M$="ELEVATION: ":M$(12)=STR$(V*1000)
1010 GOSUB 2000:PRINT :RETURN
2000 PRINT CHR$(125);
2010 IF LEN(M$)<=40 THEN NS=M$:GOSUB 3000:RETURN
2020 Y=41:Z=1:FOR X=Y TO Z STEP -1
2030 IF M$(X,X)=SP$ THEN Z=0:Y=X:X=2
2040 NEXT X:NS=M$(1,Y-1):GOSUB 3000
2050 M$=M$(Y+1-Z,LEN(M$)):GOTO 2010
3000 IF LEN(NS)=40 THEN PRINT NS:RETURN
3010 POKE 85,INT(20-LEN(NS)/2):PRINT NS:RETURN
3020 M$="" :FOR S=1 TO LEN(T$):K=ASC(T$(S,S))
4000 IF K>96 AND K<123 THEN K=K-32
4010 M$(LEN(M$)+1)=CHR$(K):NEXT S:TS=M$:RETURN
4020 PRINT CHR$(125):ALT=V*1000
5000 POSITION 12,10:PRINT "ELEVATION: ";ALT
5010 POSITION 8,19:PRINT "EMPTY"
5020 POSITION 28,19:PRINT "FULL"
5030 POSITION 9,20:PRINT FL$
5040 POSITION 9,21:PRINT FL$(1,ME(C)+1);
5050 POSITION 30,21:PRINT BK$
5060 POSITION 9,22:PRINT FL$
5070 FOR D=0 TO 150 STEP SGN(DR):NEXT D
5080 FOR Z=1 TO 5:ME(C)=ME(C)-1
5090 FOR D=0 TO 25 STEP SGN(DR):NEXT D
5100 POSITION 10+ME(C),21:PRINT SP$
5110 R=250-INT(RND(1)*10):IF DR>0 THEN R=R-50
5120 FOR S=R TO R-49 STEP -2:ALT=ALT+DR
5130 FOR L=0 TO 1:SOUND 0,S,8,L*2:SOUND 1,S-10,10,L*4
5140 NEXT L:POSITION 23,10:PRINT ALT:SP$:
5150 FOR D=1 TO 2+RND(1)*6:NEXT D:NEXT S
5160 SOUND 0,0,0,0:SOUND 1,0,0,0:NEXT Z
5170 FOR D=1 TO 200:NEXT D:RETURN
6000 POSITION 7,22:PRINT "PRESS ANY KEY TO CONTINUE.":
6010 OPEN #1,4,0,"K":GET #1,K:CLOSE #1:RETURN
7000 DATA FREDLU,DERFUL,RULFED,MOON,STARS,NIGHT
7010 DATA D,M,L,BY2,B2Y,2BY,MINUS10,AND10,PLUS10
7020 DATA CENTS,SCENTS,SENSE
8000 DATA SPHGZ,HBC,KECPP,SYHKW,CIBIH,JCSMUC
    
```

Commodore 64 & 128 (C 64 mode)/ Uphill Drive

```

10 POKE 53281,14:PRINT CHR$(142);CHR$(8);CHR$(5)
20 SF=1:SB$="LAST NAME"
30 IF SF=1 THEN MYS="MY":YOUR$="YOUR":GOTO 50
40 MYS="THE":YOUR$="THE"
50 DIM A$(18),B$(18),ME(3)
60 OS=CHR$(146):RS=CHR$(18)
70 SP$=CHR$(32):SB$=SP$:SB$
80 FL$=SP$:FOR X=2 TO 22:FL$=FL$+SP$:NEXT X
90 FOR X=1 TO 18:READ TS:GOSUB 4000:A$(X)=TS:NEXT X
100 IF SF=1 THEN CK$="231323"
110 FOR X=1 TO 6-12*(SF=2):READ TS:GOSUB 4000
120 IF SF=2 THEN B$(X)=TS:GOTO 160
130 M$="" :V=ASC(LEFT$(T$,1))-64
140 FOR Z=2 TO LEN(T$):N=ASC(MID$(T$,Z,1))-V
150 M$=M$+CHR$(N-26*(N<65)):NEXT Z:B$(X)=M$
160 NEXT X:B=54272:FOR X=B TO B+24:POKE X,0:NEXT X
170 POKE B+24,15:POKE B+5,9:POKE B+6,0:POKE B+2,50
180 POKE B+3,2:FOR E=0 TO 5:GA=20+10*(E>2)+5*(E>4)
190 FOR X=1 TO 3:ME(X)=GA:NEXT X
200 V=E:GOSUB 1000
210 M$="YOU HAVE A CHOICE OF THREE CARS."
220 M$=M$+" THEIR LICENSE PLATES ARE ..."
230 GOSUB 2010:PRINT:FOR X=E*3+1 TO (E+1)*3
240 M$=A$(X):GOSUB 2010:NEXT X:PRINT
250 TS="" :INPUT "WHICH CAR DO YOU WANT";TS
260 IF TS="" THEN 200
270 C=0:FOR X=E*3+1 TO (E+1)*3
280 IF TS=A$(X) THEN C=X-E*3:X=18
    
```

PUZZLE

```

5000 CLS:ALT=V*1000
5010 X=LM+4:Y=10:GOSUB 6500:PRINT "ELEVATION:";ALT
5020 X=LM:Y=19:GOSUB 6500:PRINT "EMPTY"
5030 X=LM+20:GOSUB 6500:PRINT "FULL"
5040 X=LM+1:Y=20:GOSUB 6500:PRINT FL$
5050 Y=21:GOSUB 6500:PRINT BK$;LEFT$(FL$,ME(C))
5060 X=LM+22:GOSUB 6500:PRINT BK$
5070 X=LM+1:Y=22:GOSUB 6500:PRINT FL$
5080 FOR D=0 TO DL*3 STEP SGN(DR):NEXT D
5090 FOR Z=1 TO 5:ME(C)=ME(C)-1
5100 FOR D=0 TO DL/2 STEP SGN(DR):NEXT D
5110 X=LM+2+ME(C):Y=21:GOSUB 6500:PRINT SP$;
5120 R=110+RND*50:IF DIR>0 THEN R=R+100
5130 FOR S=R TO R+49:ALT=ALT+DR
5140 SOUND S,RND*3+1:FOR D=1 TO 20:NEXT D
5150 X=LM+14:Y=10:GOSUB 6500:PRINT ALT;SP$;
5160 NEXT S:SOUND 37,0
5170 NEXT Z:FOR D=1 TO DL*4:NEXT D:RETURN
6000 X=1:Y=22:GOSUB 6500
6010 M$="PRESS ANY KEY TO CONTINUE.":GOSUB 2010
6020 IF INKEY$="" THEN 6020 ELSE RETURN
6500 LOCATE Y,X:RETURN
7000 DATA FREDLU,DERFUL,RULFED,MOON,STARS,NIGHT
7010 DATA D,M,L,BY2,B2Y,2BY,MINUS10,AND10,PLUS10
7020 DATA CENTS,SCENTS,SENSE
8000 DATA SPHGZ,HBC,KECPP,SYHKW,CIBIH,JCSMUC
    
```

MODIFICATIONS FOR OTHER COMPUTERS

Adam/Uphill Drive

Use the Apple version, with the following alterations: Delete lines 6030, 9010, and 9020. Change lines 60, 170, 5100-5120, 6010, 6020, and 9000 to read as follows:

```

60 ce = 10:dl = 250:lm = 3:sw = 31
170 FOR x = b TO b+5:READ a:POKE x,a:NEXT x:POKE b+6,1
59:CALL 28000
5100 r = INT(RND(1)*30)+100
5110 FOR s = r TO r-19 STEP -1
5120 POKE b+6,134:CALL 28000:POKE b+6,s:CALL 28000
6010 GOSUB 2010:POKE 16953,0:GET k$
6020 POKE 16953,95:RETURN
9000 DATA 58,102,109,211,255,201
    
```

Finally, add lines 10, 5130, 5150, and 5160:

```

10 LOMEM: 29000:b = 28000
5130 POKE b+6,144:CALL 28000
5150 FOR d = 1 TO 50+(dr > 0)*30:NEXT d
5160 POKE b+6,159:CALL 28000
    
```

IBM PC & compatibles (40-column version)/Uphill Drive

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

Use the IBM PC 80-column version, except change line 60 to read as follows:

```

60 CE=4:DL=150:LM=8:SW=40:BK$=CHR$(219):WIDTH SW:LOCAT
E ,,0
    
```

Macintosh w/Microsoft BASIC 2.0/Uphill Drive

Use the IBM PC 80-column version, except change lines 10, 60, 5110, 5120, 5140, and 5160 to read as follows:

```

10 CALL TEXTFONT(4):CALL TEXTSIZE(9):CALL TEXTFACE(1)
60 CE=4:DL=250:LM=25:SW=74:BK$=CHR$(165)
5110 X=27+ME(C):Y=21:GOSUB 6500:PRINT SP$:X=47:GOSUB 6
500:PRINT BK$
5120 R=50+RND*50:IF DR<0 THEN R=R+60
5140 SOUND S,1:FOR D=1 TO 10+DR*2:NEXT D
5160 NEXT S
    
```

Tandy Color Computer/Uphill Drive

Use the IBM PC 80-column version, except change lines 10, 60, 80, 5120, 5140, 5160, and 6500 to read as follows:

```

10 CLEAR 2000
60 CE=4:DL=50:LM=5:SW=32:BK$=CHR$(128)
80 FL$=BK$:FOR X=2 TO 22:FL$=FL$+BK$:NEXT X
5120 R=RND(50)
5140 SOUND S,1.5
5160 NEXT S
6500 PRINT@(Y-8)*32+X-1,"";:RETURN
    
```

Tandy Models III & 4 (Model III mode)/Uphill Drive

Use the IBM PC 80-column version, with the following alterations: Delete line 5140. Also, change lines 10, 60, 550, 5120, 5160, and 6500 to read as follows:

```

10 CLEAR 2000:PRINT CHR$(15)
60 CE=4:DL=30:LM=20:SW=64:BK$=CHR$(191)
550 PRINT CHR$(14):END
5120 R=10
5160 NEXT S
6500 PRINT@(Y-8)*SW+X-1,"";:RETURN
    
```

PROGRAMMING P.S.

Corrections to previous months' programs

Christmas Tree Construction Set (December 1985, page 66)

IBM PC & compatibles w/joystick & disk drive:

This version was labeled in error. It will not run correctly on the IBM PC. However, it will run correctly on the IBM PCjr w/Cartridge BASIC, and the Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. Tandy 1000 owners who have version 00.05.00 of GW-BASIC may return their disks to any Radio Shack store or computer center for a free upgrade.

In addition, sharp-eyed readers may have noticed that lines 4040-4110 were inadvertently duplicated in this listing. It's unnecessary to type in these lines twice.

Home Information Manager (August 1985, November 1985, January 1986)

As the introduction to the program states, when designing a card format you may specify a maximum of nine lines; if you try to create a format with more than nine lines, an error message is displayed and the program ceases to function. The following change will allow you to go back and try again if you make that mistake.

Apple II series w/48K RAM, disk drive (printer optional), & DOS 3.3 (November 1985, page 70):

Change line 310 to read as follows:

```

310 GOSUB 2100:GOTO 540
    
```

Commodore 64 w/disk drive or Datassette

(printer optional) (August 1985, page 61): Change line 330 to read as follows:

```

330 GOSUB 2100:GOTO 560
    
```

IBM PC/PCjr w/128K RAM & disk drive (printer optional) (January 1986, page 70):

Change line 290 to read as follows:

```

290 GOSUB 2200:GOTO 520
    
```

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